

PUBLIC IMPROVEMENT PROJECT

INVITATION TO BID

Solicitation No: 20-0030

International School of Beaverton Roof & HVAC General Contractor

ITB Closing (Due Date & Time):

March 23, 2021 at 2:00 PM Pacific Time

Issued by:

Beaverton School District 48J 16550 SW Merlo Road Beaverton, Oregon 97003 February 19, 2021 SOLICITATION SUMMARY Solicitation No: ITB 20-0030

PUBLIC IMPROVEMENT INVITATION TO BID

Solicitation No: ITB 20-0030

The purpose of this Invitation to Bid is to obtain competitive bids for International School of Beaverton Roof & HVAC general contractor. This is a public works project subject to ORS 279C.800 to 279C.870.

A MANDATORY pre-Bid conference will be held on March 1, 2021 at 9:00 AM at the International School of Beaverton 1770 SW Blanton Street, Beaverton, Oregon 97078.

Bidders must submit their Bid pursuant to the provisions of this Solicitation to contracts@beaverton.k12.or.us, **PRIOR** to the Closing:

SOLICITATION CLOSING: March 23, 2021 at 2:00 PM Pacific Time LATE BIDS WILL NOT BE ACCEPTED

Timely submitted Bids will be opened and read aloud immediately after Closing at the below conference line:

+1(503)356.4400

Participant code: 41605148

Bidders must submit a **First-Tier Subcontractor Disclosure Form** *EITHER* with the emailed Bid submission *OR* by email to contracts@beaverton.k12.or.us no later than the Disclosure Deadline:

DISCLOSURE DEADLINE: March 23, 2021 at 4:00 PM Pacific Time

Prospective Bidders must register with ORPIN – http://orpin.oregon.gov/ to obtain the Solicitation documents and related documents.

Bidders must familiarize themselves with the entire Solicitation.

All questions and comments about this solicitation must be directed <u>ONLY IN WRITING</u> to: contracts@beaverton.k12.or.us

THE DISTRICT MAY REJECT ANY BID NOT IN COMPLIANCE WITH ALL PRESCRIBED REQUIREMENTS.

SECTION I - INTRODUCTION Solicitation No: ITB 20-0030

1. INTRODUCTION: This Project follows the Design-Bid-Build contracting and project delivery method. Accordingly, the design team has completed the construction documents (see attachments). The Solicitation describes the project requirements in three places: the below General Scope of Work, SECTION III – Statement of Work, and on the attached construction documents (usually Drawings and Specifications). The Solicitation also contains rules, required forms, a sample Contract, and other requirements.

2. SOLICITATION DOCUMENTS:

The Solicitation Documents are organized in the following manner:

SOLICITATION SUMMARY

SECTION I - INTRODUCTION

SECTION II – STATEMENT OF WORK

SECTION III – SOLICITATION RULES

SECTION IV—PUBLIC WORKS REQUIREMENTS

SECTION V – ATTACHMENTS

3. IMPORTANT RESPONSIBILITIES:

Bidders are responsible for knowing and understanding all of this Solicitation's requirements, terms, conditions, and rules. Bidders may submit questions or clarification requests to contracts@beaverton.k12.or.us at any time. The District will respond to all such questions/clarification requests submitted prior to the applicable deadline.

Bidders shall promptly notify the District of any defects, ambiguities, omissions, or errors are brought to the District's attention by protest pursuant to REQUESTS FOR CLARIFICATION, CHANGE, SUBSTITUTION REQUEST, OR SOLICITATION PROTEST (Section III, Paragraph 5), protests or appeals based on such defects, ambiguities, omissions or errors received after issuance of the Notice of Intent to Award may not be favorably considered.

4. GENERAL SCOPE OF WORK:

Please refer to attached Drawings and Specifications. It is intended that the Contractor provides a complete project and coordinates work with the District, Contractors and Consultants hired by the District, and all applicable agencies having authority.

- a. Work to include supplying, storing and handling of all required materials.
- b. Work includes protection of neighboring finishes and replacement/repair of any damaged surfaces including but not limited to sheet metal, exterior wall finishes, roof mounted equipment, sidewalks and surrounding landscape areas.
- c. Contractor shall provide all labor, materials, equipment, transportation, and other facilities and services as necessary and/or required to execute all of the Work.
- d. All work areas shall be cleaned of any construction debris on a daily basis. General Contractor is responsible for material removal and disposal. Upon completion of the project, the General Contractor is to provide final cleaning of all work installed, replaced or repaired including jobsite office.
- e. Carefully review specification of Division 7 and be prepared to submit a Moisture Mitigation Plan as part of your initial submittals shortly after contract execution.
- f. Carefully review all documents. Below is only a summary of the work:

 The recovering of a ballasted built-up roof with TPO roof on the main/original building, the remove and replacement of a ballasted built-up roofing with TPO the modular building, the replacement of one RTU on the gymnasium roof and nine heat pumps on the modular building, with an alternate to replace 4 additional RTUs on the main building.

5. CONTRACT:

SECTION I - INTRODUCTION Solicitation No: ITB 20-0030

The successful Bidder, selected by the District, will receive an AIA A101 Owner Contractor Agreement with AIA A201 General Conditions. A sample is enclosed herein (see Attachments). The provisions of the sample AIA A101 Owner Contractor Agreement and AIA A201 General Conditions are in addition to the requirements set forth in this Solicitation.

- a. Bidders are advised to thoroughly review and familiarize themselves with the standard contract. Certain contract terms reflect state statute and may not be altered.
- b. The Contractor will be expected to promptly sign a contract including all standard terms and conditions contained in the sample contract.
- c. Personnel substitution if the contractor must substitute personnel included in the original bid they must obtain written District approval of substituted personnel, prior to substitution.

6. AMENDMENTS:

The District may amend a Contract without additional competition pursuant to OAR 137-049-0910.

7. DISTRICT REPRESENTATIVE:

The District Representative for the project is Doaa El Haggen, Construction Project Manager.

8. SOLICITATION SCHEDULE:

The milestones for the selection process are set forth below. The dates are specific and will be followed to the extent reasonably possible. The purpose of this schedule is for Bidder information only. Required dates for Contract period milestones, submittals and any other activities are provided elsewhere in this Solicitation. The District reserves the right to deviate from this schedule.

Solicitation Milestone	Date
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Solicitation Posted Wednesday February 19, 2021

Pre-Bid conference Wednesday March 1, 2021 (Mandatory) 9:00 AM

Deadline for Questions March 17, 2021 by 2:00 PM
Final Addendum (if Required) March 19, 2020 before 2:00 PM
Bids Due March 23, 2021 by 2:00 PM
Notice of Intent to Award on or about Friday March 24, 2021

Board Approval of Contract April 5, 2021 or April 26, 2021

9. CONTACT DURING SOLICITATION:

Questions must be submitted in writing via email to contracts@beaverton.k12.or.us as indicated in the Solicitation Summary. No other contact regarding this Solicitation during the solicitation process is permitted. Unauthorized contact regarding this Solicitation may subject the offender's Bid to rejection.

10. Additional information regarding this solicitation and certain forms for download are available on the ORPIN website: www.orpin.oregon.gov

11. COMMERCIAL ACTIVITIES TAX:

The Beaverton School District is a governmental entity and thus specifically excluded from being a subject taxpayer per the rules. Please do not include the CAT on any invoice, change order, or proposal for work with the Beaverton School District. For solicitations or bids which have the CAT included we will ignore the line of the submission, for submitted invoices we will deduct, and for any contracts we will be processing deductive contract modifications.

SECTION II – STATEMENT OF WORK Solicitation No: ITB 20-00230

1. PURPOSE AND INTRODUCTION:

This solicitation is for retaining general contractor (GC) or roofing contractor to furnish, install, manage and coordinate all work as shown in the attached documents on behalf of the Beaverton School District. The goal is to replace or recover roofs at International School of Beaverton (ISB) and replace HVAC units. Bidders shall carefully review all the documents and select projects to which they would like to submit bids. Contracts will be awarded on the district's assessment of best value.

2. OPERATIONAL ATTRIBUTES:

The District requires the project to be completed over the duration of the summer vacation beginning 6/22/2021. Depending on Comprehensive Distance Learning and the return to school plans, start date maybe adjusted. See project milestones below for further information. Coordination with summer maintenance activities will be required.

3. PROJECT REQUIREMENTS:

Reference the Exhibits to this Solicitation (e.g., Drawings, Specifications, etc.) for Project Requirements. Additionally, Bids shall include adherence to the following requirements pertaining to Project implementation:

- The Contractor's adherence to the District's facility goals and work processes, which require a focus on the following for this Project:
 - Reasonable partnering/feedback/advice on industry practices which may apply to this Project.
 - A collaborative work effort between the A/E, the District, the Constructor, and regulatory oversight agencies leading to an effective implementation.
 - Use of Value Engineering to ensure that optimized form and function are implemented for the budget available. VE efforts will conform to ASTM E1699-14, and not merely be a tool for cutting scope or quality.
 - Reasonable use of sustainable materials and construction processes are to be considered where reasonable without undue risk stemming from un-vetted products.
 - Use of the District's internet-based e-Builder Project Management System for coordination of efforts, approvals and expedited communication is required (see more under Additional Requirements).
 - Conformance with the District's Technical Standards; deviations may be proposed by the A/E with appropriate rationale for District consideration. Standards may not deviate unless approved by BSD Representative.

Dates

https://www.beaverton.k12.or.us/depts/facilities/development/Pages/default.aspx

4. PROJECT SCHEDULE

Project Milestones

The project milestones are set forth below. The dates are approximate but will be followed to the extent reasonably possible. The purpose of this schedule is for information only.

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Construction Period Begins	Tuesday June 22, 2021**
Substantial Completion	Monday August 16, 2021
Final Completion for all sites	Wednesday September 15, 2021

^{**} Construction start date is subject to change due to return to school plans

SECTION II – STATEMENT OF WORK Solicitation No: ITB 20-0030

5. BONDS AND INSURANCE:

The Contractor awarded this solicitation must, within Five (5) calendar days after receipt of the Contract for signature:

- a. Provide the required Performance Bond and Payment Bond;
- b. Provide proof that the Statutory Public Works Bond has been filed with the CCB;
- c. Provide Insurance Certificate(s) (summary-level insurance requirements are listed below; Exhibit E of the Sample Contract includes all requirements) and any guarantees and/or other required item(s).
- d. Sign the Contract issued by the District Purchasing Department.
- e. If these items are not received as specified then the Contract may not be executed, a Bid bond claim may be filed, and the Contract may be awarded to the next lowest Bidder.

Summary-Level Insurance Requirements* (See Exhibit E to the Attached Sample Contract for all Requirements)

Insurance Coverage Type	Occurrence/Loss	Aggregate	District as Additional Insured	Subrogation Waived	Required for Sub- Contractors ***
Employer's Liability		\$500,000		Х	
Worker's Comp	Statutory Limits	Statutory Limits		Х	Х
Commercial General Liability	\$1,000,000	\$2,000,000	Х		X
Business Automobile Liability		\$1,000,000	Х		Х
Professional Liability**	\$1,000,000	\$2,000,000			X
Pollution Liability Insurance	\$1,000,000	\$1,000,000			
Asbestos/hazardous materials Abatement**					x
True Umbrella Policy		\$5,000,000			
Builder's Risk	Contract Amt.	Contract Amt.			

^{*}The Summary-Level Insurance Requirements are only intended to draw Bidders' attention to the Insurance Requirements for this Solicitation. Bidders must carefully review Exhibit E Insurance Requirements to the Sample Contract for exact and full Insurance Requirements. I If there are any discrepancies between the Summary-Level Insurance Requirements and those listed under Exhibit E Insurance Requirements to the Sample Contract, Exhibit E Insurance Requirements to the Sample Contract shall govern.

Insurance Waiver Requests: Any Insurance Waiver Requests must be submitted in writing to contracts@beaverton.k12.or.us, prior to the Deadline for Questions/Change Requests/Solicitation Protests.

6. NOTICE TO PROCEED:

- a. The Contractor must not begin work until a Notice to Proceed is issued by the District Representative.
- b. The District reserves the right to cancel the Contract at no penalty if it is in the best interest of the public to do so, if:
 - i. A protest was received that overturns the award of this Contract, or
 - ii. Funding for the project is not available.

7. ADDITIONAL REQUIREMENTS:

a. The District has implemented the e-Builder Project Management software platform for coordination of efforts, approvals, and expedited communication. All prime project team members will be required to utilize the program. Each Contractor will be provided a seat (license) and a minimum of four (4) hours training.

^{**}Only required if such services are included in the Contract/Sub-Contracts resulting from this Solicitation.

^{***}The District may require Contractor to provide certificates of Sub-Contractor's insurance at any time.

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- b. All persons involved in the project who will have a physical presence on site at any time during the course of the project will need to clear a background check. The basic criteria of clearance and refusal offenses will be provided by the District Project Representative. Contractors and sub-contractors must provide a report of who has cleared the background check by an approved agency.
- c. LIQUIDATED DAMAGES: If the Work is not Substantially Complete by the applicable required Substantial Completion date, the Contractor shall pay to the Owner liquidated damages in the amount of \$500.00 for each and every day of delay in achieving Substantial Completion.

10. BUSINESS EQUITY:

The Bidder understands that the District maintains a goal of engaging minority, women, emerging, service-disabled veteran and socially or economically disadvantaged businesses (DMWESBSDVBE) as service providers in delivering services necessary to implement our bond program. The District aspires to a goal of ten (10) percent DMWESBSDVBE content, by contract value, in completing our capital bond work, and the Contractor shall expend reasonable efforts to reach this content in the total value of their contracts with the District.

11. NO WAIVER OF CONDITIONS:

Failure of the Owner to insist on strict performance will not constitute a waiver of any of the provisions of this Contract or waiver of any other default of the Contractor.

12. SAFE, INCLUSIVE, AND RESPECTFUL WORKSITE.

a. Each of the Awarded Contractor's employees, subcontractors' employees and principals / owners involved in the Work shall be required to act in a safe, respectful, inclusive, and professional manner while performing the Work. This includes but is not limited to the Contractor taking whatever means and manner of action Contractor deems necessary to prevent, control, and enforce, any acts in violation of the forgoing standards ("Incidents"). Incidents include, but are not limited to: 1)excessive, offensive, or disruptive noise, including music; 2) the use of offensive language; 3) smoking or drinking of alcoholic beverages, or use of illegal substances on the Site; 4) physical violence; 5) riding in the passenger elevators; 6) thievery; 7) the transportation of articles or materials deemed hazardous; and 8) symbols, language, and other acts of hate, racism, sexism, discrimination, harassment, and bullying.

1. **DEFINITIONS**

The terms "District" or "Owner" throughout this document means the Beaverton School District. The term "Bidder" means the person or firm that submits a Bid in response to this Solicitation. The terms "Bid" or "Offer" means a written response to provide services in response to this Solicitation. The terms "Contractor" or "Supplier" means the Bidder awarded a contract as a result of this Solicitation. Terms not otherwise defined in the Solicitation Documents may assume definitions found in the laws, regulations, and/or policies governing this Solicitation.

2. SELECTION PROCEDURE

This Solicitation is a Formal Invitation to Bid for a Public Improvement Project, issued Pursuant to ORS 279A, ORS 279C and the Oregon Attorney General Model Rules Divisions 46 and 49 and District Policies.

3. ELIGIBILITY TO BID

- a. **Construction Contracts.** The District will not consider a Person's Offer to do Work as a Contractor, as defined in ORS 701.005(2), unless the Person has a current, valid certificate of registration issued by the Construction Contractor's Board at the time the Offer is made.
- b. **Landscape Contracts.** The District will not consider a Person's Offer to do Work as a landscape Contractor as defined in ORS 671.520(2), unless the Person has a current, valid landscape Contractor's license issued pursuant to ORS 671.560 by the State Landscape Contractors Board at the time the Offer is made.
- c. **Non-complying Entities.** The District will deem a Bid received from a Person that fails to comply with this rule nonresponsive and will reject the Bid as stated in ORS 279C.365(1)(k), unless contrary to federal law or subject to different timing requirements set by federal funding agencies.
- d. **Asbestos Abatement Work.** The Contractor or a subcontractor under the Contract must be licensed under ORS 468A.720 for work regarding asbestos abatement projects.

4. PRE-BID CONFERENCE

- a. **Purpose.** The District may hold pre-Bid conferences with prospective Bidders prior to Closing, to explain the procurement requirements, obtain information, and/or to conduct site inspections.
- b. **Required Attendance.** The District may require attendance at the pre-Bid conference as a condition for submission of a Bid. A mandatory attendance requirement is considered to have been met if, at any time during the mandatory meeting, a representative of an offering firm is present.
- c. **Notice.** The Summary page of this solicitation indicates the pre-Bid conference scheduled date and time, and whether the pre-Bid conference is mandatory or non-mandatory.
- d. **Statements Not Binding.** Statements made by the District's representatives at the pre-Bid conference do not change the Solicitation unless the District confirms such statements by Written Addendum.

4. ADDENDA

- a. **Issuance; Receipt.** The District may change this Solicitation only by Written Addenda. A Bidder must provide written acknowledgement of receipt of all issued Addenda with their Bid on the Bidder Certification.
- b. Notice and Distribution. The District will publish notice of all Addenda on the ORPIN (Oregon Procurement Information Network) Website. Addenda may be downloaded from the ORPIN website. It is the Bidders' responsibility to inquire about Addenda. Bidders should frequently check the ORPIN website until Closing about any Addenda issued, i.e., at least once weekly until the week of Closing and at least once daily the week of the Closing.
- c. **Timelines; Extensions.** The District will issue Addenda within a reasonable time to allow prospective Bidders to consider the Addenda in preparing their Bid. The District may extend the Closing if the District

determines prospective Bidders need additional time to review and respond to Addenda. Except to the extent required by public interest, the District will not issue Addenda less than 72 hours before the Closing unless the Addendum also extends the Closing.

d. **Request for Change or Protest.** Unless a different deadline is set forth in the Addendum, a Bidder may submit a Written request for change or protest to the Addendum, as provided in OAR 137-049-0260, by the close of the District's next business day after issuance of the Addendum, or up to the last day allowed to submit a request for change or protest under OAR 137-049-0260, whichever date is later. The District will consider only a Bidder's request for change or protest to the Addendum; the District will not consider a request for change or protest to matters not added or modified by the Addendum, unless the Bidder submits the request for change or protest before the deadline for the District's receipt of request for change or protests as set forth in OAR 137-049-0260(2) and (3).

5. REQUESTS FOR CLARIFICATION, CHANGE, SUBSTITUTION REQUEST, OR SOLICITATION PROTEST

a. Clarification. No later than the deadline for submitting a written request for clarification, change, substitution, or solicitation protest a Bidder may request that the District clarify any provision of the Solicitation. Such requests must be received prior to the stated deadline in email at contracts@beaverton.k12.or.us. The District's clarification to a Bidder, whether orally or in Writing, does not change the Solicitation and is not binding on the District unless the District amends the Solicitation by denoting "CHANGES" on a written Addendum.

b. Request for Change.

 Delivery. No later than the deadline for submitting a written request for clarification, change, substitution, or solicitation protest, a Bidder may request in writing a change to the Solicitation Documents. A Bidder must deliver the Written request for change to the District prior to the stated deadline to contracts@beaverton.k12.or.us. (Bidder is responsible for ensuring receipt by the District.)

ii. Content of Request for Written Change:

- A. A Bidder's Written request for change must include a statement of the requested change(s) to the Contract terms and conditions, including any Specifications, together with the reason for the requested change.
- B. A Bidder must include the following identifying information it its request for change as follows:
 - "Request for Change"; and
 - II. Solicitation number.

c. Substitution Requests.

- i. During Solicitation. No later than the deadline for submitting a written request for clarification, change, substitution, or solicitation protest, a Bidder may request in writing a substitution to any specified products (e.g., requests for approved equal decisions, etc.). Such requests must be submitted prior to the stated deadline to contracts@beaverton.k12.or.us. (Bidder is responsible for ensuring receipt by the District.) Requests must be submitted using the Substitution Request Form if one is attached to this Solicitation.
- ii. **During Contract.** Any Substitution Requests submitted after a Contract has been executed shall be governed by the terms and conditions of said Contract.

d. Protest.

i. **Delivery.** No later than the deadline for submitting a written request for clarification, change, substitution, or solicitation protest, a Bidder may protest Specifications or Contract terms and conditions. A Bidder must deliver a written protest on those matters to contracts@beaverton.k12.or.us by the stated deadline.

ii. Content of Protest.

A. A Bidder's Written protest must include:

- (i) A detailed statement of the legal and factual grounds for the protest;
- (ii) A description of the resulting prejudice to the Bidder; and
- (iii) A statement of the desired changes to the Contract terms and conditions, including any Specifications.
- B. A Bidder must mark its protest as follows:
 - (i) "Contract Provision Protest"; and
 - (ii) Solicitation number.
- c. **District Response.** The District is not required to consider a Bidder's request for change or protest after the deadline established for submitting such request or protest. The District will provide notice to the applicable Person if it entirely rejects a protest. If the District agrees with the Person's request or protest, in whole or in part, the District will either issue an Addendum reflecting its determination under OAR 137-49-0260 or cancel the Solicitation under OAR 137-49-0270.
- e. **Extension of Closing.** If the District receives a written request for change or protest from a Bidder in accordance with this Rule, the District may extend Closing if the District determines an extension is necessary to consider the request or protest and issue an Addendum, if any, to the Solicitation.

6. CANCELLATION OF SOLICITATION

Cancellation in the Public Interest. The District may cancel a Solicitation for good cause if the District finds that cancellation is in the public interest. The District's reasons for cancellation will be made part of the Solicitation file.

7. BID SUBMISSIONS

- a. Offer and Acceptance. The submitted Bid is the Bidder's offer to enter into a Contract. The Offer is always a "Firm Offer," i.e., the Bid must be held open by the Bidder for the District's acceptance for sixty (60) days. The District may elect to accept the Bid at any time during the specified period, and the District's Award of the Contract to a Bidder constitutes acceptance of the Offer and binds the Bidder to the Contract.
- b. Responsive Bid. The District may award a Contract only to a Responsible Bidder with a Responsive Bid.
- c. **Contingent Bids.** A Bidder must not make a Bid contingent upon the District's acceptance of any terms or conditions (including Specifications) other than those contained in this Solicitation.
- d. **Bidders Acknowledgement.** By signing and submitting a Bid, the Bidder acknowledges they have read and understand the terms and conditions contained in the Solicitation and that they accept and agree to be bound by the terms and conditions of the Solicitation.
- e. **Instructions.** A Bidder must submit and sign their Bid. A Bidder must initial any corrections or erasures to their Bid.
- f. Forms. Bidders must submit their Bid on the form(s) provided.
- g. Documents. Bidders must provide the District with all documents and descriptive literature requested.
- h. Facsimile Submissions. The District will not accept facsimile Bids.
- i. Product Samples and Descriptive Literature. The District may require product samples or descriptive literature if it is necessary or desirable to evaluate the quality, features or characteristics of the offered items. The District will dispose of product samples or return or make available for return product samples to the Bidder.
- j. Identification of Bids.
 - i. To ensure proper identification and handling, the Bids must be submitted to <u>contracts@beaverton.k12.or.us</u> and the email subject line/body text/file names should include the Bidder's name and the Solicitation number, and/or other clearly identifying information.
 - ii. The District is not responsible for Bids submitted in any manner, format or to any delivery point other than as required in the Solicitation.

- k. **Receipt of Bids.** Bidders are responsible for ensuring that the District receives their Bid at the required delivery point prior to the closing due date and time. Bids must only be emailed to contracts@beaverton.k12.or.us and received prior to the closing due date and time.
- I. Failure to submit Bids in accordance with the provisions of this Section will be grounds to declare the Bid as nonresponsive.
- m. **Certification.** Bidders must (on the Bidder Certification enclosed):
 - i. Identify whether the Bidder is or is not a "resident Bidder," as defined in ORS 279A.120(1);
 - ii. Indicate that the Bidder will comply with Prevailing Wage Laws ORS 279C.800 through ORS 279C.870 or 40 U.S.C. 3141 et seq;
 - iii. Provide certification of nondiscrimination in obtaining any required subcontractors in accordance with ORS 279A.110(4); and
 - iv. Provide written acknowledgment of receipt of all Addenda.

8. BID SECURITY

- a. **Security Amount.** The District requires Bid security of 5% of the Bidder's Bid, consisting of the base Bid together with all additive alternates. The Bidder must forfeit Bid security after Award if the Bidder fails to execute the Contract and promptly return it with any required Performance Bond and Payment Bond and with any required proof of insurance (see enclosed sample contract for amount requirements).
- b. Form of Bid Security. The District may accept only the following forms of Bid security:
 - i. A surety bond from a surety company authorized to do business in the State of Oregon;
 - ii. An irrevocable letter of credit issued by an insured institution as defined in ORS 706.008; or
 - iii. A cashier's check or Bidders certified check.
- c. **Return of Security.** The District will return or release the Bid security of all unsuccessful Bidders after a Contract has been fully executed and all required bonds and insurance have been provided, or after all Bids have been rejected.

9. PRE-CLOSING MODIFICATION OR WITHDRAWAL

- a. **Modifications.** A Bidder may modify their Bid in writing prior to the Closing. A Bidder must prepare and submit any modification to their Bid to the District in accordance with OAR 137-49-0280. Any modification must include the Bidder's statement that the modification amends and supersedes the prior Bid. The Bidder must email its modification to contracts@beaverton.k12.or.us and mark the email subject line as follows:
 - i. "Bid Modification"; and
 - ii. Solicitation Number.

b. Withdrawals.

- i. A Bidder may withdraw its Bid by Written notice submitted by email to <u>contracts@beaverton.k12.or.us</u> on the Bidder's letterhead, signed by an authorized representative of the Bidder. The notice must be received by the District prior to the Closing. The Bidder or authorized representative of the Bidder may also withdraw its Bid in Person prior to the Closing, upon presentation of appropriate identification and satisfactory evidence of authority;
- ii. The District may release an unopened, withdrawn Bid to the Bidder or its authorized representative, after voiding any date and time stamp mark, if applicable;
- iii. The Bidder must mark the Written request to withdraw a Bid as follows:
 - A. Bid Withdrawal; and
 - B. Solicitation Number.
- c. **Documentation.** The District will include all documents relating to the modification or withdrawal of Bids in the Solicitation file.

10. RECEIPT, OPENING, AND RECORDING OF BIDS; CONFIDENTIALITY OF BIDS

- a. **Receipt.** The Bidder is responsible for ensuring that the District receives its Bid at the required delivery point prior to the Closing, regardless of the method used to submit or transmit the Bid.
- b. Opening and Recording. The District will publicly open Bids including any modifications made to the Bid pursuant to OAR 137-49-0320. In the case of Invitations to Bid, to the extent practicable, the District will read aloud the name of each Bidder, the Bid price(s), and such other information, as the District considers appropriate. The District will open and publicly read bids over the following conference line: +1(503)356.4400

Participant code: 41605148

c. Availability. After Opening, the District will make Bids available for public inspection. The District may withhold from disclosure those portions of a Bid that the Bidder designates as trade secrets or as confidential proprietary data in accordance with applicable law. See ORS 192.501(2); ORS 646.461 to 646.475. To the extent the District determines such designation is not in accordance with applicable law, the District will make those portions available for public inspection. The Bidder must separate information designated as confidential from other non-confidential information at the time of submitting its Bid. Prices, makes, model or catalog numbers of items offered, scheduled delivery dates, and terms of payment are not confidential, and will be publicly available regardless of a Bidder's designation to the contrary.

11. LATE BIDS, WITHDRAWALS AND MODIFICATIONS

Any Bid received after the Closing date and time is late. A Bidder's request for withdrawal or modification of a Bid received after Closing is late. The District will not consider late Bids, withdrawals or modifications except as permitted in OAR 137-049-0350 or OAR 137-049-0390.

12. MISTAKES

- a. **Generally.** To protect the integrity of the competitive Procurement process and to assure fair treatment of Bidders, the District will carefully consider whether to permit waiver, correction or withdrawal of Bids for certain mistakes.
- b. **District Treatment of Mistakes.** The District will not allow a Bidder to correct or withdraw an Offer for an error in judgment. If the District discovers certain mistakes in a Bid after Opening, but before Award of the Contract, the District may take the following action:
 - i. The District may waive, or permit a Bidder to correct, a minor informality. A minor informality is a matter of form rather than substance that is evident on the face of the Bid, or an insignificant mistake that can be waived or corrected without prejudice to other Bidders. Examples of minor informalities include a Bidder's failure to:
 - A. Return the correct number of signed Bids or the correct number of other documents required by the Solicitation;
 - B. Sign the Bid in the designated block, provided a Signature appears elsewhere in the Bid, evidencing an intent to be bound; and
 - C. Acknowledge receipt of an Addendum to the Solicitation, provided that it is clear on the face of the Bid that the Bidder received the Addendum and intended to be bound by its terms; or the Addendum involved did not affect price, quality or delivery.
 - ii. The District may correct a clerical error if the error is evident on the face of the Bid or other documents submitted with the Bid, and the Bidder confirms the District's correction in Writing. A clerical error is a Bidder's error in transcribing its Bid. Examples include typographical mistakes, errors in extending unit prices, transposition errors, arithmetical errors, instances in which the intended correct unit or amount is evident by simple arithmetic calculations (for example a missing unit price may be established by dividing the total price for the units by the quantity of units for that

item or a missing, or incorrect total price for an item may be established by multiplying the unit price by the quantity when those figures are available in the Bid). In the event of a discrepancy, unit prices will prevail over extended prices.

- iii. The District may permit a Bidder to withdraw an Offer based on one or more clerical errors in the Bid only if the Bidder shows with objective proof and by clear and convincing evidence:
 - A. The nature of the error;
 - B. That the error is not a minor informality under this subsection or an error in judgment;
 - C. That the error cannot be corrected or waived under subsection 12.b.ii above;
 - D. That the Bidder acted in good faith in submitting a Bid that contained the claimed error and in claiming that the alleged error in the Bid exists;
 - E. That the Bidder acted without gross negligence in submitting a Bid that contained a claimed error;
 - F. That the Bidder will suffer substantial detriment if the District does not grant the Bidder permission to withdraw the Offer;
 - G. That the District's or the public's status has not changed so significantly that relief from the forfeiture will work a substantial hardship on the District or the public it represents; and
 - H. That the Bidder promptly gave notice of the claimed error to the District.
- iv. The criteria in subsection 12.b.iii above will determine whether the District will permit a Bidder to withdraw its Bid after Closing. These criteria also will apply to the question of whether the District will permit a Bidder to withdraw its Bid without forfeiture of its Bid bond (or other Bid security), or without liability to the District based on the difference between the amount of the Bidder's Bid and the amount of the Contract actually awarded by the District, whether by Award to the next lowest Responsive and Responsible Bidder, or by resort to a new solicitation.
- c. **Rejection for Mistakes.** The District will reject any Bid in which a mistake is evident on the face of the Bid and the intended correct Bid is not evident or cannot be substantiated from documents submitted with the Bid.
- d. **Identification of Mistakes after Award.** The procedures and criteria set forth above are Bidder's only opportunity to correct mistakes or withdraw Bids because of a mistake. Following Award, a Bidder is bound by its Bid, and may withdraw its Bid or rescind a Contract entered into pursuant to OAR 137 Division 49 only to the extent permitted by applicable law.

13. FIRST-TIER SUBCONTRACTORS; DISCLOSURE AND SUBSTITUTION

- a. **Required Disclosure.** Within two working hours after the Bid Closing, Bidders must submit the First-Tier Subcontractor Disclosure Form identifying any first-tier subcontractors (those Entities that would be contracting directly with the prime contractor) that will be furnishing labor or labor and materials on the Contract, if Awarded, whose subcontract value would be equal to or greater than:
 - i. Five percent of the total Contract Price, but at least \$15,000; or
 - ii. \$350,000, regardless of the percentage of the total Contract Price.
- b. **Bid Closing, Disclosure Deadline and Bid Opening.** For each ITB to which this rule applies, the District will:
 - i. Set the Bid Closing on a Tuesday, Wednesday or Thursday, and at a time between 2 p.m. and 5 p.m.;
 - ii. Open Bids publicly immediately after the Bid Closing; and
 - iii. Consider for Contract Award only those Bids for which the required disclosure has been submitted by the announced deadline on the form prescribed by the District.
- c. **Submission.** A Bidder must submit the disclosure form required by this rule either in its Bid submission, or within two working hours after Bid Closing in the manner specified by this Solicitation.
- d. **Responsiveness.** Compliance with the disclosure and submittal requirements of ORS 279C.370 and OAR 137-049-0360 is a matter of Responsiveness. Bids that are submitted by Bid Closing, but for which the

- disclosure submittal has not been made by the specified deadline, are not Responsive and will not be considered for Contract Award.
- e. **District Role.** The District will obtain, and make available for public inspection, the disclosure forms required by ORS 279C.370 and OAR 137-049-0360. The District will also provide copies of disclosure forms to the Bureau of Labor and Industries as required by ORS 279C.835. The District is not required to determine the accuracy or completeness of the information provided on disclosure forms.
- f. **Substitution.** Substitution of affected first-tier subcontractors must be made only in accordance with ORS 279C.585. The District will accept Written submissions filed under that statute as public records. Aside from issues involving inadvertent clerical error under ORS 279C.585, the District does not have a statutory role or duty to review, approve or resolve disputes concerning such substitutions. See ORS 279C.590 regarding complaints to the Construction Contractors Board on improper substitution.

14. BID EVALUATION CRITERIA

- a. **General.** A Public Improvement Contract, if awarded, will be awarded to the Responsible Bidder submitting the lowest Responsive Bid.
- b. **Bid Evaluation Criteria.** Invitations to Bid may solicit lump-sum Bids, unit-price Bids, or a combination of the two.
 - i. Lump Sum. If the ITB requires a lump-sum Bid, without additive or deductive alternates, or if the District elects not to award additive or deductive alternates, Bids will be compared on the basis of lump-sum prices, or lump-sum base Bid prices, as applicable. If the ITB calls for a lump-sum base Bid, plus additive or deductive alternates, the total Bid price will be calculated by adding to or deducting from the base Bid those alternates selected by the District, for the purpose of comparing Bids.
 - ii. **Unit Price.** If the Bid includes unit pricing for estimated quantities, the total Bid price will be calculated by multiplying the estimated quantities by the unit prices submitted by the Bidder, and adjusting for any additive or deductive alternates selected by the District, for the purpose of comparing Bids. The District will specify within the Solicitation the estimated quantity of the Procurement to be used for determination of the low Bidder. In the event of mathematical discrepancies between unit price and any extended price calculations submitted by the Bidder, the unit price will govern. See OAR 137-049-0350(2)(b).
- c. The District may reject any Bid not in compliance with all prescribed Public Contracting procedures and requirements, and may reject for good cause all Bids upon the District's finding that it is in the public interest to do so.

15. BID EVALUATION AND AWARD; DETERMINATION OF RESPONSIBILITY

- a. **General.** If Awarded, the District will Award the Contract to the Responsible Bidder submitting the lowest, Responsive Bid provided that such Person is not listed by the Construction Contractors Board as disqualified to hold a Public Improvement Contract. See ORS 279C.375 (3)(a). The District may award by item, groups of items or the entire Bid provided such Award is consistent with the Solicitation and in the public interest.
- b. **Determination of Responsibility.** Bidders are required to demonstrate their ability to perform satisfactorily under a Contract. Before Awarding a Contract, the District must have information that indicates that the Bidder meets the standards of responsibility set forth in ORS 279.375(3)(b). To be a Responsible Bidder, the District will determine that the Bidder:
 - Has available the appropriate financial, material, equipment, facility and Personnel resources and expertise, or ability to obtain the resources and expertise, necessary to meet all contractual responsibilities;

- ii. Has completed previous contracts of a similar nature with a satisfactory record of performance. A satisfactory record of performance means that, to the extent the costs associated with and time available to perform a previous contract were within the Bidder's control, the Bidder stayed within the time and budget allotted for the procurement and otherwise performed the contract in a satisfactory manner. The District should carefully scrutinize a Bidder's record of contract performance if the Bidder is or recently has been materially deficient in contract performance. In reviewing the Bidders performance, the District should determine whether the Bidders deficient performance was expressly excused under the terms of Contract, or whether the Bidder took appropriate corrective action. The District may review the Bidders performance on both private and Public Contracts in determining the Bidders record of contract performance.
- iii. Has a satisfactory record of integrity. A Bidder may lack integrity if the District determines the Bidder demonstrates a lack of business ethics such as violation of state environmental laws or false certifications made to the District. The District may find a Bidder not Responsible based on the lack of integrity of any Person having influence or control over the Bidder (such as a key employee of the Bidder that has the authority to significantly influence the Bidders performance of the Contract or a parent company, predecessor or successor Person). The standards for Conduct Disqualification under OAR 137-49-0370 may be used to determine Bidder's integrity. The District may find a Bidder non-responsible based on previous convictions of offenses related to obtaining or attempting to obtain a contract or subcontract or in connection with the Bidder's performance of a contract or subcontract;
- iv. Is qualified legally to contract with the District; and
- v. Has supplied all necessary information in connection with the inquiry concerning responsibility. If the Bidder fails to promptly supply information requested by the District concerning responsibility, the District will base the determination of responsibility on any available information, or may find the Bidder not Responsible.
- c. **District Evaluation.** The District will evaluate a Bid only as set forth in the Solicitation and in accordance with applicable law. The District will not evaluate a Bid using any other requirement or criterion.
- d. Bidder Submissions.
 - i. The District may require a Bidder to submit Product Samples, Descriptive Literature, technical data, or other material and may also require any of the following prior to award:
 - A. Demonstration, inspection or testing of a product prior to award for characteristics such as compatibility, quality or workmanship;
 - B. Examination of such elements as appearance or finish; or
 - C. Other examinations to determine whether the product conforms to Specifications.
 - ii. The District will evaluate product acceptability only in accordance with the criteria disclosed in the Solicitation to determine that a product is acceptable. The District will reject a Bid providing any product that does not meet the Solicitation requirements. The District's rejection of a Bid because it offers non-conforming Work or materials is not Disqualification and is not appealable under ORS 279C.445.
- e. **Evaluation of Bids.** The District will use only objective criteria to evaluate Bids as set forth in the Solicitation. The District will evaluate Bids to determine which Responsible Bidder submitted the lowest Responsive Bid.
 - i. **Nonresident Bidders.** In determining the lowest Responsive Bid, the District will, in accordance with OAR 137-046-0310, add a percentage increase to the Bid of a nonresident Bidder equal to the percentage, if any, of the preference given to that Bidder in the state in which the Bidder resides.
 - ii. **Clarifications.** In evaluating Bids, the District may seek information from a Bidder only to clarify the Bidder's Bid. Such clarification must not vary, contradict or supplement the Bid. A Bidder must submit Written and Signed clarifications and such clarifications will become part of the Bidder's Bid.

iii. **Negotiation Prohibited.** The District will not negotiate scope of Work or other terms or conditions under an Invitation to Bid process prior to award.

16. NOTICE OF INTENT TO AWARD

- a. **Notice.** At least seven (7) days before the Award of a Public Improvement Contract, the District will issue a Notice of the District's intent to Award the Contract.
- b. **Form and Manner of Posting.** The form and manner of posting notice will conform to customary practices within the District's procurement system and may be made electronically.
- c. **Finalizing Award.** The District's Award will not be final until the later of the following:
 - i. Seven (7) Days after the date of the notice, unless the Solicitation provided a different period for protest; or
 - ii. The District provides a written response to all timely-filed protests that denies the protest and affirms the Award.
- d. **Prior Notice Impractical.** Posting of notice of intent to award will not be required when the District determines that it is impractical due to unusual time constraints in making prompt Award for its immediate procurement needs, documents the Contract file as to the reasons for that determination, and posts notice of that action as soon as reasonably practical.

17. DOCUMENTATION OF AWARD; AVAILABILITY OF AWARD DECISIONS

- a. **Basis of Award.** After Award, the District will make a record showing the basis for determining the successful Bidder part of the District's Solicitation file.
- b. **Contract Document.** The District will deliver a fully executed copy of the final Contract to the successful Bidder.
- c. **Bid Tabulations and Award Summaries.** Upon request of any Person the District will provide tabulations of Awarded Bids.
- d. **Availability of Solicitation Files.** The District will make completed Solicitation files available for public review at the District.

18. NEGOTIATION WITH BIDDERS PROHIBITED

Except as permitted by ORS 279C.340 and OAR 137-49-0430 when all Bids exceed the cost estimate, the District will not negotiate with any Bidder prior to Contract Award. After Award of the Contract, the District and Contractor may modify the resulting Contract only by change order or Amendment to the Contract in accordance with OAR 137-49-0910.

19. NEGOTIATION WHEN BIDS EXCEED COST ESTIMATE

- a. Generally. In accordance with ORS 279C.340, if all Responsive Bids from Responsible Bidders on a competitively Bid Project exceed the District's Cost Estimate, prior to Contract Award the District may negotiate Value Engineering and Other Options with the Responsible Bidder submitting the lowest, Responsive Bid in an attempt to bring the Project within the District's Cost Estimate.
- **b. Rejection of Bids.** In determining whether all Responsive Bids from Responsible Bidders exceed the Cost Estimate, only those Bids that have been formally rejected, or Bids from Bidders who have been formally disqualified by the District, will be excluded from consideration.
- **c. Scope of Negotiations.** The District will not proceed with Contract Award if the scope of the Project is significantly changed from the original Bid. The scope is considered to have been significantly changed if the pool of competition would likely have been affected by the change.
- **d. Discontinuing Negotiations.** The District may discontinue negotiations at any time and will do so if it appears to the District that the apparent low Bidder is not negotiating in good faith or fails to share cost

- and pricing information upon request. Failure to rebid any portion of the project, or to obtain subcontractor pricing information upon request, will be considered a lack of good faith.
- **e. Limitation.** Negotiations may be undertaken only with the lowest Responsive, Responsible Bidder pursuant to ORS 279C.340. That statute does not provide any additional authority to further negotiate with Bidders next in line for Contract Award.

20. REJECTION OF BIDS

a. Rejection of a Bid.

- i. The District may reject any Bid upon finding that to accept the Bid may impair the integrity of the Procurement process or that rejecting the Bid is in the public interest.
- ii. The District will reject a Bid upon the District's finding that the Bid:
 - A. Is contingent on the District's acceptance of terms and conditions (including Specifications) that differ from the Solicitation;
 - B. Takes exception to terms and conditions (including Specifications);
 - C. Attempts to prevent public disclosure of matters in contravention of the terms and conditions of the Solicitation or in contravention of applicable law;
 - D. Offers Work that fails to meet the Specifications of the Solicitation;
 - E. Is late;
 - F. Is not in substantial compliance with the Solicitation;
 - G. Is not in substantial compliance with all prescribed public Solicitation procedures.
- iii. The District will reject a Bid upon the District's finding that the Bidder:
 - A. Has not been prequalified under ORS 279C.430 and the District required mandatory prequalification;
 - B. Has been Disqualified;
 - C. Has been declared ineligible under ORS 279C.860 by the Commissioner of Bureau of Labor and Industries and the Contract is for a Public Work;
 - D. Is listed as not qualified by the Construction Contractors Board, if the Contract is for a Public Improvement;
 - E. Has not met the requirements of ORS 279A.105 if required by the Solicitation;
 - F. Has not submitted properly executed Bid or Proposal security as required by the Solicitation;
 - G. Has failed to provide the Certification of Non-Discrimination required under OAR 137-049-0440(3);
 - H. Is not Responsible. See OAR 137-049-0390(2) regarding District determination that the Bidder has met statutory standards of responsibility.
- b. **Form of Business.** The District may investigate any Person submitting a Bid. The investigation may include that Person's officers, Directors, Owners, affiliates, or any other Person acquiring ownership of the Person to determine application of this rule or to apply the Disqualification provisions of ORS 279C.440 to 279C.450 and OAR 137-049-0370.
- c. **Certification of Non-Discrimination.** The Bidder must certify and deliver to the District as part of their Bid, written certification (see attached Bidder Certification) that the Bidder has not discriminated and will not discriminate against any disadvantaged business enterprise, minority-owned business, womenowned business, emerging small business, or business that a service-disabled veteran owns, in obtaining any required subcontracts. Failure to do so will be grounds for disqualification.
- d. **Rejection of all Bids.** The District may reject all Bids for good cause upon the District's Written finding it is in the public interest to do so. The District will notify all Bidders of the rejection of all Bids, along with the good cause justification and finding.
- e. Criteria for Rejection of All Bids. The District may reject all Bids upon a Written finding that:

- i. The content of or an error in the Solicitation, or the Solicitation process unnecessarily restricted competition for the Contract;
- ii. The price, quality or performance presented by the Bidders is too costly or of insufficient quality to justify acceptance of the Bids;
- iii. Misconduct, error, or ambiguous or misleading provisions in the Solicitation threaten the fairness and integrity of the competitive process;
- iv. Causes other than legitimate market forces threaten the integrity of the competitive Procurement process. These causes include, but are not limited to, those that tend to limit competition such as restrictions on competition, collusion, corruption, unlawful anti-competitive conduct and inadvertent or intentional errors in the Solicitation;
- v. The District cancels the Solicitation in accordance with OAR 137-049-0270; or
- vi. Any other circumstance indicating that awarding the Contract would not be in the public interest.

21. PROTEST OF CONTRACTOR SELECTION, CONTRACT AWARD

- a. **Purpose.** An adversely affected or aggrieved Bidder must exhaust all avenues of administrative review and relief before seeking judicial review of the District's Contractor selection or Contract Award decision.
- b. **Notice of Intent to Award.** Unless otherwise provided in the Solicitation, the District will provide written notice to all Bidders of the District's intent to award the Contract. The District's Award will not be final until the later of the following:
 - i. Seven (7) days after the date of the notice, unless the Solicitation provided a different period for protest; or
 - ii. The District provides a written response to all timely-filed protests that denies the protest and affirms the Award.

c. Right to Protest Award.

- i. An adversely affected or aggrieved Bidder may submit to the District a Written protest of the District's intent to award within seven (7) days after issuance of the notice of intent to award the Contract, unless a different protest period is provided under the Solicitation.
- ii. The Bidders protest must be in Writing and must specify the grounds upon which the protest is based.
- iii. A Bidder is adversely affected or aggrieved only if the Bidder is eligible for Award of the Contract as the Responsible Bidder submitting the lowest Responsive Bid and is next in line for Award, i.e., the protesting Bidder must claim and state specific reasons why all lower Bidders are ineligible for Award:
 - A. Because their Bids were non-responsive; or
 - B. The District committed a substantial violation of a provision in the Solicitation or of an applicable Procurement statute or administrative rule, and the protesting Bidder was unfairly evaluated and would have, but for such substantial violation, been the Responsible Bidder offering the lowest Responsive Bid.
- iv. The District will not consider a protest submitted after the time period established in this Rule or such different period as may be provided in the Solicitation.
- d. **Authority to Resolve Protests.** The District's Purchasing Manager will settle or resolve a written protest submitted in accordance with the requirements of this Rule.
- e. **Decision.** If a protest is not settled, the Superintendent, or designee, will promptly issue a written decision on the protest. Judicial review of this decision will be available if provided by statute.
- f. **Award.** The successful Bidder must promptly execute the Contract after the Award is final. The District will execute the Contract only after it has obtained all applicable required documents and approvals.
- **22. BID COSTS**: The District is not liable for any costs incurred by the Bidder in its Bid preparation

1. PUBLIC WORKS REQUIREMENTS

This solicitation will result in a Contract for a Public Work subject to ORS 279C.800 to 279C.870 or the Davis-Bacon Act (40 U.S.C. 3141 et seq., if applicable). No Bid will be received or considered by the District unless the Bid contains a statement by the Bidder that the provisions of ORS 279C.800 to 279C.870 (prevailing wage rates paid to employees) or the Davis Bacon Act (40 U.S.C. 3141 et seq, if applicable) are to be complied with (see Bidder Certification).

2. REGISTRATION REQUIREMENTS

Bidders must be currently registered with the Construction Contractors Board as required by ORS 701.021, licensed by the Sate Landscape Contractors Board, as required by ORS 671.530, or licensed by the Department of Environmental Quality, as required by ORS 468A.710 (Air Quality), if required, holding the proper registration for the work contemplated herein, at the time of Bid submittal. All Subcontractors participating in the project must be similarly registered with the Construction Contractors Board, State Landscape Contractors Board or Department of Environmental Quality, as required, at the time they propose to engage in subcontract work. The CCB registration requirements apply to all public works contracts unless superseded by federal law.

3. BOLI/PWR REQUIREMENTS

All contractors and subcontractors will abide by the latest determination of the minimum wage rates as scheduled and published for this region by the U.S. Department of Labor and the Oregon Bureau of Labor and Industries and will abide by all amendments, decisions, and related regulations of these agencies. Specifically:

- a. The Contractor is required to pay workers not less than prevailing wage rates for the Region #2 through the contract period.
- b. If the Contractor fails to pay for labor and services the District can pay and will withhold these amounts from payments to the Contractor. OAR 839-025-0020(2)(a).
- c. The Contractor is required to pay weekly, holiday (including weekends) and daily overtime as required. OAR 839-025-0020(2)(b).
- d. The existing 'prevailing rate of wage' as published by the Oregon Bureau of Labor and Industries are the Prevailing Wage Rates for Public Works Contracts in Oregon effective July 1, 2020 and PWR Amendment effective October 1, 2020. They may be found at the following website:

 http://www.oregon.gov/boli/WHD/PWR/Pages/pwr_state.aspx, and are incorporated herein by this reference.

4. BONDS: PERFORMANCE, PAYMENT AND PUBLIC WORKS

a. Performance and Payment Bonds.

- i. Pursuant to ORS 279C.380, the Contractor must furnish bonds covering the faithful performance of the Contact and payment of obligations arising there under. Bonds are to be obtained through a company that is authorized and licensed by the Oregon Insurance Commissioner. The bonding company must be listed on the most current US Government Treasury list, Department Circular 570 or approved PRIOR TO BID SUBMISSION by the District. The cost of the Bonds must be included in the Contract Sum. The amount of each Bond must be equal to 100 percent of the Contract Sum. Performance and Payment Bonds must be the AIA A312 or as approved by the District.
- ii. Bonds must be effective from the Contract date through the Final Completion of the Contract.
- iii. Failure to adhere to these requirements may be grounds for rejection of the Bid.

b. Public Works Bond.

- i. Contractors who work on public works projects, subject to the PWR law, are required to file a \$30,000 Public Works Bond to be used exclusively for unpaid wages determined to be due by BOLI. Proof of this bond in effect must be provided to the District prior to Contract signing, after the award of this solicitation.
- ii. General Contractors are required to verify that subcontractors have filed a public works bond before permitting a subcontractor to start work on a project.
- iii. ORS 279C.836 provides exemptions from the bond requirements for certified disadvantaged, minority, women, service-disabled veteran owned or emerging small business enterprises. It is the Contractor's responsibility to notify the District if an exemption applies to the Contractor.
- iv. The Public Works Bond must be furnished by a surety company authorized to do business in Oregon
- c. **Time for Submission.** The apparent successful Bidder must promptly furnish the required performance security upon the District's request. If the Bidder fails to furnish the security as requested, the District may reject the Bid and award the Contract to the Responsible Bidder with the next lowest Responsive Bid, and, at the District's discretion, the Bidder must forfeit its Bid Bond.

5. SUBSTITUTE CONTRACTOR

If the Contractor provided a performance bond, the District may afford the Contractor's surety the opportunity to provide a substitute Contractor to complete performance of the Contract. A substitute Contractor must perform all remaining contract Work and comply with all terms and conditions of the Contract, including the provisions of the performance bond and the payment bond. Such substitute performance does not involve the Award of a new Contract and will not be subject to the competitive procurement provisions of ORS Chapter 279C.

6. FOREIGN CONTRACTOR

If the Contract Price exceeds \$10,000 and the Contractor is a Foreign Contractor, the Contractor must promptly report to the Oregon Department of Revenue on forms provided by the Department of Revenue, the Contract Price, terms of payment, Contract duration and such other information as the Department of Revenue may require before final payment can be made on the Contract. A copy of the report must be forwarded to the District. The District will satisfy itself that the above requirements have been complied with before it issues final payment on the Contract.

7. CERTIFIED PAYROLL WITHHOLDING

- a. If a prime contractor does not file certified payroll as required (at least once per month), the District will withhold 25% of amounts due to the prime contractor, in addition to any other required Retainage.
- b. If a first-tier subcontract does not file certified payroll reports as required, the prime contractor must withhold 25% of amounts due the first-tier subcontractor.
- c. Once certified payroll reports are submitted, the District or prime contractor are to pay amounts withheld within 14 days.
- d. Neither the District nor the prime contractor is required to verify the accuracy of the contents of the certified payroll reports.

8. DRUG TESTING REQUIREMENT

ORS 279C.505(2) requires that all public improvement contracts contain a provision requiring contractors to demonstrate that an employee drug-testing program is in place. Bidders are therefore required to certify that they have an employee drug-testing program in place that applies to all employees and will maintain a drug-testing program at all times during the performance of the awarded Contract. Failure to maintain a

program will constitute a material breach of contract. The use of drugs, alcohol, or any tobacco products is prohibited on all District property.

9. OTHER TERMS AND CONDITIONS:

The Contractor must understand and agree to comply with the following:

- a. Provide prompt payment to all Persons supplying labor or material for the performance of the work; Pay
 all contributions or amounts due the Industrial Accident Fund; Not permit any lien or claim to be filed or
 prosecuted against the District; and Pay to the Department of Revenue all sums withheld from
 employees. (ORS 279C.505(1));
- b. Demonstrate that an employee drug testing program is in place. (ORS 279C.505(2));
- c. If the Contract calls for demolition Work described in ORS 279C.510(1), the Contractor is required to salvage or recycle construction and demolition debris, if feasible and cost-effective;
- d. If the Contract calls for lawn or landscape maintenance, the Contractor is required to compost or mulch yard waste material at an approved site, if feasible and cost effective (ORS 279C.510(2);
- e. If the Contractor fails, neglects or refuses to pay promptly a person's claim for labor or services provided to the contractor or a subcontractor, the District may pay the amount of the claim to the person that provides the labor or services and charge the amount of the payment against funds due or to become due the contractor, as set forth in ORS 279C.515(1);
- f. If the Contractor or a first-tier subcontractor fails, neglects or refuses to pay a person that provides labor or materials in connection with the public improvement contract within 30 days after receiving payment from the contracting agency or a contractor, the contractor or first-tier subcontractor owes the person the amount due plus interest charges. (ORS 279C.515(2));
- g. If the Contractor or a subcontractor fails, neglects or refuses to pay a person that provides labor or materials in connection with the public improvement contract, the person may file a complaint with the Construction Contractors Board, unless payment is subject to a good faith dispute as defined in ORS 279C.580. (ORS 279C.515(3));
- h. Abide by maximum hours of labor and overtime, as set forth in ORS 279C.520(1);
- i. Provide employer notice to employees of hours and days that employees may be required to work, as set forth in ORS 279C.520(2);
- j. Abide by environmental and natural resources regulations (ORS 279C.525);
- k. Make required payments for medical care and certain services related to sickness and injury to employees, as set forth in ORS 279C.530(1);
- I. Understand all employers, including Contractor, that employ subject workers who work under this Contract in the State of Oregon must comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor must ensure that each of its subcontractors complies with these requirements. (ORS 279C.530(2));
- m. Abide by maximum hours, holidays and overtime (ORS 279C.540);
- n. Abide by time limitation on claims for overtime (ORS 279C.545);
- o. Pay prevailing wage rates, including subcontractors (ORS 279C.800 to 279C.870);
- p. File required BOLI Public Works bond(s) including subcontractors, as set forth in ORS 279C.830(2);
- q. Follow Retainage rules (ORS 279C.550 to 279C.570);
- r. Abide by prompt payment policy, progress payments, rate of interest (ORS 279C.570);
- s. Maintain relations with subcontractors (ORS 279C.580);
- t. Make notice of claim (ORS 279C.605);
- u. Provide Affidavit of Compliance with the Oregon tax laws in accordance with ORS 305.385; and
- v. Certify that all subcontractors performing Work described in ORS 701.005(2) (i.e., construction Work) will be registered with the Construction Contractors Board, licensed by the State Landscape Contractors

- Board in accordance with ORS 701.021 to 701.050, or licensed under ORS 468A.720 (Air Quality), if required, before the subcontractors commence Work under the Contract.
- w. Assignment or Transfer Restricted. Unless otherwise provided in the Contract, the Contractor must not assign, sell, dispose of, or transfer rights, or delegate duties under the Contract, either in whole or in part, without the District's prior Written consent. Unless otherwise agreed by the District in Writing, such consent will not relieve the Contractor of any obligations under the Contract. Any assignee or transferee will be considered the agent of the Contractor and be bound to abide by all provisions of the Contract. If the District consents in Writing to an assignment, sale, disposal or transfer of the Contractor's rights or delegation of Contractor's duties, the Contractor and its surety, if any, must remain liable to the District for complete performance of the Contract as if no such assignment, sale, disposal, transfer or delegation had occurred unless the District otherwise agrees in Writing.

SECTION V-ATTACHMENTS Solicitation No. ITB 20-0030

1. BID PREPARATION:

- a. Bidder must complete and return as its Bid, the required Affidavit, Certifications and Forms included as Attachments to this Solicitation. (See Attached Bid Submission Checklist)
- b. Failure to complete, **sign**, and submit these and any other document(s) as requested or required in accordance with this Solicitation may be grounds to declare the Bid nonresponsive.

2. FORMS

- a. The attached forms are to be included in Bid.
- b. Copies of the included forms (See Attached Bid Submission Checklist) are to be completed and submitted by the Bidder along with other required documents as required by the Instructions to Bidders.
- c. **References.** If the Bidder has performed any project or work with the District in the last ten (10) years, one of the references must be from the Bidder's most recent contract with the District.

3. FORM OF AGREEMENT

The form of construction agreement to be used between the District and the General Contractor for the Project is the AIA Document A101-2017 and AIA Document A201-2017 as issued by the Beaverton School District. Any references and/or requirements of the General Contractor to the District must apply to subcontractors' requirements to the District and General Contractor. A sample Copy of the AIA Document A101-2017 and AIA Document A201-2017 as issued by Beaverton School District are included herein.

BID SUBMISSION CHECKLIST

ALL AFFIDAVITS, CERTIFICATIONS, FORMS AND BID CONTENT REQUIREMENTS AS SPECIFIED IN SECTION V

MUST BE INCLUDED AS PART OF THE BID. **REQUIRED AFFIDAVIT, CERTIFICATIONS AND FORMS** The following affidavit, certifications and forms must be completed and signed by the person authorized to represent the Bidder regarding all matters related to the Bid and authorized to bind the Bidder to the agreement. Failure to submit any of the required, completed, and signed affidavits/certifications/forms may be grounds to declare the Bid nonresponsive. BIDDER CERTIFICATION - This serves as the cover sheet for your Bid. (Attachment A) BID SCHEDULE. (Attachment B) BID SECURITY (Bid Bond). (Attachment C) AFFADAVIT OF NON-COLLUSION / COMPLIANCE WITH TAX LAWS. (Attachment D) NON-CONFLICT OF INTEREST CERTIFICATION. (Attachment E) BIDDER RESPONSIBILITY FORM – All Pages. (Attachment F) BIDDER REFERENCE FORMS – Include the # specified on the form. See SECTION V Paragraph 2. (Attachment G) FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM (Attachment H) The Bidder is encouraged to use the following attachment to identify their Bid. It is provided for the Bidder's convenience and is **NOT** required. The following attachment(s) are **NOT** to be returned with the Bid. Bidders must review the content of these attachment(s). ATTACHMENT I Sample Contract

During Solicitation Substitution Request Form (Separate file in ORPIN)

This checklist is provided for the Bidder's convenience in assembling their Bid and is NOT required to be returned with the Bid.

ATTACHMENT J

ATTACHMENT K

ATTACHMENT L

Drawings

Specifications

^{*}The "BID FORM" under Appendix A of the Specifications is not to be included in Bids, rather it may be used by General Contractors to solicit bids for abatement sub-contractors. Bidders/Contractors may elect to use a different form to solicit pricing for the items listed on the BID FORM found in Appendix A of the Specifications to obtain sub-contractor pricing for the specified abatement work. Bid amounts from any such sub-contractors must be included on the First Tier Sub-Contractor form if it meets the requirements stated therein.



BIDDER CERTIFICATION

	Respectfully submitted this	day of	, 20
ign Signature: _			
Name:		Phone:	
	(Please type or print)		
Title:			
Email Addres	ss:		-
Firm/Company Name:			_
Physical Address:			_
City, State, Zip:			_

- 1. The Bidder certifies that he or she has read and understands the Drawings, Specifications, Addenda, Contract and all other documents pertaining to this Project.
- 2. The Bidder, having become completely familiar with the local conditions and legal requirements affecting the cost of Work at the place where Work is to be executed, and having carefully examined the site conditions as they currently exist, agrees to provide all labor, materials, plant, equipment, transportation and other facilities and services as necessary and/or required to execute all of the Work described by the aforesaid documents will be provided and within the time specified.
- 3. The Bidder acknowledges that the Project Milestones in Section II STATEMENT OF WORK includes certain specific dates. These dates must be adhered to unless modified by mutual agreement between Contractor and the Owner. All dates indicate 5:00 PM Pacific Time.
 - The Bidder agrees to complete the work within the number of calendar days as stipulated in the Contract and to meet the Milestones and Specific Dates set forth above and acknowledges that his/her failure to achieve Completion by these stipulated dates, or by any Owner authorized extension thereto, subjects the Bidder to liquidated damages for failure to perform, as further defined in the Contracts.
- 4. The Bidder agrees to execute the formal Contract within five (5) days from date of Notice of Acceptance of this Bid. In the event the undersigned fails or neglects to execute the Contract and the undersigned is considered having abandoned the Contract by the Owner, the Bid security will be forfeited.
- 5. The Bidder acknowledges that he or she that signs this Bid is fully authorized to sign on behalf of the firm listed and to fully bind the firm listed to all conditions and provisions thereof.



6.	The Bidder certifies that Bidder has complied or will comply with all requirements of local, state, and national laws, and that no legal requirement has been or will be violated in making or accepting this Bid.				
7.	The Bidder is registered with the Construction Contractors Board, or is licensed by the State Landscape Contractors Board, or licensed under ORS 468A.720 (Air Quality), if required. License Number (The District will not receive or consider a Bid for a Public Improvement unless the Bidder is registered with the Construction Contractors Board, or is licensed by the State Landscape Contractors Board).				
8.	The Bidder, pursuant to ORS 279A.120 (1), (check one) is				
9.	The Bidder certifies that the required Statutory Public Works Bond has been filed with the Construction Contractor's Board.				
10.	The Bidder agrees to be bound by and will comply with the provisions of Prevailing Wage Laws ORS 279C.800 through ORS 279C.870 or the Davis-Bacon Act (40 U.S.C. 3141 et seq., if applicable).				
11.	The Bidder certifies that it has not discriminated and will not discriminate, in violation of ORS 279A.110, against any disadvantaged business enterprise, minority-owned business, women-owned business, emerging small business, or business that a service-disabled veteran owns in obtaining any required subcontract.				
12.	The Bidder agrees to comply with Oregon tax laws in accordance with ORS 305.385.				
13.	Any Bid of a contractor or subcontractor listed on BOLI's List of Ineligibles will be rejected.				
14.	The Bidder acknowledges receipt of the following Addenda: (List by number and date appearing on Addendum.)				
	Addendum Number Date Addendum Number Date				

This solicitation will result in a Contract for a Public Work subject to ORS 279C.800 to 279C.870.



BID SCHEDULE

(Contractor)
TOTAL BASE BID: including the Work as defined in the Project Manual, Drawings and Addenda (if any), the TOTAL SUM OF:
DOLLARS (\$)
Alternates (Mandatory):
Alternate 1) Remove, replace and install new RTU's, curbs, and system components as indicated on Contrac Drawings. Refer to 012300 - 2 of the Specifications and applicable sheets in the Drawings for more details.
Lump Sum Price for Alternate 1)
Unit Pricing:
Please review Specification Section 01 22 00 for more information
A. Roof Sheathing Replacement:
Estimated Quantity (for Bid Evaluation Purposes only): 100 square feet
Cost per square foot:



BID BOND

(Contractor)		_	
THIS DOCUMENT HAS IMPORTANT I MODIFICATION.	LEGAL CONSEQUENCES: C	ONSULTATION WITH AN ATTORNEY IS ENCOURAGED WITH RE	SPECT TO ITS COMPLETION OR
KNOW ALL MEN BY THESE PF	RESENTS, that we	(Here insert full name and address or legal title of Contra	- ctor)
As Principal, hereinafter calle			
bound unto Beaverton Schoo Obligee, in the sum of five pe	ol District No. 48J, 16 ercent of dollars (\$) a	ne State of Oregon as Surety, hereinafter called th 1550 SW Merlo Road, Beaverton, OR 97003, as Oblamount Bid (5%), for the payment of which sum wheirs, executors, administrators, successors and a	ligee, hereinafter called the ell and truly to be made, the said
WHEREAS, the Principal has s	submitted a Bid for _	·	
accordance with the terms o sufficient surety for the faith prosecution thereof, or in the shall pay to the Obligee the o	f such Bid, and give s ful performance of s e event of the failure difference not to exc e may in good faith o	Bid of the Principal and the Principal shall enter in such bond or bonds as may be specified in the Con uch Contract and for the prompt payment of labo e of the Principal to enter such Contract and give s eed the penalty hereof between the amount spec contract with another party to perform the Work of main in full force and effect.	ntract Documents with good and or and material furnished in the ouch bond or bonds, if the Principal ified in said Bid and such larger
Signed and sealed this	day of	, 20	
(Witness)		(Principal)	- /Soal)
(withess)		(Fillicipal)	(Seal)
	-	(Title)	-
(Witness)		(Surety)	- (Seal)
	-	(Title)	-



AFFIDAVIT OF NON-COLLUSION / COMPLIANCE WITH TAX LAWS

(Bidder))
I state t	hat:
(1)	The correct taxpayer identification numbers are:
(2)	A. Federal Employer ID Number (EIN): Bidder is not subject to backup withholding because (i) Bidder is exempt from backup withholding, (ii) Bidder has not been notified by the IRS that Bidder is subject to backup withholding as a result of a failure to report all interest or dividends, or (iii) the IRS has notified Bidder that Bidder is no longer subject to backup withholding;
(3)(4)	The price(s) and amount of this Bid must be arrived at independently and without consultation, communication or agreement with any other Supplier, Bidder or potential Bidder, except as disclosed on the attached appendix. That neither the price(s) nor the amount of this Bid, and neither the approximate price(s) nor approximate amount of this Bid, will be disclosed to any other firm or person who is a Bidder or potential Bidder, and they will
	not be disclosed before Contract award.
(5)	No attempt has been made or will be made to induce any firm or person to refrain from proposing on this Solicitation, or to submit any noncompetitive Bid or other complementary Bid.
(6)	The Bid of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other noncompetitive Bid.
(7)	(name of firm), its affiliates, subsidiaries, officers, directors and employees are not currently under investigation by any governmental agency and have not in the last four years been convicted of or found liable for any act prohibited by State or Federal law in any jurisdiction, involving conspiracy or collusion with respect to proposing on any public contract, except as described in the attached appendix.
the abo the con affidavi the sub regardin includin	chat
(Affiant's	s Signature)
STATE C	OF OREGON
County	of
Signed	and sworn to before me on by
-	(date) (Affiant's name)
	Notary:
	My Commission Expires:



NON-CONFLICT OF INTEREST CERTIFICATION

Issuing A	gency: Beaverton School District	
	hereby on the defining conflict of interest as quoted below; that I understand to finterest exists as therein defined, which precludes an impart	
submitte	d by myself or the entity/company for which the Bid/Proposal is sub t should arise, I will immediately notify the Beaverton School Dis	mitted, and that if such
INTERES	FICER, EMPLOYEE, OR AGENT OF THE BIDDER/PROPOSER HAS ANY IT, DIRECT OR INDIRECT, IN THE OPERATION OF THE BEAVERTON SCHOOL AND DISTRICT IMPROPERTY OR INDIRECTLY."	OOL DISTRICT OR WITH
Signatur	e:	
Name:	(Please type or print)	
Title:		
Firm/Co	npany Name:(Please type or print)	
Date:	(Please type or print)	

BIDDER RESPONSIBILITY FORM (CONTRACTOR'S QUALIFICATIONS AND FINANCIAL INFORMATION)

DECLARATION AND SIGNATURES

The undersigned hereby declares that the he or she is duly authorized to complete and submit this Bidder Responsibility Form and that the statements contained herein are true and correct as of the date set forth below. Incomplete, incorrect or misleading information will be reason for a determination by the District of Bidder non-responsibility.

Date:		
Signature:		
Name:		
	(Please type or print)	
Title:		
	(Please type or print)	
Firm/Company:		
	(Please type or print)	
CCB#:		

<u>Instructions</u>

- 1. The information provided in this form is part of the District's inquiry concerning Bidder responsibility. Please print clearly or type.
- 2. If you need more space, use plain paper. Submit completed form with Bid response.
- 3. Answer all questions. Submission of a form with unanswered questions, incomplete or illegible answers may result in a finding that the Bidder is not a responsible Bidder.



CURRENT CONTRACTS IN FORCE

ITEM	CONTRACT 1	CONTRACT 2	
A. Work Location			
B. Scope of Work;			
Check box:	New Construction Re-Construction	☐ New Construction ☐ Re-Construction	
C. Contract Amount	\$	\$	
D. Change Order Amount	\$	\$	
E. % Completed	%	%	
F. Est. Completion Date			
G. Owner's Name			
H. Owner Contact			
I. Telephone	()	()	
J. E-Mail Address			
		CONTRACT 4	
ITEM	CONTRACT 3	CONTRACT 4	
ITEM A. Work Location	CONTRACT 3	CONTRACT 4	
	CONTRACT 3	CONTRACT 4	
A. Work Location	CONTRACT 3 New Construction Re-Construction	CONTRACT 4 New Construction Re-Construction	
A. Work Location B. Scope of Work;			
A. Work Location B. Scope of Work; Check box:	☐ New Construction ☐ Re-Construction	☐ New Construction ☐ Re-Construction	
A. Work Location B. Scope of Work; Check box: C. Contract Amount	New Construction Re-Construction	New Construction Re-Construction	
A. Work Location B. Scope of Work; Check box: C. Contract Amount D. Change Order Amount	New Construction Re-Construction \$ \$	New Construction Re-Construction \$	
A. Work Location B. Scope of Work; Check box: C. Contract Amount D. Change Order Amount E. % Completed	New Construction Re-Construction \$ \$	New Construction Re-Construction \$	
A. Work Location B. Scope of Work; Check box: C. Contract Amount D. Change Order Amount E. % Completed F. Est. Completion Date	New Construction Re-Construction \$ \$	New Construction Re-Construction \$	
A. Work Location B. Scope of Work; Check box: C. Contract Amount D. Change Order Amount E. % Completed F. Est. Completion Date G. Owner's Name	New Construction Re-Construction \$ \$	New Construction Re-Construction \$	



LARGEST SIMILAR JOBS YOU HAVE COMPLETED IN THE LAST FIVE YEARS AS THE PRIME CONTRACTOR

ITEM	CONTRACT 1		CONTRACT 2	
A. Work Location				
B. Scope of Work;				
Check box:	New Construction	Re-Construction	New Construction	Re-Construction
C. Contract Amount	\$		\$	
D. Change Order Amount	\$		\$	
E. % Completed		%		%
F. Completion Date				
G. Owner's Name				
H. Owner Contact				
I. Telephone	()		()	
J. E-Mail Address				

LIST COMPANIES FROM WHOM YOU OBTAIN SURETY BONDS

ITEM		SURETY COMPANY 1	SURETY COMPANY 2
A. Company Name			
B. Contact's Name			
C. Telephone	()	()
D. Fax	()	()
E. E-Mail Address			
PRESENT AMOUNT OF BON COVERAGE (\$):	IDING	HAS YOUR APPLICATION FOR SURETY BOND EVER BEEN DECLINED (If Yes, please provide detailed information in Remarks) YES NO	DURING THE PAST 2 YEARS, HAVE YOU BEEN CHARGED WITH A FAILURE TO MEET THE CLAIMS OF YOUR SUBCONTRACTORS OR SUPPLIERS (If Yes, please provide detailed information in Remarks)



RELIABILITY

Has your company ever been declared in breach of any contract for unperformed or defective work?	es. No.
If "yes", explain.	
Has any employee or agent of your company ever been convicted of a criminal offense arising out of obtain to obtain, or performing a public or private contract or subcontract?	ning, attempting
If "yes," explain.	
Has any employee or agent of your company been convicted under state or federal law of embezzlement bribery, falsification or destruction of records, receiving stolen property or any other offense indicating a integrity or business honesty? Yes. No.	
If "yes," explain.	
Has your company or any employee or agent of your company been convicted under state or federal antitrus Yes. No.	st laws?
If "yes," explain.	
Has any Officer or Partner of your organization ever been an Officer or Partner of another Organization that fa a construction contract? Yes. No.	iled to complete
If "yes," explain.	



FINANCIAL RESOURCES

Indicate the Contractors total bonding capacity amount: \$
What portion of this amount remains available at time of completion of this form? \$
Has your firm ever been at any time in the last ten years the debtor in a bankruptcy case? Yes. No.
If "yes," explain.
Does your firm have any outstanding judgments pending against it?
If "yes," explain.
In the past ten years, has your firm been a party to litigation, arbitration or mediation where the amount in dispute exceeded \$10,000? Yes. No.
If "yes," explain.
(Include court, case number and party names.)
In the past ten years, has your firm been a party to litigation, arbitration or mediation on a matter related to payment to subcontractors or work performance on a contract? Check "yes" even if the matter proceeded to arbitration or mediation without court litigation. Yes. No.
If "yes," explain. (Include court, case number and party names.)
Have you or any of your affiliates discontinued business operation with outstanding debts?
If "yes," explain.



KEY PERSONNEL

List the principal individuals of your company, their current job title, the total years of experience they have in the construction industry and their current primary responsibility for your company. Corporations list current officers and those who own 5% or more of the corporation's stock. Limited liability companies list members who own 5% or more of company. Partnerships list all partners. Joint ventures list each firm that is a member of the joint venture and the percentage of ownership the firm has in the joint venture.

ITEM	Principal Individual
A. Name	
B. Position	
C. Years in Construction	
D. Current Primary Responsibility	
ITEM	Principal Individual
A. Name	
B. Position	
C. Years in Construction	
D. Current Primary Responsibility	
ITEM	Principal Individual
A. Name	
B. Position	
C. Years in Construction	
D. Current Primary Responsibility	
ITEM	Principal Individual
A. Name	
B. Position	
C. Years in Construction	
D. Current Primary Responsibility	

List the individuals who will be in the following roles if your company is awarded this Contract:

ITEM	Contractor's Representative	Project Manger	Project Superintendent
A. Name			
B. Position			
C. Years in Position	N/A		
D. Largest Project Supervised	N/A	\$	\$
E. Largest number of employees ever supervised	N/A		



SECTION V – ATTACHMENTS ATTACHMENT G Solicitation No. ITB 20-0030

BIDDER REFERENCE FORM

BIDDER REFERENCE FORM FOR				
(Insert Name of Bidder)				
Bidder must provide five (5) references and must use a separate copy of this form for each reference.				
Date(s) Work Performed:				
Name(s) of Project(s):				
Value of Project(s): \$				
Name of Company:				
Address:				
Contact Name:				
Telephone:				
Email:				

Method: Subjective Evaluation

Each reference may be checked for, but not limited to, adherence to contract terms and conditions, timelines, quality standards, overall customer service, project being of similar size, scope and complexity.

FIRST-TIER SUBCONTRACTOR DISCLOSURE FORM

(Contra	actor)				
PROJECT	NAME:	International School o	f Beaverton Roof & H	VAC General Contractor	
BID #:	20-0030	BID CLOSING DATE:	March 23, 2021	BID CLOSING TIME:	2:00 PM Pacific Time
		1	•		
	OSURE DLINE:	DISCLOSURE DUE DATE:	March 23, 2021	DISCLOSURE DUE TIME:	4:00 PM Pacific Time
		his First-Tier Subcontracto later than the Disclosure (Bid submission *OR* in a
equired to	o be disclose	each subcontractor that velocity the category of work the Category of work the CANE" if there are no subco	at the subcontractor v	vill be performing and th	
	SUBCONTRA	CTOR'S NAME	CATEGORY	OF WORK	DOLLAR VALUE
1.					
2.					
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
qual to: a) 5% of the	ier subcontractor(s) are fur total project Bid, but at le regardless of the percenta	ast \$15,000 (including	; all alternates); or	llar Value greater than or
		HIS FORM BY THE DISCLOS NOT BE CONSIDERED FOR		RESULT IN A NON-RESPO	ONSIVE BID. A NON-
ontractor	r Contact Na	me:		Phone #:	
		Deliver Form T	o: contracts@beavertor	ı.k12.or.us	
			1		
	Person	Designated to Receive Fori	m: Any Purchasing S	taff	

THE DISTRICT MUST REJECT A BID IF THE BIDDER FAILS TO SUBMIT THE DISCLOSURE FORM WITH THIS INFORMATION BY THE STATED DEADLINE (see OAR 137-049-0360).

BY THE SPECIFIED DISCLOSURE DEADLINE. SEE INSTRUCTIONS TO BIDDERS.

ATTACHMENT I

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 date of full execution by the Owner.	П
BETWEEN the Owner:	ADDITIONS AND DELETIONS:
Beaverton School District #48J 16550 SW Merlo Road Beaverton, OR 97003	The author of this document has added information needed for its completion. The author may also have
and the Contractor:	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.
for the following Project:	This document has important legal consequences. Consultation with an attorney is encouraged with
<pre> « » « » « » « »</pre>	respect to its completion or modification. The parties should complete A101 2017, Exhibit A, Insurance and Bonds,
The Architect:	contemporaneously with this Agreement. AIA Document A201™-2017, General Conditions of the Contract
<pre>« »« » « » « » [All references to and responsibilities of Architect are to be completed by Owner or Owner's contracted Engineering Firm.]</pre>	for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.
1159322\v7	
The Owner and Contractor agree as follows.	

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TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS

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

§ 2.1 The Contractor shall fully execute the Work described in the Contract Documents or incidental, necessary, or reasonably inferable therefrom, except as specifically indicated in the Contract Documents to be the responsibility of others.

§ 2.2 THE OWNER'S RELIANCE ON THE CONTRACTOR AND SUBCONTRACTORS

§ 2.2.1 The Contractor accepts the relationship of trust and confidence established by this Agreement and covenants with the Owner to cooperate with the Architect and exercise the Contractor's skill and judgment in furthering the interests of the Owner; to furnish efficient construction administration, management services and supervision; to furnish at all times an adequate supply of workers and materials; and to perform the Work in an expeditious and economical manner consistent with the Owner's interests. The Owner and Contractor acknowledge and agree that (1) all Work performed by the Contractor and the Subcontractors shall be performed in the interests of the Owner and for its benefit, (2) the Contractor and the Subcontractors are authorized by the Owner to exercise their own independent, professional and trade judgments in performing their contractual obligations pursuant to this Section 2.2 on behalf of the Owner, (3) the Owner will be relying on the Contractor and the Subcontractors to perform their obligations consistent with this Section 2.2 and (4), as a result, the Contractor and Subcontractors at all tiers shall owe a duty to the Owner to exercise reasonable care and to avoid negligence in performing their obligations under the Contract and on the Project. The Contractor shall incorporate, and shall cause to be incorporated, into all subcontracts with Subcontractors a provision equivalent to this Section 2.2.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date fixed in a notice to proceed issued by the Owner.

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

§ 3.3 Subject to adjustments	of the Contract Time as provided in the Contra	act Documents, the Contractor shall
achieve Substantial Completi	ion of the entire Work not later than	and Final Completion of the entire
Work not later than	(collectively, the "Contract Time"). Ir	addition to achieving Substantial
Completion and Final Compl	letion by the dates required herein, the Contract	ctor shall achieve sufficient completion of

the Work so that Owner has full access to the Premises for the purpose of Owner's installation of furniture, fixtures, cabling and equipment that are not included in the Work not later than ____ days prior to the earlier of the required or actual Substantial Completion date ("Access Completion"). [ADJUST FOR PHASED DELIVERIES]

§ 3.3.1 The Contractor shall perform the Work diligently and continuously consistent with the Contract Time and Construction Schedule. Time is of the essence in the performance of the Work.

§ 3.4 ACCELERATION OF THE WORK

- § 3.4.1 If during the course of construction the Owner or Architect determines that the performance of the Work has not progressed or reached the level of completion required by the current, approved Construction Schedule, the Owner shall have the right to order the Contractor to take corrective measures as necessary to restore the progress of the construction to the requirements of such schedule, including but not limited to (1) working additional shifts or overtime, (2) finishing additional labor, services, materials, equipment and facilities and (3) other similar acceleration measures. The costs incurred by the Contractor pursuant to this Section 3.4.1 shall be paid by the Contractor.
- § 3.4.2 In the circumstances referenced in Section 3.4.1, and without limiting the Owner's rights under that Section, upon demand by the Owner the Contractor shall prepare and submit to the Owner and Architect a Recovery Schedule, in a form and providing sufficient detail to explain and display how the Contractor intends to reschedule the Work to regain compliance with the Construction Schedule during an agreed Recovery Period.
- § 3.4.2.1 Within seven (7) days after the Contractor's receipt of the Owner's demand for a Recovery Schedule, the Contractor shall present the Recovery Schedule to the Owner and Architect. The Recovery Schedule shall represent the Contractor's best judgment as to how the Work should be made to comply with the Construction Schedule within the agreed Recovery Period. The Recovery Schedule shall be prepared to a similar level of detail as the Contractor's construction schedule.
- § 3.4.2.2 Five (5) days prior to the expiration of the agreed Recovery Period, the Owner, Architect and Contractor shall confer to determine whether the Contractor has regained compliance with the Construction Schedule. If in the opinion of the Owner the Contractor is still not in compliance with the Construction Schedule, the Contractor shall prepare another Recovery Schedule pursuant to Sections 3.4.2 and 3.4.2.1, to take effect during the immediate subsequent agreed Recovery Period. If in the opinion of the Owner the Contractor has regained compliance with the Construction Schedule, the use of the Construction Schedule shall be resumed.
- § 3.5 Nothing in this Article 3 or any other provision of this Agreement shall be construed or applied to prevent or bar the Owner from directing the Contractor to accelerate the Work pursuant to the General Conditions.

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 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:

(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

« »

§ 4.3 Unit prices, if any:

(Identify and state the unit price; state quantity limitations, if any, to which the unit price will be applicable.)

Item Units and Limitations Price Per Unit (\$0.00)

Unless expressly stated otherwise herein, unit prices cover the entire cost of material, labor, equipment, shipping, insurance, installation, and overhead, fees and profit.

§ 4.4 Allowances included in the Contract Sum, if any:

(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Price

§ 4.5 Liquidated Damages

§ 4.5.1 The Contractor acknowledges that the Owner will incur significant damages if the Project is not completed within the Contract Time, including without limitation, damages in the form of: inability to use the Project and all related facilities (i.e., "loss of use"); delay costs for completion of portions of the Project or related projects to be constructed by the Owner or the Owner's separate contractors; or costs of extended services of the Owner's project management staff, outside construction management firms, Architect, any separate contractors and consultants, and others performing work or services related to the Project. In consideration of the factors set out in this Section 4.5.1, the Contractor acknowledges and agrees that time is particularly of the essence in the Contractor's performance of the Work in accordance with the agreed date of commencement of the Work, the agreed dates of Access Completion, Substantial Completion and Final Completion of the Work, and the approved Construction Schedule. The Owner will incur serious and substantial special, incidental and consequential damages if Access Completion, Substantial Completion and Final Completion of the Work do not occur within the respective specified dates. It would be difficult if not impossible to determine the amount of such damages. Consequently, provisions for liquidated damages as a reasonable estimate of loss are included in the Contract Documents. Such liquidated damages are a reasonable estimate of actual damages from loss of use delay and are not a penalty. The Owner's right to liquidated damages for delay is not affected by partial completion, occupancy, or beneficial occupancy. If the Work is to be performed in phases, with separate dates set forth elsewhere in the Contract Documents, then the liquidated damages of this Section shall apply separately to each such phase. The liquidated damages provisions herein are intended to be in addition to every other remedy enforceable at law, equity, or under this Contract, including without limitation the right to collect actual damages in any case where liquidated damages are unenforceable or otherwise unavailable. The provisions shall not relieve or release the Contractor from liability for any and all damage or damages suffered by the Owner due to other breaches of the Contract or suffered by separate contractors or under the indemnification and warranty provisions of this Contract, that are not breaches expressly covered by liquidated damages.

§ 4.5.2 Loss of Use Liquidated Damages

§ 4.5.2.1 The Owner and Contractor acknowledge and agree that if Substantial Completion of the Work is not achieved by the Contract Time for Substantial Completion, or Access Completion is not achieved by the required date for Access Completion, the amount of the Owner's actual loss of use damages (as described in Section 4.5.1 above) will be difficult, impractical or impossible to determine. Accordingly, the parties agree that if Access Completion or Substantial Completion is not achieved by the agreed date of Access Completion or Substantial Completion (as the case may be) as may be adjusted pursuant to the Contract Documents, the Contractor shall pay to the Owner as liquidated damages for the loss of use of the Project the following amounts: the sum of) for each partial day or full day of delay beyond the deadline for Dollars (\$ Access Completion or Substantial Completion. [Liquidated damages shall be the greater of the two numbers, so for example if Access Completion is 3 days late and Substantial Completion is 2 days late, 3 days of liquidated damages shall apply.] Modify as necessary for each Contract. LDs can be different for Access Completion and Substantial Completion based on the project.

§ 4.5.2.2 The parties further acknowledge and agree that the Contractor's obligation to pay liquidated damages under this Section 4.5.2 shall be in lieu of the obligation to pay actual delay damages for the loss of use damages in connection with Access Completion and Substantial Completion. The parties agree that the daily rate agreed to above is reasonable in comparison to the approximate scope of actual delay damages for loss of use that the parties anticipate as of the time of execution of this Agreement, and that the payment of such liquidated damages is not intended to be a penalty or forfeiture. The parties further acknowledge that these liquidated damages are meant to reimburse the Owner only for Access Completion and/or Substantial Completion loss of use delay damages and that the Owner reserves the right to claim other types of damages against Contractor resulting from delays, including but not limited to other delay damages. The Contractor's obligation to pay liquidated damages for the applicable period shall not require Owner's establishment of any actual damages for such delay.

§ 4.5.2.3 Withholding of Liquidated Damages

The Owner may withhold liquidated damages from any progress or final payment.

ARTICLE 5 PAYMENTS § 5.1 PROGRESS PAYMENTS

- § 5.1.1 Based upon Applications for Payment submitted to the Owner and 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. Payments shall be made in accordance with the Oregon Prompt Payment Act, ORS 279C.570.
- § 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month:
- § 5.1.3 Provided that a complete and correct Application for Payment is received by the Owner and Architect not later than the first (1st) day of a month, the Owner shall make payment of the approved amount to the Contractor not later than the thirtieth (30th) day of the same month. If an Application for Payment is received by the Owner and Architect after the application date fixed above, payment shall be made of the approved amount by the Owner not later than thirty (30) days after the Owner and Architect receive the Application for Payment.
- § 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor and approved by the Owner 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 or the Owner may require. The current schedule of values as approved by the Owner 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 A201TM–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:
 - That portion of the Contract Sum properly allocable to completed Work;
 - That portion of the Contract Sum properly allocable to materials and equipment delivered and .2 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 Owner determines, in the Owner's judgment, to be reasonably justified.
- § 5.1.6.2 The amount of each progress payment shall then be reduced by:
 - 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;
 - For Work performed or defects discovered since the last payment application, any amount for which the Architect or the Owner 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 Final Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due: five percent (5%) of each progress payment (unless otherwise required by law).

(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.)

- § 5.1.7.2 Upon Final Completion of the Work and fulfillment of all requirements for Final Completion and release of retainage, 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.
- § 5.1.8 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.
- § 5.1.9 In accordance with ORS 279C.570, the Owner and Contractor shall endeavor to agree upon (1) a mutually acceptable procedure for review and approval of payments to Subcontractors and (2) the percentage of retainage held on Subcontracts, and the Contractor shall execute subcontracts in accordance with those agreements. Unless otherwise agreed in writing with the Owner, The Contractor agrees to withhold as retainage from each first-tier Subcontractor five percent (5%) of the amount of each progress payment to such first-tier Subcontractor, until completion of the Work, and to otherwise apply such retainage in accordance with the applicable Subcontract to protect the interests of the Owner.

§ 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 after final payment as provided in Section 12.2.2 of the General Conditions, and to satisfy other requirements, if any, which arise or extend beyond final payment;
 - .2 a final Certificate for Payment has been issued by the Architect and approved by the Owner; and
 - .3 the Contractor has fully complied with the General Conditions and all other requirements of the Contract Documents for final payment.
- § 5.2.2 The Owner's final payment to the Contractor shall be made no later than thirty (30) days after the issuance of the Architect's final Certificate for Payment.
- § 5.3 Interest payments due and unpaid under the Contract shall bear interest at the rate required under Oregon law.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 For any Claim subject to, but not resolved by, mediation pursuant to Section 15.2 of the General Conditions, the method of binding dispute resolution shall pursuant to Section 15.3 of the General Conditions be at the Owner's sole option either (i) arbitration or (ii) 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 the General Conditions.
- § 7.2 The Work may be suspended by the Owner as provided in Article 14 of the General Conditions.

ARTICLE 8 MISCELLANEOUS PROVISIONS

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

§ 8.2 The Owner's Representative:

(Name, address and other information)

«Larry Pelatt» «Purchasing Manager» «Beaverton School District #48J » «16550 SW Merlo Road» «Beaverton, OR 97003» «Telephone: (503) 356-4379»

(Name, address and other information)
« »
« »
« »
« »
« »
« »
§ 8.4 Either party may change their representative by written notice to the other party. The Contractor's Representative shall not be replaced without ten (10) days written notice to and the consent of the Owner. If the Owner approves replacement of the Contractor's Representative, the Owner shall have the right to approve the replacement Contractor's Representative. The Owner shall have the right, which shall be exercised in a reasonable fashion, to require replacement of the Contractor's Representative. The Owner may replace the Owner's Representative at its discretion.
§ 8.5 Contractor's Project Manager shall be:
§ 8.6 Contractor's Project Superintendent shall be:
§ 8.5 Insurance and Bonds
§ 8.5.1 The Contractor shall purchase and maintain insurance as set forth in the Contract Documents.
§ 8.5.2 The Contractor shall provide bonds as set forth in the Contract Documents.
§ 8.6 The Owner's Project Manager.
(Name, address and other information)
« »
« »
« »
« »
« »
« »
§ 8.6.1 The Owner's Representative and the Contractor's Representative shall have authority to bind the Owner and Contractor, respectively, regarding all matters related to the Contract. The Owner's Project Manager shall represent

§ 8.6.1 The Owner's Representative and the Contractor's Representative shall have authority to bind the Owner and Contractor, respectively, regarding all matters related to the Contract. The Owner's Project Manager shall represent the Owner's interest throughout the Project. The Owner's Project Manager shall not have the authority to bind the Owner regarding any matter relating to the Contract.

§ 8.7 Other Provisions:

§ 8.3 The Contractor's Representative:

- § 8.7.1 The Contractor represents and warrants to the Owner, in addition to the other representations and warranties contained in the Contract Documents and as an inducement to the Owner to execute this Agreement, which representations and warranties shall survive the execution of this Agreement and the Final Completion of the Work, as follows:
 - .1 that the Contractor is financially solvent, able to pay its debts as they mature and possessed of sufficient working capital to perform and complete the Work as described in the Contract Documents and to otherwise perform its obligations under the Contract Documents;
 - .2 that the Contractor is able to furnish the labor, services, materials, equipment, facilities, supervision, Project management and other services necessary and required to perform and complete the Work and to otherwise perform its obligations under the Contract Documents, and has sufficient experience and competence to do so;
 - .3 that the Contractor is authorized to do business in the state where the Project is located and is properly licensed and registered by all necessary governmental and quasi-public authorities having jurisdiction over the Contractor, the Work and the Project; and

duly authorized powers.

§ 8.7.2 The Contractor hereby agrees that the Project will be completed substantially in accordance with building permits and any other permits related to development of the Project, the Contract Documents and unless otherwise

that the Contractor's execution of this Agreement and its performance of the Contract is within its

- § 8.7.2 The Contractor hereby agrees that the Project will be completed substantially in accordance with building permits and any other permits related to development of the Project, the Contract Documents and unless otherwise provided in the Contract Documents all manufacturers' or suppliers' recommended installation procedures so as to preserve any warranties with respect thereto, free and clear of all liens or encumbrances and within the time set forth in the Contract Documents. Contractor does further agree that on the date of Substantial Completion, the Project shall comply with all applicable building laws, ordinances, rules and regulations known, or which should in the exercise of reasonable care be known, to Contractor, and that all utility services necessary for the operation of the Project shall have been provided to the Project within the time for completion of construction.
- § 8.7.3 Interpretation. The Contract Documents have been carefully reviewed and negotiated by both parties at arm's length, and they shall be given fair and reasonable interpretation in accordance with the words contained in them without any weight being given to whether a provision was drafted by one party or its counsel. Section headings are for convenience only and shall not be a part of the Contract Documents or considered in their interpretation. The Exhibits attached hereto are made a part hereof.
- § 8.7.4 If the Contractor fails, neglects or refuses to make prompt payment for labor, materials, equipment or other services furnished to the Contractor or a Subcontractor by any person in connection with the Project as such claim becomes due, the Owner may pay the claim and charge the amount of the payment against funds due or to become due the Contractor under this Contract. Payment of claims in this manner shall not relieve the Contractor or the Contractor's surety from obligation with respect to any unpaid claims.
- § 8.7.5 This Contract is subject to the State of Oregon Bureau of Labor and Industries Prevailing Wage Rates, and Contractor shall pay or cause to be paid all workers accordingly. For this contract, the 'prevailing rate of wage' as published by the Oregon Bureau of Labor and Industries are the Prevailing Wage Rates for Public Works Contracts in Oregon effective July 1, 2019. Such rates may be found at the Bureau's web site www.boli.state.or.us as in effect on the Publication Date.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

.4

- § 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below. Any Contractor or subcontractor proposals referenced as part of the Contract Documents are incorporated solely for: (i) any statement of fees and schedule that is otherwise consistent with the terms of this Agreement and (ii) any statement of services and scope of Work that is consistent with the remainder of this Agreement, or that provides additional Work without adjustment to the Contract Sum or Contract Time. No other provisions of any proposal are part of this Agreement, including without limitation any purported limitation on liability. To the extent that a proposal term otherwise conflicts with the other terms of this Agreement, such proposed conflicting terms are void and are expressly and wholly subject to the terms of this Agreement. In the event of overlap or inconsistency between the provisions of such proposals and the other terms of this Agreement, the provision that provides a better quality or quantity of service to Owner shall control.
- § 9.1.1 The Agreement is this executed and modified AIA Document A101TM_2017, Standard Form of Agreement Between Owner and Contractor.
- § 9.1.2 The General Conditions are the General Conditions of the Contract for Construction, as modified herein. References to the AIA Document A201TM-2017 mean the General Conditions.
- § 9.1.3 The Specifications will be set out in Exhibit A, Construction Documents List.
- § 9.1.4 The Drawings will be set out in Exhibit A, Construction Documents List.
- § 9.1.5 The Addenda, if any, are set out in Exhibit A, Construction Documents List.
- § 9.1.6 Additional documents, if any, forming part of the Contract Documents:

Exhibit A: Construction Documents List

Exhibit B: Forms of Claim Waivers and Releases

Exhibit C: Exhibit D: Exhibit E: Exhibit F:	Contract Provisions from ORS Chapters 279A and 279C, the Attorney General Model Public Contracting Rules and Other Laws Statement of Work-Owner's Solicitation ITB [] including issued Addenda Insurance Requirements Contractor's Bid dated []				
This Agreement entered	into as of the day and	d year first writte	en above.		
Beaverton School Di	strict		Contractor		
District Representat	ive	Date	Signature of Person to Bind Contractor	Authorized	Date
Department Admini	strator	Date	Printed Name and	Title	
Executive Administr	rator for Facilities	Date	Telephone Numbe	r	
Business Services Ac	lministrator	Date	e-Mail Address		
Business Services Pu	ırchasing	Date			
Not a valid contract unti	l all signatures are co	omplete.			

DRAFT AIA Document A201™ - 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

« » **«** »

THE OWNER:

(Name, legal status and address)

«Beaverton School District #48J» «16550 SW Merlo Road » «Beaverton, OR 97003»

THE ARCHITECT:

(Name, legal status and address)

« »« » « »

[All references to and responsibilities of Architect are to be completed by Owner or Owner's contracted Engineering Firm.] – *Include if there is no Architect on the project.*

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

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

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





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Architect's Copyright

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, signed by both parties, (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. Submittals are not Contract Documents unless and until they are formalized as a Change Order.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction (the "Contract"). The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior or contemporaneous 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.

§ 1.1.2.1 Notwithstanding Section 1.1.2, the Owner is (1) a third-party beneficiary of subcontracts, purchase orders and similar agreements between the Contractor and its Subcontractors and between Subcontractors and their Subcontractors, as set out in Section 5.3, and (2) a contingent assignee of such subcontracts, purchase orders and similar agreements, as set out in Section 5.4.

§ 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 and Subcontractors to fulfill the Contractor's obligations. The Work includes all work performed by Contractor and its Subcontractors at any tier on the Project prior to the date of this Contract, if any, and may constitute the whole or a part of the Project. The Work shall consist of all items set forth in, required by or reasonably inferable from Contract Documents in order to fully complete the Project, including, unless otherwise specifically excluded, all demolition and construction services, supervision, administration, coordination, tests, inspections, clean up, repairs and other items that are necessary and appropriate, together with the additional, collateral and incidental work and services required for completion of the Work as set forth in the Contract Documents.

§ 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 (whether work made for hire or otherwise). Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 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. The Work includes, unless specifically excluded, all demolition and construction services, construction supervision, administration, coordination, acquisition of permits and approvals, tests, inspections, clean up, repairs, and other items that are necessary and appropriate to complete construction of the Work together with the additional collateral and incidental work and services required for completion of the Work as set forth in the Contract Documents. Contractor is responsible for performing and completing the Work in a manner that provides a complete and functional Project for the Owner, and the Work includes all materials and labor required for provision of such a Project.
- § 1.2.1.1 If any provision of this Contract at any time is determined to be invalid, void or otherwise unenforceable for any reason, then the remaining provisions or portions of provisions shall remain in full force and effect and the offending provision shall be given the broadest meaning and effect allowed by law. 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.
- § 1.2.4 In the event of conflicts, inconsistencies, discrepancies or ambiguities between or among the Contract Documents, interpretations shall be based on the following order of precedence:
 - Modifications of the Contract, with those of later date having precedence over those of earlier date, and .1 with those of the same date having precedence based upon Clauses .2 through .6 of this Section 1.2.4;
 - .2 the Agreement;
 - .3 these General Conditions;
 - .4 addenda, with those of later date having precedence over those of earlier date;
 - .5 the Drawings, with those in larger scale having precedence over those in smaller scale, and with notes and schedules thereon having precedence over the remainder; and
 - .6 the Specifications.
 - .7 Owner's Solicitation
- § 1.2.5 In the event of conflicts, inconsistencies, discrepancies or ambiguities between or among the Drawings, or between or among the Specifications, remaining after application of Section 1.2.4, those Drawings or Specifications of later date shall have precedence over those of earlier date. Drawings govern Specifications for quantity and location and Specifications govern Drawings for quality and performance. In the event of ambiguity in quantity or quality, the greater quantity and the better quality shall govern. Work described in the specifications that is not specifically located on the drawings is nonetheless included in the Work. Items reasonably inferred from the Drawings but not in the Drawings (e.g., missing doorknobs, electrical connections to HVAC, etc.) shall be deemed part of the Drawings. Reference in the singular to an article, device, item or piece of equipment shall include the larger of the number of such articles indicated in the Contract Documents or the number required to complete the installation. Figured or written dimensions govern scale dimensions, and large scale Drawings govern small scale Drawings; provided that where the Contract Documents provide for different or conflicting standards or requirements as to any portion of the Work, Contractor shall be obligated to provide the better quality, greater quantity, or comply with the more stringent requirements. In the event that work is shown on Drawings but not contained in Specifications or contained in the Specifications and not shown on the Drawings, it will be assumed the work as shown shall be provided at no change in the Contract Sum or Contract Time, according to the Drawings and/or Specifications. The Contractor shall not be entitled to an increase in the Contract Sum or Time arising out of an error or conflict where the Contractor failed adequately to review the Contract Documents and timely report the error or conflict to the Owner and the Architect. If a conflict, inconsistency, discrepancy or ambiguity nonetheless remains, the Contractor shall provide written notice

thereof to the Architect and the Owner. Thereafter, unless otherwise ordered in writing by the Architect, the Contractor shall provide the better quality of, and the greater quantity of, the Work. The provisions of this Section 1.2.5 shall apply only to conflicts, inconsistencies, discrepancies or ambiguities in express requirements of the Drawings and Specifications and not to interpretations thereof by the Owner or the Architect.

§ 1.2.6 Where a conflict in Contract Document requirements occurs between the Specifications and Drawings or between Drawings only and clarification is not secured in writing prior to the Contractor's bid date or execution of this Agreement, whichever is earlier, the Contractor and its subcontractors at all tiers assume the responsibility and bear the risk that the bid assumption differs from the actual requirements of the Project. The Architect shall decide which of the conflicting requirements will govern based upon the most stringent of the requirements, and subject to the approval of the Owner, the Contractor shall perform the Work consistent with the Architect's decision without adjustment of the Contract Sum or Contract Time.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles and identified references to Sections and Clauses in the document, or (3) the titles of other documents published by the American Institute of the Architects or by Owner.

§ 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 Drawings, Specifications and other documents, including those in electronic form, prepared by the Architect and the Architect's consultants are Instruments of Service through which the Work to be executed by the Contractor is described. The Contractor and its Sub-Contractors may retain one record set. Unless otherwise indicated, the Architect and the Architect's consultants shall be deemed the authors of their respective Instruments of Service, including the Drawings and Specifications, and unless otherwise agreed with the Owner will retain all common law, statutory and other reserved rights, 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 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 (the Contractor acknowledges the Architect's consent also may be required and if so the Contractor shall procure such consent).

§ 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 Transmission of Data in Digital Form

If the parties intend to transmit Drawings or Specifications or any other information or documentation in digital form, they shall comply with the Owner's identified protocols or, in the absence of such protocol, shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

§ 1.8 Execution of Contract Documents

The Contract Documents shall be signed by the Owner and Contractor. If either the Owner or Contractor or both do not sign all the Contract Documents, the Contractor is responsible for identifying such unsigned Document prior to initiating the Work.

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. Changes to the Contract involving modifications to the Contract Time or Contract Sum must be signed by an authorized representative of the Owner. The term "the Owner" means the Owner or the Owner's authorized representative. The only entity or person authorized to act for the Owner means the authorized representative outlined above, including any substituted authorized representative. Teachers, staff, a principal, custodians or others at the school who are not the Owner's authorized representatives are not authorized to act for Owner as to any matter regarding this Contract.
- § 2.1.2 Owner shall have the right, but not the obligation, to have a representative on-site (who need not be the Owner's Representative identified above) to observe the progress of the Work. The presence of the Owner's representative shall in no way relieve the Contractor of Contractor's obligations to supervise the Work so that the Work is in conformity with the Contract Documents. The presence of Owner's representative on-site shall not he deemed in any respect to constitute an approval or concurrence by Owner that any portion of the Work has been properly executed, installed or completed in accordance with the Contract Documents, nor an assumption of any duty for the means and methods of performance of the Work. Owner's representative shall be entitled to make notes or audio or video recordings of conditions and activities observed and shall have the right to inspect and review activity reports, Contractor's logs or other information available on-site, or at Contractor's offices, provided that Owner Representative shall not materially delay the progress of the Work in undertaking such activities.

§ 2.2 Information Provided by the Owner

- § 2.2.1 The Owner has furnished the information describing physical characteristics, legal limitations and utility locations for the site of the Project to the extent indicated in the Invitation to Bid. The Contractor shall be entitled to reasonably rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.
- § 2.2.2 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 fourteen (14) days' notice to the Owner, only where disclosure is required by law, by 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 on a need-to-know basis 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, on condition that they agree, in writing, 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 or Subcontractors under the Contract Documents or applicable law, including those required under Section 3.7.1, the Owner or the Architect shall secure and the Owner shall pay for the building permit, development fees, plan check fees, system development charges, road approach and right-of-way permits, air discharge permits and other similar necessary permits, 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 whose status under the Contract Documents shall be that of the Architect, but who need not be licensed to practice architecture.

- § 2.3.4 Contractor shall confirm the location of each utility, shall excavate and where necessary dispose of each onsite utility and shall cap offsite utility as required by the Work and as may be included in the Specifications. At the Owner's request, Contractor shall make available to the Owner the results of any site investigation, test borings, analyses, studies, or other tests conducted by or in possession of Contractor or any of its agents. The Contractor shall confirm indicated dimensions and other aspects of existing conditions at the Project site as necessary for the proper performance of the Work. The Contractor may rely only on the accuracy of the technical information contained in surveys and other reports furnished by the Owner, and only to the extent Contractor does not have knowledge of information to the contrary. Contractor shall exercise special care in executing the subsurface work in proximity of known subsurface utilities, improvements and easements.
- § 2.3.4.1 The Contractor shall be responsible for determining, prior to commencement of the Work, the locations of all underground utility lines, cables, pipelines and similar such underground public service installations within and serving the Project site, utilizing utility locating services or other means permitted by law. The Contractor shall coordinate with utility and other involved third-party representatives regarding utility locations and related issues, and shall hand excavate or otherwise take special precautions so as to perform the Work in such a manner as to avoid damaging, or interrupting the operation of, all utility lines, cables, pipelines and similar public service installations within and serving the Project site, whether above ground or underground.
- § 2.3.5 The Owner shall furnish to the Contractor one (1) reproducible copy of the Drawings and Specifications at no cost to the Contractor. The Contractor's cost of reproducing or obtaining additional copies of the Drawings and Specifications as are required for the performance of the Work shall be included in the Contract Sum.
- § 2.3.6 The Contractor agrees that the Owner shall have no obligation to deliver copies of notices of right to a lien received by the Owner from parties purporting to be performing or furnishing Work under the Contract or on the Project, and that the Owner's non-delivery of copies of such notices to the Contractor shall have no effect on the obligations of the Contractor to hold harmless and indemnify the Owner for mechanics', material suppliers', design professionals', construction or similar liens as required by the Contract or applicable law.

§ 2.4 The 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 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. This right shall be in addition to, and not in restriction of, the Owner's other rights under this Agreement and at law, and its exercise shall not excuse the Contractor from damages caused by breach of this Agreement or its responsibility for full performance of this Agreement.

§ 2.5 The Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to protect or carry out the Work in accordance with the Contract Documents and fails within a seven-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Pursuant to Section 9.5.1, a Certificate for Payment may be withheld or nullified in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies or protecting the Work, including but not limited to the Owner's attorneys' fees and related costs, disbursements and the Owner's expenses and compensation for the Architect's or the Owner's consultants 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. The right of the Owner to protect the Work or correct deficiencies in the Work shall not give rise to any duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, nor excuse any default by Contractor. 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.

§ 2.6 Owner's Audit Rights

§ 2.6.1 The Contractor shall keep full and detailed accounts and exercise such controls as may be necessary for proper financial management under this Contract, and the accounting and control systems shall be satisfactory to the Owner. The Contractor shall develop a system of cost control for the Work, including regular monitoring of actual costs for activities in progress and estimates for uncompleted tasks and proposed changes. The Contractor shall identify

variances between actual and estimated costs and report the variances to the Owner and the Architect at regular intervals, using Contractor's job-cost tracking system.

- § 2.6.2 The Contractor's records, which shall include but not be limited to accounting records, written policies and procedures, subcontractor files (including proposals of successful and unsuccessful bidders), original estimates, estimating work sheets, correspondence, change order files (including documentation covering negotiated settlements), and any other supporting evidence necessary to substantiate charges related to the Contract shall be open to inspection and subject to audit and/or reproduction, during normal working hours, by the Owner's agents or authorized representatives. Such records subject to examination shall also include, but not be limited to, those records necessary to evaluate and verify direct and indirect costs (including overhead allocations) as they may apply to costs associated with the Contract and records relating to the performance of the Work. The Contractor shall preserve such records for a period of at least three years following the date of Final Acceptance under the Contract and for such longer period as may be required by any other provision of the Contract
- § 2.6.3 For the purpose of such audits, inspections, examinations and evaluations, the Owner's agents or authorized representatives shall have access to said records from the commencement of the Contract for the duration of the Work and thereafter.
- § 2.6.4 The Owner's agents or authorized representatives shall have access to all of the Contractor's facilities and databases where such records are located, and shall be provided adequate and appropriate work space, in order to conduct audits in compliance with this section.

§ 2.7 Nonwaiver of Rights By the Owner

No action or inaction on the part of the Owner at any time in the exercise of any right or remedies conferred upon it under this Contract shall be deemed to be a waiver on the part of the Owner of any of its rights or remedies.

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 in the jurisdiction where the Project is located, and shall cause all of its subcontractors at all tiers to be so lawfully licensed when required for performance of their portion of the Work. 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.
- § 3.1.1.1 Unless they leave the employ of the Contractor, the Contractor's Superintendent(s) and Project Manager(s) identified in this Agreement shall serve in these positions throughout the duration of the Contractor's performance of the Contract except as approved otherwise in writing in advance by the Owner. Persons named to replace those set out above shall be approved in writing in advance by the Owner. The Owner's approvals as required by this Clause shall not unreasonably be withheld. The Project Manager and Superintendent shall, among other things, supervise and coordinate all Work on the Project and shall attend and participate in all meetings throughout the Project unless excused from such attendance by the Owner.
- § 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.
- § 3.1.4 The Contractor shall be and operate as an independent contractor under this Contract and in the performance of the Work and shall have complete control over and responsibility for all personnel performing the Work. In no event shall the Contractor be authorized to enter into any agreements or undertakings for or on behalf of the Owner or to act as or be an agent or employee of the Owner. The Contractor accepts the relationship of trust and confidence between Contractor and the Owner and agrees to furnish its best professional skill, judgment and efforts to accomplish the Work in an expeditious manner consistent with the best interests of the Owner. Contractor acknowledges that it has a relationship of special trust with the Owner, and that the Owner is relying on Contractor's expertise in entering into this Contract. Nothing in the Contract Documents is intended or shall be construed as creating any other relationship or designating Contractor as an agent for or joint venturer with the Owner.

§ 3.1.5 The Contractor shall (a) record the progress of the Work; (b) submit to the Owner a written progress report every month; (c) submit to the Owner such reports and notifications as the Owner may reasonably request from time to time; and (d) keep a daily log of information reasonably relevant to the Work.

§ 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 and shall carefully compare such field measurements and conditions and other information known to the Contractor with the Contract Documents before commencing such activities. The Contractor shall prevent the dislocation or destruction of reference points and shall employ a registered land surveyor currently licensed in Oregon for, and be responsible for accuracy of layout and elevations for the Work. The Contractor shall promptly report in writing to the Architect and the Owner 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. The Contractor shall do no work without applicable Drawings, Specifications, the Architect's Supplemental Instructions, or written modifications or, where required, approved Shop Drawings, Product Data, or Samples, unless instructed to do so in writing by the Architect and the Owner. Where conflicts that the Contractor knew or reasonably should have known have not been brought to the Architect's attention in a timely manner, the Contractor will be deemed to have elected the method(s) or material (s) necessary in the Architect's opinion to reconcile the conflict as included in the Contract Sum and Contract Time. Any design errors or omissions noted by the Contractor during this review shall be reported promptly by Contractor to the Owner and the Architect but 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, except for design build Work or lawful orders of public authorities, but the Contractor shall promptly report in writing to the Architect and the Owner any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require. If the Contractor performs Work knowing it to be contrary to laws, statutes, ordinances, building codes, and rules and regulations without such notice to the Architect and the Owner, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.
- § 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 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 the 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, except for unreported observed deficiencies or those items related to design-build or design-assist Work unless the Contractor recognized or reasonably should have recognized such error, inconsistency, omission, nonconformity or difference and failed to report it to the Architect and the Owner. If the Contractor performs any construction activity it knows or reasonably should have known involves an error, inconsistency or omission in the Contract Documents without such notice to the Architect and the Owner, the Contractor shall be responsible for such performance and shall bear the attributable costs for correction.
- § 3.2.4.1 Contractor shall confirm applicable requirements appearing in any easements, covenants and other record documents and in the event of any discovered conflict between any such requirement and the Drawings and Specifications shall immediately notify the Owner and the Architect.
- § 3.2.4.2 Any investigations of hidden or subsurface conditions have been made for design purposes. The results of these investigations may be bound into or referenced in the Contract Documents for the convenience of the Contractor

and Sub-contractors and are a part of the Contract Documents. There is no guarantee, express or implied, that the conditions indicated are representative of those existing throughout the site or that unforeseen developments not inferable from such investigations may not occur.

§ 3.2.4.3 The Owner shall be entitled to deduct from the Contract Sum amounts paid by the Owner to the Architect for the Architect to evaluate and respond to the Contractor's requests for information, where such information was available to the Contractor from a study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

§ 3.2.5 Notwithstanding any other provision of the Contract, the Contractor hereby specifically acknowledges that the Contract Documents are sufficient to have enabled the Contractor to determine the cost of the Work therein in order to enter into the Contract, and that the Drawings, the Specifications and all Addenda and other Contract Documents are sufficient to enable the Contractor to perform the Work outlined therein in accordance with applicable laws, statutes, building codes and regulations and otherwise to fulfill all of its obligations hereunder. The Contractor further acknowledges that (a) it has visited and made a thorough examination of the jobsite and existing documentation, (b) it has examined all conditions affecting the Work, (c) it has reviewed necessary tests, surveys, studies and reports and all other conditions which might reasonably affect the progress of the Work as the Contractor deems advisable, and that it has satisfied itself by such review, (d) having carefully examined the jobsite and all Drawings, Specifications, and documents, the Contractor has satisfied itself that there are no discrepancies or omissions in the Contract Documents that a Contractor exercising professional General Contracting practices, skills, judgment, etc. would have reasonably recognized, (e) the Contract Sum includes payment for all Work that may be necessary to overcome unanticipated conditions that a Contractor exercising professional General Contracting practices, skills, judgment, etc. would have reasonably recognized, and (f) except as otherwise expressly provided for herein, no Claim for unforeseen or unforeseeable conditions or limitations that exist or may arise affecting the Work or difficulties in performing the Work will be accepted, nor shall it give rise to a Claim, nor shall it constitute an excuse or basis for any failure or omission by the Contractor or for extra compensation, or as a basis for an extension of time in which to complete performance of the Contract.

§ 3.2.6 By executing this Contract, the Contractor represents and acknowledges that the Contract Sum is reasonable compensation for all the Work, that the Contract Time is adequate for the performance of the Work, and that it has carefully examined the contract documents and the Project site, including any existing structures, and that it has satisfied itself as to the nature, location, character, quality and quantity of the Work, the labor, materials, equipment, goods, supplies, work, services and other items to be furnished and all other requirements of the Contract Documents, as well as the surface conditions and other matters that may be encountered at the Project site or affect performance of the Work or the cost or difficulty thereof, including but not limited to those conditions and matters affecting: transportation, access, disposal, handling and storage of materials, equipment and other items; availability and quality of labor, water, electric power, utilities, drainage; availability and condition of roads; normal climatic conditions and seasons; physical conditions at the Project site and the surrounding locality; topography and ground surface conditions; and equipment and facilities needed preliminary to and at all times during the performance of the Work. The failure of the Contractor to acquaint itself with any such condition or matter shall not in any way relieve the Contractor from the responsibility for performing the Work in accordance with the Contract Documents and within the Contract Time and the Contract Sum. The Contractor acknowledges that having carefully examined the jobsite and all Drawings, Specifications, and documents, the Contractor has satisfied itself that there are no discrepancies or omissions in the Contract Documents that a Contractor exercising professional General Contracting practices, skills, judgment, etc. would have reasonably recognized.

§ 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. The Contractor shall review any such specific instructions and any construction or installation procedure specified in the Contract Documents, shall advise the Architect if following the instruction or procedure will affect any warranties. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, 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 written notice to the Owner and the Architect, and shall propose alternative means, methods, techniques, sequences, or procedures.

Contractor shall not proceed with that portion of the Work without further written instructions from the Owner or the Architect. 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. The Contractor shall perform no portion of the Work without Contract Documents, or, where required, approved Shop Drawings, Product Data or Samples for such portion of the Work, unless authorized to do so by written instructions of the Owner. Where specific instructions are given in a Contract Document, the Contractor shall review the instructions, including those of manufacturers, and promptly notify the Architect and the Owner in writing if the specified instruction or procedure deviates from accepted construction practice, or normal procedure, or will affect warranties, or other responsibilities of the Contractor. The Contractor's notification shall include reasonable alternatives that the Contractor, exercising Professional judgment, believes will accomplish the original intent of the Contract Documents.

- § 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors at any tier, design professionals performing services on behalf of the Contractor or Subcontractors, and their respective 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 at any tier. The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in its administration of the Contract, or by tests, inspections or approvals required or performed by persons other than the Contractor.
- § 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. Under no conditions shall a section of Work proceed prior to preparatory work having been completed, cured, dried and otherwise made satisfactory to receive the related work. Responsibility for timely installation of all materials and equipment rests solely with the Contractor, who shall maintain coordination control at all times.
- § 3.3.4 Prior to the commencement of construction, the Contractor shall prepare and obtain the Owner's approval of a construction site management plan, which will take into account requirements contained in the Specifications, and the Owner's requirements and restrictions concerning access and parking for construction personnel, staging areas and material delivery times, traffic flow requirements of the Owner and local governmental authorities, and work hours, among other things.
- § 3.3.5 The Contractor shall perform such detailed examination, inspection and quality surveillance of the Work as will ensure that the Work is progressing and is being completed in strict accordance with the Contract Documents, including the latest issue of the Drawings and Specifications. The Contractor shall be responsible for examination, inspection and quality surveillance of all Work performed by any Subcontractor, and for each Subcontractors' performance of such Work itself. The Contractor shall determine when it is necessary to perform and shall perform, or arrange for the performance of, tests (in addition to those requested by the Owner or required by the Specifications or any other provision of the Contract Documents) to verify its inspections or to ensure that the Work is being completed in strict accordance with the Contract Documents. If any of the Work is required to be inspected or approved by any public authority, Contractor shall cause such inspection or approval to be performed. No inspection performed or failed to be performed by the Owner hereunder shall be a waiver of any of Contractor's obligations hereunder.
- § 3.3.6 The Contractor shall plan and lay out all Work in advance of operations so as to coordinate all work without delay or revision. The Contractor shall establish and maintain existing lot lines, restrictions, and bench marks. The Contractor shall establish and maintain all other grades, lines, levels and bench marks necessary for the execution of the Work and take necessary steps to prevent their dislocation or destruction. For new building construction or additions, the Contractor shall employ a professional land surveyor registered in the State of Oregon to establish building corners and floor elevations. The land surveyor shall also provide a stamped and signed drawing certifying the actual location of the building corners in reference to the lot lines and actual floor elevations as constructed. The Contractor shall report errors or inconsistencies to the Owner and the Architect before commencing Work and review placement of the improvements on the site with the Owner and the Architect after all lines are staked out and before foundation work is started.
- § 3.3.7 Should the Specifications and Drawings fail to particularly describe the material or kind of goods to be used in any place, or their method or integration into the Work, Contractor shall have the duty to make inquiry of the Owner and the Architect as to what is required prior to performance of the Work. Absent Specifications to the contrary, the

material that would normally be used to produce finished Work shall be considered a part of the Contract requirements.

- § 3.3.8 If any of the Work is required to be inspected or approved by any public authority, Contractor shall cause such inspection or approval to be performed. No inspection performed or failed to be performed by the Owner hereunder shall be a waiver of any of Contractor's obligations hereunder.
- § 3.3.9 Contractor acknowledges that it is Contractor's responsibility to hire all personnel for the proper and diligent prosecution of the Work, and Contractor shall use its best efforts to maintain labor peace by and/or among its employees and subcontractors for the duration of the project. In the event of a labor dispute related to this project, Contractor shall not be entitled to an increase in the Contract Sum or Contract Time if the dispute was caused by acts or omissions of Contractor, or Contractor's agents, Subcontractors or Suppliers.

§ 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.
- § 3.4.2.1 If prior to performing a certain portion of the Work, the Contractor desires to submit a substitute product or method for that Work in lieu of what has been specified, the Contractor shall provide written notice to the Architect and the Owner setting forth the following information and documents:
 - a full explanation of the proposed substitution and a submittal of all supporting data, including technical information, catalog cuts, warranties, test results, installation instructions, operation procedures and other like information necessary for a complete evaluation of the substitution;
 - .2 reasons the substitution is advantageous and necessary, including but not limited to the benefits to the Owner and the Work in the event the substitution is accepted;
 - .3 the adjustment, if any, in the Contract Sum, in the event the substitution is accepted;
 - the adjustment, if any, in the Contract Time and the Contractor's Construction Schedule in the event the substitution is accepted;
 - an affidavit stating that (1) the proposed substitution meets all the requirements of the Drawings and Specifications and (2) the Contractor will perform or cause to be performed the warranty and correction of Work obligations with respect to the proposed substitution that would have been performed for the specified product or method; and
 - .6 the impact, if any, on the Subcontractors or other contractors performing Work on the Project, in the event the substitution is accepted.

Proposals for substitutions shall be submitted to the Architect and the Owner in sufficient time to allow the Architect and the Owner no less than fourteen (14) days for review.

By making requests for substitutions, the Contractor represents, warrants and certifies that: (1) the Contractor has personally investigated the proposed substitute product; (2) the Contractor will provide the same materials and labor warranty for the substitution that the Contractor would for that specified unless approved otherwise; (3) the substitute product is of equal or better quality and useful life to the originally-specified product; (4) the cost data presented is complete and includes all related costs under the Contract Documents except the Architect's redesign costs, and (5) the Contractor will coordinate the installation of the accepted substitute, making such changes as may be required for the Work to be completed in all respects. The Contractor will be responsible for the reasonable costs of any time the Owner and/or the Architect expends in reviewing a Contractor substitution request. Should the Contractor or the

Owner request substitution with a material or system of lesser quality and/or cost, if approved by the Owner, the Contractor shall compensate the Owner for the difference in cost through a deductive Change Order or Change Directive.

- § 3.4.3 The Contractor shall enforce strict discipline and good order and civil and appropriate conduct among the Contractor's and Subcontractors' 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. The Contractor shall not permit at the site of the Work the use of alcohol, tobacco or cannabis, vaping, illegal use of drugs or other controlled substances, firearms or other weapons, verbal or other harassment, lewd or obscene language or behavior, or disregard for the property, privacy, or personal or business interests of the Owner or other occupants of adjacent or nearby parcels, or their respective contractors. The Contractor agrees to take prompt and effective corrective action in the event of violations of these standards of conduct. The Owner may require in writing the Contractor to immediately remove from the Work any employee or other person carrying out the Contract that the Owner considers objectionable. To the fullest extent permitted by Law, the Contractor shall not be entitled to any change to the Contract Sum or Contract Time as a result of any such removal required by the Owner.
- § 3.4.4 The Contractor shall coordinate, supervise and otherwise administer the Work so as to maintain labor harmony between and among the trades performing the Work and so as to avoid lockouts, strikes and other labor-related events or circumstances which delay or otherwise impact the Work; provided that the Contractor's obligations under this Section 3.4.4 shall be limited to events and circumstances which occur substantially where the Work is performed or which result substantially from the actions of persons or entities performing the Work.
- § 3.4.5 The Contractor agrees that each of its employees, subcontractors' employees and principals/owners involved in the Work may, at the option of the Owner, be subject to a security check, at any time, through the local police department or other venue. Notwithstanding the foregoing, Contractor, and not the Owner, remains solely responsible for performing background checks on, and screening for public safety all subcontractors at any tier and employees, and, to the extent allowed by law, shall provide such screening methodologies and information to the Owner upon request.
- § 3.4.6 Contractor acknowledges that it is Contractor's responsibility to hire all personnel for the proper and diligent prosecution of the Work, and Contractor shall use its best efforts to maintain labor peace by and/or among its employees and subcontractors at all tiers for the duration of the project. In the event of a labor dispute related to this project, Contractor shall not be entitled to an increase in the Contract Sum or Contract Time if the dispute was caused by acts or omissions of Contractor, or Contractor's agents, subcontractors at any tier or suppliers.
- § 3.4.7 If requested by the Owner, the Contractor and all Subcontractors' employees shall submit to fingerprinting and be subject to criminal background checks and any other rules and procedures of the Owner as a condition of entering the Project site.

§ 3.5 Warranty

- § 3.5.1 The Contractor warrants to the Owner and the 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, will be performed in a good and workmanlike manner in accordance with manufacturer specifications where applicable, and will be free from defects, and that all materials and equipment selected by the Contractor or Subcontractor will be suitable for the purposes indicated in the Contract Documents. 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. Notwithstanding the above, the contractor's warranty for all elements of the work shall hold regardless of normal wear and tear. If required by the Architect or the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment. This warranty shall be in addition to any other warranties required by the Specifications or provided by law. The Contractor shall assign to the Owner all other warranties at the time of final completion of the Work.
- § 3.5.2 Without limitation of any remedy of the Owner, upon Substantial Completion of the Work or termination of the Contract, the Owner shall be entitled to enforce at its option any and all Subcontractor and manufacturer warranties relating to Work performed and materials and equipment furnished by such Subcontractors. The Contractor agrees to perform the Work in such manner so as to preserve any and all such manufacturer's warranties and Subcontractor

warranties. The Contractor also shall collect, assemble in a binder, and submit to the Owner, in a manner acceptable to the Owner, written Subcontractor warranties, manufacturer warranties and related documents, including without limitation from Subcontractors performing Work and furnishing materials, equipment, appliances and other components of the Project. The Contractor shall assign to the Owner all other warranties at the time of final completion of the Work.

§ 3.5.3 The Contractor shall not be relieved of its general warranty obligations by the specification of a particular product or procedure in the Contract Documents. Warranties in the Contract Documents shall survive completion, acceptance and final payment. Contractor shall at Contractor's expense promptly pay and perform, to the reasonable satisfaction of the Owner, any repairs required of Contractor in fulfillment of the foregoing warranty obligations. Should Contractor fail to perform any maintenance or repair required of it pursuant to this Section 3.5 within seven (7) days of notice thereof from the Owner (provided no notice shall be required for emergency repairs), the Owner may make such repair and the Owner shall be entitled to recover directly from Contractor the reasonable cost thereof (including attorneys' fees) plus interest at the statutory rate thereon from the date of repair, immediately and upon demand by the Owner therefore.

§ 3.5.4 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.

§ 3.6 Taxes

The Contractor shall pay sales, consumer, use Business & Occupation, income, 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. Such taxes are either separately stated or included in the Contract Sum. Contractor shall indemnify, defend and hold harmless the Owner from any liability for taxes and relating to the employees of Contractor, any Subcontractor or any Sub-subcontractor, including taxes and contributions required under the Federal Social Security Act and the unemployment compensation law or any similar law of any state. Contractor is advised that income taxes in Beaverton and surrounding areas may include, but not be limited to, taxation by the State of Oregon, by Washington County, and by Tri-Met.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise designated by the Owner, 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. Without limitation to the foregoing, Contractor shall procure all certificates of inspection, use, occupancy, permits and licenses, pay all charges and fees and give all notices necessary and incidental to the due and lawful prosecution of the Work including without limitation street use and street closure permits. Certificates of inspection, use and temporary certificate of occupancy shall be delivered to the Owner by Contractor prior to (and as a condition to) Substantial Completion of the Work of each Phase in sufficient time for occupation of the Phase in accordance with the Contract Documents, and the final certificate of occupancy prior to (and as a condition to) Final Completion. The Owner will reimburse the Contractor for the actual cost, without markup, of the building permit, permanent utility connection permits and fees, and permits required for construction of work in the public right-of-way and associated bonds or assurances outside the Contract Sum. The Owner may, at its election, retain a firm to perform and pay for the permitting jurisdictions required special inspections. Any other required permits including trade permits and governmental fees, licenses and inspections necessary for proper execution and completion of the Work shall be the responsibility of the Contractor and are included in the Contract Sum. Contractor shall deliver an electronic copy in a PDF format of the building permit and attachments to the Architect and the Owner as soon as it is issued. Upon final completion, the Contractor shall deliver to the Owner all original permits, licenses and certificates of occupancy with photocopies to the Architect.

§ 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 contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, or fails to perform any permit requirements, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction and such other costs and damages to the Owner as would have been avoided if the Contractor had performed its obligations.

§ 3.7.4 In addition to Contractor's indemnification and other obligations set forth in this Agreement, and its confirmation that Contractor is acting as an independent contractor, Contractor will defend, indemnify and save harmless the Owner and its Separate Contractors, consultants, and agents and employees of any of them against any and all settlement amounts and all liabilities, costs, losses, damages, fees (including attorney fees), and expenses in connection with any third-party legal proceeding (including administrative action, enforcement action, or other conduct or allegation by an individual, the Internal Revenue Service, or any state or local government agency or any other court, entity, or agency) asserting or predicated upon an alleged employment relationship or co- or joint employment relationship between any employees of Contractor or subcontractors at any tier (or such individual's or entity's employees or subcontractors) and any of the indemnified parties, or any obligation of the indemnified parties to pay or provide wages, withholding or employee benefits, including but not limited to such claims that assert or are predicated upon wrongdoing or alleged wrongdoing by the indemnified parties.

§ 3.7.5 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 seven (7) days after first observance of the conditions; otherwise Contractor's Claim will be barred. 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 Owner or 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 Owner or Architect shall promptly notify the Contractor in writing, stating the reasons. If either party disputes the Owner's or Architect's determination or recommendation, that party may submit a Claim as provided in Article 15. No increase to the Contract Sum or Contract Time shall be allowed if the Contractor knew of the concealed conditions prior to its executing the Contract or such conditions were reasonably discernable from the bidding documents or a careful review of the project site. If the Contractor encounters such a condition, and proceeds to perform any additional work or incur any additional jobsite costs in regard to such condition without prior written direction from the Owner, Contractor will be deemed to have acknowledged that such condition does not entitle Contractor to any additional compensation or extension of the Contract Time.

§ 3.7.6 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 the 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 and (if applicable) Guaranteed Maximum Price 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 The allowances shall cover the entire cost of the Work to perform or furnish the allowance items, including without limitation the following:

- 1 cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 costs for unloading and handling at the site, labor, installation costs, overhead, profit, general conditions and other.

Whenever given costs, as agreed to in writing by the Owner, 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 the difference between such actual agreed costs and the allowances under 3.8. The Contractor shall not perform any Work covered by an allowance before the execution by the Owner of a Change Order or Construction Change Directive incorporating the

Drawings and Specifications related to the allowance item and any adjustment to the Contract Sum. In the event that the Contractor performs Work covered by an allowance before the execution by the Owner of a Change Order or Construction Change Directive, any costs incurred in excess of the allowance amount will be at Contractor's expense and without reimbursement from the Owner. Periodically, during the course of construction, representatives of the Contractor shall advise the Owner of the cost status of each allowance. The Contractor shall provide this information in a timely manner, but always prior to the termination of the allowance Work. The intent of this subparagraph is to identify possible cost overrun exposure and bring same to the attention of the Owner as soon as possible.

§ 3.8.3 Materials and equipment required under an allowance shall be proposed by Contractor and approved in writing by the Owner prior to procurement.

§ 3.9 Project Manager / Superintendent

- § 3.9.1 The Contractor shall employ a competent project manager and superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work as required by this Contract or as otherwise necessary or appropriate. The Project Manager and/or the Superintendent shall represent the Contractor, and communications given to the Project Manager and/or Superintendent shall be as binding as if given to the Contractor.
- § 3.9.2 Unless the Superintendent and Project Manager are already identified in the Contract Documents, 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 and project manager. Within 14 days of receipt of the information, the Owner or the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or project manager; or (2) requires additional time for review. Failure of the Owner or the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.
- § 3.9.3 Unless otherwise agreed in writing, the Contractor shall cause the Superintendent to remain on the Project site whenever Subcontractors are present and not less than eight hours per day, five days per week, unless the job is closed down due to a legal holiday, a general strike, conditions beyond the control of the Contractor, termination of the contract in accordance with the Contract Documents, until Final Completion is attained.
- § 3.9.4 The Contractor shall not employ a proposed superintendent or project manager to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the Superintendent or Project Manager without the Owner's consent, which shall not unreasonably be withheld or delayed.
- § 3.9.5 Within ten (10) days after issuance of the Notice to Proceed, the Contactor shall furnish to the Architect and the Owner a chain-of-command organizational chart which includes all supervisory personnel, including the Project Manager, the project engineer and the Superintendent, that the Contractor intends to use on the Work. The chart shall specify any limits of authority for each person, including but not limited to their ability to speak for and bind the Contractor, as well as any limits on decision-making authority with respect to specific dollar values, contract time, and issues affecting quality of the Work. The Contractor shall also provide the Owner with a list of telephone numbers for all key personnel of the Contractor and its principal Subcontractors at all tiers for purposes of contacting personnel as the Owner reasonably determines necessary. Contractor shall periodically update the list as necessary to ensure the Owner has the most current information.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 The Contractor, promptly but in any event within twenty (20) days after being awarded the Contract, shall submit for the Owner's and the Architect's information a Contractor's construction schedule for the Work. Contractor shall prepare the schedule using the critical path method (CPM). 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 Contractor shall load his labor resource requirements and constructed value to each task on the schedule unless the Owner elects to waive this requirement in writing. The Contractor shall monitor the progress of the Work for conformance with the requirements of the construction schedule and shall promptly advise the Owner of any delays or potential delays. The construction schedule shall be updated by Contractor to reflect actual conditions on a period described elsewhere herein. In the event any progress report indicates any delays, the Contractor shall propose an affirmative plan to adjust the schedule to correct the delay, including overtime and/or additional labor, if necessary. 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. The schedule shall be related to

the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

- § 3.10.1.1 From time to time as appropriate during the performance of the Work but not less often than monthly, the Contractor shall prepare and submit to the Owner and the Architect, for the Owner's approval, a current, updated Contractor's construction schedule reflecting any and all changes and revisions.
- § 3.10.1.2 The Contractor shall take such actions as are necessary to adhere to the approved Contractor's construction schedule then in effect, which actions shall include as appropriate, but not be limited to, providing additional labor, supervision, materials, equipment, tools, Subcontractors and other services and facilities. For purposes of whether any Change Orders or Construction Change Directives extend the contractual dates of Substantial Completion and Final Completion, any "float" or "slack" time for the whole or any part of the Work shall not be for the exclusive use or benefit of either the Owner or the Contractor but shall be reserved and apportioned by the Owner and Contractor in accordance with the needs of the Project. The Contractor shall not be entitled to make a Claim based upon an alleged inability to complete the Project early.
- § 3.10.2 The Contractor, promptly after being awarded the Contract, but no more than twenty (20) calendar days after award, and thereafter as necessary to maintain a current submittal schedule, shall prepare and submit a submittal schedule for the Owner's and 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 and the Owner 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 approved by the Owner and the Architect. The Contractor must include a response time of at least ten (10) days for the Architect's review and at least fourteen (14) days for review by the Architect's consultants. Neither the Owner nor the Architect can guarantee response times from governmental authorities, such as permitting agencies.
- § 3.10.4 In the event the Owner determines that the performance of the Work has not progressed or reached the level of completion required by the current, approved Contractor's construction schedule, the Owner shall have the right to order the Contractor to take corrective measures as necessary to restore the progress of the construction to the requirements of such schedule, including but not limited to (1) working additional shifts or overtime, (2) furnishing additional labor, services, materials, equipment and facilities and (3) other similar acceleration measures. The costs incurred by the Contractor pursuant to this Section 3.10.4 shall be paid by the Contractor.
- § 3.10.5 Without limiting the Owner's rights, upon demand by the Owner the Contractor shall prepare and submit to the Owner and the Architect a "Recovery Schedule," in a form and providing sufficient detail to explain and display how the Contractor intends to reschedule those activities to regain compliance with the Contractor's construction schedule during an agreed Recovery Period.
- § 3.10.5.1 Within seven (7) days after the Contractor's receipt of the Owner's demand for a Recovery Schedule, the Contractor shall present the Recovery Schedule to the Owner and the Architect. The Recovery Schedule shall represent the Contractor's best judgment as to how the Work should be made to comply with the Contractor's construction schedule within the agreed Recovery Period. The Recovery Schedule shall be prepared to a similar level of detail as the Contractor's construction schedule.
- § 3.10.6 Progress Meetings The Contractor shall participate in progress meetings held at least once every week or at more or less frequent intervals as may be described in the Contract Documents, with the Architect, the Owner, subcontractors at all tiers and other appropriate consultants. The Contractor shall fully brief the Architect and the Owner on the progress of the Work.

§ 3.10.7 Reports

.1 Progress Reports: Contractor shall prepare and deliver to the Owner at least monthly a progress report in a form and in sufficient detail as is reasonably acceptable to the Owner approved by the Owner. The progress report shall specify, among other things, an estimated percentage of completion, whether the Project is on schedule, and if not, the reasons therefore and the new proposed schedule, as well as the

- number of days worked for each category of labor and the projected Work to be completed in the next succeeding month. The report shall include a listing and the status of all Change Orders, Modifications, bulletins, and other relevant documents, and shall detail any issues challenging completion of the Work on schedule and Contractor's solutions to same.
- .2 Additional Reports: Contractor shall prepare and deliver such additional reports as the Owner may reasonably request.
- .3 Logs: Contractor shall prepare and keep current, for the Architect's and the Owner's approval, logs or schedules reflecting the date the items were submitted, when a response is reasonably due and when receipt occurred of Requests for Information (RFI's), Change Order Requests (COR's), Change Orders (CO's) and submittals which shall be coordinated by Contractor with Contractor's construction schedule and which allows the Architect and the Owner reasonable time to review submittals or other such documents. Contractor shall post all logs to eBuilder or if eBuilder is not used, give the Owner access to such logs and schedules at all times. Logs shall be kept on Excel spread sheets unless other format is approved by the Owner Representative.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site and updated at least weekly, 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 otherwise marked to depict the as-built nature and configuration of the Work and the approved Shop Drawings, Product Data, Samples, and similar required submittals. Contractor also shall maintain at the Project site for the Owner and the Architect one current copy of all subcontracts with Subcontractors, RFIs, Requests For Change Proposals and Change Proposals. These shall be in electronic form or paper copy, available to the Architect and the Owner, and delivered to the Architect for submittal to the Owner no later than, and as a condition of, Final Completion of the Work as a record of the Work as constructed.

- § 3.11.1 The marked record Drawings and Specifications referenced shall be marked to show field decisions and selections affecting the Work, including but not limited to information regarding (1) approved or directed deviations from the Drawings and Specifications made during construction, (2) details of Work not previously shown or indicated, (3) changes to existing conditions or existing conditions found to differ from those shown on the Drawings or Specifications and (4) other information that the Architect or the Owner reasonably requests. The final set of marked Drawings shall be on drawings in PDF format and in reproducible hardcopy, with each hardcopy sheet stamped "As-Built" and signed by the Contractor. The final act of marked Specifications shall be in PDF format on disk and in reproducible hardcopy, with each hardcopy page stamped "As-Built" and signed by the Contractor.
- § 3.11.2 The location of all existing or new hidden piping, valves, and utilities, as located during the course of construction, shall be appropriately marked on plans. The approved permit set of plans shall also be available to the Architect and the Owner at the site.
- § 3.11.3 Contractor shall submit to the Architect with each Application for Payment an accurate and updated set of field drawings, in such format as the Architect may reasonably request, marked currently to record field changes and selections. Upon final completion of the Work the Contractor shall certify that the record documents reflect complete and accurate "as-built" conditions and shall deliver the documents as well as the approved permit set of plans in good condition to the Architect for submittal to the Owner in accordance with the provisions of the Contract Documents. Contractor shall indicate on the face of each as-built drawing its concurrence that the as-built drawings are accurate. Satisfactory maintenance and submission of up-to-date record drawings will be a requirement and condition for approval of progress payments. Notwithstanding the completion of the as-built drawings and any review and correction of such drawings by Contractor, neither the Architect nor Contractor shall be relieved of any responsibility each has under its contract with District for the execution and completion of Work in compliance with the Contract Documents.

§ 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 (including any approval of conforming with the submittal requirements as specified in the Contract Documents), 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. The Contractor shall be responsible for all costs associated with Shop Drawings, Product Data and Samples submitted out of sequence through the fault of Contractor. Submittals which are not marked as reviewed and approved by the Contractor for conformance with the submittal requirements of the Contract Documents may be returned by the Architect without action.
- § 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and the 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 or release for use 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 or the Owner's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect and the Owner in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. Any corrections or modifications to Shop Drawings requested by the Architect shall be deemed accepted by the Contractor, without change in Contract Sum or Contract Time, unless the Contractor provides the Architect with written notice specifically identifying the deviation and impact before commencing any Work from such Shop Drawings. The Contractor shall make all corrections and modifications requested by the Architect and, when requested by the Architect, provide a corrected Submittal. Notwithstanding the foregoing, 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 and the Owner's approval or review thereof. The Contractor shall be solely responsible for errors or omissions in all submittals and Shop Drawings, whether or not the submittals and Shop Drawings have been reviewed or approved by the Architect or the Owner.
- § 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 written notice, the Architect's approval of a resubmission shall not apply to such revisions.
- § 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.
- § 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 cause such services or

certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Contractor shall cause such portions of the Work to be designed, engineered, and permitted, and to construct such Work in accordance with all such criteria, in accordance with all applicable laws and codes, and in a manner such that these systems are functioning and properly integrated into the remainder of the Work. Any of Contractor's (or any Subcontractor's) design or engineering professionals shall carry errors and omissions coverage of at least \$1,000,000 for the design and engineering of such Work. The premium for errors and omissions coverages is included in the Contract Sum. The Owner will be the Owner of all design and engineering documents so generated for the Work. They are not to be used by Contractor or its Subcontractors on any other project and shall be given to the Owner or destroyed upon completion of the Work, at the Owner's discretion. Contractor shall cause shop drawings and designs for such Work to be submitted in a timely fashion to the Architect for review in accordance with the schedule requirements. 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 and completeness of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and the 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 or the Owner 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. Contractor shall submit a copy of all design documents prepared by such design professionals to the Owner and to the Architect. The Owner will have an irrevocable, perpetual license to use all design documents generated by Contractor or its Subcontractors at any tier. They are not to be used by Contractor or its Subcontractors on any other project and shall be given to the Owner upon completion of the Work.

§ 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.

§ 3.12.11 Any corrections or modifications to Shop Drawings and other submittals made by the Architect shall be deemed acceptable by the Contractor, without change in the Contract Sum or Contract Time, unless said changes constitute changes to the Contract Documents and the Contractor provides the Architect with contrary written notice before commencing any such changed Work. In the absence of such notice, the Contractor shall make all corrections requested by the Architect and provide a corrected submittal without change in the Contract Sum or Contract Time.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, permits, rules and regulations, and lawful orders of public authorities, and the Contract Documents, and shall not unreasonably encumber the site with materials or equipment. Portions of the site may be occupied and in use during construction. Contractor shall maintain access and services to minimize disturbance to occupants and to allow the Owner to utilize the occupied portion of the site throughout the construction period. Without limitation, the Contractor shall at all times and at its expense fully comply with the requirements of all applicable laws pertaining to storm water discharges and mitigation requirements.

§ 3.13.1 The Owner shall have the exclusive rights to approve of any signs erected at the Project, including without limitation signs placed on cranes or other equipment, company names, advertising on trailers, or other signs. The Contractor and all Subcontractors shall notify the Owner before signs are erected and shall obtain approval of their placement. No signs or advertising media of any nature shall be permitted on the site of Work or enclosing structures without the written approval of the Owner. Any approved signs shall comply with the applicable laws, ordinances, and/or rules. Contractor shall not use in its external advertising, marketing programs, or other promotional efforts, any data, pictures or other representations of the Owner, except with prior specific written authorization from the Owner.

§ 3.13.2 Prior to the commencement of construction, the Contractor shall prepare and obtain the Owner's approval of a construction site management plan, which will take into account requirements contained in the Specifications, and the Owner's requirements and restrictions concerning access and parking for construction personnel, staging areas and material delivery times, traffic flow requirements of the Owner and local governmental authorities, and work hours, among other things.

§ 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.
- § 3.14.3 Existing structures and facilities, including but not limited to buildings, utilities, topography, streets, curbs, and walks, that are damaged or removed due to excavations or other construction work, shall be patched, repaired, or replaced by the Contractor to the satisfaction of the Architect, the Owner of such structures and facilities, and governmental authorities having jurisdiction. In the event the governmental authorities require that the repairing and patching be done with their own labor and/or materials, the Contractor shall abide by such regulations and it shall pay for such work.

§ 3.15 Cleaning Up

- § 3.15.1 The Contractor shall keep the premises and surrounding area in a clean condition, free from accumulation of waste materials and rubbish, excavated materials and "tracking" caused by operations under the Contract, on a daily basis or such other period as is acceptable to the Owner. At completion of the Work, the Contractor shall remove from the site, the surrounding area and contiguous roads, streets and sidewalks waste materials, rubbish, the Contractor's and Subcontractor's tools, construction equipment, machinery, and surplus materials from and about the Project and clean all surfaces.
- § 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 immediate reimbursement from, or an offset of charges from the Contractor for the costs (internal or external) incurred by the Owner.
- § 3.15.3 The Contractor's obligations under this Section 3.15 shall include the proper disposal of all such waste materials, rubbish and disposable surplus materials consistent with and in compliance with all applicable laws, statutes, ordinances, codes, rules, regulations and lawful orders of public authorities, including without limitation those relating to hazardous materials and the environment.

§ 3.16 Access to Work

The Contractor shall provide the Owner and the 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 the 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 the 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, protect, defend and hold harmless, and reimburse the Owner, the Architect, the Architect's consultants, and the members, partners, officers, directors, agents, employees and successors of any of them from, for and against suits, actions, awards, penalties, liabilities, claims, damages, losses, costs, and expenses, direct and indirect, or consequential, whether directly incurred or from third parties, including but not limited to attorneys' fees, costs, design professional fees, consultant and expert witness fees and other costs incurred on such claims, and in proving the right to indemnification arising out of or resulting from performance of the Work, including but not limited to any such suit, action, award, penalty, liability, claim, damage, loss or expense attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible

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property in any event to the extent caused, in whole or in part, by (1) the negligent or other wrongful acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable or (2) the failure of such person or entities to perform in accordance with the Contract. The Contractor's obligation under this Article 3.18 shall include damage to the Owner's own property and the Project itself, 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. Contractor's duty of defense shall arise immediately upon assertion of any claim actually or allegedly covered by this indemnification provision, and, to the fullest extent allowed by law, shall be independent of any limitations upon Contractor's duty of indemnification.

- § 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, or Supplier of any tier, their agents and 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.
- § 3.18.3 If any provision of this Contract is determined to require either party to indemnify, defend, reimburse, hold harmless or provide insurance to the other party (or that party's insurers or sureties) in a manner that would violate applicable law (including but not limited to ORS 30.140), then the offending provision shall be construed such that it is given the broadest meaning and effect allowed by law.
- § 3.18.4 The indemnities and other covenants of this Section 3.18 shall survive the termination of the Contract.

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. Nothing herein shall require the Owner to designate the Architect. If no such party is designated, the Owner shall reserve, for itself or a third party under contract with the Owner, the administrative duties, rights, and responsibilities of the Architect herein.
- § 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. Notwithstanding any provision of the Contract to the contrary, the Contractor agrees that any matter which is subject to the review, interpretation, approval, consent or direction of the Architect shall also be subject to the review, interpretation, approval, consent or direction of the Owner, whose opinions(s) shall govern and bind the Contractor in the event of any disagreement between the Owner (on the one hand) and the Architect (on the other hand).
- § 4.1.3 In the event of a termination of the Architect or a restriction of the duties, responsibilities or authority of the Architect as described in the Contract Documents, the Owner or a third party under contract with the Owner may carry out those duties, responsibilities and authority of the Architect; provided that all such duties, responsibilities and authorities that by law must be carried out by a licensed design professional shall be carried out by a licensed design professional.

§ 4.2 Administration of the Contract

- § 4.2.1 At the direction of the Owner, the Architect will provide administration of the Contract as described in the Contract Documents during construction until the date the Owner or 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.
 - .1 With the Owner's concurrence, the Architect may also provide administration from time to time during the period for correction of Work described in Section 12.2.
- § 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.

- § 4.2.2.1 The Contractor acknowledges that the Architect is not the Owner's agent and does not have authority to make any decision or give any direction to the Contractor that would impact the Contract Sum or Contract Time without the prior written approval of the Owner.
- § 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 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. Neither the Architect nor the Owner will be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. Neither the Architect nor the Owner will have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors at any tier, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

The Contractor shall endeavor to communicate through the Architect about matters arising out of or relating to the Contract; provided that the Owner and Contractor may communicate directly with each other at any time regarding the Project. Communications by and with the Architect's consultants shall be through the Architect with copies to be given to the Owner's Project Manager. Communications by and with Subcontractors and suppliers shall be through the Contractor, unless at that time the Owner believes it has cause to communicate with them directly or determines the Contractor is in breach of the Contract Documents. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

- **§ 4.2.4.1** The Contractor shall provide the Owner with a direct copy of all written communications to or from the Architect, including all notes, requests, claims and potential changes in the Contract Sum or Time.
- § 4.2.5 Based on the Architect's observations and 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 Owner and the Architect, after consultation with the Owner, will have authority to reject Work that is defective or does not conform to the Contract Documents. Whenever the Architect or the Owner considers it necessary or advisable, and after obtaining the Owner's permission in each instance, the Architect will have authority to require inspection or testing of the Work in accordance with Section 13.4, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect or the Owner 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 or the Owner to the Contractor, Subcontractors, 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. Contractor shall provide submittals for review so as to cause no delay in the Work. 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 fabrication, 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 the Contract Documents. The Architect's review is undertaken solely to satisfy its obligations to the Owner and shall not give rise to any claim by the Contractor or Subcontractors against the Architect or the Owner. 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. The Contractor should expect a submittal review cycle time of up to 14 days, although the Owner may in its discretion, at the request of Contractor, request that the Architect accelerate certain submittal reviews where these are shown to Owner to be necessary for the Project schedule. Neither the Owner nor the Architect can guarantee response times from governmental authorities.

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- § 4.2.8 With the written approval of the Owner, the Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. At the Owner's request, the Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.5.
- § 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 the 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 At the Owner's written request, the Architect will interpret and decide matters concerning performance under, and requirements of, 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 no agreement is made concerning the time within which interpretations required of the Architect shall be furnished, then delay shall not be recognized on account of failure by the Architect to furnish such interpretations until at least 15 days after written request is made for them accompanied by sufficient information for the determination.
- § 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.
- § 4.2.13 The Architect's decisions on all matters will be final only if approved by the Owner. 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.
- § 4.2.14 In reviewing the quality and progress of the Work and submittals received from the Contractor, the Architect is acting solely for the convenience of the Owner. Neither the Owner nor the Architect has any responsibility to assist the Contractor in the supervision or performance of the Work. No action, approval or omission to act or failure to advise the Contractor as to any matter by the Owner or the Architect shall in any way relieve the Contractor from its responsibility for the performance of the Work in accordance with the Contract Documents. Neither the Architect nor the Owner will be responsible for defining the extent of any subcontract or dealing with disputes between the Contractor and third parties. The presence of the Architect or the Owner at the site shall not in any manner be construed as assurance that the Work is being completed in compliance with the Contract Documents, nor as evidence that any requirement of the Contract Documents of any kind, including notice, has been met or waived.

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 or to supply materials or equipment. 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. Unless the context indicates otherwise, the term "Subcontractor" also includes subcontractors, suppliers and consultants of the Contractor at all tiers, including subcontractors, suppliers and consultants of other Subcontractors.
- § 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

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

- § 5.2.1 Unless otherwise stated in the Contract Documents or already-submitted first-tier disclosure, the Contractor, as soon as practicable after Notice of Intent of award of the Contract (but not later than ten (10) days after the Notice of Intent), shall notify the Owner and the 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. The Contractor shall organize this list of Subcontractors in the same sequence as the Index of Specifications Sections, and state the Work category followed by the name of the Subcontractor and/or fabricator (or "Contractor" where the portion of the Work is by the Contractor's own forces). The list shall be accompanied by evidence of any qualifications required within the technical Sections of the Project Manual and satisfactory to the Architect and the Owner. This list shall be updated monthly as part of the payment process if additional Subcontractors are engaged. No progress payment will become due until this information is so furnished. No action or inaction of the Owner or the Architect in response to receipt of the names of the proposed Subcontractors or Suppliers of any tier shall constitute approval of any Subcontractor or Supplier of any tier or of its performance. Within 14 days of receipt of the information, the Owner may notify the Contractor whether the Owner (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Owner to provide notice within the 14-day period shall constitute notice of no reasonable objection. If the Owner concludes that a proposed Subcontractor has materially failed to perform satisfactorily (such as causing a material delay or an unsafe working environment) on one or more projects for the Owner within three years of the bidding date or that a proposed Subcontractor is otherwise not "responsible", at the Owner's request, objection will be deemed reasonable and the Contractor shall replace the Subcontractor. Such a replacement shall not relieve the Contractor of its responsibility for the performance of the work or compliance with all of the requirements of the Contract within the Contract Sum or the Contract Time, except that the Owner will be responsible for the difference between the original Subcontractor's sub-bid and the replacement Subcontractor's sub-bid including any schedule impact. Notwithstanding the above, if the Owner finds the Subcontractor irresponsible based on past performance which was known to the Contractor or reasonably should have been known to the Contractor, then replacement with another Subcontractor shall not result in any change to Contract Sum and/or Contract Time.
- § 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or the 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 the Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or the Architect has no reasonable objection. Similarly, any objection that a proposed Subcontractor or Supplier of any tier is different from an entity listed with the Bid shall be deemed a reasonable objection. If the proposed but unreasonably 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 or Change Directive 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 or the proposed Subcontractor or Supplier of any tier is different from an entity listed with the Bid.
- § 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or the Architect makes reasonable objection to such substitution. If the Owner reasonably concludes that any portion of the Work subcontracted by the Contractor is not being prosecuted in accordance with the Contract Documents, the Contractor shall, upon request of the Owner, remove the Subcontractor performing such work. Such removal shall not relieve the Contractor of its responsibility for the performance of the Work or complying with all of the requirements of the Contract within the Contract Sum and Contract Time.
- § 5.2.5 Notwithstanding the foregoing procedures, the Contractor may only engage and substitute first tier subcontractors as permitted by ORS 279C370, 279C.585, and 279C.590.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each first-tier Subcontractor, to the extent of the Work to be performed by the first-tier 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 first-tier Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and the Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and the Architect under the Contract Documents with respect to the Work to be performed by the first-tier Subcontractor so that subcontracting

thereof will not prejudice such rights, and shall allow to the first-tier Subcontractor, unless specifically provided otherwise in the subcontract, purchase order, and similar agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. The Contractor shall require each first-tier Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed first-tier Subcontractor, prior to the execution of the subcontract, purchase order, or similar agreement, copies of the Contract Documents to which the first-tier Subcontractor will be bound, and, upon written request of the first-tier Subcontractor, identify to the first-tier Subcontractor terms and conditions of the proposed subcontract, purchase order, or similar agreement that may be at variance with the Contract Documents. First-tier Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors. The Contractor shall provide to the Owner copies of the written agreements between the Contractor and any subcontractor on request.

- § 5.3.1 The Contractor shall pay each Subcontractor, upon receipt of payment from the Owner, an amount equal to the percentage of completion allowed to the Contractor on account of such Subcontractor's work, less the percentage retained. Contractor shall require each Subcontractor to make similar payments to its Sub-subcontractor. The Contractor shall defend, indemnify and hold harmless the Owner from any liens and Subcontractor claims, including all expenses and attorneys' fees.
- § 5.3.2 Each subcontract, purchase order, and similar agreement shall state that the Subcontractor agrees to the contingent assignment of the subcontract, purchase order, or similar agreement to the Owner, consistent with Section 5.4. Each subcontract, purchase order and similar agreement at every tier shall provide that the Owner is and shall be a third-party beneficiary of such subcontract, purchase order and similar agreement, and that the Owner shall have the right, but not the obligation, to assert claims directly against the Subcontractor for breach of contract, breach of express warranties, breach of implied warranties including but not limited to warranties of merchantability and of fitness for a particular purpose, negligence and other claims arising out of or related to the Work or the Project. The Owner and Contractor acknowledge and agree that the purpose of this Section 5.3.2 is to enable the Owner at its discretion, in addition to the Contractor, to assert claims for damages and indemnification directly against Subcontractors that are or may be responsible for breach of the contract, defects in the Work, and other damages incurred by the Owner arising out of or related to the Work or the Project.
- § 5.3.3 Contractor shall include with every Subcontract agreement the following language: "Subcontractor binds itself to Contractor and Owner, and is obligated to Contractor and Owner, in the same manner and to the same extent that Contractor is bound and obligated to Owner under the Prime Contract. In the event of any dispute between the Owner and Contractor, Subcontractor shall be bound by all decisions, directives, interpretations and rulings of the Owner or the Architect, at Owner's option, including Owner's termination or suspension of Contractor."
- § 5.3.4 The Contractor shall schedule, supervise and coordinate the operations of all Subcontractors. No subcontracting of any of the Work shall relieve the Contractor its responsibility for the performance of the Work in accordance with the Contract Documents or from its responsibility for the performance of any other of its obligations under the Contract Documents.

§ 5.4 Contingent Assignment of Subcontracts

- § 5.4.1 Each subcontract, purchase order and similar agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that
 - assignment is effective only after termination of the Contract by the Owner and only for those subcontracts, purchase orders and similar subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
 - assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the .2 Contract.

When the Owner accepts the assignment of a subcontract, purchase order, or similar agreement, the Owner assumes the Contractor's rights and obligations under the subcontract, purchase order, or similar agreement.

- § 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

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Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

§ 5.5 Subcontractors as Assignees and Third-Party Beneficiaries

§ 5.5.1 Nothing in this Article 5 or elsewhere in the Contract Documents shall be interpreted to (1) constitute an assignment of the Contractor's rights against the Owner to any Subcontractor or (2) make any Subcontractor a third-party beneficiary of the Contract.

§ 5.6 SUBCONTRACTOR CLAIMS

The Contractor shall promptly pay (and secure the discharge of any liens or claims asserted by) all persons properly furnishing labor, equipment, materials or other items in connection with the performance of the Work (including, but not limited, to any Subcontractors). The Contractor shall furnish to the Owner such releases of claims, payment, bond and surety claims, and other documents as required by Section 9.3 and as the Owner may request to evidence such payment and discharge. The Owner, at its option, may withhold payment, in whole or in part, to the Contractor until such documents are furnished.

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 and to furnish materials or equipment for the Project with the Owner's own forces, and with Separate Contractors.
- § 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 Unless the Owner elects to do so, the Contractor shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor. The Owner shall require its own forces and Separate Contractors to cooperate with the Contractor with respect to such coordination. 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 reasonable agreement. The construction schedules so established 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 (as to the Owner's own forces) 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.
- § 6.1.5 The cost of any materials or equipment to be provided by the Owner shall not be included in the Contract Sum, and no Contractor Fee (if applicable) shall apply to such cost. The cost of installing such materials or equipment shall be included in the Contract Sum to the extent the Contract Documents require the Contractor to install such materials or equipment as part of the Work. Handling and storage of any such materials or equipment supplied by the Owner and delivered to the site for installation by the Contractor shall be the responsibility of the Contractor.

§ 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. If the Contractor receives items from a separate contractor or from the Owner for storage, erection or installation, the Contractor shall acknowledge receipt for items delivered, and thereafter will be held responsible for the care, storage and any necessary replacement of items received.
- § 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 and the Owner in writing 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 so notify the Architect and the Owner 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 actually or readily apparent unless reasonably discoverable.

- § 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.
- § 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 (but shall not be obligated to) clean up and the Architect will allocate the cost among those responsible.

CHANGES IN THE WORK ARTICLE 7

§ 7.1 General

- § 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, only 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 between the Owner and Contractor and at the Owner's discretion the Architect; a Construction Change Directive requires direction by the Owner and at the Owner's discretion the 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. Change Orders shall be deemed to cover all costs and time impacts associated with the Work change including, but not limited to, all direct and indirect costs, and Contractor shall be entitled to no further compensation or time adjustments related to such Work.
- § 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. Before effectuating a change the Contractor shall propose the amount of change in the Contract Sum, if any, and the amount of change in the Contract Time, if any, arising from a proposed change in the work in the form of a Change Order Proposal. The Contractor shall submit its responsible proposal within no longer than seven (7) days after request from Owner or Architect, and shall in good faith specify the components and amounts by which the Contract Sum and/or Contract Time would change. If the Contractor fails to respond within this time or an agreed to extension thereof, the Contractor shall be liable for any delays or costs to other Work associated with accepting or denying the change. The Owner may accept the proposal in writing, in which case the Owner and Contractor are bound to the terms of the proposal, it will be deemed a Change Order, and the Contractor shall commence the change in the Work immediately in accordance with the proposal. The Owner shall include the accepted proposal in the next available formal Change Order. The Owner may reject the proposal, in which case the Owner may either not effectuate the change or may order the change through a Construction Change Directive or an 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, the Owner or Contractor and signed by the Owner, Contractor, and (at the Owner's election) the Architect stating their agreement upon all of the following:

- The change in the Work; .1
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- The extent of the adjustment, if any, in the Contract Time.

§ 7.2.2 The form of Change Orders shall be AIA Document G701, Change Order, or as approved by the Owner.

- § 7.2.3 If the Change Order 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. At a minimum, the Contractor shall submit an itemized breakdown of the cost and/or time required by the Change in the Work, including but not limited to, the following:
 - .a Material quantities and costs.
 - **.b** Direct labor hours and hourly rates for specific work or operation to be performed.
 - .c Equipment costs or rental charges.
 - d Specified overhead and profit.
 - .2 Unit prices stated in the Contract Documents or subsequently agreed upon; or
 - .3 As provided in Section 7.5; or
 - .4 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
 - **.5** As provided in Section 7.3.5.
- § 7.2.4 Agreement on any Amendment shall constitute a final settlement of all matters relating to the change in the Work that is the subject of the Change Order, including, but not limited to, all direct and indirect costs associated with such change and any and all adjustments to the Contract Sum, the construction schedule, and the Contract Time.

§ 7.3 Construction Change Directives

- § 7.3.1 A Construction Change Directive is a written order prepared by the Owner or at the Owner's election, the Architect, and signed by the Owner and at the Owner's election, the 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 and 7.5.
- § 7.3.4 Unit prices are inclusive of all costs for the unit price Work, including but not limited to costs of labor, services, materials, equipment, supervision, insurance, bonds and general conditions, as well as applicable taxes and overhead and profit for that Work. If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner, the applicable unit prices shall be equitably adjusted.
- § 7.3.5 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Owner shall determine the method and the adjustment on the basis of reasonable cost expenditures and cost savings of those performing the Work attributable to the change, including but not limited to, 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 Item .3 of Section 7.3.3, the Contractor shall keep and present, in such form as the Owner may prescribe, an itemized accounting together with appropriate supporting data.
- § 7.3.5.1 Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.5, shall be limited to the following, subject to the limitations of Section 7.5:
 - 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 Additional costs of supervision and field office personnel directly attributable to the change.
- § 7.3.5.2 As to CM/GC contracts only, the terms used in Section 7.3.5.1, including but not limited to Items .1 through .5, shall be subject to the provisions of Articles 4 and 5 of the Agreement.
- § 7.3.6 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.
- § 7.3.7 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved. As soon as possible, but no longer than seven (7) days of receipt, the Contractor shall advise the Owner and the Architect of the Contractor's agreement or disagreement with the cost or the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time. If the Contractor does not timely disagree with the adjustments, the Construction Change Directive will be deemed an agreed "Change Order". The Contractor's notice shall reasonably specify the reasons for its disagreement and the amount or other terms that it proposes. Without such timely written notice, the Contractor shall conclusively be deemed to have accepted the Owner's adjustment. The Contractor's disagreement shall not relieve the Contractor of its obligation to comply promptly with any written notice issued by the Owner or the Architect. The adjustment shall then be determined by the Owner on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, in strict accordance with this Paragraph and other applicable provisions of the Contract Documents.
- § 7.3.8 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.
- § 7.3.9 If the Contractor timely disagrees with the proposed method for adjustment in the Contract Sum and the parties do not otherwise come to terms on adjustment, or if cost is to be determined under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Owner and the Architect may prescribe, an itemized accounting together with appropriate supporting data. In order to facilitate checking of such quotations, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by complete itemization of costs, including labor, materials and subcontract costs. Labor and materials shall be itemized in the manner described in Section 7.5. When cost items in excess of \$2,500 arise from Subcontractors, these items shall also be itemized and presented to the Owner. Approval may not be given without such itemization. Failure to provide data within seven (7) days of the Owner's request or approved extension thereof shall constitute waiver of any Claim for changes in the Contract Time or Contract Sum. The Owner shall have the right to audit and copy the books and records of the Contractor and of any Subcontractor or Supplier of any tier seeking a change in the Contract Sum.
- § 7.3.10 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 the larger of the reasonable value of the deletion or change, or the actual net decrease in 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 or decrease, if any, with respect to that change.
- § 7.3.11 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.
- § 7.3.12 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 or Owner will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.3.13 Any adjustment in the Contract Time arising from a Change or a Claim shall be limited to the change in the actual critical path of the progress schedule directly caused thereby.

§ 7.4 Minor Changes in the Work

The Architect and the Owner 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 or Owner's order for minor changes must 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 immediately notify the Architect and Owner, with its identification of the adjustment. If the Contractor performs the Work set forth in the Architect's or Owner's order for a minor change without prior written notice to the Architect and Owner 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.

§ 7.5 PRICING COMPONENTS

- § 7.5.1 The total cost of any changed Work or of any other increase or decrease in the Contract Sum, including a Claim, shall be limited to the following components:
 - .1 Basic wages: The hourly wage (without markup, fringe benefits or labor burden) not to exceed that specified in the applicable "Prevailing Wage Publication" for the laborers, apprentices, journeymen, and foremen performing and/or directly supervising the changed Work on the site. The premium portion of overtime wages is not included unless pre-approved by the Owner.
 - Fringe benefits: Fringe benefits paid by the Contractor as established by the Oregon Bureau of Labor and Industries or contributed to labor trust funds as itemized fringe benefits, whichever is applicable. Costs paid or incurred by the Contractor for vacations, per diem, bonuses, stock options, or discretionary payments to employees are not reimbursable.
 - Workers' insurances: Direct contributions to the State of Oregon as industrial insurance; medical aid; and supplemental pension by class and rates established by the Oregon Bureau of Labor and Industries.
 - .4 Federal insurances: Direct contributions required by the Federal Insurance Compensation Act (FICA); Federal Unemployment Tax Act (FUTA); and State Unemployment Compensation Act (SUCA).
- § 7.5.2 Direct material costs: This is an itemization, including material invoice, of the quantity and cost of additional materials reasonable and necessary to perform the change in the Work. The unit cost shall be based upon the net cost after all discounts or rebates, freight costs, express charges, or special delivery costs, when applicable. No lump sum costs will be allowed except when approved in advance by the Architect. Discounts and rebates based on prompt payment shall be included.
- § 7.5.3 Construction equipment usage costs: This is an itemization of the actual length of time that construction equipment appropriate for the Work will be used solely on the change in the Work at the site times the applicable rental cost as established by the lower of the local prevailing rate published in The Rental Rate Blue Book by Data Quest, San Jose, California, or the actual rate paid to an unrelated third party as evidenced by rental receipts. Actual, reasonable mobilization costs are permitted if the equipment is brought to the Site solely for the change in the Work. If equipment is required for which a rental rate is not established by The Rental Rate Blue Book, an agreed rental rate shall be established for the equipment, which rate and use must be approved by the Architect prior to performing the work. If more than one rate is applicable, the lowest rate will be utilized. The rates in effect at the time of the performance of the changed Work are the maximum rates allowable for equipment of modern design and in good working condition and include full compensation for furnishing all fuel, oil, lubrication, repairs, maintenance, and insurance. Equipment not of modern design and/or not in good working condition will have lower rates. Hourly, weekly, and/or monthly rates, as appropriate, will be applied to yield the lowest total cost. The rate for equipment necessarily standing by for future use on the changed Work shall be 50% of the rate established above. The total cost of rental allowed shall not exceed the cost of purchasing the equipment outright.

§ 7.5.4 Cost of change in insurance or bond premium. This is defined as:

- .1 Contractors' liability insurance: The cost (expressed as a percentage) of any changes in the Contractor's liability insurance arising directly from the changed Work; and
- .2 Payment and performance bond: The cost (expressed as a percentage) of the change in the Contractor's premium for the Contractor's bond arising directly from the changed Work.

Upon request, the Contractor shall provide the Owner with supporting documentation from its insurer or surety of any associated cost incurred.

- § 7.5.5 Subcontractor costs: These are payments the Contractor makes to Subcontractors for changed Work performed by Subcontractors. The Subcontractors' cost of changed Work shall be determined as the lesser of the manner stated in their Subcontract, or in the manner as prescribed in this Section 7.5 (and, if this is a CM/GC contract, as further limited pursuant to Sections 4 and 5 of the A133 Agreement). Payments to subcontractors or suppliers that are affiliates of Contractor for change work shall not exceed market rates for the services provided.
- § 7.5.6 Fee: This is the allowance for all combined overhead, profit and other costs, including all office, home office and site overhead (including project manager, project engineers, project foreman, estimator, superintendent and their vehicles), taxes (except for sales tax), warranty, safety costs, quality control/assurance, purchasing, small or hand tool or expendable charges, preparation of as-built drawings, impact on unchanged Work, Claim preparation, and delay and impact costs of any kind, added to the total cost to the Owner of any Change Order, Construction Change Directive, Claim or any other claim of any kind on this Project. The total aggregate amount of Fee allowed on Work performed by Contractor's own forces shall be limited to Contractor's original Fee percentage of the allowed costs of the change in the Work, but not more than 10% of the allowed costs of the change in the Work. The Contractor also shall receive the Fee identified in clause (2) below (or if less, Contractor's original fee percentage not exceeding 5%) on the amount owed directly to a Subcontractor or Supplier for materials supplied or work properly performed by that Subcontractor or Supplier.
 - .1 The Contractor shall receive as Overhead and Profit its Fee percentage of the cost of any materials or work performed by the Contractor's or its Affiliates' own forces or that labor performed or materials supplied by subcontractors; provided total Contractor Overhead and Profit charges cumulatively at all tiers shall not exceed 20%.
 - .2 Each Subcontractor at any tier (including lower tier subcontractor involved, but excluding an Affiliates of Contractor) shall receive a maximum of 10% of the cost of any materials or work directly performed by its own forces, and a maximum of 5% of the cost of any materials and labor performed by its sub-tier subcontractors.

If a change in the Work involves both additive and deductive items, the appropriate net Fee allowed will be added to the net positive difference of the items. If the net difference is negative, net negative Fee will be included in the negative figure as a further deduction.

§ 7.5.7 The total cost of any change, including a Claim under Article 15, shall be limited to the reasonable value, as determined by the Owner (subject to appeal through the dispute resolution procedure of Article 15), of the items in this Section 7.5. Unless otherwise agreed in writing by the Owner, the cost shall not exceed the lower of the prevailing cost of the work in the locality of the Project or the cost of the work in the current editions of R.S. Means Company, Inc. Building Construction cost Data as adjusted to local costs and conditions. The Owner or Architect may confer directly with Subcontractors or Suppliers of any tier concerning any item chargeable to the Owner under this Article to confirm balances due and to obtain statements or lien waivers.

§ 7.6 CHANGE PROPOSALS

Within the time limits set out in this Section 7.6, after receipt of a Request For Change Order Proposal or a Construction Change Directive, the Contractor shall submit to the Owner and the Architect a written Change Order Proposal setting out any proposed adjustment in the Contract Sum or Contract Time, or both, to which the Contractor believes it (1) would be entitled as a result of the change in the Work proposed in the Request For Change Order Proposal or (2) is entitled as a result of the change in the Work directed by the Construction Change Directive. Such Change Order Proposal may be in the form of a lump sum proposal (with adequate cost substantiation as required by the Owner and calculations showing the amount of markups on costs), or a unit price proposal, or a combination thereof, for a proposed increase in the Contract Sum, and in similar form for a proposed extension of the Contract

Time, and otherwise shall be in such form and in such detail as the Owner or the Architect may require. Such Change Order Proposal shall be submitted as soon as practicable after the Contractor's receipt of the Request For Change Order Proposal or the Construction Change Directive, but in no event later that thirty (30) days after the Contractor's receipt of the Request For Change Order Proposal or the Construction Change Directive.

§ 7.7 Contractor shall not be entitled to a Change Order for any change in the Work unless a Change Order has been signed by the Owner, a Construction Change Directive has been issued, a Change Proposal has been approved by the Owner in writing, or a similar written Authorization has been issued by the Owner, prior to initiation of such Work.

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 achievement of Substantial Completion and Final 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 satisfying the requirements of the Architect in Section 9.8.
- § 8.1.4 The date of Final Completion is the date satisfying the requirements of the Architect in Section 9.10.
- § 8.1.5 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined. The term "working day" shall mean any calendar day except Saturdays, Sundays, and Legal Holidays at the place of building.

§ 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 and completing the Work.
- § 8.2.2 The Contractor shall not, 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 the Owner.
- **§ 8.2.3** The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion and Final Completion within the applicable 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 the Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, not caused or contributed to by Contractor, Subcontractors, or any person or entity for whose acts or omissions any of them are responsible, fire, unusual delay in deliveries beyond the Contractor's reasonable control, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes not reasonably foreseeable on the date the Work commenced and which are beyond the Contractor's control and not caused by the acts or omissions of Contractor or any Subcontractor or Sub-subcontractor; or (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Owner determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Owner may determine. The Contractor shall be required to use best efforts to mitigate both the necessity of the delay and the period of the delay. Extension shall not exceed the change in the actual critical path of the Contractor's Construction Schedule directly caused thereby, but in no circumstance more than a day for day increase due to the number of days of legitimate occurrence as defined above, as the Owner may determine consistent with the provisions of the Contract Documents.
- § 8.3.1.1 No extensions of the Contract Time shall be allowed for delays or suspensions to the extent caused by the negligent or other wrongful acts or omissions of the Contractor, Subcontractors, or anyone for whose acts or omissions any of them are responsible, or by the failure of such persons or entities to perform as required by the Contract.
- § 8.3.1.2 Any such extension of the Contract Time shall be net of any contingency, weather delay, or "float" time allowance included in the Contractor's construction schedule. If more than one event causes concurrent delays, and the cause of at least one of those events is a cause of delay that would not entitle the Contractor to an extension of time, then to the extent of such concurrency, the Contractor shall not be entitled to an extension of time.

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- § 8.3.2 All claims for extension of time shall be made in writing to the Owner no more than seven (7) days after the commencement of the delay; otherwise they shall be deemed waived and barred. The Contractor shall provide an estimate of the probable effect of such delay on the progress of the Work and shall notify the Owner within ten (10) days after the event causing the delay has ceased. Claims relating to time otherwise shall be made in accordance with applicable provisions of Article 15. The Owner's or Architect's awareness of the occurrence of the delay through means other than the Contractor's written notification shall not constitute a waiver of a timely or written notice or Claim.
- § 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.
- § 8.3.4 When the Contract Time has been extended (i) such extension of time shall be the Contractor's sole remedy for such delay, and the Contractor shall not be entitled to any delay, equitable adjustment or impact damages or other increase in compensation due to such extension, and (ii) the Contractor agrees to make no monetary claim under any legal theory for delay, interference or hindrance of any kind in the performance of this Contract for any reason, and (iii) agrees that any such claim shall be fully compensated for by an extension of time to complete performance of the Work. This Section 8.3.4 shall not apply to the extent of unreasonable delay occasioned by any act or omission of the Owner or anyone acting by or through the Owner.
- § 8.3.5 To the fullest extent allowed by law, the Contractor may recover an increase in the Contract Sum or Contract Time from the Owner for the Owner-directed changes only if the actions or inactions of the Owner or persons acting therefor were the actual cause of the delay. The Contractor shall not be entitled to an equitable adjustment or an increase in the Contract Sum or Contract Time from the Owner where the Contractor could have reasonably avoided the delay by the exercise of due diligence.
- § 8.3.6 In addition to the other limits stated in Section 8.3, to the fullest extent allowed by law, the Contractor shall not in any event be entitled to damages arising out of actual or alleged loss of efficiency; morale, fatigue, altitude, or labor rhythm; constructive acceleration; home office overhead; expectant underrun; trade stacking; reassignment of workers; concurrent operations; dilution of supervision; learning curve; beneficial or joint occupancy; logistics; ripple; season change; extended overhead; profit upon damages for delay; impact damages; or similar theories of damages.

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.

§ 9.2 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 or the Owner. If a schedule of values is attached as an exhibit to this Contract, it shall be considered the schedule of values for the purposes of this Contract. This schedule, unless objected to by the Owner or 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 the Owner and supported by such data to substantiate its accuracy as the Architect or the Owner may require, and unless objected to by the Architect or the Owner, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

§ 9.3 Applications for Payment

§ 9.3.1 Progress payments will be made monthly for work duly certified, approved, and performed during the calendar month preceding the application. At least the number of days before the date established for each progress payment established in this Agreement, The Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, as 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 the Architect require, such as copies of requisitions, and releases and waivers from Contractor, Subcontractors and suppliers in the form of Exhibit B, and shall reflect retainage if provided for in the Contract Documents.

- § 9.3.1.1 Draft Application: On or about the 25th of each month, the Contractor shall submit to the Architect and the Owner, a report on the current progress of the Work as compared to the Contractor's Construction Schedule, and a draft, itemized Application for Payment for work performed during the prior calendar month. This draft shall not constitute a payment request or formal Application for Payment. The Contractor, the Owner, and the Architect shall confer regarding the current progress of the Work and the amount of payment to which the Contractor is entitled. The Owner or the Architect may request the Contractor to provide data substantiating the Contractor's right to payment, such as copies of requisitions from Subcontractors, and reflecting retainage as provided elsewhere in the Contract Documents. The Contractor shall not be entitled to make a payment request, nor is any payment due the Contractor, until such data is furnished. THE SUBMISSION OF THIS APPLICATION CONSTITUTES A CERTIFICATION THAT THE WORK IS CURRENT ON THE CONTRACTOR'S CONSTRUCTION SCHEDULE, unless otherwise noted on the application.
- § 9.3.1.2 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; provided that the Owner may withhold payment of disputed Construction Change Directive amounts.
- § 9.3.1.3 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. An Application for Payment request shall not be valid unless it complies with the requirements of the Contract Documents.
- § 9.3.1.4 The form of Application for Payment shall be a notarized AIA Document G702, Application and Certification For Payment, supported by AIA Document G703, Continuation Sheet.
- § 9.3.1.5 Each Application for Payment shall be accompanied by the following, all in form and substance satisfactory to the Architect and the Owner:
 - .1 Duly executed lien and claim waivers in the forms attached as Exhibit B to the Agreement, executed acknowledged, and sworn by the Contractor, showing: all first-tier Subcontractors with whom the Contractor has entered into subcontracts, the amount of each such subcontract, the amount requested for payment to each such first-tier Subcontractor, and the amounts to be paid to and retained by the Contractor from such progress payment. The waiver and release forms submitted by the Contractor shall be conditional as to the payment sought by the current Application for Payment and shall be unconditional as to the payment received pursuant to the prior Application for Payment.
 - Duly executed lien and claim waivers in the forms attached as Exhibit B to the Agreement executed acknowledged, and sworn by all first-tier Subcontractors (and any Sub-subcontractors as required by the Owner) showing: all lower-tier Subcontractors with whom the first-tier Subcontractor has entered into subcontracts, the amount of each such subcontract, the amount requested for payment to each such lower-tier Subcontractor, and the amounts to be paid to and retained by the first-tier Subcontractor from such progress payment. The lien and claim waiver forms submitted by first-tier Subcontractors shall be conditional as to the payment sought by the current Application for Payment and shall be unconditional as to the payment received pursuant to the prior Application for Payment.
- § 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of project specific materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in writing in advance by the Owner, on such terms as the Owner may require, 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 subject to the Owner's approval and 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 upon physical incorporation into the construction at the site or the time of payment, whichever occurs first. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Applications for payment or 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 a reasonable period 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 the 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 the 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. 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. Furthermore, the issuance of a Certificate for Payment will not excuse Contractor from (1) defects in the quality or quantity of the Work, (2) Contractor's responsibility for construction means, methods, techniques, sequences or procedures, (3) deficiencies in requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, (4) Contractor's duty to properly use money previously paid on account of the Contract Sum or (5) any other obligation of Contractor under the Contract Documents.

§ 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 the Owner as provided in Section 9.4.1. If the Contractor and the 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

- defective or nonconforming Work not remedied; 150% of the estimated value of such defective Work .1 may be withheld;
- .2 third party claims, including but not limited to construction lien claims and bond 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, services, materials or equipment;
- reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum; .4
- .5 damage to the Owner or a Separate Contractor or third party;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, or that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- .7 unsatisfactory prosecution of the Work by the Contractor, including but not limited to failure to carry out the Work in accordance with the Contract Documents;
- 8. delay by the Contractor and/or its Subcontractor(s), or failure to comply with the Contractor's Construction Schedule requirements;
- .9 failure of the Contractor to submit updates of the Contractor's construction schedule as required by Section 3.10.1.1;
- failure to submit affidavits pertaining to wages paid as required by statute;

- failure of the Contractor to provide satisfactions of claims of mechanics', material suppliers', design professionals', construction or similar liens;
- failure to comply with a requirement of the Contract Documents in which the Owner has reserved the right to withhold payment;
- .13 failure of the Contractor to provide waivers and releases from the Contractor and Subcontractors;
- .14 liquidated damages; or
- .15 any other grounds for withholding under this Contract or at law.
- § 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 Architect will reflect the payment in its records. Such payment will not relieve the Contractor or its surety. Contractor shall reflect such payment on its next Application for Payment.
- § 9.5.5 The Owner will have the same rights of withholding as the Architect, under Section 9.5.1, regardless of whether the Architect withholds.
- § 9.5.4 To the fullest extent allowed by law, Contractor shall have no right to stop the Work if Contractor timely is paid for all undisputed invoices, and if so paid, Contractor shall proceed with the performance of its obligations hereunder with reservation of all rights and remedies it may have at law or in equity with respect to disputed invoices.

§ 9.6 Progress Payments

- § 9.6.1 After the Architect has issued and the Owner has approved a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, absent any material breaches by Contractor and/or the Owner's good-faith belief that a withholding of payment is necessary to protect the Owner from Contractor's failure to perform its obligations hereunder.
- § 9.6.2 The Contractor shall pay each Subcontractor, no later than seven (7) 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. If the Contractor does not receive payment for any cause which is not the fault of a particular subcontractor, but does receive payment for work done by the particular subcontractor, the Contractor shall pay that subcontractor on demand, made at any time after which such payment to the Contractor would have been made, for its satisfactorily completed work of such subcontractor, less the retained percentage.
- § 9.6.2.1 Should the Contractor withhold payment from a first-tier Subcontractor due to a bona fide dispute, the Contractor shall notify the Owner. The Owner may then withhold such funds from the Contractor until the dispute is resolved; provided that this Section 9.6.2.1 shall not be construed or applied to prevent the Contractor from receiving payment from the Owner for Work performed by the Contractor or by another Subcontractor when such Work is the subject of a back-charge by the Contractor against the Subcontractor involved in the bona fide dispute. In accordance with ORS Chapter 279C, unless payment is subject to a good-faith dispute as defined in ORS Chapter 279C, if Contractor or any first-tier Subcontractor fails, neglects, or refuses to make payment to person or entity furnishing labor or materials for this Project within thirty (30) days after receipt of payment from the Owner, the Contractor or first-tier Subcontractor shall owe the person or entity the amount due plus interest charges commencing at end of ten (10) day period that payment is due, unless payment is subject to good faith dispute as defined in ORS Chapter 279C. The rate of interest charged shall be equal to three (3) times the discount rate on ninety (90) day commercial paper in effect at Federal Reserve Bank on the date thirty (30) days after date payment was received from the Owner, but the rate of interest shall not exceed thirty percent (30%). The amount of interest may not be waived. Additionally, if Contractor or any Subcontractor fails, neglects, or refuses to pay person or entity furnishing labor or material for the Project, the person or entity may file a complaint with the Construction Contractors Board, unless payment is subject to a

good-faith dispute as defined in ORS Chapter 279C. The payment of a claim in the manner authorized in this section shall not relieve the Contractor or the Contractor's surety from obligation with respect to any unpaid claims.

- § 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 the 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 (7) days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor the 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 that is defective or 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 equipment, or any combination of the foregoing 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 Upon reasonable evidence of the unjustified nonpayment of one or more Subcontractors by the Contractor, the Owner may, after giving ten (10) days' notice and opportunity to cure to the Contractor, make payment of amounts due to Subcontractors by direct payments or by means of multiple-payee checks. Upon request of the Owner, the Contractor shall timely furnish to the Owner such information as the Owner reasonably will need to make such direct or multiple-payee check payments, including but not limited to the names and addresses of the first-tier Subcontractor payees and the amounts due to each.
- § 9.6.9 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 may notify the Contractor. Should any Subcontractor, Supplier or other person make, record or file, or maintain any action on or respecting a claim of construction lien, mechanic's lien, stop notice or lis pendens, relating to the Work, then the Contractor shall immediately and at its sole expense cause the same to be removed, extinguished and expunged.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, Subcontractors, or anyone else for whose acts or omissions any of them are responsible, within ten (10) days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor the required undisputed amount within the earlier of 30 days after receipt of the properly submitted Application for Payment and supporting documents from the Contractor or 15 days after the payment is approved by the Owner the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon fourteen (14) additional days' written notice to the Owner and the 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. Contractor shall have no right to stop or suspend the Work, withhold services or Work, or terminate this Agreement if Contractor timely is paid all undisputed amounts after applicable withholdings, and if so paid, Contractor shall proceed with the performance of its obligations hereunder with reservation of rights, but subject to the other terms of this Agreement regarding assertion of Claims.

§ 9.8 Substantial Completion

- § 9.8.1 Substantial Completion is the latest of (a) the stage in the progress of the Work when the Work or designated portion thereof that the Owner agrees to accept separately is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use, including without limitation issuance of a certificate of occupancy or passage of any necessary governmental inspection; or (b) the date of the Owner's receipt of the Certificate of Substantial Completion from the Architect. The Work will be considered not Substantially Complete if the Owner determines that appropriate cleaning has not occurred. The only remaining Work after Substantial Completion shall be minor in nature, so that the Owner could occupy the Project on that date and the completion of the Work by the Contractor would not interfere with or hamper the Owner's or its occupants' normal operations. Without limitation, no building or facility will be considered to have reached Substantial Completion unless all utilities and systems (mechanical, electrical, etc.) are connected, commissioned, and operating as required for normal use including balancing of the HVAC system, any receiving area and areas for loading and unloading are completed, the Contractor has completed all of the building systems training procedures with the Owner and the building or facility is accessible by normal vehicular and pedestrian traffic routes. The fact that the Owner may occupy the Work or designated portion thereof alone does not indicate that the Work is Substantially Complete or is acceptable in whole or in part, nor does such occupation toll or change liquidated damages owed to the Owner and the Owner can perform "move-in" activities without interruption or risk of damages to people or property.
- § 9.8.1.1 For Substantial Completion of the Work or designated portion thereof to be achieved, the Owner also must have received a temporary or final certificate of occupancy (if necessary for occupancy) and all other governmental approvals necessary and required for the Owner to occupy or utilize the Work or designated portion for its intended purpose.
- § 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 and the Owner a comprehensive punch list of items to be completed or corrected prior to final payment. Failure to include an item on such punch 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 punch list, the Owner, Contractor and the Architect will jointly make an inspection to determine whether the Work or designated portion thereof the Owner agrees to accept separately, is substantially complete. If the Owner's and the Architect's inspection discloses any item, whether or not included on the Contractor's punch 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 Owner, Contractor and the Architect to determine Substantial Completion. In the event the Architect is required to make more than two (2) observations to determine Substantial Completion because of the Contractor's fault, the Contractor shall reimburse the Owner for compensation for the Architect's services and expenses incurred in conducting the third (3rd) and subsequent such observations. If upon observation of the Work or designated portion thereof pursuant to this Section 9.8.3 there is not agreement between or among the Owner, Contractor and the Architect as to whether Substantial Completion has been achieved, the stage of the progress of the Work shall be determined by decision of the Architect.
- § 9.8.4 When the Work or designated portion thereof, which the Owner agrees to accept separately, 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 punch 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. With respect to components or portions of the Work for which Substantial Completion is achieved after the date of Substantial Completion of the Work as a whole, such warranties shall commence on the dates of Substantial Completion of such components or portions.
- § 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.
- § 9.8.6 Commissioning of Critical Systems: The following systems of the Work, and any other systems designated in the Contract Documents, are considered "Critical Systems":

- .1 HVAC system;
- .2 Electrical system;
- .3 Data communication system(s);
- .4 Intercom system, the life safety system(s);
- .5 Security system.

When the Contractor considers that the Critical Systems are up and running and ready for normal operation as specified for each phase, the Contractor shall so notify the Architect and Owner in writing a minimum of 14 days prior to the Date of Substantial Completion for that portion or phase as fixed in the Contract Documents. The Architect will then schedule a pre- commissioning inspection of these systems to determine whether the Critical Systems are complete and ready for normal operation. If the Architect's or Owner's inspection discloses that the Critical Systems are not Substantially Complete or that any item is not in accordance with the requirements of the Contract Documents, the Contractor shall expeditiously, and before the Date of Substantial Completion, complete or correct such item upon notification by the Architect. The Contractor shall then submit a request for another inspection by the Architect to determine completion of the Critical Systems and pay the costs associated with the re-inspections, including fees of the Architect and its consultants. When the Critical Systems are ready for operation, the Architect will notify the Owner in writing, which shall establish the Date of Commissioning. Warranties on the Critical Systems required by the Contract Documents shall commence on the later of the Date of Commissioning or Date of Substantial Completion, unless otherwise provided in the Contract Documents. The Date of Commissioning shall not have an effect on the duties of the parties at Substantial Completion.

§ 9.9 Partial Occupancy or Use

- § 9.9.1 The Owner may upon written notice to the Contractor, take possession of, occupy or use any completed or partially completed portion of the Work at any stage and time, when it is legal to do so. Unless otherwise agreed in writing, such possession, use or operation shall not be deemed an acceptance of any portion of the Work, nor accelerate the time for any payment to the Contractor under the Contract, nor prejudice any rights of the Owner under the Contract or under any insurance, bond, guaranty or other requirement of the Contract, nor relieve the Contractor of any of its obligations under the Contract. If the Contractor fails to complete the Work within the Contract Time, the Owner may take possession of, use or operate all or any part of the Work without an increase in the Contract Sum.
- § 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and the 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. A reasonable sum may be withheld by Owner until Contractor delivers to Owner record Drawings, Specifications, Addenda, Change Orders and other Modifications, and the warranties, instructions, and maintenance manuals required by the Specifications, and a final statement of the cost of the Work allocated in accordance with the budget and in a form approved by Owner.
- § 9.9.3 Unless otherwise agreed upon in writing by the Owner, 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, nor start the period for correction of Work mentioned in Section 12.2.2, nor establish Substantial Completion of the portion of the Work, nor accelerate the time for any payment to the Contractor under the Contract, nor prejudice any rights of the Owner under the Contract or under any insurance, bond, guaranty or other requirement of the Contract, nor relieve the Contractor of any of its obligations under the Contract.

§ 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 Owner, Contractor and the Architect will jointly and promptly make such inspection. When the Owner and the Architect find 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. In the event the Architect is required to make more than two (2) observations to determine Final Completion, the contractor shall reimburse the Owner for compensation for the Architect's services and expenses incurred in conducting the third (3rd) and subsequent such observations. 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. The Contractor is liable for, and the Owner may deduct from any amounts due the Contractor, all fees and expenses incurred by the Owner for services

performed after the required Final Completion date of all the Work due to the delay of the Contractor, whether or not those services would have been performed prior to that date had Final Completion been achieved in a timely manner.

- § 9.10.1.1 The term "Final Completion" as used in the Contract Documents shall mean that (1) Substantial Completion of the Work or designated portion thereof has been achieved and the punch list work completed, (2) the Owner has received a final certificate of occupancy and all other governmental approvals as necessary and required for the Owner to occupy or utilize the Work for its intended purpose and (3) the Contractor has performed all of its obligations under the Contract except for those obligations that, by their nature, extend beyond Final Completion.
- § 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect and the Owner (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 the Owner) have been paid or otherwise satisfied; (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least thirty (30) days' prior written notice has been given to the Owner; (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) 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; (6) all warranties, guarantees, manuals, operation instructions, certificates, spare parts, maintenance stock, specified excess material, as-built drawings and other documents or items required by the Contract Documents; (7) originals of all permits, licenses and certificates, together with a certified statement that the Contractor has closed all necessary permits or otherwise met the requirements of all governing jurisdictions related to this project, including but not limited to all city or county departments, health departments and utility owners, provided to Owner with a copy of all closed or signed off permits; (8) proof satisfactory to Owner that the Contractor has fully complied with the requirements of ORS 279C.845(7); (9) if the Contractor is not domiciled in or registered to do business in the State of Oregon, confirmation the Contractor has complied with the requirements of ORS 279A.120.2; (10) as-built Drawings in CAD format acceptable to the Owner to the extent required by the Specifications or this Agreement; and (11) all other documents and items required by the Contract Documents to be provided as a condition of achieving Final Completion. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Owner may (1) retain funds in such amount as to defray the cost of foreclosing the liens of such claims and to pay attorneys' fees, the total of which shall be no less than 150% of the claimed amount; or (2) accept from the Contractor, a bond or other security satisfactory to the Owner, in its sole discretion, 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 but not limited to all costs, disbursements, expenses and reasonable attorneys' fees.
- § 9.10.2.1 In addition to other documentation required by the Architect and the Owner as a condition of final payment, the application for final payment shall be accompanied by final waivers and releases of claims, executed by the Contractor and Subcontractors. The forms of the waivers and releases shall be as set out in Exhibit B.
- § 9.10.3 If, after Substantial Completion of the Work, Final Completion thereof is materially delayed through no fault of the Contractor, a Subcontractor or anyone for whom they are responsible, or by issuance of Change Orders affecting final completion, and the Owner and the Architect so confirm, 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.
- § 9.10.3.1 If the Owner elects to make such payment in advance of Final Completion, the Owner may retain an amount no less than one hundred fifty percent (150%) of the value of such Work for the Contractor to finally complete the Work, as determined by the Architect.
- § 9.10.4 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

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final Application for Payment. The execution of a Change Order shall constitute a waiver of Claims by the Contractor arising out of the work to be performed or deleted pursuant to the Change Order, except as specifically described in the Change Order. General reservations of rights will be deemed waived and void.

§ 9.11 Records

The Contractor shall maintain books, records, documents, and other evidence pertaining to the costs incurred by the Contractor in connection with or related to the Contract ("records") to such extent and in such detail as will properly reflect and fully support all costs, charges and other amounts of whatever nature for which reimbursement or payment is or may be claimed under the Contract. The Contractor shall preserve such records for a period of three (3) years following the date of Final Acceptance under the Contract and for such longer period as may be required by any other provision of the Contract. In the event of a claim or dispute, the Contractor agrees to make available at the office of the Contractor at all reasonable times all records for inspection, audit and reproduction by the Owner and its representatives. These requirements shall be applicable to and included in each Subcontract and purchase order issued with respect to the Work, except fixed price Subcontracts where the price is \$25,000 or less.

PROTECTION OF PERSONS AND PROPERTY ARTICLE 10

§ 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 and the entirety of the Work.

- § 10.1.1 No action or inaction of the Owner or the Architect relating to safety or property protection or a violation thereof will:
 - .1 Relieve the Contractor of sole and complete responsibility for the violation and the correction thereof, or of sole liability for the consequences of said violation;
 - .2 Impose any obligation upon the Owner or the Architect to inspect or review the Contractor's safety program or precautions or to enforce the Contractor's compliance with the requirements of this Article 10; and
 - .3 Impose any continuing obligation upon the Owner or Architect to provide such notice to the Contractor or any other person or entity.

§ 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
 - employees and others performing labor or services or furnishing materials or equipment on the Work and other persons who may be affected thereby;
 - .2 the Work and materials and equipment to be incorporated or utilized therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor;
 - .3 other property and structures at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction; and
 - .4 the work, materials, equipment, tools, machinery and facilities of or being utilized by the Owner's own forces or their separate design professionals, consultants or contractors.
- § 10.2.2 The Contractor shall comply with, and give notices required by, and otherwise shall comply with applicable laws, statutes, ordinances, codes, rules, regulations, permits, 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 but not limited to 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 and give the Owner and the Architect reasonable prior notice.
- § 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2, 10.2.1.3, and 10.2.1.4

caused in whole or in part by the Contractor, a Sub-contractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2, 10.2.1.3, and 10.2.1.4. 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 the negligent or other wrongful acts or omissions of the Owner or the Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's 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 the 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 The Contractor shall immediately report to the Owner and the Architect all accidents arising out of or in connection with the Work which cause death, serious personal injury or substantial or significant property damage. The Contractor shall promptly thereafter submit a written report of such accident, giving full details and statements of any witnesses. In addition, if death, serious personal injuries, or serious damages are caused, the accident shall be reported immediately by telephone or messenger to the Owner.

§ 10.2.9 The Contractor shall, and shall require its Subcontractors to: be responsible for the adequate strength and safety of all scaffolding, staging and hoisting equipment and for temporary shoring, bracing and tying; furnish approved hard hats, other personal protective equipment as required, approved first aid supplies, the name of an individual on each shift who has completed the OSHA Supervisory Training Course and a posted list of emergency facilities; take prompt action to correct any hazardous conditions reported; comply with the requirements of the Occupational Safety and Health Act ("OSHA") and all other applicable federal, state and local worker safety laws, rules and regulations, including all standards and regulations which have been promulgated by the governmental authorities which administer such Acts and said requirements, standards and regulations are incorporated herein by reference. The Contractor shall be directly responsible for compliance therewith on the part of its agents, employees, Subcontractors, Sub-subcontractors, and materialmen and shall directly receive and be responsible for all citations, assessments, fines or penalties which may be incurred by reason of the failure of its agents, employees, materialmen, Subcontractors or Sub-subcontractors to so comply. Contractor shall provide adequate fire protection procedures during the use of cutting torches, welding equipment, plumber's torches and other flame and spark producing apparatus and comply with NFPA Standard No. 51B, as amended, or its replacement. The Contractor shall submit its Safety Plan for the Project in hardcopy form as a submittal to the Owner to demonstrate the general level of safety program he will conduct and his general adherence to good safety practices. The Owner's review, comment upon, approval or disapproval of such Safety Plan or any portion thereof shall not relieve Contractor for full responsibility for Project safety.

§ 10.2.10 The Contractor, in all cases, shall comply with OSHA, EPA and all other Governmental Workplace Requirements. The term "Governmental Workplace Requirements" as used in the Contract Documents shall mean building, traffic, environmental, occupancy health, accessibility for disabled and other applicable laws, statutes, ordinances, regulations or decrees, of any federal, state, county, municipal or other governmental or quasi-governmental authority or agency pertaining (a) to the Project, (b) to the use and operation of the Project for their intended purposes, or (c) if the context of the sentence establishes this term is being used in connection with a different subject than those described in clauses (a) or (b), then to the subject matter described in the Section in which the term is used.

§ 10.2.11 Injury or Damage to Person or Property

If the Contractor suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of the injury or damage, whether or not insured, shall be given to the Owner within a reasonable time not exceeding seventy-two (72) hours after discovery. The notice shall provide sufficient detail to enable the Owner to investigate the matter.

§ 10.2.12 Contractor shall protect adjoining private or municipal property and shall provide barricades, temporary fences and covered walkways required to protect the safety of passers-by, as required by prudent construction practices, local building codes, ordinances or other laws, or the Contract Documents.

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§ 10.2.13 At all times until the Owner's occupancy of the Work or a designated portion of the Work, the Contractor shall protect from damage, weather, deterioration, theft, vandalism and malicious mischief all materials, equipment, tools, and other items incorporated or to be incorporated in the Work or designated portion, or consumed or used in the performance of the Work or designated portion, and all Work in process and completed Work or designated portion. Contractor shall maintain Work materials and equipment free from damage from rain, wind, storms, frost or heat. If adverse weather makes it impossible to continue operations safely in spite of weather precautions, Contractor shall cease Work and immediately notify the Owner and the Architect of such cessation. Contractor shall not permit open fires or smoking on the Project site.

§ 10.3 Hazardous Materials and Substances [Not applicable to asbestos/hazardous materials abatement contractors] § 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 the Architect of the condition orally and in writing.

§ 10.3.1.1 As used in this Article 10, the term "hazardous material" shall mean and include any "hazardous substance" as defined in the federal Comprehensive Environmental Response Compensation Liability Act (CERCLA), any "hazardous waste" as defined in the federal Resource Conservation Recovery Act (RCRA), and similar terms as used in applicable federal, state and local statutes, rules and regulations.

§ 10.3.2 In the event the Contractor ceases the Work under any of the circumstances described in Section 10.3.1, the Owner in consultation with the Architect and Contractor shall arrange at the Owner's cost for such governmental reviews, professional services and laboratory and other analyses as are reasonably necessary to determine the presence or absence of the suspected hazardous material, wetland condition or archeological site. In so doing, the Owner shall inform the Architect and Contractor of the nature of the governmental reviews, professional services and laboratory and other analyses that the Owner intends to arrange, and the identity of the agencies, firms and individuals the Owner intends to involve. If the Contractor has a reasonable objection to the nature of the reviews, services or analyses that the Owner intends to arrange, or to the identity of the agencies, firms or individuals that the Owner intends to involve, the Owner and Contractor shall negotiate in good faith and with expediency to determine alternative means or parties to perform the reviews, services or analyses. The Contractor shall cooperate in good faith with the Owner, the Architect, the Architect's consultants, the Owner's separate consultants and contractors and other agencies, firms and individuals that perform services or work at the Project site to analyze, control, remediate, render harmless or protect the suspected hazardous material, wetland condition or archeological site. Upon a determination based on such completed reviews, services or analyses as are reasonably necessary that the suspected hazardous material in fact does not exist, or has been controlled, remediated, rendered harmless or protected, the Owner shall transmit a written order to the Contractor to resume the construction of the Work in the affected area. Upon receipt of such order, the Contractor shall resume the Work as ordered. The Contractor shall be entitled to an extension of the Contract Time to the extent the Contractor is delayed in the progress of the Work by cessation of the Work under Section 10.3.1. If the Contractor claims additional costs as a result of such cessation of the Work, it shall make a Claim pursuant to Article 15.

§ 10.3.3 The Contractor shall not permit or allow any Hazardous Substance to be deposited, disposed, placed, generated, buried, discharged, manufactured, refined, transported, treated, handled or located on or about the Project. Except as reasonably required for and are in quantities appropriate to the performance of the Work then being done, the Contractor shall exercise oversight over the use and storage of such Hazardous Substances and compliance with Governmental Requirements applicable to such use and storage. The Contractor shall store all hazardous materials safely, whether or not required by the Contract Documents. To the extent required by applicable Governmental Requirements, the Contractor shall have Material Safety Data Sheets (MSDS) for all Hazardous Substances used in the workplace and make them available to employees who are potentially exposed to those Hazardous Substances. The MSDS and other information shall be available at the jobsite with two (2) full copies of all information to be turned over to the Owner as it is received. The Contractor will be solely responsible for compliance with any "Right to Know" law relating to notice to its employees and others concerning Hazardous Substances to which they could be exposed in the course or the conduct of the Work, including the labeling of such materials, the filing of any necessary reports relating thereto, and related requirements. 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, or by the failure of Contractor to perform as required by this Section 10.3.

- § 10.3.4 The Contractor shall indemnify and 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, except to the extent that the cost and expense are due to the Owner's fault or negligence.
- § 10.3.5 If, without negligence on the part of the Contractor, Subcontractor, or anyone for whose acts or omissions any of them are responsible, 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 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.

§ 10.5 SPILL RESPONSIBILITY

- § 10.5.1 The Contractor is responsible for any and all releases of environmental pollution during performance of the Contract which occur as a result of, or are contributed to by, actions of its agents, employees, or Subcontractors. The Contractor agrees to promptly remediate such releases to satisfaction of the Owner and proper regulatory agencies in a manner that complies with applicable federal, state, and local laws and regulations. Cleanup shall be at no cost to the Owner.
- § 10.5.2 Contractor shall obtain the Owner's written consent prior to bringing onto the Work site any (i) environmental pollutants or (ii) hazardous materials, as the same or reasonably similar terms are used in any applicable federal, state, or local statutes, rules or ordinances. Notwithstanding such written consent from the Owner, the Contractor, at all times, shall:
 - properly handle, use and dispose of all environmental pollutants and hazardous materials brought onto .1 the Work site, in accordance with all applicable federal, state, or local statutes, rules, or ordinances;
 - .2 be responsible for any and all spills, releases, discharges, or leaks of (or from) environmental pollutants or hazardous materials that the Contractor has brought onto the Work site; and
 - .3 promptly clean up, without cost to the Owner, such spills, releases, discharges, or leaks to the Owner's satisfaction and in compliance with all applicable federal, state, or local statutes, rules or ordinances.
- § 10.5.3 The Contractor shall be liable for any and all costs, expenses, damages, claims, and causes of action, or any of them, related to or arising out of a spill, release, discharge, or leak of (or from) any environmental pollutant or hazardous substance or material, to the extent such spill, release, discharge, or leak was caused or contributed to by the Contractor's (i) fault or (ii) failure to perform in accordance with the Contract Documents. Nothing in this Section 10.5 shall limit the Contractor's liability or responsibility under any other provision of the Contract Documents.
- § 10.5.4 The Contractor shall report all reportable quantity releases described in this Section 10.5 to applicable federal, state, and local regulatory and emergency response agencies. Upon discovery, regardless of quantity, the Contractor must telephonically report all releases to the Owner. A written follow-up report shall be submitted to the Owner within forty-eight (48) hours of the telephonic report. Such written report shall contain, at a minimum.
 - .1 Description of items released (identity, quantity, manifest number, and all other documentation required by law);
 - .2 Whether amount of items released is EPA/DOE reportable and, if so, when it was reported;
 - .3 Exact time and location of release, including a description of the area involved;
 - .4 Containment procedures initiated;
 - Summary of communications about the release the Contractor has had with members of the press or .5 state officials other than the Owner;
 - .6 Description of cleanup procedures employed or to be employed at the site, including disposal location of spill residue; and

.7 Personnel injuries, if any, resulting from, or aggravated by, the release.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase and maintain, and cause Subcontractors to purchase and maintain, insurance as set forth in Exhibit E.

§ 11.2 THE OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

§ 11.3 PERFORMANCE BOND AND PAYMENT BOND

§ 11.3.1 The Contractor shall furnish separate bonds covering the faithful performance of the Contract and the payment of obligations arising thereunder. The amount of each bond shall be equal to one hundred percent (100%) of the Contract Sum. The bonding company must be listed on the most current US Government Treasury list, Department Circular 570 or approved PRIOR TO BID SUBMISSION by Owner. The cost of the bonds shall be included in the Contract Sum. The bonds shall be submitted on the AIA A312 or other form acceptable to Owner and shall name Owner as beneficiary. Failure to adhere to these requirements may be grounds for rejection of the bid or cancellation by Owner of this Agreement.

§ 11.3.2 Any Change Order, Construction Change Directive, order for a minor change in the Work or other modification of the Contractor's obligations under the Contract shall not be subject to inspection or approval by any surety on any required bond. The surety on such bond, by issuing the bond, expressly waives its right to approve any such Change Order, Construction Change Directive or order and consents to any modification of the Contractor's obligations hereunder.

§ 11.3.3 The Contractor shall deliver the required bonds to the Owner prior to or with the signed (by the Contractor) Agreement to the Owner Representative at the address of the first page of this Agreement. The Contract shall not be executed by the Owner until the bonds have been received and validated.

§ 11.3.4 POWER OF ATTORNEY

The Contractor shall require the Attorney-in-fact that executes the required bonds on behalf of the surety to affix thereto a certified and current copy of their power of attorney. The surety on any required bond shall be bound by the arbitration or litigation of any disputes between and among the Owner, Contractor, Subcontractors' sureties, the Architect, the Architect's consultants, the Owner's separate contractors and consultants, and other third parties in the same way and to the same extent that the Contractor shall be bound. The surety shall be bound by the decisions and award of the arbitrator(s) or court in the same way and to the same extent that the Contractor shall be bound.

§ 11.3.5 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 permit a copy to be made.

§ 11.3.6 If a payment bond and/or performance bond is required by the Owner under the Contract, the Owner may require that the Contractor subcontract only with Subcontractors who agree to file suit against such bond(s) in the event the Contractor fails to meet its payment or performance obligations to the Subcontractor, as the Subcontractor's exclusive remedy against the Owner, the Project or the Land. This requirement shall not apply if Contractor has not made payments to Subcontractors for the sole reason that the Owner has not paid the Contractor per the terms of the Agreement.

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 or the Owner's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Owner or the Architect, be uncovered for the Owner's or the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time or Contract Sum.

§ 12.1.2 If a portion of the Work has been covered that the Owner or the Architect has not specifically requested to examine prior to its being covered, the Architect or the Owner may request to see such Work and it shall be uncovered

by the Contractor subject to approval of the Owner. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Amendment, be at the Owner's expense. 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 without reimbursement from the Owner.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or the Owner as defective or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and the Owner's attorneys' fees and related costs, disbursements and expenses made necessary thereby, shall be at the Contractor's expense without reimbursement from the Owner. Roadways, pavements and curbs that are broken, damaged, settled or otherwise defective as a result of receiving, handling, storage of materials or the performance of any Work under the Contract Documents shall be fully restored to the satisfaction of the Owner.

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, (i) within one year after the date of Substantial Completion of the entire Work; (ii) within two years after the date of Substantial Completion of the Work, as to those components of the Work that include, alter or affect any portion of the building envelope and penetration components; or (iii) within the period established by the terms of an applicable special warranty required by the Contract Documents or by law; or (iv) after the date for commencement of warranties established under Section 9.9.1, any of the Work is found to be defective or not in accordance with the requirements of the Contract Documents, the Contractor shall correct it at the Contractor's expense without reimbursement from the Owner promptly after receipt of written notice from the Owner to do so. 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 on grounds of breach of warranty. The obligations of Contractor under this Section 12.2 shall survive acceptance of the Work under the Contract and termination of the Contact, is in addition to other warranties provided by contract or law, and does not establish a time limit for damages. If the Contractor fails to correct defective or nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or the Architect, the Owner may correct it in accordance with Section 2.5. If payment of the Contract Sum has already been made by the Owner then upon demand the Contractor shall reimburse the Owner pursuant to Section 2.5. Without voiding specified warranties or relieving the Contractor of its responsibilities under this Section 12.2.2, the Owner reserves the right to make repairs as necessary to maintain the structure and its contents and operability. In addition:

- .1 If, in the Owner's opinion, the nonconforming Work either prevents the use of the facility and/or immediate response is required to present further damage or to restore security to prevent external entrance, and/or is a safety hazard (e.g., break in the waterline, sprinkler system failure, failure of the heating system, inability to close or lock exterior door, etc.), Contractor shall initiate corrective work on site the same day if the Contactor is notified prior to noon, or by noon the following day if notified after noon, and shall complete corrective action within 48 hours.
- .2 If, in the Owner's opinion, the nonconforming Work has the potential of becoming a safety hazard, affects internal security, or limits the use of the facility (e.g. loss of heat in a single classroom, failure of one or more plumbing fixtures, interior door locks not working, etc.), Contractor shall initiate corrective work on site within two working days and shall complete corrective action within 5 working days.
- .3 If, in the Owner's opinion, the nonconforming Work does not have an impact on the use of the building, but must be fixed, (e.g., interior door closer broken, window cracked, wall covering seam coming loose, etc.), the Contractor shall initiate corrective work on site within 14 calendar days and shall complete corrective action within 28 calendar days.
- § 12.2.2.2 The period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion of the Work as a whole by the period of time between Substantial Completion of the Work as a whole and the actual completion of that portion of the Work. For example, if a portion of the Work is completed 15 days after Substantial Completion, the period of correction shall commence as to such Work 15 days after Substantial Completion.

- § 12.2.2.3 The period for correction of Work shall be extended by corrective Work performed by the Contractor pursuant to this Section 12.2, for such corrective Work for that period of time that equals the amount of time after Substantial Completion of the Work as a whole that the corrected portions of the Work were defective or nonconforming. Such extensions shall be applicable only to corrected portions of the Work.
- § 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 defective or 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 or applicable law. Establishment of the 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 nor shall otherwise be deemed to limit the time within which the obligation to comply with the Contract Documents or applicable law 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.
- § 12.2.6 Prior to the first anniversary of Substantial Completion, the Contractor shall walk the project together with the Owner to identify items requiring to be corrected by the Contractor. The Contractor shall be responsible for scheduling this meeting, or shall attend such meeting together with relevant Subcontractors if scheduled by the Owner.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is defective or 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. The Owner shall never be obligated to accept defective or non-conforming Work, or damages for the difference in value between conforming and defective or nonconforming Work, and in all cases the Owner shall be entitled to full removal and correction of defective or non-conforming Work.

§ 12.4 EFFECT OF OBSERVATIONS AND APPROVALS OF THE WORK

§ 12.4.1 The Contractor shall not be relieved from its obligations to perform the Work pursuant to the Contract Documents, or from responsibility for defects or nonconformities in the Work, either by the observations or reviews of the Work by the Owner, the Architect or other persons or entities or by other inspections, tests or approvals of the Work by any agency, entity or person.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located.

§ 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. The Contractor shall not assign its rights or obligations under the Contract in whole or in part, for any purpose, except to Subcontractors approved pursuant to the Contract, without the prior written consent of the Owner. If the Contractor makes or attempts to make such an assignment without such consent, the Contractor shall nevertheless remain legally responsible for all obligations under the Contract and such assignment shall be null, void and of no force or effect.
- § 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing bonds or construction financing for the Project or to a successor school owner or another government agency. In such event, the Contractor shall execute all consents and other documents 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. The Contractor's sole remedy for claims, disputes and other matters in question of the Contractor, direct or indirect, arising out of, or relating to the Contact Documents or breach thereof, except claims which have been waived, is the dispute resolution procedure of Article 15.

- § 13.3.2 No action or failure to act by the Owner, the 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.
- § 13.3.3 Notwithstanding any provision in this Contract to the contrary, in the event requirements of the Owner's lender or bond financing source, if any, regarding the conditions, calculation or timing of progress payments differ from those set forth in this Contract, Contractor shall cooperate to comply with such requirements provided the same are not unduly burdensome to Contractor.
- § 13.3.4 If the majority of the Ownership or the control of the Contractor is acquired by a third party, and such acquisition reasonably imperils performance or creates a conflict of interest that the Owner, in its sole discretion, determines the Owner cannot itself reconcile, then the Owner may terminate this Contract at any time pursuant to Section 14.2, except that the Owner shall give the Contractor thirty days written notice of termination and the opportunity for the Contractor to cure prior to termination.

§ 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 schedule and 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 and the Owner timely notice of when and where tests and inspections are to be made so that the Architect and the Owner may be present for such procedures. The independent testing agency shall prepare the test reports, logs and certificates applicable to the specific inspections and tests and promptly and simultaneously deliver the specified number of copies of them to the designated parties. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded, unless the test, inspection or approval arises from the fault of the Contractor or a Subcontractor or supplier, except as provided in Section 13.4.3. 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, the 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 Owner and the Architect of when and where tests and inspections are to be made so that the Owner and 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. If the Contractor arranges for an inspection and the inspector is required to wait, to leave without inspection, to perform a partial inspection, to return to complete or re-inspect, or otherwise to expend time other than for the primary inspection, the Contractor shall be responsible for all such costs to the extent caused by the Contractor. If the Contractor does not pay the charges for which it is responsible within 30 days of billing, the Owner may pay the charges directly and back charge the Contractor on the next progress payment the amount plus a 10% handling fee.
- § 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 Owner and 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.

§ 13.4.7 No acceptance by the Owner of any Work shall be construed to result from any inspections, tests or failure to inspect or test by the Owner, the Owner's representative, the Architect or any other person. No inspection, test, failure to inspect or test, or failure to discover any defect or nonconformity by the Owner, the Owner's representatives, the Architect or any other person shall relieve the Contractor of its responsibility for meeting the requirements of the Contract Documents or impair the Owner's right to reject defective or nonconforming items or right to avail itself of any other remedy to which the Owner may be entitled, notwithstanding the Owner's knowledge of the defect or nonconformity, its substantiality or the ease of its discovery.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest as specified by ORS 279C.570 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 for public improvement contracts.

§ 13.6 TIME ACCRUAL OF CLAIMS

For claims by the Owner against Contractor based on the so-called "discovery rule," the applicable period of limitations or claims shall not commence to run and any alleged cause of action shall not be deemed to have accrued, whether such claims or actions involve strict liability, indemnity, intentional tort or other tort, breach of contract, breach of implied or express warranty, or any other legal or equitable theory, unless and until the party making the claim is fully aware of all three (3) of the following: (a) the identity of the party(ies) responsible; (b) the magnitude of the damage or the injury; and (c) the cause(s) of the damage or injury, provided this Section 13.6 shall not act to accelerate the accrual of any claim. The discovery rule provided herein applies in lieu of any other applicable statute or related case law. This provision does not accelerate the accrual of any claim earlier than what accrual would have been in the absence of this provision.

§ 13.7 EXCULPATORY PROVISION No personal liability or personal responsibility is assumed by nor shall at any time be asserted or enforced against any affiliate, partner, member, officer, director, trustee or beneficiary of the Owner on account of any agreement contained in the Agreement or any other Contract Documents, whether expressed or implied. Liability with respect to the entry and performance of this Agreement and all other Contract Documents, however it may arise, with respect to the Owner shall be asserted and enforced only against the Owner, and Contractor shall have no recourse to any assets of any affiliate, partner, member, director, officer, employee, trustee, beneficiary or other representative of the Owner. Any and all personal liability, if any, beyond that which may be asserted against the Owner is expressly waived and released by Contractor and by all persons or entities claiming by, through and under Contractor.

§ 13.8 INTERPRETATION

The Contract Documents have been carefully reviewed by Contractor and its counsel and they shall be given fair and reasonable interpretation in accordance with the words contained in them without any weight being given to whether a provision was drafted by one party or its counsel. Paragraph headings are for convenience only and shall not be a part of the Contract Documents or considered in their interpretation. The Exhibits attached hereto are made a part hereof.

§ 13.9 SURVIVAL

§ 13.9.1 If the full performance of an obligation is not required prior to the termination of this Contract, such obligation shall survive the termination and be fully enforceable thereafter. In addition, except as otherwise waived or barred, all rights and obligations set out in the Contract shall survive completion of the Project or termination of the Contract (1) as to the parties rights and obligations that arose before such completion of the Project or termination and (2) as is necessary to give effect to rights and obligations that arise after such completion of the Project or termination but derive from a breach or performance failure that occurred prior to such completion or termination.

§ 13.10 WAIVER, AMENDMENT AND EXTENSION; RIGHTS

No waiver, amendment, extension or variation in the terms of the Contract Documents shall be valid against a party unless in writing and signed by such party and then only to the extent specifically set forth in the writing. No failure or delay on the part of Owner in exercising any right, power or privilege under the Contract Documents, nor any course of dealing between the parties, will waive, amend or vary the terms of the Contract Documents. The Owner's rights and remedies provided by the Contract are cumulative and the use of any one right or remedy by the Owner shall not preclude or waive the right to use any or all other remedies. The Owner's rights and remedies are given in addition to any other rights the Owner may have by law, statute, ordinance or otherwise.

§ 13.11 EXTENT OF CONTRACT

The terms of the Contract Documents are intended by the parties to be a final expression of their understanding with respect to the Project and may not be contradicted by evidence of any prior or contemporaneous statements or understandings. No addition to, deletion from or modification of any term or provision of the Contract Documents shall be effective unless it is made in a writing signed by the parties hereto.

§ 13.12 SEVERABILITY

§ 13.12.1 This Contract is deemed to incorporate all provisions as required by law. Such incorporated provisions will have priority over any conflicting provision herein. Should any provision of the Contract, at any time, be in conflict with any law, statute, code, ordinance, rule, regulation or lawful order of a public authority, or be unenforceable or inoperative for any reason, then the remaining provisions of the Contract nonetheless shall continue in full force and effect and the court shall give the offending provision the fullest meaning and effect allowed by law.

§ 13.13 COUNTERPARTS

This Contract may be executed in counterparts, a complete set of which shall be considered an original.

§ 13.14 AUTHORITY

The Contractor represents and warrants that he or she or it has the full right, power, legal capacity and authority to enter into and perform the Contractor's respective obligations hereunder, and that such obligations shall be binding upon the Contractor without the requirement of the approval or consent of any other person or entity in connection herewith. Each person signing the Contract on behalf of the Contractor represents and warrants that he or she has the full right, power, legal capacity and authority to sign the Contract on behalf of the Contractor.

§ 13.15 REPRESENTATIONS

Contractor represents that (1) it has sufficient knowledge and expertise to construct the Work in accordance with all applicable codes and regulations; (2) it has reviewed, analyzed, and has current knowledge of the site; and (3) it has reviewed, analyzed, and has found sufficient for completion of the Work the Contract Documents. Contractor acknowledges and warrants that any exceptions to this representation have been specifically identified in the Contract Documents.

§ 13.16 OPERATION AND MAINTENANCE MANUALS

As part of the Work, Contractor shall submit one hard copy and two electronic media copies (on memory stick, CD or DVD and in standard Microsoft or Adobe format) of completed operation and maintenance manuals for review by the Owner's Representative prior to submission of any pay request for more than ninety percent (90%) of the work. No payments beyond ninety percent (90%) will be made by the Owner until the O & M Manual has been received. The O & M Manual shall contain a complete set of all submittals; all product data as required by the specifications; training information; a telephone list of consultants, manufacturers, installer and suppliers; manufacturer's printed data; balance reports; record and shop drawings; schematic diagrams of systems; appropriate equipment indices; warranties; bonds; etc. The Owner's Representative shall review and return one O & M Manual for any modifications or additions required. Prior to submission of its final pay request, complete and approved sets of O & M Manuals shall be delivered to the Owner's Representative by the Contractor.

§ 13.17 Training

As part of the Work, and prior to submission of the request for final payment, the Contractor shall schedule with the Owner's Representative training sessions for all equipment and systems, as required in the individual specifications sections. The Contractor shall schedule training sessions at least two (2) weeks in advance of the date of training to allow the Owner's personnel adequate notice. The O & M Manual shall be used as a basis for training. Training shall be a formal session, held after the equipment and/or system is completely installed and operational in its normal operating environment.

§ 13.18 Compliance with All Governmental Laws and Regulations. The Contractor shall comply with all federal, state and local laws, codes, regulations and ordinances applicable to the Work and this Agreement. ORS Chapters 279A and 279C and the Attorney General's Model Public Contracting Rules (as such rules may have been modified by the Owner) ("Rules") contain certain requirements for public contracts, including but not limited to certain required contract provisions. Required contract provisions are attached as Exhibit C and are incorporated herein by this reference. Furthermore, Contractor and the Owner agree to comply with all requirements of ORS Chapter 297A and 279C, the Rules and all other applicable laws and regulations (collectively "Laws"), whether or not such applicable provisions are included in Exhibit C and whether or not such provisions are excised in Exhibit C. In the event of a

conflict between any applicable Law and the provisions of this Contract, including Exhibit C, the Law shall prevail and control.

- § 13.20 Contractor hereby agrees that the Project will be completed substantially in accordance with building permits and any other permits related to development of the Project, the Contract Documents and unless otherwise provided in the Contract Documents all manufacturers' or suppliers' recommended installation procedures so as to preserve any warranties with respect thereto, free and clear of all liens or encumbrances and within the time set forth in the Contract Documents. Contractor does further agree that on the date of Substantial Completion, the Project shall comply with all applicable building laws, ordinances, rules and regulations known, or which should in the exercise of reasonable care be known, to Contractor, and that all utility services necessary for the operation of the Project shall have been provided to the Project within the time for completion of construction.
- § 13.21 If the Contractor fails, neglects or refuses to make prompt payment for labor, materials, equipment or other services furnished to the Contractor or a Subcontractor by any person in connection with the Project as such claim becomes due, the Owner may pay the claim and charge the amount of the payment against funds due or to become due the Contractor under this Contract. Payment of claims in this manner shall not relieve the Contractor or the Contractor's surety from obligation with respect to any unpaid claims.
- § 13.22 This Contract is subject to the State of Oregon Bureau of Labor and Industries Prevailing Wage Rates, and Contractor shall pay or cause to be paid all workers accordingly.

TERMINATION OR SUSPENSION OF THE CONTRACT ARTICLE 14

§ 14.1 Termination by the Contractor

- § 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of [thirty (30) consecutive days (adjust if there's a prospect for delay between signature and construction)] 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 under direct or indirect contract with the Contractor, for any of the following reasons:
 - Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be
 - .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 and the Owner has not cured such matters within seven (7) days after the date of Contractor's notice to the Owner, or because the Owner has not made payment on an approved Certificate for Payment (other than disputed sums) within the time stated in the Contract Documents.
- § 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 entire days scheduled for the Work completion, or [120] days (adjust if there's a prospect for delay between signature and construction)] in any 365-day period, whichever is
- § 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven (7) days' written notice to the Owner, and if the Owner fails to cure such reason during the seven (7) day period, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work executed, and costs incurred by reason of such termination. The total recovery of the Contractor shall not exceed the unpaid balance of the Contract Sum.
- § 14.1.4 Notwithstanding any provision of the Contract seemingly to the contrary, to the fullest extent allowed by law, Contractor shall not stop or suspend the Work or terminate this Contract in the event the Owner withholds any disputed payment, so long as the Owner continues to make undisputed payments for which the Architect has issued a Certificate of Payment.

§ 14.2 Termination by the Owner for Cause

- § 14.2.1 The Owner may terminate the Contract if the Contractor
 - refuses or fails to supply enough properly skilled workers or proper materials or equipment;

- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 fails to abide by or disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority having jurisdiction;
- .4 fails to prosecute the Work or any portion thereof with sufficient diligence to ensure the Substantial Completion of the Work within the Contract Time;
- .5 fails to comply with the current Contractor's construction schedule;
- is adjudged bankrupt, makes a general assignment for the benefit of its creditors, or a receiver is .6 appointed on account of its insolvency;
- .7 submits one or more Applications for Payment that the Contractor overstates the amount to be paid, by the Owner; or
- 8. 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, 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, at least one (1) business day's written notice, terminate the Contract in whole or in part and may end employment of the Contractor and may:
 - .1 Exclude the Contractor from the site and take possession of all or a portion of materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
 - .2 Accept assignment of some or all subcontracts pursuant to Section 5.4; and
 - Finish the Work or a portion thereof by whatever reasonable means and method the Owner may deem .3 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 in whole or in part 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 Owner completes the Work and 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 exceeded the unpaid Contract Sum, such excess shall be paid by the Contractor to the Owner. Contractor shall be responsible and shall pay all the Owners' claims for costs and damages upon demand, pending reconciliation pursuant to this Section 14.2.4. The amount to be paid to the Contractor or the Owner, as the case may be, shall be determined and, at the Owner's option, certified by the Architect upon application by the Owner. This obligation for payment shall survive termination of the Contract.
- § 14.2.5 In the event the Owner terminates the Contract for cause under this Section 14.2 and such termination subsequently is determined in a final arbitrated award or a final judgment to have been wrongful, the termination shall automatically be converted to a termination for the Owner's convenience pursuant to Section 14.4.

§ 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 on all Work executed only. Adjustment of the Contract Sum shall be consistent with the terms of the Contract Documents, provided to the fullest extent allowed by law Contractor waives all claims for additional profit as a result of such suspension. 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 (without prejudice to any right or remedy of the Owner) the Contract in whole or in part for the Owner's convenience and without cause.
- § 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall
 - 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;
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, and also except for Work not covered by the termination, terminate all existing subcontracts and purchase orders and similar agreements and enter into no further subcontracts and purchase orders, and similar agreements.
- § 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. The total sum to be paid to the Contractor under this Section 14.4 shall not exceed the Contract Sum as reduced by the amount of payments otherwise made, the price of Work not terminated, and as otherwise permitted by this Contract. The amounts payable to the Contractor shall exclude the fair value of property which is destroyed, lost, stolen or damaged so as to become undeliverable to the Owner or to a buyer pursuant to section 14.5.
- § 14.4.4 If the Owner terminates for cause, the Owner at any time may, by notice to Contractor, convert the termination to a termination for convenience. In the event the Owner terminates for cause and it is determined that the Owner did not have sufficient cause for termination, such termination shall be deemed at the Owner's convenience under this Section. Termination for convenience shall not impair the Owner's other rights, including its rights and remedies for any breach of this Contract. In no event shall Contractor have a claim for damages, lost profits or otherwise on account of the termination of the Contract by the Owner, with or without cause.

§ 14.5 TERMINATION AND SUSPENSION BY THE OWNER

§ 14.5.1 In the event the Owner terminates the Contract in part under Section 14.2 or 14.4 or suspends the Contract in part under Section 14.3, the Contractor shall cooperate with the Owner and all other persons and entities performing work or services on the Project as necessary and required to facilitate the efficient and proper performance and completion of (1) the overall Project, if the Owner completes the entire Project, or (2) the portion of the Project the Owner completes, if the Owner completes less than the entire Project. In the event of a termination, the Owner expressly reserves the right to recover damages arising out of or related to Contractor's performance of the Contract, regardless of whether (a) such performance occurred before or after the effective date of termination or (b) the Owner provided Contractor with the opportunity to cure. Unless the Owner directs otherwise, after receipt of a notice of termination from the Owner pursuant to Section 14.2 or 14.4, the Contractor shall promptly:

- .1 Stop Work under the Contract on the date and as specified in the Notice of Termination;
- .2 Place no further orders or subcontracts for materials, equipment, services or facilities, except as may be necessary for completion of such portion of the Work as is not terminated;
- .3 Procure cancellation of all orders and subcontracts, upon terms acceptable to the Owner, to the extent that they relate to the performance of Work terminated;
- .4 Assign to the Owner all of the right, title and interest of the Contractor under all orders and subcontracts, in which case the Owner shall have the right, in its discretion, to accept such assignments or any of them, and settle or pay any or all claims arising out of the termination of such orders and subcontracts;
- .5 With the Owner's approval, settle all outstanding liabilities and all claims arising out of such termination of orders and subcontracts not assigned to the Owner;
- .6 Transfer title and deliver to the entity or entities designated by the Owner the fabricated or un-fabricated parts. Work in process, partially completed supplies and equipment, materials, parts, tools, dies, jigs and other fixtures, completed Work, supplies and other material produced as part of, or acquired in connection with the performance of, the Work terminated, and the completed or partially completed plans, drawings, information and other property related to the Work;
- .7 Use its best efforts to sell any property of the types referred to in Section 14.5.1.6. The Contractor shall not be required to extend credit to any buyer, and may acquire any such property under the conditions prescribed by and at a price or prices approved by the Owner, and the proceeds of any such transfer or disposition may be applied in reduction of any payments to be made by the Owner to the Contractor;
- 8. Take such action as may be necessary or as directed by the Owner to preserve and protect the Work and property related to this Project in the possession of the Contractor in which the Owner has an interest; and
- .9 Continue performance only to the extent not terminated.

- § 14.5.2 The Contractor shall, from the effective Date of Termination until the expiration of three (3) years after final settlement under this Contract, preserve and make available to the Owner, at all reasonable times at the office of the Contractor, and without charge to the Owner, all books, records, documents, photographs and other evidence bearing on the costs and expenses of the Contractor under this Contract and relating to the terminated Work.
- § 14.5.3 In arriving at any amount due the Contractor after termination, in addition to any other permitted deductions, the following deductions shall be made:
 - .1 All un-liquidated advance or other prior payments on account made to the Contractor applicable to the terminated portion of the Contract;
 - Any claim pursued under the Contract which the Owner may have against the Contractor, including without limitation liquidated damages;
 - .3 An amount necessary to protect the Owner against outstanding or potential liens or claims;
 - .4 The agreed price for or the proceeds of sale of any materials, suppliers or other things acquired by the Contractor or sold, pursuant to the provisions of section 14.5.1.7, and not otherwise recovered by or credited to the Owner.
- § 14.5.4 If (and only if) the termination pursuant to Section 14.4 is partial, the Contractor may file a claim for equitable adjustment of the price or prices specified in the Contract relating to the continued portion of the Contract. Any claim by the Contractor for an equitable adjustment under this section must be asserted within thirty days from the effective date of the partial termination or it shall be deemed barred.
- § 14.5.5 The Contractor shall refund to the Owner any amounts paid by the Owner to the Contractor in excess of costs reimbursable under the Contract Documents.
- § 14.5.6 The Owner may have costs reimbursable under this Article 14 audited and certified by accountants selected by the Owner, who shall have full access to all the books and records of the Contractor.
- § 14.5.7 To the fullest extent allowed by law, the damages and relief from termination by the Owner specifically provided in Article 14 shall be the Contractor's sole entitlement in the event of termination.

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 Claims

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. Contractor waives 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 shall be initiated by written notice to the other party. Unless a different period for assertion of particular Claims is specifically identified in this Agreement, Contractor must give written notice of any Claim to the Owner not later than seven (7) days after occurrence of the event giving rise to the Claim or Contractor first becomes aware of the Claim, whichever is sooner, or the Claim shall be deemed forever time barred and waived. Contractor's notice shall provide sufficient detail to enable the Owner to investigate the matter, and shall include a clear description of the Claim, the proposed change in the Contract Sum and/or Contract Time of the Claim, and data supporting the Claim. Failure to properly submit the notice of Claim shall constitute waiver of the Claim. The Claim shall be deemed to include all changes, direct and indirect, in cost and in time to which the Contractor (and Subcontractors) is entitled. Prior to the initiation of a dispute resolution procedure, the Owner or its representatives shall have the right to audit and copy any Subcontractor or Supplier whose claim is part of or included in the Claim. All Claims shall be addressed to:

«Purchasing Manager» «Beaverton School District #48J » «16550 SW Merlo Road» «Beaverton, OR 97003» «Telephone: (503) 356-4324»

In addition, a copy of the Claim notice shall be sent concurrently to the Owner's Project Manager and the Owner's Administrator for Facilities Development at the above address. All unresolved Contractor Claims shall be deemed waived and released by Contractor unless Contractor has strictly complied with the time limits of the Contract Documents.

§ 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 of undisputed amounts in accordance with the Contract Documents. The Architect will prepare Amendments, Change Orders and issue Certificates for Payment in accordance with the decisions of the Owner.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written 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. Notice under Section 15.1.3 shall contain sufficient detail and substantiating data to permit evaluation of the Claim by the Owner. No such Claim shall be valid unless so made. 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. Such notice shall include detailed documentation of the cause or event resulting in the need for the extension of time, and a schedule analysis based upon the approved Contractor's construction schedule, showing the impact of the cause or event on the critical path of the approved Contractor's construction schedule. No Claim under this Section 15.1.6 shall be valid unless so made. 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 critical path for the scheduled construction in a manner that could not be avoided by rescheduling and that either the Work was on schedule (or not behind schedule through the fault of the Contractor) at the time the adverse weather conditions occurred or the adverse effect on the scheduled construction would have occurred whether or not the Work was on schedule, or by implementing measures to protect against the weather so that the Work could proceed. No claim for additional time will be granted where the scheduled construction adversely affected was not on the critical path or was within the schedule float or contingency (or would have been in float or contingency had Contractor appropriately rescheduled Work on account of weather conditions), or could be avoided by Contractor through temporary weather protection measures. Claims for additional time will not be granted where the delays for which the Contractor is responsible result in moving Work into an adverse weather season. The Contractor shall provide copies of weather reports to the Owner and the Architect, produced from 'NOAA'- National Oceanic & Atmospheric Administration' for dates affected, as well as, a ten (10) year historical average report for same period of time. In addition, the Contractor must submit a revised construction schedule to the Owner and the Architect showing critical path activities affected by the delay. A rain, snow, ice, windstorm, high water, or other natural phenomenon for the specific locality of the Work (a "Weather Event"), which might reasonably have been anticipated from the previous 10-year historical records of the general locality of the Work, shall not be construed as abnormal. The parties agree that only a Weather Event exceeding one-hundred twenty-five percent (125%) of the weekly, 10-year historical average for the general locality of the Work shall be considered abnormal for purposes of this Section 15.1.6.2. The Office of the Environmental Data Service of the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce nearest the Project site shall be considered the official agency of record for weather information.

§ 15.2 Initial Decision

- § 15.2.1 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.
- § 15.2.2 If a claim, dispute or other matter in question relates to or is the subject of a bond, the party asserting such matter may proceed in accordance with applicable Oregon law to comply with the bond notice or filing deadlines prior to resolution of the matter by the Owner. Contractor shall make its employees and principals, as well as its work and project records, available to the Owner upon the Owner's request, in the event that there is any dispute concerning the compliance of the Work with the Agreement or the Contract Documents. The availability of such personnel and documentation shall be provided without the necessity of a subpoena, request for production or similar legal process. In the event that the Owner is required to utilize some form of legal process to obtain such ability, the Owner shall be entitled to recover its reasonable attorney fees and the costs expended in obtaining access to such personnel and documentation, regardless of whether the Owner is the prevailing party in connection with any later dispute resolution, mediation, arbitration, or litigation regarding such matters.

§ 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, at the election of the Owner, be subject to mediation as a condition precedent to binding dispute resolution. If the Owner has given written notice to Contractor requiring mediation of the claim, Contractor may not commence litigation against the Owner until the mediation is concluded, except as is necessary to avoid a time bar from commencement of litigation under this Contract or applicable law the Owner may commence binding dispute resolution at any time.
- § 15.3.2 At the Owner's election, 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 attempted mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15,3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.
- § 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

- § 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement (otherwise, litigation shall be the means of binding dispute resolution), any Claim subject to, but not resolved by, mediation (if the Owner elected to mediate) 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. There shall only be one arbitrator regardless of the amount in dispute. 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.
- § 15.4.1.2 Any arbitration or other legal proceeding must be initiated by Contractor within the earlier of (a) one hundred twenty (120) days after Substantial Completion as designated in writing by the Owner or (b) sixty (60) days after Final Acceptance, or the Claim will be considered waived and time-barred. This requirement cannot be waived

except by an explicit written waiver signed by the Owner. The pendency of mediation shall toll these deadlines unless and until the Owner terminates mediation.

- § 15.4.2 The award rendered by the arbitrator 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, Owner (and with the Owner's prior written consent, the Contractor) 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). In addition, at the Owner's election, the Contractor agrees to joinder in any arbitration or litigation proceeding in which the Owner is a party with third parties in which the Owner or such third party alleges indemnification or contribution from the Contractor, any of its Subcontractors, any one directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable. The Contractor agrees that all of its Subcontractors will, in the subcontracts, similarly stipulate; in the event any does not, the Contractor shall be liable in place of such Subcontractor(s).
- § 15.4.4.2 Subject to the rules of the American Arbitration Association or other applicable arbitration rules, the Owner (and with Owner's prior written consent, the Contractor) 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 the 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 the Contractor under this Agreement.
- § 15.4.4.4 Notwithstanding the foregoing, the Owner does not agree to joinder in any separate proceeding in which Contractor is a party, without the Owner's written consent. Upon demand by the Owner, claims between the Owner and Contractor, the Owner and the Architect, Contractor and the Architect or Contractor and its subcontractors and suppliers shall be submitted in a single arbitration, and Contractor agrees to joinder in such arbitration.
- § 15.4.4.5 If another involved party will not consent to arbitration or cannot be joined, the Owner, in its sole discretion, has the option to elect consolidated litigation in court to resolve the dispute. The venue for such litigation shall be in the place where the Project is located, and the outcome shall be decided by the judge only (bench trial). Both parties expressly waive their right to a jury trial. If another involved party will not consent to a bench trial, the Owner, in its sole discretion, has the option to elect a consolidated jury trial. The agreements contained in this Section 15.4 shall be specifically enforceable in accordance with applicable law in any court having jurisdiction. Any award rendered by an arbitrator shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction. The arbitrator is specifically empowered to award attorneys' fees and costs to the extent allowed by contract or law. It is understood that the purpose of this Section 15.4.4.5 is to allow the Owner to determine the best means of achieving a single consolidated proceeding that will minimize duplicative processes and minimize the risk of inconsistent results, in the following order of preference: (1) a consolidated arbitration of all significant parties, if possible; or (2) alternatively, a consolidated bench trial of all significant parties, if possible; or (3) alternatively, and as a last resort, a consolidated jury trial of all significant parties.
- § 15.4.4.6 With respect to any claim for allegedly defective work or warranty item asserted against the Owner by any occupant or user of any portion of the Project, or their assignee, successor or subrogee, through court action or arbitration ("Defect Claims"), the Owner shall have the right to join the Contractor in the proceeding. In the event a proceeding under this Agreement is pending relating to a matter of common fact in the Defect Claim proceeding, such

proceeding under this Agreement shall be stayed pending resolution of the Defect Claim proceeding to the extent allowed by law.

§ 15.5 DISPUTE EXPENSES

§ 15.5.1 In the event of any dispute relating to this Agreement the Work or the Project, whether such dispute is resolved through arbitration or through judicial process, the prevailing party shall recover from the other party, the prevailing party's "Dispute Expenses" incurred in arbitration, at trial or on appeal or review from a decision or determination in arbitration or following trial, including without limitation any proceeding under the US Bankruptcy Code. For purposes of this Agreement, the term "Dispute Expenses" shall include a recovery for the following items of expense: reasonable attorney and paralegal fees, reasonable fees for expert witnesses and consultants, costs for providing discovery materials, costs for creation of mediation or trial materials (including, without limitation, photographs, exhibits, analyses, diagrams, or plans) and a reasonable reimbursement for employed staff time incurred with respect to handling any such claim to completion. All the foregoing items shall be in addition to any statutory award of costs and fees provided under Oregon law. The foregoing provisions recognize the significant expenditure of public funds by the Owner under this Agreement and the necessity of the Owner to recoup expenses associated with recovering public money for breaches of this Agreement, for non-complying Work or for warranty or contractual claims.



Business Services Procurement and Contracting 16550 SW Merlo Road Beaverton, OR 97003 (503) 356-4324



XX-XXXX Contract Documents in Order of Precedence

- 1. AIA A101-2017 (modified) Contract
- 2. AIA A201-2017 (modified) General Conditions
- 3. [ITB or RFP XX-XXXX] including any Addenda incorporated by reference.
- 4. Specifications incorporated by reference.
- 5. Drawings incorporated by reference.
- 6. [Contractor] Bid.

District Goal: WE empower all students to achieve post-high school success.

The Beaverton School District recognizes the diversity and worth of all individuals and groups. It is the policy of the Beaverton School District that there will be no discrimination or harassment of individuals or groups based on race, color, religion, gender, sexual orientation, gender identity, gender expression, national origin, marital status, age, veterans' status, genetic information or disability in any educational programs, activities or employment.

EXHIBIT B

FORMS OF WAIVERS AND RELEASES

CONDITIONAL RELEASE ON PROGRESS	UNCONDITIONAL RELEASE ON PROGRESS
PAYMENT	PAYMENT
The undersigned does hereby acknowledge that	The undersigned does hereby acknowledge that the
upon receipt by the undersigned of a check from	undersigned has been paid and has received a
in the sum of	progress payment in the sum of \$
\$ for labor, services, equipment and	for labor, services, equipment and materials, and
materials, and covering all events, conditions and	covering all events, conditions and occurrences, on
occurrences, on the above-referenced job, and when	the above-referenced job, and does hereby release
the check has been properly endorsed and has been	any and all rights of lien and claims of lien, and any
paid by the bank upon which it was drawn, this	and all other claims, including but not limited to,
document shall become effective to release any and	negligence, breach of contract, delay and impact
all rights of lien and claims of lien, and any and all	claims, or any other claims, which the undersigned
other claims, including but not limited to,	has or may have, whether known or unknown, on
negligence, breach of contract, delay and impact	the above-referenced job ("Claims"). This release
claims, or any other claims, which the undersigned	covers full payment for all labor, services,
has or may have, whether known or unknown, on	equipment, materials, events, conditions,
the above-referenced job ("Claims"). This release	occurrences and Claims through
covers full payment for all labor, services, equipment, materials, events, conditions,	(Date) only and does not cover unpaid retention or items furnished after that date.
occurrences and Claims through	items furnished after that date.
(Date) only and does not cover unpaid retention or	NOTICE: THIS DOCUMENT IS
items furnished after that date.	ENFORCEABLE AGAINST YOU IF YOU SIGN
	IT, EVEN IF YOU HAVE NOT BEEN PAID. IF
Before any recipient of this document relies on it,	YOU HAVE NOT BEEN PAID, USE A
said party should verify evidence of payment to the	CONDITIONAL RELEASE FORM.
undersigned.	
	I CERTIFY UNDER PENALTY OF PERJURY
I CERTIFY UNDER PENALTY OF PERJURY	UNDER LAWS OF THE STATE OF OREGON
UNDER LAWS OF THE STATE OF OREGON	THAT THE ABOVE IS A TRUE AND CORRECT
THAT THE ABOVE IS A TRUE AND CORRECT	STATEMENT.
STATEMENT.	CLONATURE
CIONATUDE.	SIGNATURE:
SIGNATURE:	(Authorized Corporate Officer/Partner/Owner)
	•
(Authorized Corporate Officer/Partner/Owner)	(Title)
•	Company Name:
(Title)	Dated this day of, 20
Company Name:	·
Dated this day of, 20	Project Name:
Project Name:	Project Address:
•	
Project Address:	

1159701\v1 **EXHIBIT B**

CONDITIONAL RELEASE ON FINAL PAYMENT

Project Address:

UNCONDITIONAL RELEASE ON FINAL PAYMENT

The undersigned does hereby acknowledge that	The undersigned does hereby acknowledge that the
upon receipt by the undersigned of a final payment	undersigned has been paid and has received final
check from in the sum of	payment in the sum of \$
\$ (representing the agreed full and	(representing the agreed full and final payment) for
final payment) for all labor, services, equipment and	all labor, services, equipment and materials, and
materials, and covering all events, conditions and	covering all events, conditions and occurrences, on
occurrences, on the above-referenced job, and when	the above-referenced job, and does hereby release
the check has been properly endorsed and has been	any and all rights of lien and claims of lien, and any
paid by the bank upon which it was drawn, this	and all other claims, including but not limited to,
document shall become effective to release any and	negligence, breach of contract, delay and impact
all rights of lien and claims of lien, and any and all	claims, or any other claims, which the undersigned
other claims, including but not limited to,	has or may have, whether known or unknown, on
negligence, breach of contract, delay and impact	the above-referenced job ("Claims"). This release
claims, or any other claims, which the undersigned	covers full and final payment for all labor, services,
has or may have, whether known or unknown, on	equipment, materials, events, conditions,
the above-referenced job ("Claims"). This release	occurrences and Claims, including but not limited to
covers full and final payment for all labor, services,	all retention, through Final Completion of the Work
equipment, materials, events, conditions,	and for the entire project.
occurrences and Claims, including but not limited to	1 -3
all retention, through Final Completion of the Work	NOTICE: THIS DOCUMENT IS
and for the entire project.	ENFORCEABLE AGAINST YOU IF YOU SIGN
	IT, EVEN IF YOU HAVE NOT BEEN PAID. IF
Before any recipient of this document relies on it,	YOU HAVE NOT BEEN PAID, USE A
said party should verify evidence of payment to the	CONDITIONAL RELEASE FORM.
undersigned.	
under signed.	I CERTIFY UNDER PENALTY OF PERJURY
I CERTIFY UNDER PENALTY OF PERJURY	UNDER LAWS OF THE STATE OF OREGON
UNDER LAWS OF THE STATE OF OREGON	THAT THE ABOVE IS A TRUE AND CORRECT
THAT THE ABOVE IS A TRUE AND CORRECT	STATEMENT.
STATEMENT.	DITTEMENT.
STATEMENT.	SIGNATURE:
	SIGIVII ORE.
SIGNATURE:	(Authorized Corporate Officer/Partner/Owner)
	(Title)
(Authorized Corporate Officer/Partner/Owner)	Company Name:
(Title)	Dated this day of, 20
Company Name:	Project Name:
Dated this day of, 20	Project Address:
Project Name:	

1159701\v1 **EXHIBIT B**

EXHIBIT C

PROVISIONS FROM THE OREGON PUBLIC CONTRACTING CODE AND PUBLIC CONTRACTING RULES

1. GENERAL

- 1.1 INCORPORATION OF ALL CONTRACT PROVISIONS. The Contract hereby incorporates all contract provisions that are required to be incorporated into contracts with public entities pursuant to (a) the Public Contracting Code (ORS Chapters 279A, 279B and 279C), (b) the Attorney General Model Public Contracting Rules (which are referred to in this Exhibit as the "Rules") or (c) other applicable law. The provisions incorporated into the Contract under the preceding sentence include, without limitation, any provisions or amendments to provisions that become required after the Contract is executed.
- 1.2 DISCLAIMER REGARDING ANY UNLISTED CONTRACT PROVISIONS. The provisions listed in this Exhibit are not necessarily an exhaustive list of provisions that are required under the Public Contracting Code, the Rules or other applicable law, and the fact that this Exhibit does not list a provision that is required by the Public Contracting Code, the Rules or other applicable law will not (i) prevent or otherwise diminish the incorporation of that unlisted provision into the Contract or (ii) negate or otherwise diminish Contractor's obligation to comply with applicable laws.

2. PAYMENT.

- 2.1 PROMPT PAYMENT. Contractor shall promptly pay all of its obligations arising out of or in connection with the Work, including, but not limited to, payments (1) to all persons, as due, supplying to Contractor labor, equipment, services or material for the performance of the Work, (2) of all contributions or amounts due the Industrial Accident Fund from Contractor or the Subcontractors incurred in the performance of the Work, and (3) to the Department of Revenue of all sums withheld from employees under ORS 316.167.
- 2.2 CONTRACTOR'S OBLIGATIONS TO FIRST-TIER SUBCONTRACTOR. Contractor shall pay each first-tier Subcontractor for satisfactory performance under its subcontract within 10 days out of amounts the Owner pays to the Contractor under the Contract. Contractor shall provide a first-tier Subcontractor with a standard form that the first-tier Subcontractor may use as an application for payment or as another method by which the Subcontractor may claim a payment due from the Contractor. Contractor shall use this same form and regular administrative procedures for processing payments during the entire term of the Subcontract. Contractor may change the form or the regular administrative procedures the Contractor uses for processing payments if the Contractor notifies the Subcontractor in writing at least 45 days before the date on which the Contractor makes the change and includes with the written notice a copy of the new or changed form or a description of the new or changed procedure.
- 2.3 PROMPT PAYMENT POLICY. It is the policy of the State of Oregon that all payments due on a public improvement contract and owed by a contracting agency shall be paid promptly. No public contracting agency is exempt from the provisions of ORS 279C.570.
- 2.4 CONTRACTOR'S FAILURE TO MAKE PROMPT PAYMENT. If the Contractor has failed, neglected or refused to pay promptly a person's claim for labor, equipment, services or materials that the person provides to the Contractor or a Subcontractor in connection with the Project as such claim becomes due, the Owner may pay such claim to the person that provides the labor, equipment, services or materials and charge the amount of the payment against funds due or to become due the Contractor under the Contract. Owner reserves the right to make payments directly or by multiple-payee check and Contractor hereby consents to such direct and multiple-payee check payments. Upon Owner's request, Contractor

 shall furnish to Owner the information required to facilitate such payments with each application for payment, including (1) names, addresses, and telephone numbers of persons making any such claim for labor, equipment, services or material, and (2) a complete listing of outstanding amounts owed to all such persons.

- 2.5 CONTRACTOR'S AND FIRST-TIER SUBCONTRACTOR'S FAILURE TO MAKE PAYMENT AFTER PAYMENT FROM OWNER; INTEREST PENALTY. If the Contractor or a first-tier Subcontractor fails, neglects or refuses to pay a person that provides labor, equipment, services or materials in connection the Contract within thirty (30) days after receiving payment from the Owner or the Contractor, the Contractor or first-tier Subcontractor owes the person the amount due plus interest charges that begin at the end of the 10-day period that payment is due under ORS 279C.580(4) and that end upon final payment, unless payment is subject to a good faith dispute as defined in ORS 279C.580. The rate of interest on the amount due is nine percent per annum. The amount of interest may not be waived.
- 2.6 CONSTRUCTION CONTRACTORS BOARD COMPLAINT. If the Contractor or a Subcontractor fails, neglects or refuses to make payment to a person that provides labor, equipment, services or materials in connection with the Contract, the person may file a complaint with the Construction Contractors Board, unless payment is subject to a good faith dispute as defined in ORS 279C.580.
- 2.7 CONTINUING LIABILITY OF CONTRACTOR AND SURETY. Payment by the Owner of a claim in the manner authorized in this Section 2 does not relieve the Contractor or the Contractor's surety from obligation with respect to any unpaid claims.
- 2.8 RETAINAGE. Retainage shall be subject to the applicable requirements of ORS 279C.550 through 279C.570C.570. The Owner may elect to make early release of some or any portion of the retainage as allowed therein. The Contractor may withhold payment of not more than 5% from the moneys earned by any Subcontractor, provided that the Contractor pays interest to the Subcontractor at the same interest rate it receives from its reserved funds. If requested by the Owner, the Contractor shall specify the amount of the retainage and interest due a Subcontractor.

3. PUBLIC WORKS PROJECT.

- 3.1 PREVAILING RATE OF WAGE. The Project is a public works project subject to the prevailing wage rate requirements in ORS 279C.800 to 279C.870. Contractor and the Subcontractors shall comply with ORS 279C.840. Workers in each trade or occupation required for the Work of the Project shall not be paid less than the minimum hourly rate of wage for such workers as detailed in the Specifications for the Contract. For CM/GC contracts, the "prevailing rate of wage" shall mean the prevailing wage rate in effect at the time the CM/GC contract "becomes a public works contract" as defined in OAR 839-025-0020(6), which prevailing rates shall be incorporated by attachment or reference in Guaranteed Maximum Price Amendment or, if applicable, the Early Work Amendment to the CM/GC contract. Pursuant to ORS 279C.840, the Contractor shall keep the prevailing wage rate for the Project posted in a conspicuous and accessible place in or about the Project. Copies of these wage rates are available from the Commissioner of the Bureau of Labor and Industries without charge. The Contractor shall also post a description of provided health and welfare and/or pension plans in the same place. In addition to the description of the plans, the notice shall contain information on how and where to make claims and where to obtain further information. The Contractor shall, and shall cause all subcontractors at all tiers to, timely comply with the requirements of ORS 279C.845. Contractor shall indemnify, defend, protect and hold harmless the Owner from any violation of or noncompliance with the prevailing wage laws (ORS 279C.800 et seq) by Contractor or any subcontractor at any tier.
- 3.2 PUBLIC WORKS BOND. Before starting the Work, Contractor and every Subcontractor shall file with the Construction Contractors Board a public works bond in accordance with ORS 279C.836, unless the Contractor or Subcontractor has elected not to file a public works bond under ORS 279C.836(7) or (8) or is exempt under ORS 279C.836(4) or (9). Before permitting a Subcontractor to start the Work, Contractor shall verify that the Subcontractor has filed a public works bond as required by ORS 279C.836, has elected not to file a public works bond under ORS 279C.836(7) or (8) or is exempt under ORS

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- 279C.836(4) or (9). Contractor shall also ensure that each subcontract entered into by a Subcontractor for the Project shall include a clause obligating each Subcontractor to comply with the requirements of this Section 3.2, such that all subcontracts at all tiers include a requirement to comply with this Section 3.2.
- 4. COMPLIANCE WITH LAWS/TAX LAWS. Contractor shall comply with all applicable federal, state, and local laws, statutes, codes, regulations, rules, orders and rulings as well as all applicable construction industry standards, including without limitation those governing labor, materials, equipment, construction procedures, safety, health, sanitation and the environment. Contractor agrees to indemnify, hold harmless, reimburse, and defend Owner from and against any penalties or liabilities arising out of violations of such obligations by Contractor or its Subcontractors at any tier. Contractor must also comply with all Oregon tax laws and shall submit a certification of such compliance in accordance with ORS 305.385(6).
- 5. CONTRACTOR'S EMPLOYEES AND SUBCONTRACTORS.
 - 5.1 EMPLOYEE DRUG TESTING PROGRAM. The Contractor shall demonstrate to the Owner, in a manner acceptable to the Owner, that the Contractor has initiated, and shall maintain through the completion of the Work of the Project, an employee drug testing program.
 - 5.2 WORK DAY/WORK WEEK. No person shall be required or permitted to labor more than 10 hours in any one day, or 40 hours in any one week, except in cases of necessity or emergency or when the public policy absolutely requires it, in which event, the person so employed for excessive hours shall receive at least time and a half pay for (1) all overtime in excess of eight hours in any one day or 40 hours in any one week when the work week is five consecutive days, Monday through Friday; or (2) all overtime in excess of 10 hours in any one day or 40 hours in any one week when the work week is four consecutive days, Monday through Friday; and (3) all work performed on Saturday and on any legal holiday specified in ORS 279C.540.
 - 5.3 NOTICE OF REQUIRED WORK HOURS. The Contractor and each Subcontractor must give notice to its employees in writing, either at the time of hire or before commencement of Work, or by posting a notice in a location frequented by its employees, of the number of hours per day and days per week that the employees may be required to work.
 - 5.4 CLAIMS FOR OVERTIME. Any worker employed by the Contractor shall be foreclosed from the right to collect for any overtime provided in ORS 279C.540 unless a claim for payment is filed with the Contractor within 90 days from the completion of the Contract, provided the Contractor has: (1) caused a circular clearly printed in boldfaced 12-point type and containing a copy of this Section 5.4 to be posted in a prominent place alongside the door of the timekeeper's office or in a similar place that is readily available and freely visible to any or all workers employed on the Work; and (2) maintained such circular continuously posted from the inception to the completion of the contract on which workers are or have been employed.
 - 5.5 WORKERS' COMPENSATION. All employers, including Contractor, that employ subject workers who work under the Contract in the State of Oregon shall comply with ORS 656.017 and provide the required Workers' Compensation coverage, unless such employers are exempt under ORS 656.126. Contractor shall ensure that each of its Subcontractors complies with these requirements.
 - 5.6 PROMPT PAYMENT FOR MEDICAL SERVICES. The Contractor shall promptly, as due, make payment to any person, co-partnership, association or corporation furnishing medical, surgical and hospital care services or other needed care and attention, incident to sickness or injury, to the employees of the Contractor, of all sums that the Contractor agrees to pay for the services and all moneys and sums that the Contractor collected or deducted from the wages of employees under any law, contract or agreement for the purpose of providing or paying for the services.
 - 5.7 PROMPT PAYMENT BY SUBCONTRACTORS; INTEREST PENALTY. Contractor shall include in each subcontract entered into by the Contractor (including contracts with material suppliers) the following:

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- (a) A payment clause that obligates the Contractor to pay the first-tier subcontractor for satisfactory performance under the subcontract within 10 days out of amounts the Owner pays to the Contractor under the Contract.
- (b) A clause that requires the Contractor to provide a first-tier subcontractor with a standard form that the first-tier subcontractor may use as an application for payment or as another method by which the subcontractor may claim a payment due from the Contractor.
- (c) A clause that requires the Contractor, except as otherwise provided in this paragraph, to use the same form and regular administrative procedures for processing payments during the entire term of the subcontract. The Contractor may change the form or the regular administrative procedures the Contractor uses for processing payments if the Contractor:
- (A) Notifies the subcontractor in writing at least 45 days before the date on which the Contractor makes the change; and
- (B) Includes with the written notice a copy of the new or changed form or a description of the new or changed procedure.
- (d) An interest penalty clause that obligates the Contractor, if the Contractor does not pay the first-tier subcontractor within 30 days after receiving payment from the Owner, to pay the first-tier subcontractor an interest penalty on amounts due in each payment the Contractor does not make in accordance with the payment clause included in the subcontract under paragraph (a) of this Section. The Contractor or first-tier subcontractor is not obligated to pay an interest penalty if the only reason that the Contractor or first-tier subcontractor did not make payment when payment was due is that the Contractor or first-tier subcontractor did not receive payment from the Owner or Contractor when payment was due. The interest penalty:
- (A) Applies to the period that begins on the day after the required payment date and that ends on the date on which the amount due is paid; and
- (B) Is computed at the rate specified in ORS 279C.515 (Conditions concerning payment of claims by public officers, payment to persons furnishing labor or materials and complaints).
- (e) a clause requiring the first-tier subcontractor to include a payment clause and an interest penalty clause that conforms to the standards of this section in each of the first-tier subcontractor's subcontracts and to require each of the first-tier subcontractor's subcontractors to include such clauses in the first-tier subcontractors' subcontractors with each lower-tier subcontractor or supplier.
- 5.8 LICENSING WITH CONSTRUCTION CONTRACTORS BOARD AND LANDSCAPE CONTRACTORS BOARD. Before commencing the Work, Contractor shall ensure that the Subcontractors are duly registered with the Oregon State Construction Contractors Board (and the State Landscape Contractors Board, if applicable), and that no Subcontractor has been declared ineligible to work on a public contract.
- 5.9 FIRST-TIER SUBCONTRACTORS. the Contractor may only engage and substitute first tier subcontractors as permitted by ORS 279C.370, 279C.585, and 279C.590.
- 5.10 NO DISCRIMINATION. Pursuant to ORS 279A.100 to ORS 279A.110, the Contractor shall not discriminate against minority, women, or emerging small business enterprises in the awarding of subcontracts. The Contractor covenants and agrees not to discriminate against any qualified employee or qualified applicant for employment because of race, creed, color, sex or national origin, and that similar provisions shall also be included by said party in any subcontract. The Contractor shall comply with the prohibition set forth in ORS 652.220 (Prohibition of discriminatory wage rates based on sex). Compliance is a material element of the Contract and a failure to comply is a breach that entitles the Owner to terminate the contract for cause.

- 5.11 NO PROHIBITION. The Contractor may not prohibit any of the Contractor's employees from discussing the employee's rate of wage, salary, benefits or other compensation with another employee or another person and may not retaliate against an employee who discusses the employee's rate of wage, salary, benefits or other compensation with another employee or another person.
- 6. MATERIAL SALVAGE. To the extent the scope of the Work for the Contract requires demolition, Contractor must salvage or recycle construction and demolition debris, if feasible and cost-effective.
- 7. COMPOSTING. To the extent the scope of the Work for the Contract requires lawn and landscape maintenance, the Contractor must compost or mulch yard waste material at an approved site, if feasible and cost-effective.
- 8. RECYCLED MATERIALS. The Contractor, in performance of the Work, shall give preference to the procurement of goods manufactured from recycled materials.
- 9. ENVIRONMENTAL AND NATURAL RESOURCES LAWS. Pursuant to ORS 279C.525, the following is a list of Federal, State, and Local agencies that have enacted ordinances, rules or regulations dealing with the prevention of environmental pollution and the preservation of natural resources that may affect the performance of the Contract. The following list may not include all such agencies that have enacted ordinances, rules or regulations relating to the environmental pollution and preservation of natural resources.

Federal Agencies:

Agriculture, Dept. of Forest Service Natural Resource Conservation Service Defense, Dept. of Army Corps of Engineers Coast Guard **Environmental Protection Agency** Interior, Dept. of U.S. Fish and Wildlife Service Bureau of Land Management Bureau of Indian Affairs Bureau of Reclamation Labor, Dept. of Occupational Safety and Health Administration Transportation, Dept. of Federal Highway Administration

State Agencies:

Agriculture, Dept. of
Consumer and Business Services Dept.
Oregon Occupational Safety and Health Division
Environmental Quality, Dept. of
Fish and Wildlife, Dept. of
Forestry, Dept. of
Geology and Mineral Industries, Dept. of
Human Services, Dept. of
Land Conservation and Development, Dept. of
Natural Resources, Dept. of
State Fire Marshall
State Lands, Dept. of
Water Resources Department

Local Agencies:

City Councils Circuit Courts County Commissioners, Boards of Fire Districts Planning Commissions

10. CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

Contractor shall comply with all applicable standards, orders, or regulations issued pursuant to the Clean Air Act of 1970 (42 U.S.C. 1867 et seq.) and the Federal Water Pollution Control Act (33 U.S.C. 1251 et seq.) as amended. Violations shall be reported as required by law.

- 11. RETAINAGE. The withholding of retainage by the Contractor or Subcontractor shall be in accordance with ORS 279C.550 to ORS 279C.570.
- 12. LIENS. The Contractor shall not permit any lien or claim to be filed or prosecuted against the state, county, school district, municipality, municipal corporation or subdivision thereof, on account of any labor or material furnished.
- 13. NONRESIDENT. If the Contractor is a "nonresident bidder" as defined in ORS 279A.120, the Contractor shall comply with the reporting requirements of that statute.
- 14. NOTICE OF CLAIM ON BOND. The notice of claim required by ORS 279C.600 must be sent by registered or certified mail or hand delivered no later than 180 days after the day the person last provided labor or furnished materials or 180 days after the worker listed in the notice of claim by the Commissioner of the Bureau of Labor and Industries last provided labor. The notice may be sent or delivered to the Contractor or Subcontractor at any place the Contractor or Subcontractor maintains an office or conducts business or at the residence of the Contractor or Subcontractor. If the claim is for a required contribution to a fund of any employee benefit plan, the notice required by ORS 279C.600 must be sent or delivered within 200 days after the employee last provided labor or materials. The notice shall be in writing substantially as follows:

To (here insert the name of the Contractor or Subcontractor and the name of the Owner):

Notice hereby is given that the undersigned (here insert the name of the claimant) has a claim for (here insert a brief description of the labor or materials performed or furnished and the person by whom performed or furnished; if the claim is for other than labor or materials, insert a brief description of the claim) in the sum of (here insert the amount) dollars against the (here insert public works bond or payment bond, as applicable) taken from (here insert the name of the principal and, if known, the surety or sureties upon the public works bond or payment bond) for the work of (here insert a brief description of the work concerning which the public works bond or payment bond was taken). Such material or labor was supplied to (here insert the name of the Contractor or Subcontractor).

[15. ADD ANY NECESSARY CONTRACTOR COMPLIANCE/REPORTING PROVISIONS FOR AGENCY'S WMBE GOALS PROGRAM UNDER ORS 200.090]

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EXHIBIT E

INSURANCE REQUIREMENTS

- 1. Insurance Coverages. The Contractor shall procure and maintain (and, unless the Owner permits otherwise in writing, shall cause all Subcontractors to procure and maintain) at the Contractor's expense during the period of performance and thereafter as required below the following insurance from one or more companies authorized to do business in the State of Oregon with a policyholder's rating of not less than A-IX in the most recent edition of *Best's Rating Guide*. Except as approved otherwise by the Owner in advance, such insurance shall protect against claims which arise out of or relate to all of the Contractor's (and such Subcontractors') services under the Agreement, whether performed by the Contractor or a Subcontractor or consultant or a person or entity for which either of them may be responsible. The insurance coverages required by this Paragraph 1 shall be written on an occurrence basis, except the Professional Liability Insurance.
 - **1.1 Workers' Compensation Insurance**, if required by law, with statutory limits.
- **1.2. Employer's Liability Insurance**, if employees are employed for other than secretarial or bookkeeping services, with a limit of not less than \$500,000.
- 1.3. Commercial General Liability Insurance, applicable to all premises and operations, including Bodily Injury, Property Damage, Personal Injury, Contractual Liability, Independent Contractors, Products and Completed Operations, Broad Form Property Damage (including Completed Operations), Pollution Liability (coverage shall apply to both sudden and gradual pollution conditions), and coverage for explosion, collapse and underground hazards, with limits of not less than \$1,000,000 per occurrence, \$2,000,000 aggregate applicable specifically to the Project, \$1,000,000 personal and advertising injury and \$1,000,000 Products and Completed Operations.
- **1.4. Business Automobile Liability Insurance**, applicable to owned, non-owned and hired automobiles, with a limit of not less than \$1,000,000 combined single limit each accident; .
- **1.5. Professional Liability Insurance**, covering performance of professional services by the Contractor or any Subcontractor or professional firm at any tier (e.g. for bidder-design or design-build components), whether or not performed by a licensed architect or engineer, with policy limits of not less than \$1,000,000 per claim and \$2,000,000 in the aggregate.
- 1.6 Pollution Liability Insurance, covering the Contractor's liability for a third-party bodily injury and property damage arising from pollution conditions caused by the Contractor while performing their operations under the contract. The insurance coverage shall apply to sudden and accidental pollution events. Any coverage restriction as to time limit for discovery of a pollution incident and/or a time limit for notice to the insurer must be accepted by the Owner. The insurance coverage shall also respond to cleanup cost. This coverage may be written in combination with the commercial general liability insurance or professional liability insurance. The policy's limits shall not be less than \$1,000,000 each loss / \$1,000,000 aggregate. The policy shall be endorsed to state that the general aggregate limit of liability shall apply separately to this contract. Any self- insured retention / deductible amount shall be submitted to the Owner for review and approval.
- 1.7 Asbestos/hazardous materials Abatement (only applicable to Asbestos/hazardous materials abatement Contractors): General Liability policy shall be written on a form that meets the following criteria, and must be ASBESTOS SPECIFIC as follows:
 - (a) A full occurrence form, or
 - (b) A limited occurrence form with at least a three (3) year tail, or
 - (c) A claims made form with a three (3) year tail.
- **1.8 True Umbrella Policy,** which provides excess limits over the primary layer, in an amount not less than \$5,000,000.

- 1.9 Subcontractors: The Contractor shall require all subcontractors to provide and maintain General Liability, Auto Liability, Professional Liability (as applicable), and Workers' Compensation insurance with coverage's equivalent to those required of the General Contractor in this Agreement. The Contractor shall require certificates of insurance from all subcontractors as evidence of coverage.
 - **1.10 Exceptions or Waivers:** Any exception of waiver of these requirements shall be subject to review and written approval from the Owner.
- **2. Deductibles.** The Contractor shall pay all deductibles on all policies required by Paragraph 1.
- **3. Waivers of Subrogation Re Liability Insurance**. The Workers' Compensation and Employer's Liability policies shall be subject to a waiver of subrogation in favor of Owner and its members, partners, officers, directors, agents and employees, and the successors in interest of the foregoing.
- **4. Cross-Liability Coverages**. The Commercial General Liability and Automobile Liability policies shall provide cross-liability coverages as would be achieved under the standard International Organization for Standardization ("ISO") separations of insureds clause.
- 5. Additional Insureds. The Commercial General Liability and Automobile Liability policies shall name the Owner and its officers, directors, agents and employees, and the successors in interest of the foregoing, as additional insureds, using ISO additional insureds endorsement CG 20 10 11 85 or a substitute providing equivalent coverages. Such coverages provided to the additional insureds shall (a) be primary and noncontributory with respect to any insurance or self-insurance retention of the additional insureds, including but not limited to any Excess Liability coverage maintained by the additional insureds, (b) provide the same types and extents of coverages as the coverages provided to the primary insured, and shall not be limited to the "vicarious liability" of the additional insureds, (c) waive all rights of subrogation against the additional insureds, (d) cover all additional insureds that are a partnership or joint venture, if any, as "Named Insureds" as expressly stated in endorsements and (e) be maintained for the same durations as the coverages provided to the primary insured, including but not limited to the continuation of the Products and Completed Operations coverage until three (3) years after final payment to the Owner's prime contractor on the Project, and shall not be limited to "ongoing operations". Notwithstanding the foregoing, this Paragraph shall not be construed to require the Contractor to provide insurance coverage of the additional insureds in a way or to an extent that results in a violation of ORS § 30.140.
- **6. Duration of Coverages**. The insurance coverages required by Paragraph 1 shall be written on an occurrence basis, except the Professional Liability Insurance. The Professional Liability policy shall provide for a retroactive date of placement prior to or coinciding with the date of commencement under the Agreement. All other policies shall be in effect as of the date of commencement of the Contractor's services under the Agreement. All policies shall be maintained and remain in effect until one (1) year after Final Completion and thereafter when the Contractor is assisting or advising the Owner regarding the correction of defective or nonconforming Work; provided that the Products and Completed Operations policy and the Professional Liability policy shall remain in effect until three (3) years after final payment to the Owner's prime contractor on the Project. The Contractor shall notify the Owner of any claims against the Professional Liability policy, in which event the Owner shall have the right to require the Contractor at its expense to obtain additional Professional Liability Insurance in order to restore the required coverage available for the Project.

7. Builder's Risk Insurance.

The Contractor shall obtain Builder's Risk Insurance as described below:

(1) The Contractor shall purchase and maintain in force during the term of this Contract, at its own expense, Builder's Risk insurance in an amount equal to the Contract Amount, including any subsequent modifications for the entire project at the site on a replacement cost basis, including covering all costs needed to repair the structure or work based on the value figured at the time of rebuilding or repairing, not at the time of loss. Such coverage shall be maintained, unless otherwise provided in the Contract Documents, or otherwise agreed to in writing by all persons and entities who are beneficiaries of such insurance, until final

payment has been made or until no person or entity other than the Owner has insurable interest in the property to be covered, whichever is earlier. The Builder's Risk insurance shall include interests of the Owner, the Contractor, Subcontractors and sub-tier contractors in the project.

- Special Covered Cause of Loss Form. The Contractor's Builder's Risk Coverage shall be on a special covered cause of loss form and shall include theft, vandalism, malicious mischief, collapse, false-work, temporary buildings and debris removal including demolition, increased cost of construction, architect's fees and expenses, flood and earthquake coverage, materials and equipment in transit, and all below and above ground structures, water and sewer mains. Other coverage may be required if provided in contract documents. Coverage shall be written for 100% of the completed value (replacement cost basis) of the work being performed.
- (3) Amendments and Provisions. The Contractor's Builder's Risk shall also include the following amendments and provisions.
- **a. Waiver of Subrogation**. Waiver of subrogation against all parties named as insured, to the extent the loss is covered;
- **b. Beneficial Occupancy Clause**. The policy shall specifically permit partial or beneficial occupancy at or before substantial completion or final acceptance of the entire work. The Contractor shall take reasonable steps to obtain any necessary consent of the insurance company or companies and agrees to take no action, other than upon mutual written consent, with respect to occupancy or use of the work that could lead to cancellation, lapse or reduction of insurance;
- **c. Equipment Breakdown Coverage**. Equipment breakdown coverage (aka boiler & machinery coverage) shall be provided that specifically covers insured equipment during installation and testing;
- **d. Interior Damage**. Any clause that excludes recovery of damage to the interior of building shall be deleted. The Builder's Risk policy shall provide for recovery for damage to the interior of a building if caused by perils insured against in the Builder's Risk Policy;
- **e. Design Error**. The Builder's Risk policy shall not exclude coverage of damages caused by design error;
- **f. Settlement, Cracking, Etc.** The Builder's Risk policy shall cover settling, cracking, shrinking or expansion (including coverage for loss resulting from settling, cracking, shrinking or expansion) of foundation walls, floors and other parts of the structure; and
 - **Deductible**. Any deductible shall not exceed \$50,000 for each loss.
- Builder's Risk Installation Floater. If approved in writing by the Owner's Risk Manager, the Contractor may obtain a Builder's Risk Installation Floater in lieu of Builder's Risk Insurance at the Contractor's expense. The Contractor shall keep the Builder's Risk Installation Floater in effect during the term of this Contract for the value of materials and equipment, on a replacement cost basis, including covering all costs needed to repair the structure or Work (including overhead and profit) based on the values figured at the time of rebuilding or repairing, not at the time of loss. Such coverage shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed to in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made or until no person or entity other than the Owner has an insurable interest in the property to be covered, whichever is earlier. The Builders' Risk Installation Floater shall include interest of the Owner, The Contractor, Subcontractors and sub-tier Contractors in the project. The Builders' Risk Installation Floater shall be on a Special Covered Cause of Loss Form and shall include theft, vandalism, malicious mischief, faulty workmanship, labor, materials and equipment to be installed. Other coverages may be required if provided in the Contract Documents. The Builders' Risk Installation Floater shall also provide a Waiver of Subrogation against all parties named as insured, but only to the extent the loss is covered. Coverages shall be written for 100% of the completed value (replacement cost basis including labor and materials) of the work being performed or other limit as specified in the Contract Documents. Coverage shall extend to when project materials are in off-site storage and while in transit.

- (5) Insured Loss. The owner shall have sole power and authority to adjust and settle a loss with insurers. A loss insured under the Builder's Risk Insurance or Builder's Risk Installation Floater shall be adjusted by the Owner and any payments or settlements shall be made payable to the Owner for the insureds, as their interests may appear. The Owner shall be entitled to full payment of its loss from the insurance proceeds before payment of the remainder to any other beneficiaries of the policy. The Contractor shall pay Subcontractors their just share of remaining insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors make payments to the Sub-subcontractors in similar manner.
- **Deductible.** Payment of the deductible on the Builders Risk policy claims is the responsibility of the Contractor and is not subject to reimbursement by the Owner. The Contractor promptly shall pay the deductible (or if the claim is less than the deductible, the amount of the claim) promptly and without offset or deduction. If the Contractor does not do so, the Owner may, in addition to other remedies, deduct and offset the amount of the deductible from the Contract Sum.
- 8. **Proof of Insurance**. The Contractor shall file with Owner, upon execution of the Agreement, certificates of insurance acceptable to the Owner as well as copies of all insurance policies, with all riders and endorsements, all separate exclusions, conditions and waivers, and all other amendatory documents attached, evidencing the insurance required of the Contractor by this Exhibit E. No progress payment will be due until all such Certificates and policies are furnished. All policies and certificates must be signed copies and shall contain a provision that coverages afforded under the policies cannot be materially altered (i.e., the coverage's reduced, the limits decreased, or the additional insured removed), allowed to expire, or cancelled without first giving 30 days' prior written notice to the Owner. The Contractor shall furnish to the Owner copies of any subsequently issued endorsements amending, modifying, altering, or restricting coverage of limits. Furthermore, such policies or certificates shall verify that the policy contains coverage for blanket contractual liability including both oral and written contracts and acknowledge the indemnification provisions and liability coverages called for by this Agreement. If any of the required coverages are to renew during the period when such coverage is to remain in effect, or are required to remain in force after final payment to the Owner's prime contractor on the Project, an additional certificate evidencing continuation of such coverage shall be submitted upon renewal or with the Contractor's final invoice.
- **9. Effect of No or Insufficient Insurance**. The Contractor's failure to comply with the requirements of this Exhibit E shall constitute a material breach of the Agreement entitling the Owner to terminate the Agreement for cause. In the alternative, the Owner in its sole discretion may purchase the insurance required of, but not obtained or maintained, by the Contractor pursuant to this Exhibit E and charge such costs thereof to the Contractor or deduct the costs thereof from the Contract Sum. The Owner's rights under this Paragraph shall be in addition to, and without waiver of, its other rights and remedies under the Agreement or applicable law.
- **10. Waivers of Subrogation**. The Owner and the 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 the Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, the 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.
- 1. Limitation of This Exhibit E. Nothing in this Exhibit E shall negate, abridge or reduce the Contractor's responsibilities or liabilities under the Agreement or applicable law, the meaning and effect of the provisions of this Exhibit E being limited to setting out the Contractor's express obligations with respect to

insurance. By requiring insurance, the Owner does not guarantee that the insurance is sufficient to cover all the risks the Contractor may face. The Contractor's liability is not limited to insurance.

- 2. The Contractor shall obtain, at its own expense, the minimum insurance coverage described in this Exhibit and maintain that coverage until final acceptance of the entire Project, and through the stated completed operations period as applicable. By requiring such minimum insurance, the Owner does not guarantee that the insurance is sufficient to cover all the risks the Contractor may face. The Contractor's liability is not limited to insurance. The insurance carried by the Contractor shall be the primary coverage and non-contributory, and any insurance maintained by the Owner is excess and in any event solely for damages or losses for which the Owner is responsible.
- 3. The Owner's specification or approval of the insurance in this Contract or of its amount shall not relieve or decrease the liability of the Contractor under the Contract documents or otherwise. Coverage's are the minimum to be provided and are not limitations of liability under the Contract, indemnification, or applicable law provisions. The Contractor may, at its expense, purchase larger coverage amounts.
- **4.** Contract Sum. The Contract Sum includes the cost of any insurance required by the Contract Documents.

BSD INTERNATIONAL SCHOOL OF BEAVERTON: RE-ROOF

BEAVERTON, OREGON

BEAVERTON SCHOOL DISTRICT

OWNER

16550 SW MERLO ROAD BEAVERTON, OREGON 97003 (T): (503) 863-9083 CONTACT: DOAA EL HAGGAN | doaa_el_haggan@beaverton.k12.or.us

TBD

GENERAL CONTRACTOR

LICENSE No.: TBD

CIDA, INC.

ARCHITECT | STRUCTURAL ENGINEER

15895 SW 72ND AVENUE, SUITE 200 PORTLAND, OREGON 97224 (T): (503) 226-1285 CONTACT: ERIK WINTER | ewinter@cidainc.com

R&W ENGINEERING

MECHANICAL AND ELECTRICAL ENGINEER

9715 SW ALLEN BOULEVARD, SUITE No. 117 BEAVERTON, OREGON 97239 (T): (503) 292-6000 CONTACT: ED CARLISLE | ecarlisle@rweng.com

RDH BUILDING SCIENCE

ROOFING CONSULTANT

5331 SOUTH MACADAM AVENUE, SUITE No. 314 PORTLAND, OREGON 97224 (T): (503) 867-8519 CONTACT: SCOTT MECALIS | smecalis@rdh.com

LEGAL DESCRIPTION AND ZONING SUMMARY

MAP AND TAXLOT No.: REAL PROPERTY ACCOUNT No:

17770 SW BLANTON STREET | BEAVERTON, OREGON | 97078 ISI18BA00600 R152792

ZONING DESIGNATION: **ZONING OVERLAY(S):**

WASHINGTON COUNTY - AUTHORITIES HAVING JURISDICTION FOR THIS PROJECT INSTITUTIONAL DISTRICT (INST)

PROJECT DESCRIPTION

IN BRIEF AND WITHOUT FORCE AND EFFECT ON THE REQUIREMENTS OF THE CONTRACT DOCUMENTS, THE PROJECT CONSISTS OF THE FOLLOWING: THE WORK INCLUDES THE REMOVAL AND REPLACEMENT OF THE EXISTING ROOF MEMBRANE SYSTEM(S) AT THE AREAS NOTED HEREIN, AS WELL AS ASSOCIATED STRUCTURAL IMPROVEMENTS RELATED TO THE ROOF ASSEMBLY. EXTERIOR WORK ALSO INCLUDE REMOVAL AND REPLACEMENT OF EXISTING ROOF TOP MECHANICAL UNITS AS

• ROOFING CLASS: NOTED HEREIN. NO INTERIOR WORK IS INCLUDED, EXCEPT AS REQUIRED TO PERFORM ROOF AND EQUIPMENT WORK.

DEFERRED SUBMITTAL (DELEGATED DESIGN)

NOTE: DEFERRED SUBMITTAL(S) INDICATED BELOW WILL BE PREPARED BY OTHERS AND SUBMITTED UNDER SEPARATE COVER. I. SHORING (TEMPORARY), AS REQUIRED

WORK UNDER SEPARATE CONTRACT(S) (BY OTHERS)

NOTE: DESIGN ELEMENTS INDICATED BELOW WILL BE PREPARED BY OTHERS. I. SHORING (TEMPORARY), AS REQUIRED.

BUILDING CODE SUMMARY

2019 OREGON STRUCTURAL SPECIALTY CODE (OSSC) DESIGN CODE(S): 2019 OREGON ZERO ENERGY READY COMMERCIAL CODE

OCCUPANCY:

 CONSTRUCTION TYPE: - A/B WINGS & GYMNASIUM:

TYPE V-B (ASSUMED) - MODULAR BUILDING: TYPE V-B (ASSUMED)

FIRE PROTECTION (SPRINKLERS):

A/B WINGS & GYMNASIUM: YES (EXISTING) - MODULAR BUILDING: YES (EXISTING)

CLASS A ROOF ASSEMBLY AT ALL LOCATIONS

THERMAL INSULATION (AT ROOF):

- ROOF AREA 'A':

EXISTING THERMAL INSULATION (BLOWN-IN INSULATION) LOCATED BELOW ROOF DECK TO REMAIN. NO NEW THERMAL INSULATION TO BE ADDED BELOW OR ABOVE ROOF DECKING.

- ROOF AREA 'B':

EXISTING THERMAL INSULATION (BATT INSULATION) LOCATED BELOW ROOF DECK BETWEEN ROOF FRAMING MEMBERS, TO REMAIN. NO NEW THERMAL INSULATION TO BE ADDED BELOW OR ABOVE ROOF DECKING.

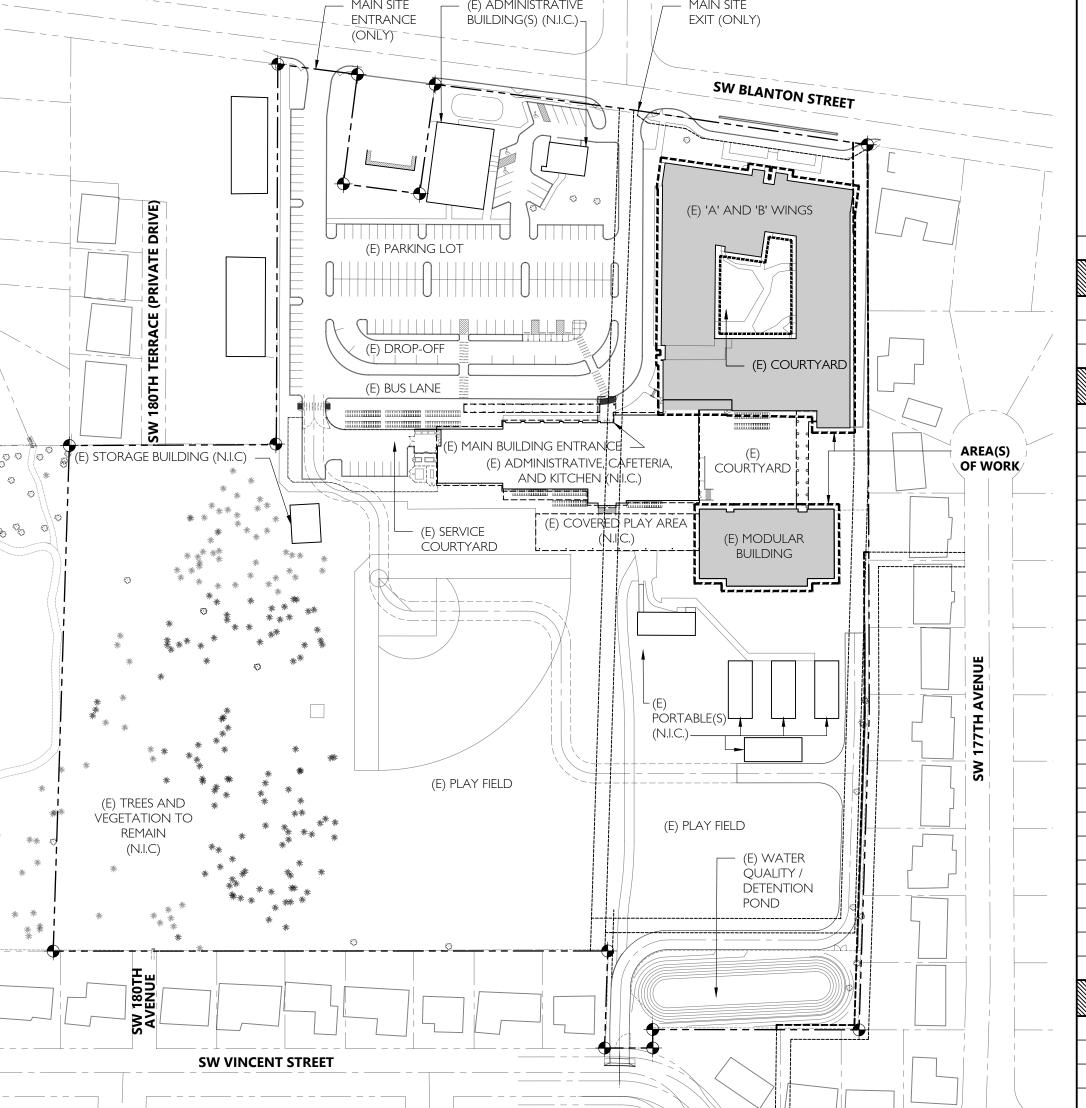
- ROOF AREA 'C':

EXISTING THERMAL INSULATION (BATT INSULATION) LOCATED BELOW ROOF DECK BETWEEN ROOF FRAMING MEMBERS, TO REMAIN. NEW RIGID BOARD THERMAL INSULATION TO BE ADDED ABOVE ROOF SHEATHING. CONTRACTOR SHALL VERIFY EXISTING BELOW ROOF DECKING INSULATION VALUE(S). FINAL INSTALLED ROOF THERMAL INSULATION (BELOW AND ABOVE DECK INSULATION COMBINED) SHALL NOT BE LESS THAN R-49.

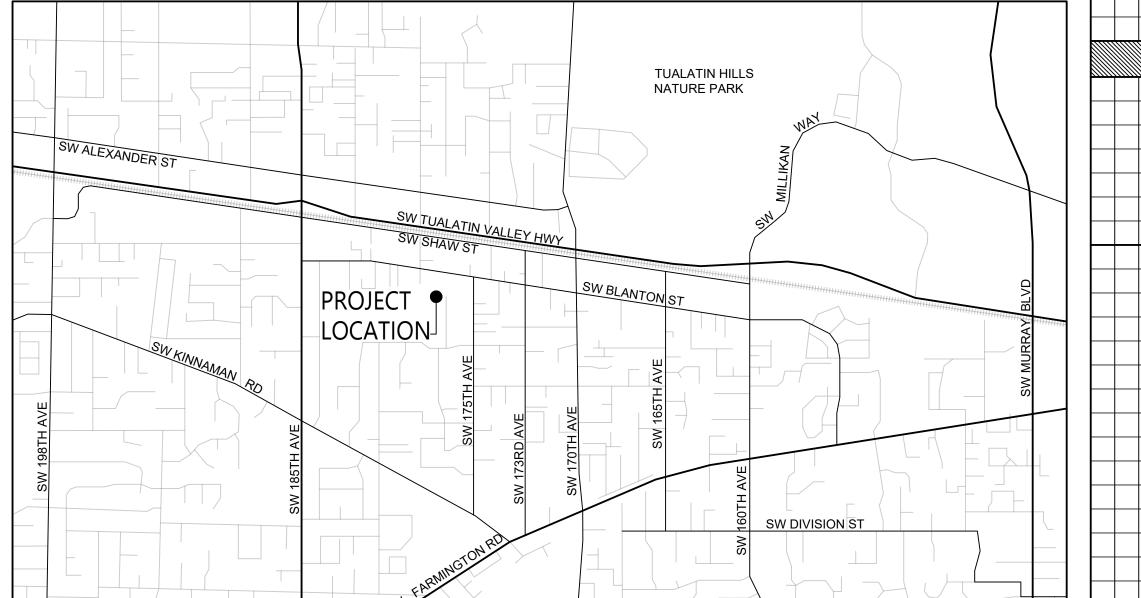
AREAS OF WORK (APPROXIMATE):

± 37,100 GSF - ROOF AREA 'A': ± 7,025 GSF - ROOF AREA 'B': ± 11,250 GSF

NOTE: ESTIMATED AREAS PROVIDED FOR REFERENCE AND BIDDERS CONVENIENCE. BIDDERS ARE RESPONSIBLE FOR PERFORMING THEIR OWN TAKE-OFFS AND CONFIRMING AREAS AND QUANTITIES OF ITEMS REQUIRED TO COMPLETE THE SCOPE OF WORK DESCRIBED WITHIN THESE CONTRACT DOCUMENTS.







2 VICINITY MAP

O CURRENT RELEASE - NO CHANGES **COVER SHEET** CSI COVER SHEET **ARCHITECTURAL** DETAILS - A & B WINGS, GYM A4.3 DETAILS - MODULAR BUILDING DETAILS - MODULAR BUILDING

RELEASES

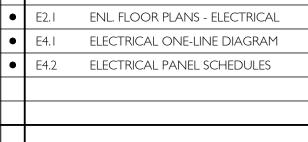
	•	SI.I	ROOF PLAN	
	•	S2.1	DETAILS	
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STRUCTURAL

	•	M0.1	MECHANICAL LEGEND & SCHE
	•	M0.2	MECHANICAL SCHEDULES
	•	M1.0	ROOF PLAN - MECHANICAL

MECHANICAL

	ELE	CTRICAL
•	E0.1	ELECTRICAL COVER SHEET
•	E1.0	SITE PLAN - ELECTRICAL
•	E2.1	ENL. FLOOR PLANS - ELECTRICAL
•	E4.1	ELECTRICAL ONE-LINE DIAGRAM
•	E4.2	ELECTRICAL PANEL SCHEDULES



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STREET



ARCHITECTURAL GENERAL NOTES

DISCLAIMER: THESE ARCHITECTURAL GENERAL NOTES SHALL APPLY TO THE ENTIRE PROJECT UNLESS SPECIFICALLY NOTED OTHERWISE WITHIN THE CONSTRUCTION DOCUMENTS.

GENERAL PROJECT NOTES

- REFERENCES IN THE DRAWINGS AND SPECIFICATIONS SHALL MEAN, AND ARE INTENDED TO BE, THE LATEST EDITION, AMENDMENT OR REVISION OF SUCH REFERENCED STANDARD IN EFFECT AS OF THE DATE OF THE CONTRACT DOCUMENTS.
- B. ANY DISCREPANCY FOUND AMONG THE DRAWINGS, SPECIFICATIONS, THESE NOTES, AND ANY SITE CONDITIONS SHALL BE REPORTED IN A TIMELY MANNER, IN WRITING TO THE ARCHITECT, WHO SHALL CLARIFY ANY DISCREPANCY IN C. SITE WORK IS LIMITED TO THAT WHICH IS DESCRIBED WITHIN THESE CONTRACT DOCUMENTS. WRITING. ANY WORK DONE BY THE CONTRACTOR AFTER DISCOVERY OF SUCH DISCREPANCY SHALL BE DONE AT THE CONTRACTOR'S RISK AND EXPENSE.
- C. DO NOT SCALE DRAWINGS. WRITTEN DIMENSIONS TAKE PRECEDENCE OVER THOSE SHOWN GRAPHICALLY.
- D. THE CONTRACTOR SHALL VERIFY AND COORDINATE THE DIMENSIONS SHOWN ON DRAWINGS AFTER AWARD OF CONTRACT AND PRIOR TO PROCEEDING WITH ANY WORK OR FABRICATION.
- E. THE ARCHITECTURAL DRAWINGS REPRESENT THE COMPLETED DESIGN INTENT AND ARE NOT INTENDED TO INDICATE THE MEANS AND METHOD OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCING, SECURITY AND SAFETY REQUIRED FOR THIS PROJECT.
- F. ALL DESIGN, BUILDING AND DETAIL ELEMENTS FOR CONSTRUCTION NOT FULLY SHOWN SHALL BE THE SAME TYPE AND CHARACTER AS SHOWN FOR SIMILAR CONDITIONS.
- G. ALL PRODUCTS AND MATERIALS BEING PROVIDED AND INSTALLED BY THE CONTRACTOR SHALL BE APPLIED, PLACED, ERECTED OR INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.
- H. PROVIDE, FURNISH AND INSTALL ALL ITEMS INDICATED IN THE CONTRACT DOCUMENTS, COMPLETE AND READY FOR THEIR INTENDED USE, AT NO ADDITIONAL COST TO THE PROJECT.
- I. THESE DOCUMENTS CONTAIN NOTES THAT MAY APPLY GENERALLY TO ALL DESIGN ELEMENTS. SPECIFICALLY TO ONE SHEET, OR SPECIFICALLY TO ONE OR MORE DESIGN ELEMENTS. THE NOTES ARE NOT MERE GUIDELINES, THEY ARE PART AND PARCEL OF THE DESIGN. ANY WORK THAT IS PERFORMED THAT IS NOT IN COMPLIANCE WITH THE NOTES IS NOT IN ADDITION TO THE NOTES BY WRITING, ACT OR FAILURE TO ACT, SHALL BE CARRIED OUT ONLY WITH THE PRIOR EXPRESS WRITTEN CONSENT AND APPROVAL OF THE ARCHITECT.
- DRAWINGS AND DETAILS ARE MEANT TO INDICATE GENERAL DESIGN INTENT AND SHOW ASSEMBLIES OF STRUCTURAL AND NON-STRUCTURAL MEMBERS, SIZES, SHAPES, CONNECTIONS, ETC. COORDINATE WITH OTHER CONTRACT DOCUMENTS FOR COMPLETE SYSTEMS AND ASSEMBLY INFORMATION. ANY ITEMS NOT SHOWN, BUT NECESSARY FOR A COMPLETE AND FINISHED PRODUCT ARE TO BE CONSIDERED PART OF EACH DETAIL AND SHALL BE INCLUDED IN THE CONSTRUCTION TO MEET INDUSTRY STANDARDS.
- K. PEDESTRIAN PROTECTION SHALL BE PROVIDED AS REQUIRED BY THE GOVERNING AUTHORITY HAVING JURISDICTION STANDARDS.
- L. CONTRACTOR SHALL PROTECT ALL EXTERIOR EXPOSED WORK BEING INSTALLED IN WEATHER TIGHT MANNER. PROVIDE NECESSARY SUPPORTING SUB-STRUCTURE TO ENSURE WATER IS SHED AWAY FROM EXPOSED OPENINGS AND AREAS OF
- M. A COMPLETE AND CURRENT SET OF THE CONSTRUCTION DOCUMENTS, AS APPROVED BY THE GOVERNING AUTHORITIES HAVING JURISDICTION, MUST BE ON THE JOB SITE WHENEVER CONSTRUCTION IS IN PROGRESS.
- N. WHERE AN EMERGENCY AND STANDBY SYSTEM IS REQUIRED BY THE GOVERNING AUTHORITIES HAVING JURISDICTION, THE ENTIRE SYSTEM SHALL COMPLY WITH THE CURRENT EDITION OF THE GOVERNING CODE(S) REQUIREMENT(S).
- O. CONSTRUCTION MATERIALS SHALL BE SPREAD OUT IF PLACED ON FRAMED FLOORS OR ROOF. LOAD SHALL NOT EXCEED THE DESIGN LIVE LOAD PER SQUARE FEET AS SPECIFIED BY THE STRUCTURAL ENGINEER OF RECORD.
- P. DO NOT NOTCH OR DRILL JOISTS, BEAMS, OR LOAD BEARING STUDS WITHOUT THE PRIOR APPROVAL OF THE STRUCTURAL ENGINEER OF RECORD.
- Q. PROVIDE BLOCKING, BACKING, FRAMING WITHIN ALL WALLS HAVING WALL-MOUNTED FIXTURES, ACCESSORIES,
- FURNISHINGS AND EQUIPMENT.
- R. PROVIDE VENTING FOR ALL CONCEALED SPACES PER BUILDING CODE.
- ALL INSULATION AND FINISH MATERIALS INDICATED IN THE CONSTRUCTION DOCUMENTS SHALL COMPLY WITH OR EXCEED THE REQUIREMENTS OF THE MOST RESTRICTIVE PREVAILING BUILDING CODE FOR SMOKE DENSITY AND FLAME
- T. PROVIDE WEATHER BARRIER MATERIALS AS REQUIRED FOR WATERTIGHT CONSTRUCTION. PROVIDE TEMPORARY COVER AS NECESSARY TO PREVENT WATER INFILTRATION INTO THE BUILDING INTERIOR OR WIND DAMAGE DURING
- U. ALL METAL FLASHING EDGES SHALL BE HEMMED, UNLESS NOTED OTHERWISE.
- V. PROVIDE SEPARATION BETWEEN DISSIMILAR METALS.
- W. ALL DIMENSIONS SHOWN ARE TO CENTERLINE OF COLUMN(S) AND FACE OF STUD, UNLESS OTHERWISE NOTED.
- X. ALL EXPOSED EXTERIOR STEEL SHAPES SHALL BE GALVANIZED AND PRIMED AND PAINTED, UNLESS OTHERWISE NOTED.
- Y. DEFINITION: "APPURTENANCE." AN ACCESSORY THAT IS ATTACHED TO THE BUILDING EITHER DIRECTLY THROUGH OR SUPERFICIALLY TO THE EXTERIOR WALL ASSEMBLY. EXAMPLES INCLUDE BUT ARE NOT LIMITED TO ALL MECHANICAL, ELECTRICAL AND PLUMBING ELEMENTS INCLUDING. BUT NOT LIMITED TO, HOSE BIBBS, EXHAUST VENTS, CONDENSATES. ELECTRICAL OUTLETS, LIGHT FIXTURES, SIGNAGE, GUARDRAILS AND THE LIKE.
- Z. PROVIDE ACCESS PANELS AS REQUIRED. LOCATION, FINISH AND TYPE SHALL BE APPROVED BY ARCHITECT AND APPROVED BY ARCHITECT AND ARCHITECT'S CONSULTANT(S) WILL BE SUBJECT TO MODIFICATION AT CONTRACTOR'S EXPENSE. PROVIDE RATED ACCESS PANELS WITH THE SAME RATING AS THE ASSEMBLY IN WHICH THEY ARE INSTALLED. ACCESS PANELS IN SHAFT WALLS, RATED FLOOR/CEILINGS OR RATING ROOF/CEILINGS SHALL BE SMOKE SEALED AS I. SCOPE OF WORK LIMITED TO "AREA OF WORK" ILLUSTRATED IN CONTRACT DOCUMENTS. REQUIRED BY THE CURRENT EDITION OF THE GOVERNING CODE(S) REQUIREMENT(S).
- AA. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE ACCESSIBILITY REQUIREMENTS WHICH ARE PERTINENT TO THIS PROJECT. INFORMATION PROVIDED HEREIN ARE NOT MEANT TO SUPERSEDE THE BUILDING CODE OR AUTHORITIES HAVING JURISDICTION CONCERNING ACCESSIBILITY REQUIREMENTS.
- AB. ARCHITECT'S DIGITAL DATA FILES: ELECTRONIC COPIES OF CAD DRAWINGS OF THE CONTRACT DRAWINGS MAY BE PROVIDED BY ARCHITECT AT ITS DISCRETION FOR CONTRACTOR'S USE IN PREPARING SUBMITTALS. THE CONTRACTOR SHALL NOT ASSUME THAT THE ARCHITECT WILL BE RELEASING SAID FILES.
- AC. AIA DOCUMENT A201 "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION" IS INCLUDED WITHIN THESE L. EXISTING EXIT SIGNAGE AND EMERGENCY LIGHTING TO REMAIN FUNCTIONAL UNTIL REPLACED AND MADE FULLY CONTRACT DOCUMENTS BY REFERENCE.
- CONTRACTOR SHALL SUBMIT A COMPLETE WEATHER PROTECTION PLAN FOR OWNER AND ARCHITECT TO REVIEW AND OWNER TO APPROVE. REFER TO PROJECT MANUAL FOR ADDITIONAL REQUIREMENTS.
- AE. THE CURRENT EDITION OF BEAVERTON SCHOOL DISTRICT STANDARDS FOR DESIGN AND CONSTRUCTION OF ALL DISTRICT FACILITIES GUIDELINES AND REQUIREMENTS IS INCLUDED WITHIN THESE CONTRACT DOCUMENTS BY REFERENCE.
- AF. LOWER LEVEL AND MEZZANINE FLOOR PLANS HAVE NOT BEEN PROVIDED BUT CAN BE PROVIDED BY OWNER AT CONTRACTOR'S WRITTEN REQUEST UPON CONTRACT AWARD.
- AG. REFER TO ROOFING CONSULTANTS "ROOF MOISTURE SURVEY REPORT", DATED DECEMBER 18, 2020, WHICH IS INCLUDED IN THE PROJECT MANUAL FOR REFERENCE, FOR ADDITIONAL INFORMATION. CONTRACTOR SHALL FURTHER INVESTIGATE AREAS NOTED WITHIN THE AFOREMENTIONED REPORT THAT WERE FOUND TO HAVE OR WERE SUSPECTED TO HAVE ELEVATED AREAS OF MOISTURE,, IN ADDITION TO ANY EXPLORATION AND EVALUATION REQUIRED BY THE SELECTED ROOFING MEMBRANE MANUFACTURER.
- AH. PROTECT ALL EXISTING ITEMS AND MATERIALS / SURFACES THAT SHALL REMAIN FROM DAMAGE DURING DEMOLITION. CONTRACTOR SHALL, AT REGULAR INTERVALS ACCEPTABLE TO THE OWNER, INSPECT AREAS BELOW ARES OF WORK TO DETERMINE IF EXTERIOR WORK HAS CAUSED DAMAGE TO THE INTERIOR ENVIRONMENT. CONTRACTOR WILL BE SOLELY RESPONSIBLE FOR REMEDIATION AND REPAIRS NECESSARY TO RETURN INTERIOR ENVIRONMENTS BACK TO PREVIOUS WORKING CONDITION AND ORDER.

GENERAL SITE PLAN NOTES

- A. APPLICABLE CODES: ALL WORK SHALL BE IN CONFORMANCE WITH ALL FEDERAL, STATE, AND LOCAL CODES. ALL CODE A. FIELD VERIFY ALL INFORMATION PRIOR TO CONSTRUCTION. IF SITE CONDITIONS VARY FROM CONTRACT DOCUMENTS, A. CONTRACTOR SHALL VERIFY & CONFIRM EXISTING CONDITIONS SHOWN OR IMPLIED ON DRAWINGS PRIOR TO START OF NOTIFY ARCHITECT, IN WRITING, IMMEDIATELY.
 - B. SITE INFORMATION PROVIDED IS FOR REFERENCE ONLY. ALL INFORMATION SHOWN OR IMPLIED SHALL BE FIELD VERIFIED B. PRIOR TO CONSTRUCTION.

 - D. CONTRACTOR SHALL COORDINATE DIRECTLY WITH OWNER FOR APPROVED CONSTRUCTION STAGING AND STORAGE LOCATIONS AT THE PROJECT SITE.
 - E. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING EXISTING SITE AND DRAINAGE PATTERNS AND PROTECTION OF EXISTING ENGINEERED DRAINAGE FACILITIES.
 - F. CONTRACTOR SHALL REPLACE AND RESTORE AREAS NOT SCHEDULED FOR CONSTRUCTION TO THEIR ORIGINAL CONDITION AND TO THE APPROVAL OF THE OWNER PRIOR TO SUBSTANTIAL COMPLETION.
 - G. CONTRACTOR SHALL EXERCISE EXTREME CAUTION WHEN WORKING AND OR STORING IN AREAS ADJACENT TO EXISTING VEGETATION AND TREES IN ORDER TO MINIMIZE DISTURBANCES. DAMAGED VEGETATION SHALL BE REPLACED BY THE CONTRACTOR, AT NO COST TO THE OWNER, PRIOR TO SUBSTANTIAL COMPLETION.
 - H. CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES WHETHER INDICATED OR NOT AND PROTECT FROM DAMAGE. CONTRACTOR SHALL BEAR ALL REPAIR AND/OR REPLACEMENT EXPENSES OF UTILITIES OR OTHER PROPERTY DAMAGED BY OPERATIONS IN CONJUNCTION WITH THE EXECUTION OF THE WORK.

GENERAL DEMOLITION NOTES

- COMPLIANCE WITH THE DESIGN AND IS SUBJECT TO REJECTION. ANY ALTERATION, MODIFICATION, OR A. CONTRACTOR SHALL PROTECT PROJECT WORK AREA, OWNER'S PROPERTY (BOTH NEW AND EXISTING), BUILDING MATERIALS AND ANY FINISHES, FIXTURES AND EQUIPMENT FROM DAMAGE DURING CONSTRUCTION. ANY DAMAGES TO SAME SHALL BE REPAIRED AND/OR REPLACED AT NO COST TO THE OWNER OR TENANT PRIOR TO SUBSTANTIAL COMPLETION.
 - B. DEFINITIONS:
 - REMOVE: DETACH ITEM(S) FROM EXISTING CONSTRUCTION AND DISPOSE OF THEM OFF-SITE UNLESS INDICATED TO BE SALVAGED OR REINSTALLED.
 - REMOVE AND SALVAGE: DETACH ITEMS FROM EXISTING CONSTRUCTION, IN A MANNER TO PREVENT DAMAGE AND COORDINATE WITH OWNER FOR RE-USE AND/OR STORAGE.
 - REMOVE AND REINSTALL: DETACH ITEMS FROM EXISTING CONSTRUCTION, IN A MANNER TO PREVENT DAMAGE,
 - PREPARE FOR REUSE, AND REINSTALL WHERE INDICATED. EXISTING TO REMAIN: LEAVE EXISTING ITEMS THAT ARE NOT TO BE REMOVED AND THAT ARE NOT OTHERWISE
 - INDICATED TO BE SALVAGED OR REINSTALLED. C. WHERE NOT INDICATED ON DRAWINGS, OWNER SHALL HAVE RIGHT OF FIRST REFUSAL FOR EQUIPMENT AND MATERIALS
 - REMOVED DURING DEMOLITION AND WILL PROMPTLY REMOVE SELECTED ITEMS. SALVAGEABLE / RECYCLABLE EQUIPMENT AND MATERIALS SHALL BE STOCKPILED AT AN OWNER PROVIDED ON-SITE LOCATION FOR FUTURE USE / RECYCLING. ALL OTHER DEMOLISHED MATERIALS ARE TO BE REMOVED DAILY. FEES ASSOCIATED WITH DISPOSAL SHALL BE INCLUDED IN THE CONTRACTOR'S BASE BID.
 - CONTENTS, COMMEMORATIVE PLAQUES AND TABLETS, AND OTHER ITEMS OF INTEREST OR VALUE TO OWNER THAT MAY BE UNCOVERED DURING DEMOLITION REMAIN THE PROPERTY OF THE OWNER.
 - WHERE NOT INDICATED ON DRAWINGS, ALL ITEMS NOT REUSED FOR NEW CONSTRUCTION ARE TO BE RECYCLED TO THE MAXIMUM EXTENT ALLOWED PER LOCAL CODE. VERIFY WHICH ITEMS TO BE REUSED WITH BUILDING OWNER AND ARCHITECT PRIOR TO REMOVAL.
 - F. CONDUCT SELECTIVE DEMOLITION AND DEBRIS-REMOVAL OPERATIONS TO ENSURE MINIMUM INTERFERENCE WITH K. INSTALLATION OF NEW AND/OR REINSTALLATION OF EXISTING GAS LINES SHALL CONFORM TO CURRENT BUILDING ROADS, STREETS, WALKS, WALKWAYS, AND OTHER ADJACENT OCCUPIED AND USED FACILITIES.
 - G. DEMOLISH AND REMOVE EXISTING CONSTRUCTION ONLY TO THE EXTENT REQUIRED AS INDICATED. USE METHODS REQUIRED TO COMPLETE THE WORK WITHIN LIMITATIONS OF GOVERNING REGULATIONS AND AS FOLLOWS
 - PROCEED WITH SELECTIVE DEMOLITION IN SYSTEMATIC ORDER, AS APPROVED BY OWNER, SO AS TO LIMIT
 - DISTURBANCE TO ADJACENT OCCUPIED SPACES. NEATLY CUT OPENINGS AND HOLES PLUMB, SOUARE, AND TRUE TO DIMENSIONS REQUIRED. USE CUTTING METHODS LEAST LIKELY TO DAMAGE CONSTRUCTION TO REMAIN OR ADJOINING CONSTRUCTION. USE HAND TOOLS OR SMALL POWER TOOLS DESIGNED FOR SAWING OR GRINDING, NOT HAMMERING AND CHOPPING.
 - TEMPORARILY COVER OPENINGS TO REMAIN. CUT OR DRILL FROM THE EXPOSED OR FINISHED SIDE INTO CONCEALED SURFACES TO AVOID MARRING EXISTING
 - DO NOT USE CUTTING TORCHES UNTIL WORK AREA IS CLEARED OF FLAMMABLE MATERIALS. AT CONCEALED SPACES, SUCH AS DUCT AND PIPE INTERIORS, VERIFY CONDITION AND CONTENTS OF HIDDEN SPACE BEFORE STARTING FLAME-CUTTING OPERATIONS, IF PERMITTED. MAINTAIN PORTABLE FIRE-SUPPRESSION DEVICES DURING FLAME-CUTTING OPERATIONS.
 - 5. IF FLAME-CUTTING OPERATIONS ARE PERMITTED, MAINTAIN FIRE WATCH DURING AND AFTER FLAME-CUTTING OPERATIONS.
 - MAINTAIN ADEOUATE VENTILATION WHEN USING CUTTING TORCHES. REMOVE DECAYED, VERMIN-INFESTED, OR OTHERWISE DANGEROUS OR UNSUITABLE MATERIALS AND PROMPTLY
 - DISPOSE OF OFF-SITE.
 - REMOVE FRAMING MEMBERS AND LOWER TO GROUND BY METHOD SUITABLE TO AVOID FREE FALL AND TO PREVENT GROUND IMPACT OR DUST GENERATION.
- ARCHITECT'S CONSULTANT(S) PRIOR TO OBTAINING AND INSTALLING. ACCESS PANEL LOCATION, FINISH AND TYPE NOT H. REFER TO MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS.

 - EXISTING MEANS OF EGRESS SHALL BE MAINTAINED (UNOBSTRUCTED AND FUNCTIONAL) THROUGHOUT THE ENTIRE BUILDING AT ALL TIMES DURING CONSTRUCTION.
 - K. COORDINATE WITH OWNER IF TEMPORARY WALLS TO ENCLOSE THE AREA(S) OF WORK, INCLUDING BUT NOT LIMITED CIRCULATION PATHS FOR CONSTRUCTION PERSONNEL ACCESSING THE ROOF AREA(S) OF WORK, AS INDICATED ARE REQUIRED. IF REQUIRED, TEMPORARY WALLS SHALL BE SEALED TO EXISTING CONSTRUCTION AS REQUIRED TO PREVENT MIGRATION OF CONSTRUCTION RELATED DIRT, DUST AND DEBRIS FROM CONTAMINATING NON-AREA OF WORK SPACES.
 - FUNCTIONAL AS PART OF THIS PROJECT'S SCOPE OF WORK.
- AD. PRIOR TO COMMENCEMENT OF WORK AND WITHIN (7) DAYS OF ISSUANCE OF OWNER'S NOTICE TO PROCEED, M. EXISTING EGRESS COMPONENTS, ELEMENTS AND ASSOCIATED ASSEMBLIES TO REMAIN. MAINTAIN EXISTING FIRE AND SMOKE RATINGS, EGRESS HARDWARE (WHERE NOT INDICATED TO BE REMOVED AND/OR REPLACED), AND SIGNAGE.
 - N. EXISTING PRIMARY STRUCTURE ELEMENTS BEAMS, COLUMNS, BEARING WALLS, SHEAR WALLS, ETC. AND ASSOCIATED ASSEMBLIES TO REMAIN, UNLESS OTHERWISE NOTED. VERIFY LOCATIONS AND QUANTITIES OF STRUCTURAL ELEMENTS IN
 - O. WHERE PLANS CALL FOR DEMOLITION OF WALLS OR FINISH(ES) ADJACENT TO EXISTING ASSEMBLIES TO REMAIN, PATCH & repair existing surfaces that remain to maintain current fire and smoke rating(s) and aesthetic APPEARANCE OF ASSEMBLY.

GENERAL ROOF PLAN NOTES

- CONSTRUCTION. NOTIFY ARCHITECT, IN WRITING, OF ANY DISCREPANCIES.
- ALL ROOFING REPAIR WORK TO BE PREFORMED BY ROOFING CONTRACTOR CERTIFIED BY ROOFING MANUFACTURER AND AS REQUIRED TO MEET INSTALLATION REQUIREMENTS OF SPECIFIED ROOFING SYSTEM WARRANTY
- C. ALL ROOFING REPAIR WORK IS SUBJECT TO INSPECTION AND APPROVAL BY ROOFING MANUFACTURER FIELD representative. Contractor to schedule roofing inspection at intervals determined by manufacturer FOR ROOFING SYSTEM WARRANTY.
- ROOF PENETRATIONS:
- D.I. CONTRACTOR IS RESPONSIBLE FOR COORDINATING LOCATION OF FINAL ROOF PENETRATIONS TO AVOID CONFLICT WITH EXISTING STRUCTURE AND BUILDING SYSTEMS.
- D.2. NOT ALL ROOF EQUIPMENT, VENTING, & PENETRATIONS ARE SHOWN. REFER TO MECHANICAL, ELECTRICAL, & PLUMBING DRAWINGS FOR ADDITIONAL ROOF EQUIPMENT & PENETRATION INFORMATION - VERIFY LOCATIONS
- AND QUANTITIES OF EXISTING ELEMENTS IN FIELD.
- D.3. EXISTING ROOF PENETRATIONS & CURBS INDICATED BENEATH MECHANICAL EQUIPMENT AT ROOF ARE DIAGRAMMATIC. CONTRACTOR SHALL FIELD VERIFY EXISTING SIZES, CONFIGURATIONS, & PLACEMENT, TYPICAL. D.4. EXISTING EQUIPMENT CURBS, CRICKETS & ROOF PENETRATIONS AT SMALL EQUIPMENT ARE NOT SHOWN FOR
- DRAWING CLARITY. REFER TO LEGEND & KEYNOTES FOR INDICATION OF CURBED VERSUS NON-CURBED CONDITION. D.5. PROVIDE PENETRATION FLASHING FOR ALL ROOF TOP EQUIPMENT, SCREENING, AND RELATED CONDUIT, PIPING AND VENTING COMPONENTS AND SYSTEMS. REFER TO PROJECT MANUAL, CONTRACT DOCUMENTS, AS WELL AS MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR LOCATIONS AND QUANTITIES OF PENETRATIONS NOT
- INDICATED ON ARCHITECTURAL ROOF PLAN. D.6. COVER VENTILATION OPENINGS WITH CORROSION-RESISTANT INSECT SCREENING. PROTECT VENTILATION OPENINGS AGAINST THE ENTRANCE OF SNOW AND/OR RAIN. WHERE EAVE VENTS ARE INSTALLED, INSULATION
- SHALL NOT BLOCK THE FREE FLOW OF AIR. D.7. ALL ROOF PENETRATIONS TO MAINTAIN REQUIRED FIRE RATING(S) AND TO BE INSTALLED PER MANUFACTURER'S SUGGESTED INSTRUCTIONS.
- CONTRACTOR SHALL INSPECT CONDITION OF ROOF SHEATHING (WHERE SCHEDULED TO BE EXPOSED OR WHERE DAMAGE MAY BE SUSPECTED) & PROVIDE WRITTEN REPORT TO OWNER, ARCHITECT, & STRUCTURAL ENGINEER OF RECORD, REMOVE AND REPLACE DAMAGED ROOF SHEATHING WITH APA RATED SHEATHING PER STRUCTURAL ENGINEER OF RECORD'S DESIGN REQUIREMENTS. USE OF ORIENTED STRAND BOARD (OSB) SHEATHING IS NOT PERMITTED.
- F. OPENINGS (NEW OR EXISTING) IN ROOF ARE NOT PERMITTED AT THE ROOF WITHIN 4'-0" OF RATED WALL ASSEMBLIES (REFERENCE CODE SECTION: IBC SECTION 706). PROVIDE APA RATED FIRE RETARDANT TREATED SHEATHING WITHIN 4'-0" OF RATED WALL ASSEMBLY(S).
- AT AREAS OF WORK:
- G.I. MAINTAIN EXISTING RATED WALL ASSEMBLIES, INCLUDING FULL-HEIGHT RATED DEMISING WALLS AND EXISTING
- DRAFT STOPPING ASSEMBLIES AT ATTIC; G.2. ASSEMBLY COMPONENTS SHOWN IN REFERENCED DETAILS MAY REFLECT THE MAJOR CONSTRUCTION MATERIALS;
- ADDITIONAL AND ALTERNATE MATERIALS MAY BE INDICATED IN REFERENCED ASSEMBLIES; G.3. MAINTAIN STRUCTURAL, FIRE RATING AND STC RATING AT ALL PENETRATIONS FOR ELECTRICAL, MECHANICAL PLUMBING AND CONDUITS, PIPES AND SIMILAR SYSTEMS. ALL WORK SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF GOVERNING CODES, LOCAL AUTHORITIES HAVING JURISDICTION OR OWNER REQUIREMENTS,
- G.4. PROVIDE VERTICAL AND HORIZONTAL FIRE BLOCKING AS REQUIRED BY CODE AT AREAS OF WORK; AND G.5. ALL FIRE RATED ASSEMBLIES SHALL BE CONSTRUCTED TO PREVENT THE MOVEMENT OF HOT FLAME OR GASES. ALL

PENETRATIONS THROUGH RATED ASSEMBLIES SHALL BE FIRE STOPPED PER THE GOVERNING CODE REQUIREMENTS.

- D. HISTORIC ITEMS, RELICS, ANTIQUES, AND SIMILAR OBJECTS INCLUDING, BUT NOT LIMITED TO, CORNERSTONES AND THEIR H. UNLESS OTHERWISE NOTED, MAINTAIN SURFACE DRAINAGE PATTERNS OF EXISTING ROOF(S) WITH SLOPE OF NOT LESS THAN 2 PERCENT SLOPE...
 - EXISTING FASCIA AND/OR BARGE TRIM AT AREAS OF WORK FOUND TO BE DAMAGED SHALL BE REMOVED AND REPLACE WITH NEW WOOD TRIM, MATCHING EXISTING TRIM DIMENSIONS.
 - J. USE OF EXPOSED TREATED WOOD BLOCKS AT ROOF AREAS IS PROHIBITED.

WHICHEVER IS MORE RESTRICTIVE;

CODE REQUIREMENTS, CONTRACTOR SHALL VERIFY ALL EXISTING PIPING AND EQUIPMENT RECEIVING GAS PIPING ARE FULLY FUNCTIONAL AND IN WORKING ORDER. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL REQUIREMENTS.





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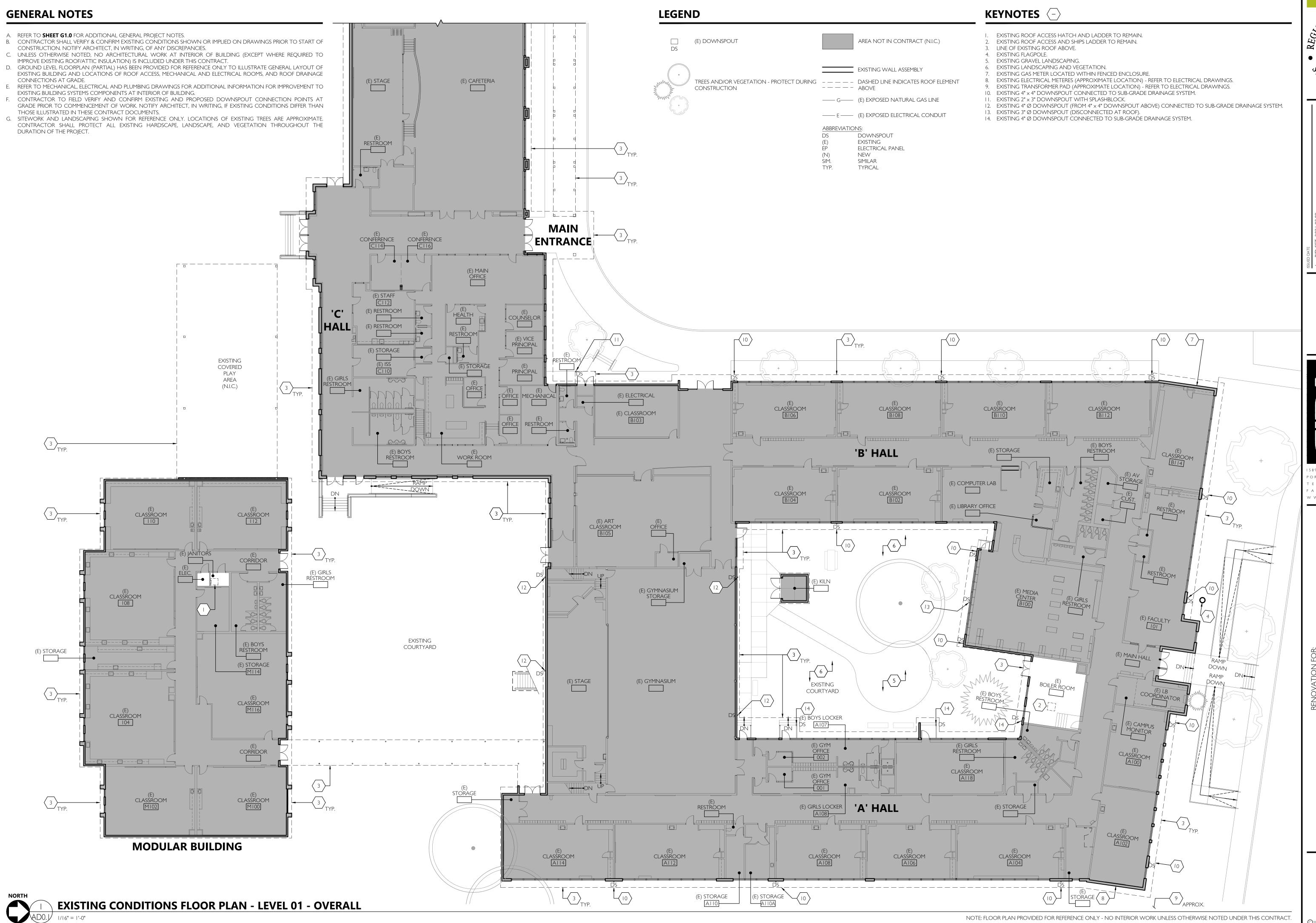
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GENERAL NOTES

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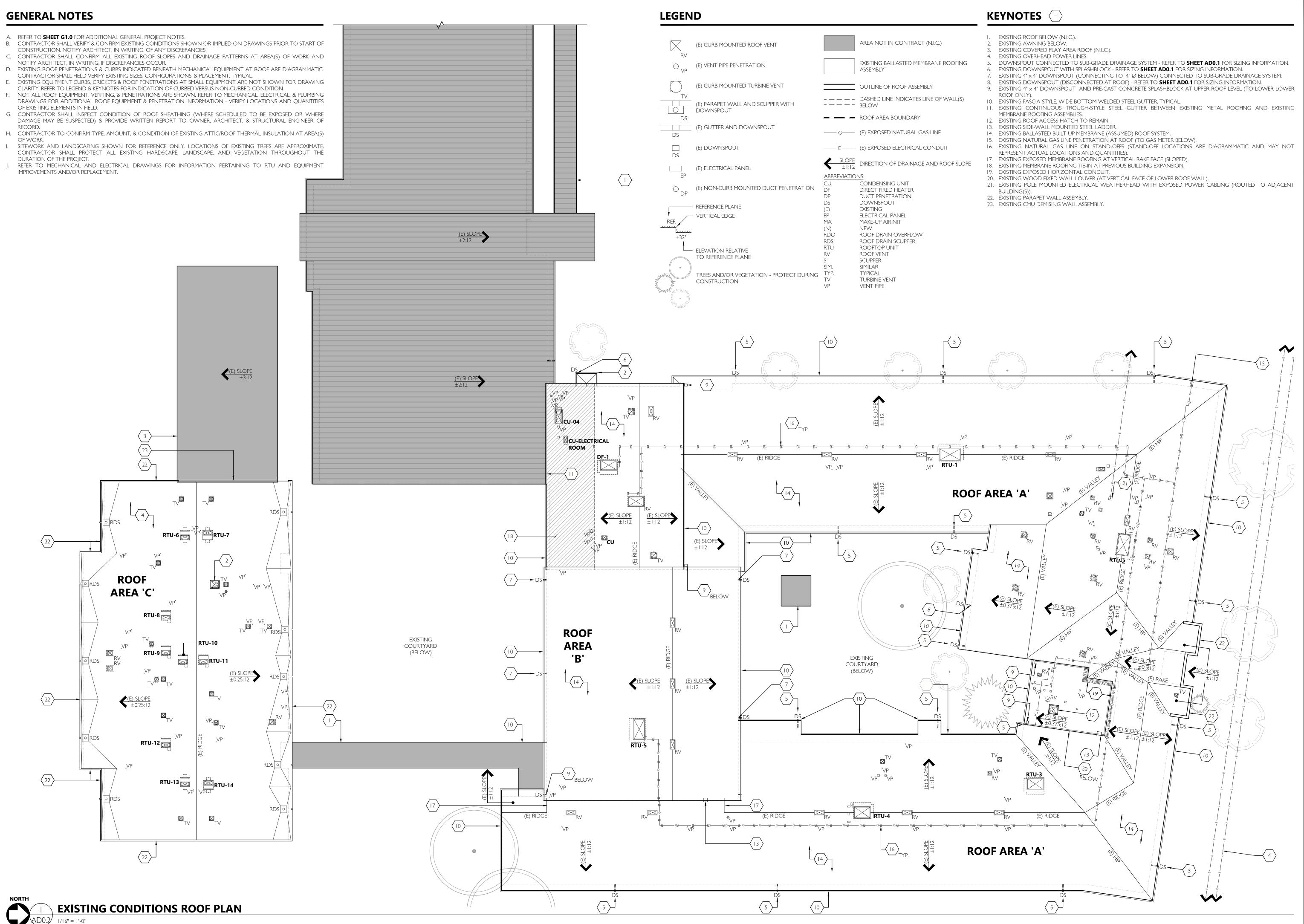
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SCHOOL INTERNATIONAL

EXISTING CONDITIONS FLOOR PLAN - LEVEL 01

JOB NO. 20Y105.01



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OF **SCHOOL**

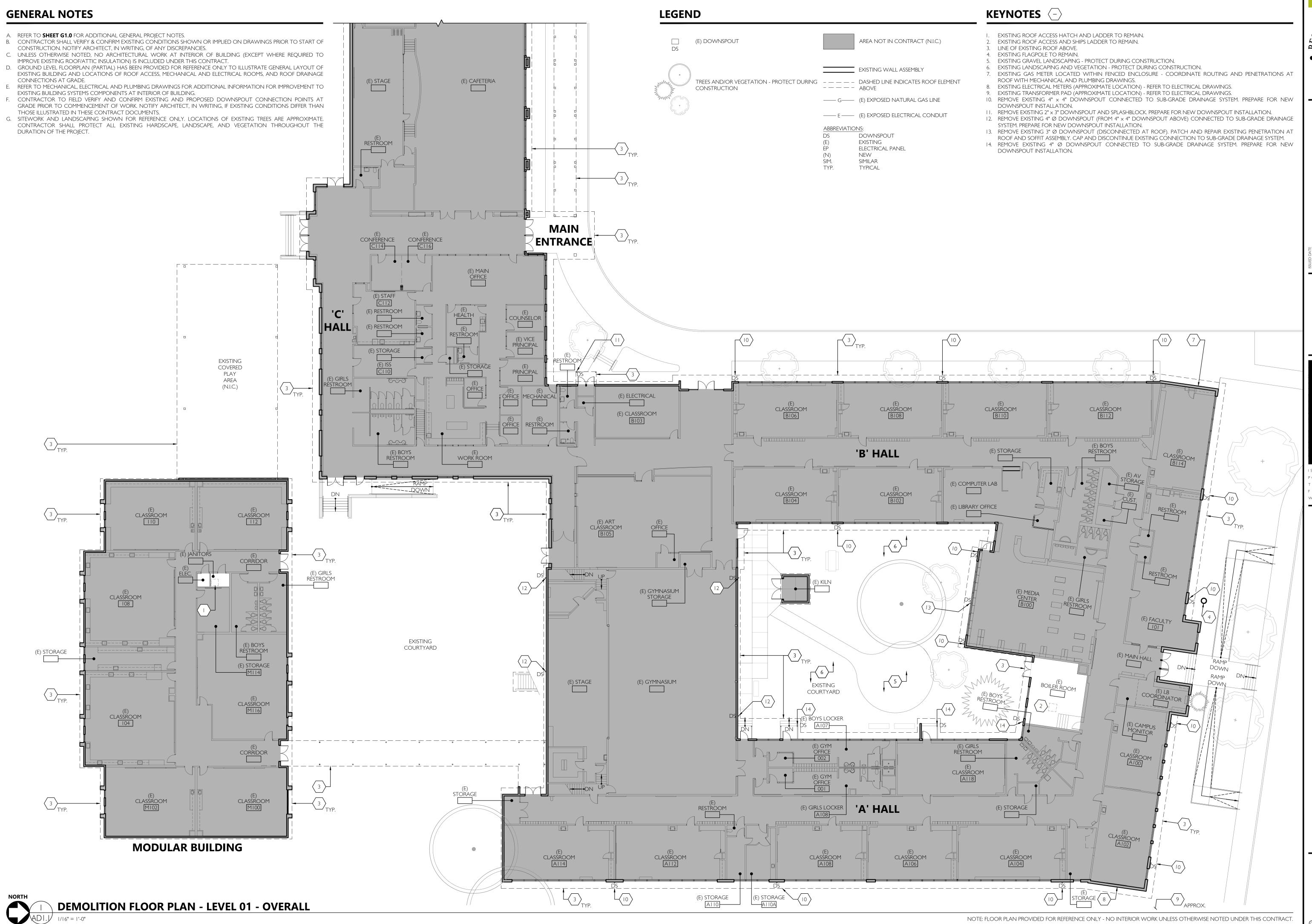
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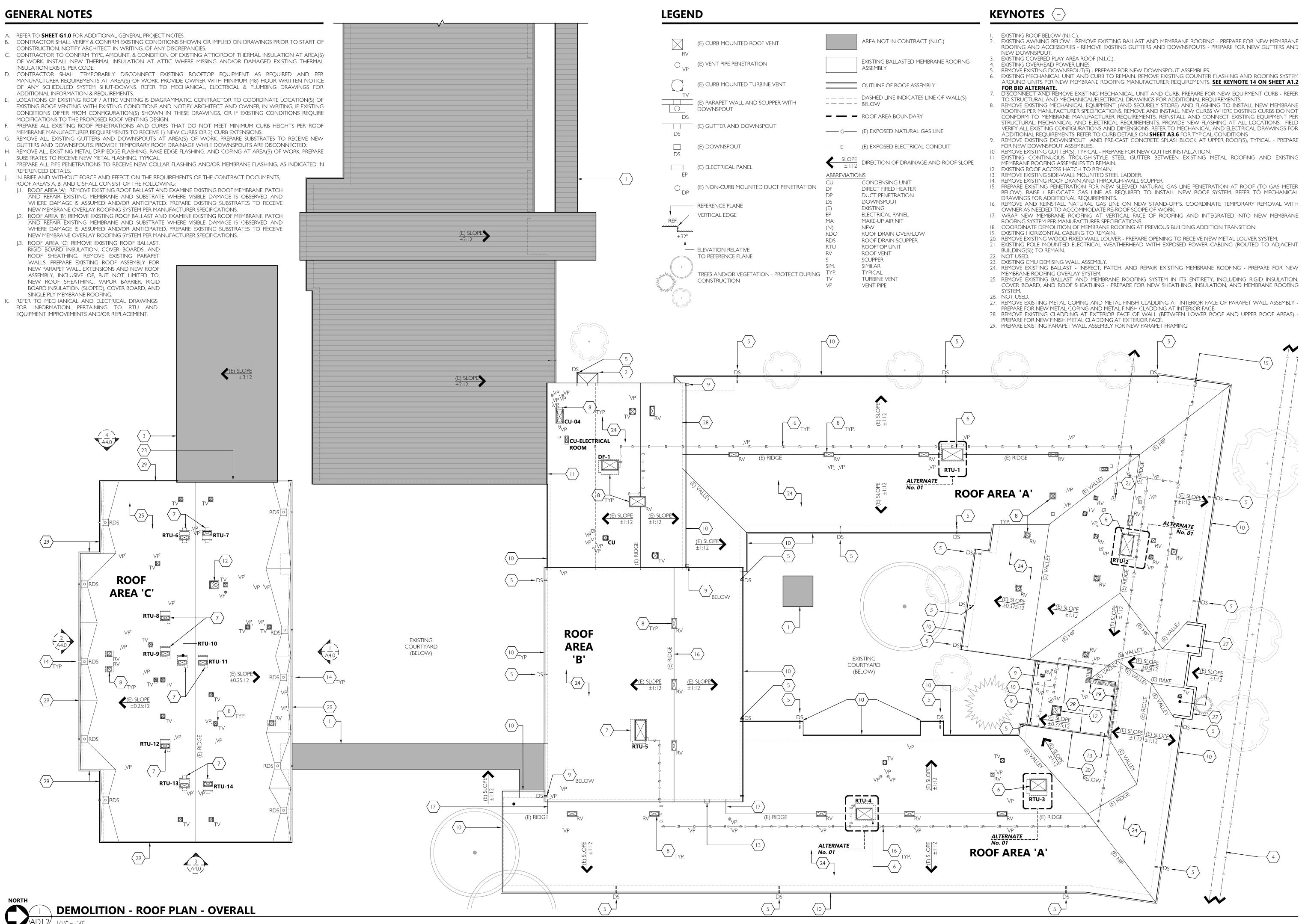
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INTERNATIONAL BEAVERTO

DEMOLITION FLOOR PLAN - LEVEL 01 JOB NO. 20Y105.01





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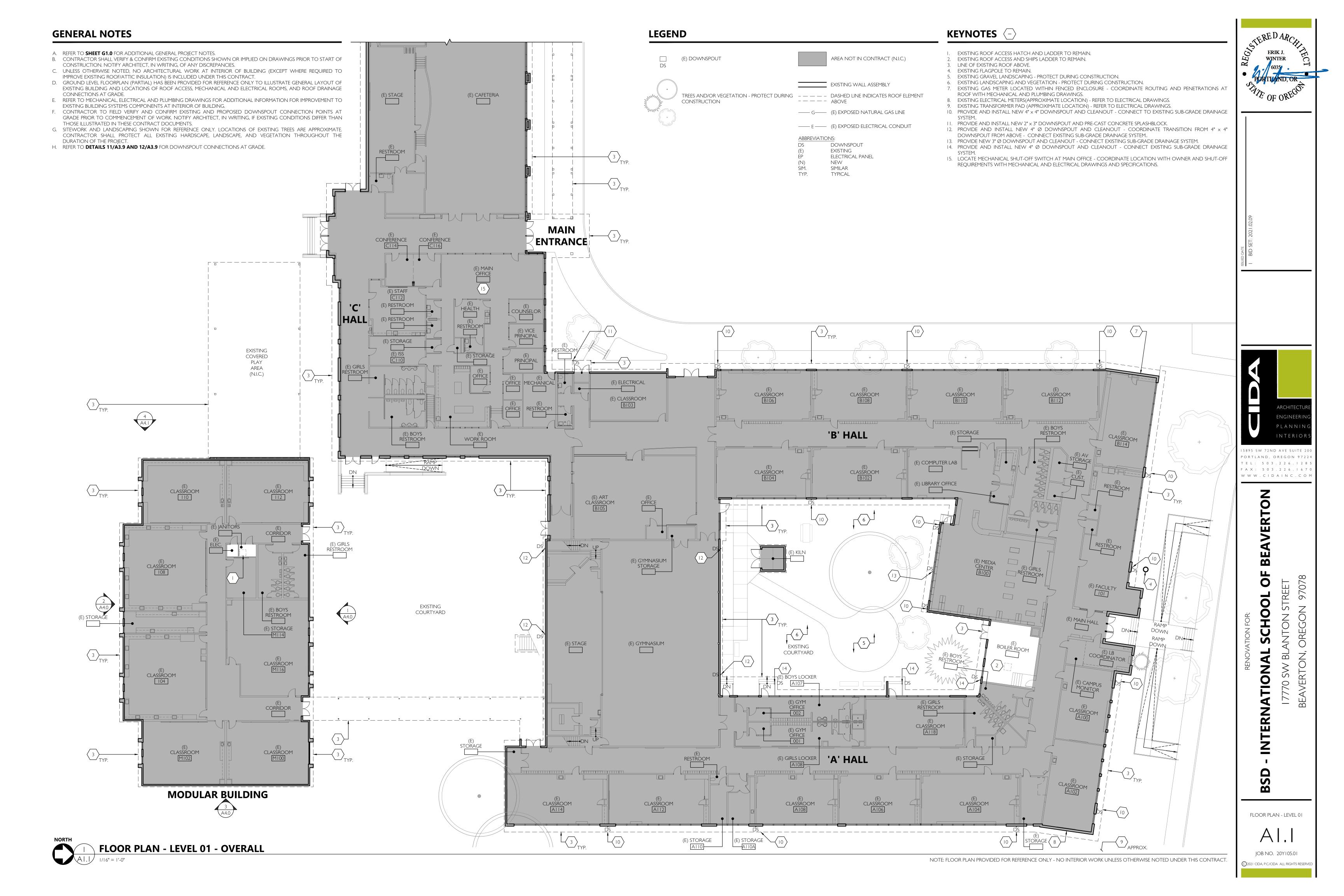
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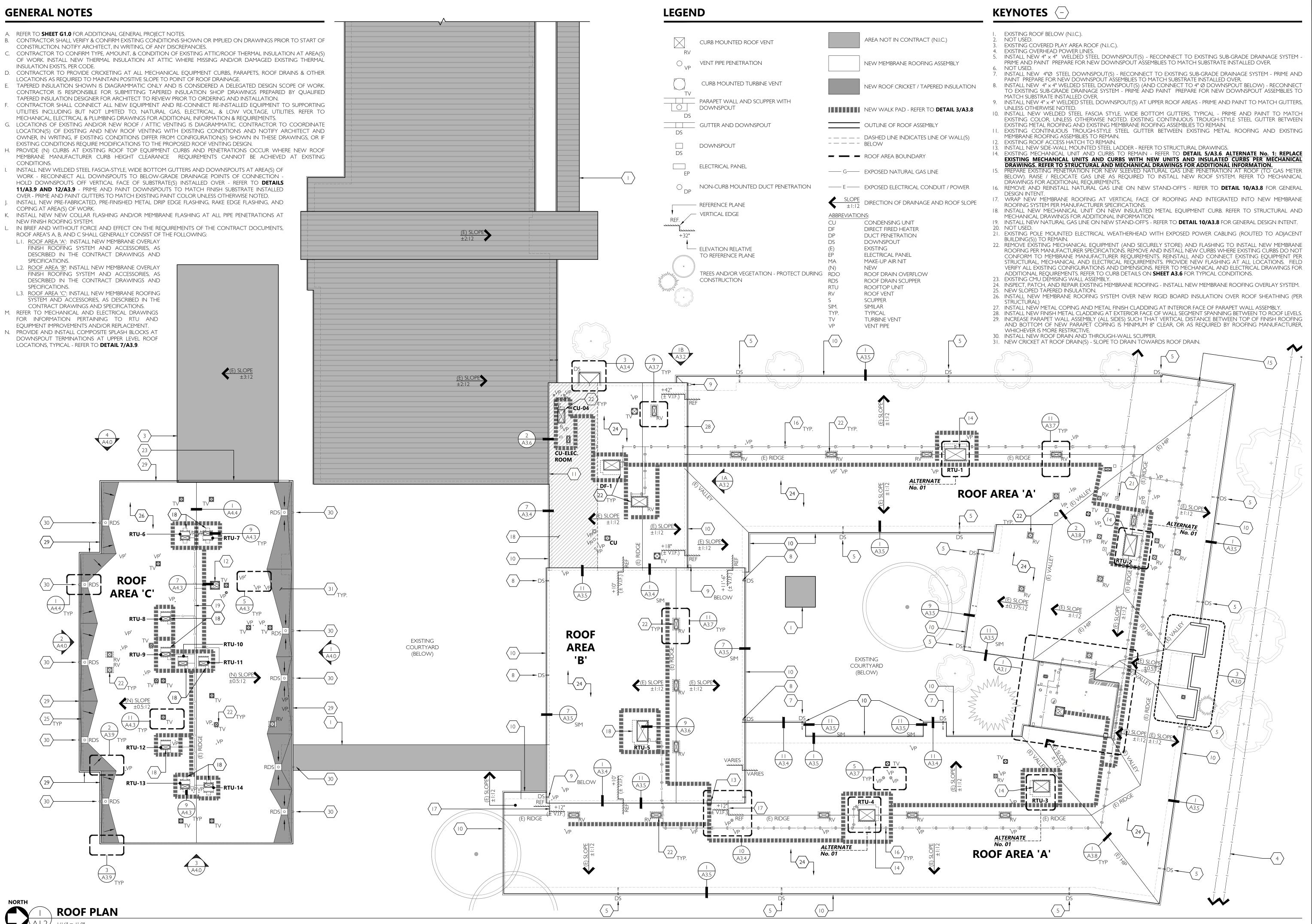
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DEMOLITION ROOF PLAN

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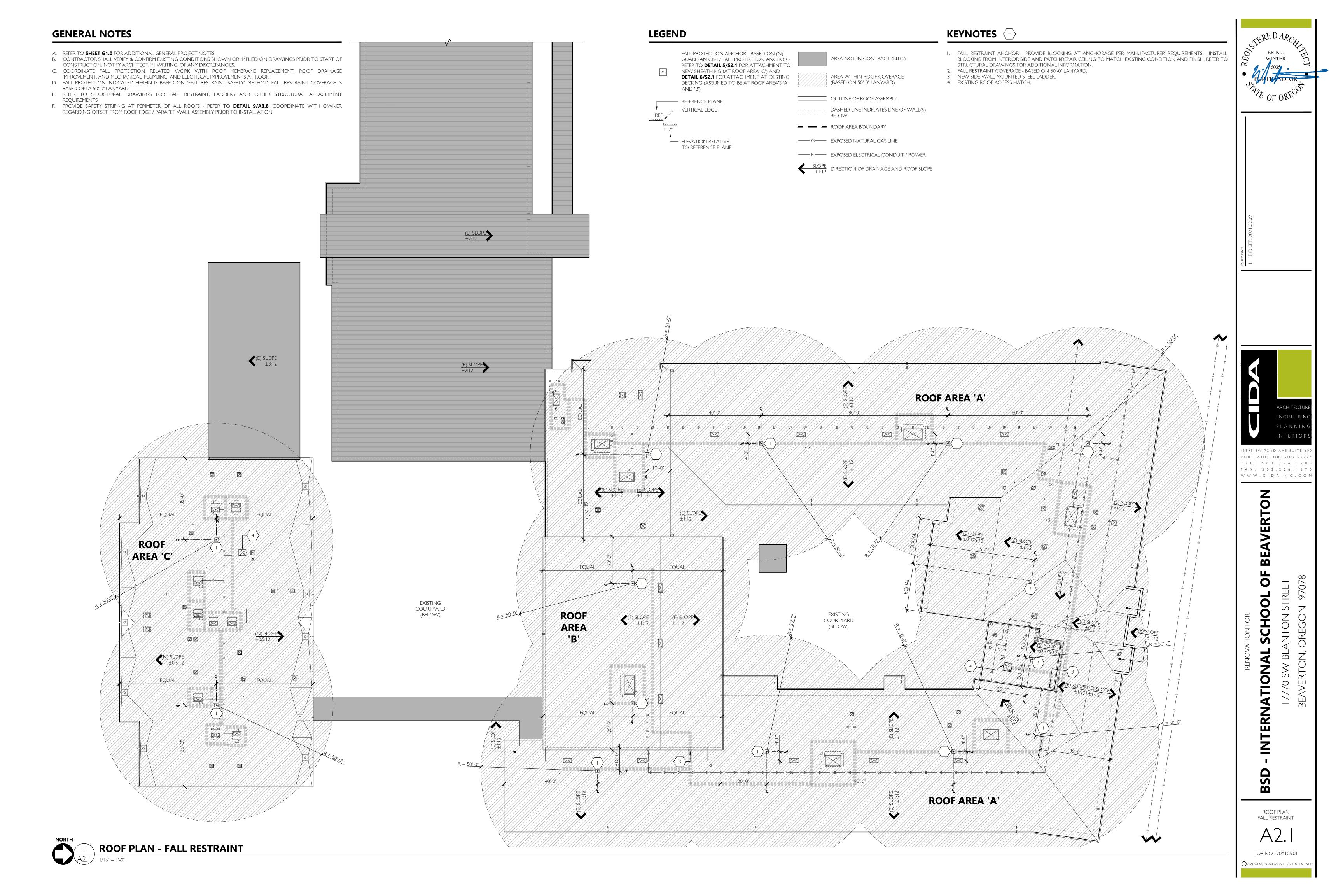


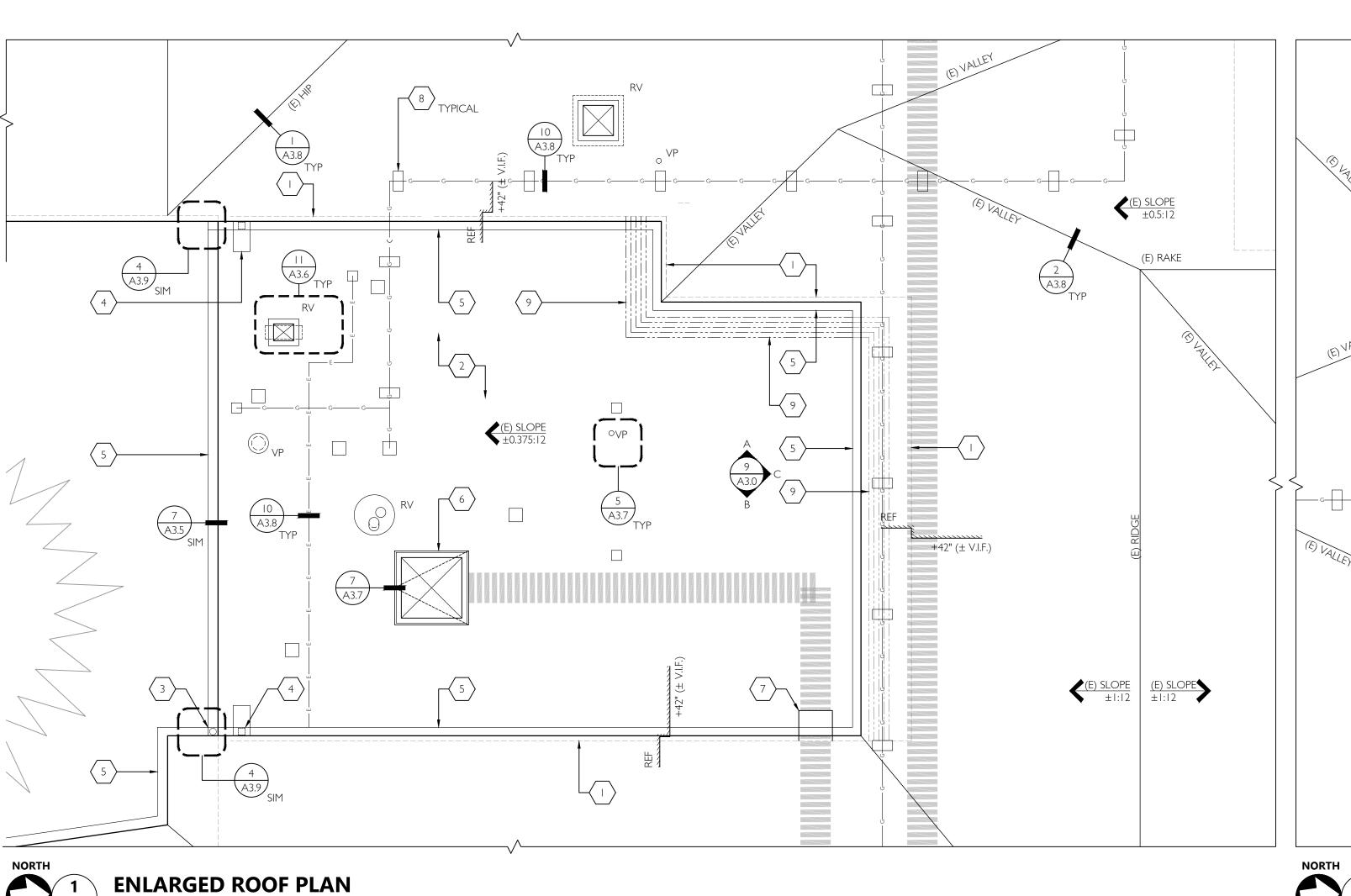
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ROOF PLAN

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L(12) TYPICAL

TYPICAL 18

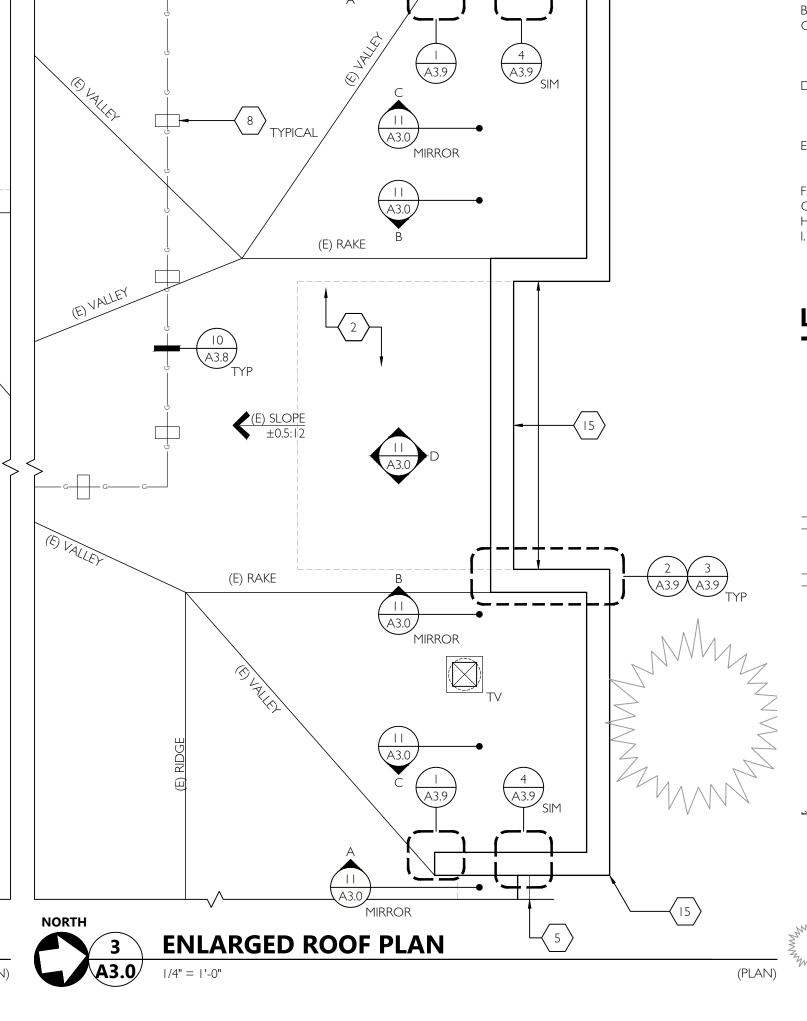
(E) ROOF SLOPE

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A3.8

EXISTING LOUVER

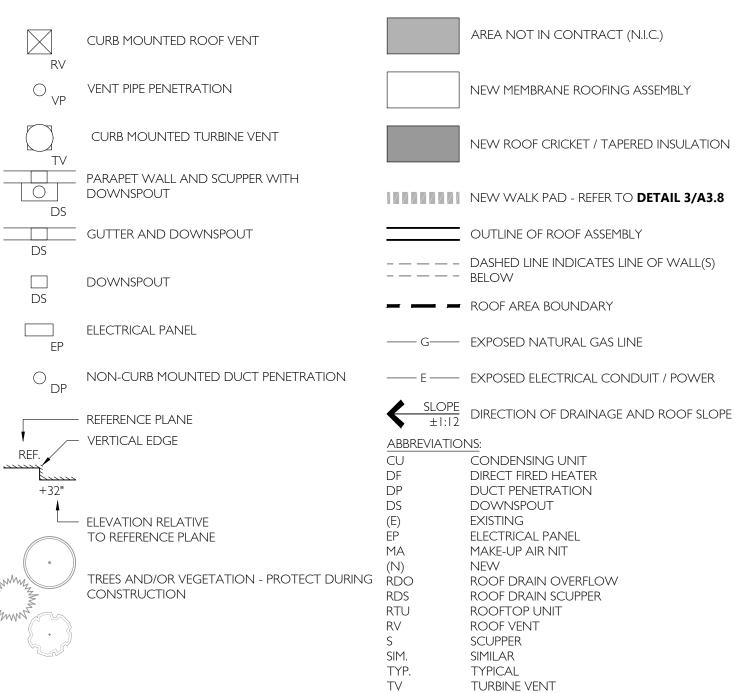
OPENING ±6'-2" - V.I.F.



GENERAL NOTES

- A. THESE GENERAL NOTES SHALL APPLY TO THE ENTIRE PROJECT UNLESS SPECIFICALLY NOTED OTHERWISE WITHIN THE
 - REFER TO GENERAL PROJECT NOTES ON **Sheets G1.0** and **A1.2** for additional requirements.
- EXISTING CONCEALED ASSEMBLY(S) AND ASSEMBLY COMPONENTS/INSTALLATION(S) SHOWN ARE DIAGRAMMATIC AND ILLUSTRATE THE ASSUMED, EXISTING CONDITIONS. CONTRACTOR SHALL VERIFY, IN FIELD, ALL EXISTING CONDITIONS REQUIRED TO COMPLETE THE SCOPE OF WORK DESCRIBED WITHIN THESE CONTRACT DOCUMENTS AND NOTIFY THE ARCHITECT, IN WRITING, WHEN EXISTING CONDITIONS DIFFER THAN THOSE DESCRIBED HEREIN. D. CONTRACTOR SHALL VERIFY CONDITION(S) OF EXISTING WALL AND ROOF SHEATHING COMPONENTS, WHERE
- VISIBLE OR WHEN MADE VISIBLE AS PART OF THE REPAIR SCOPE OF WORK DESCRIBED WITHIN THESE CONTRACT DOCUMENTS. CONTRACTOR SHALL NOTIFY THE ARCHITECT, IN WRITING, OF ANY KNOWN DEFECTS IN EXISTING SYSTEM COMPONENTS PRIOR TO INSTALLING NEW WORK.
- E. AT REMOVED AND/OR DEMOLISHED ITEMS, ELEMENTS, SYSTEMS, ASSEMBLIES AND THE LIKE, CONTRACTOR SHALL PATCH AND REPAIR EXISTING SURFACES, SYSTEMS, SUBSTRATES, AND THE LIKE, TO REMAIN. PATCH AND REPAIR WORK TO MATCH SURFACES, SYSTEMS, SUBSTRATES, FINISHES, AND THE LIKE, OF EXISTING ADJACENT SURFACES TO REMAIN. PROVIDE BOND-BREAKER TAPE AT ALL NEW SEALANT LOCATIONS WHERE THREE-POINT ADHESION MAY OCCUR.
- G. ALL TRIM AND CLADDING COMPONENTS END CUTS TO BE PRIMED TO RECEIVING PAINT, TYPICAL. H. PROVIDE INTERMITTENT WEEPS AT BOTTOM OF ALL METAL PANELS TO ALLOW FOR DRAINAGE.
- PROVIDE NEW CEMENTITIOUS SHEATHING WHERE EXISTING VERTICAL SUBSTRATE(S) ARE MISSING AND/OR DO NOT CONFORM TO MEMBRANE ROOFING MANUFACTURER REQUIREMENTS.

LEGEND



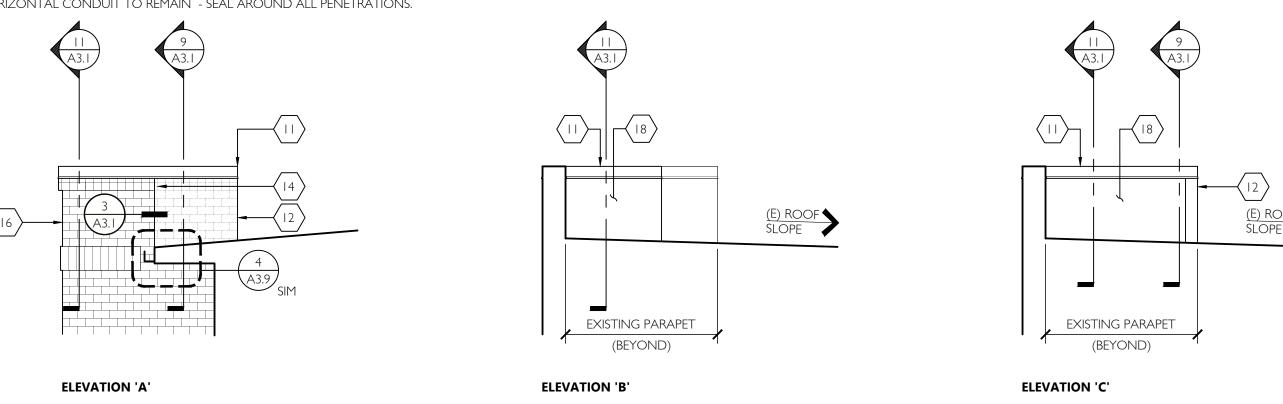
KEYNOTES $\langle - \rangle$

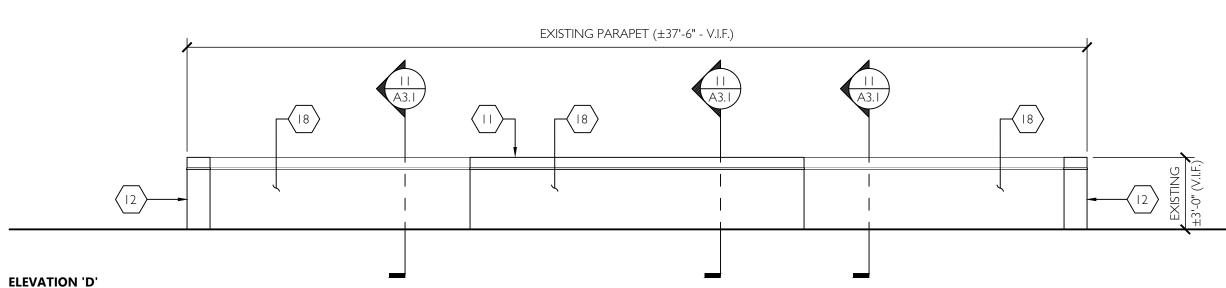
- I. LINE OF WALL BELOW. INSTALL NEW SINGLE-PLY MEMBRANE ROOFING OVERLAY SYSTEM, TYPICAL.
- REMOVE EXISTING DOWNSPOUT, TYPICAL. INSTALL NEW 4" Ø WELDED STEEL DOWNSPOUT(S) RECONNECT TO 11. INSTALL NEW METAL COPING AT ALL PARAPET WALL ASSEMBLY LOCATIONS. EXISTING SUB-GRADE DRAINAGE SYSTEM - PRIME AND PAINT PREPARE FOR NEW DOWNSPOUT ASSEMBLIES TO MATCH
- 4. REMOVE EXISTING DOWNSPOUT AND SPLASH BLOCK. INSTALL NEW 4" x 4" WELDED STEEL DOWNSPOUT. PROVIDE 14. TRANSITION FROM NEW METAL WALL CLADDING TO EXISTING MASONRY CLADDING.
- 5. REMOVE EXISTING GUTTER, TYPICAL. INSTALL NEW WELDED STEEL FASCIA STYLE, WIDE BOTTOM GUTTERS, TYPICAL -PRIME AND PAINT. EXISTING ROOF ACCESS HATCH TO REMAIN.
- INSTALL NEW SIDE-WALL MOUNTED STEEL LADDER REFER TO STRUCTURAL DRAWINGS. REMOVE AND REINSTALL NATURAL GAS LINE ON NEW STAND-OFF'S.
- EXISTING HORIZONTAL CONDUIT TO REMAIN SEAL AROUND ALL PENETRATIONS.

10. INSTALL NEW PRE-FINISHED METAL FIXED WALL LOUVER - REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.

VENT PIPE

- 12. INSTALL NEW FINISH METAL CLADDING AT EXTERIOR FACE OF WALL. 13. INSTALL NEW METAL TRIM FLASHING WHEN TRANSITION BETWEEN MATERIALS - REFER TO REFERENCED DETAILS.
- SPLASH BLOCK AT DOWNSPOUT TERMINATIONS AT UPPER LEVEL ROOF LOCATIONS, TYPICAL. REFER TO **DETAIL** 15. EXISTING PARAPET WALL REMOVE EXISTING COPING AND METAL CLADDING (INSIDE FACE OF PARAPET ONLY) EXISTING MASONRY CLADDING TO REMAIN - INSTALL NEW PRE-FINISHED METAL COPING AND PRE-FINISHED METAL CLADDING AS INDICATED IN ELEVATIONS.
 - 16. EXISTING MASONRY CLADDING TO REMAIN.
 - 17. REMOVE EXISTING DIAGONAL STRUT SUPPORTS PROVIDE NEW ADJUSTABLE STRUT SUPPORTS. 18. NEW MEMBRANE ROOFING AT VERTICAL FACE OF PARAPET WALL (EXPOSED).











(ELEVATION) A3.0



PARTIAL EXTERIOR ELEVATIONS (AT ROOF)

97078 STREET SCHOOL

BEAVERTO

OF

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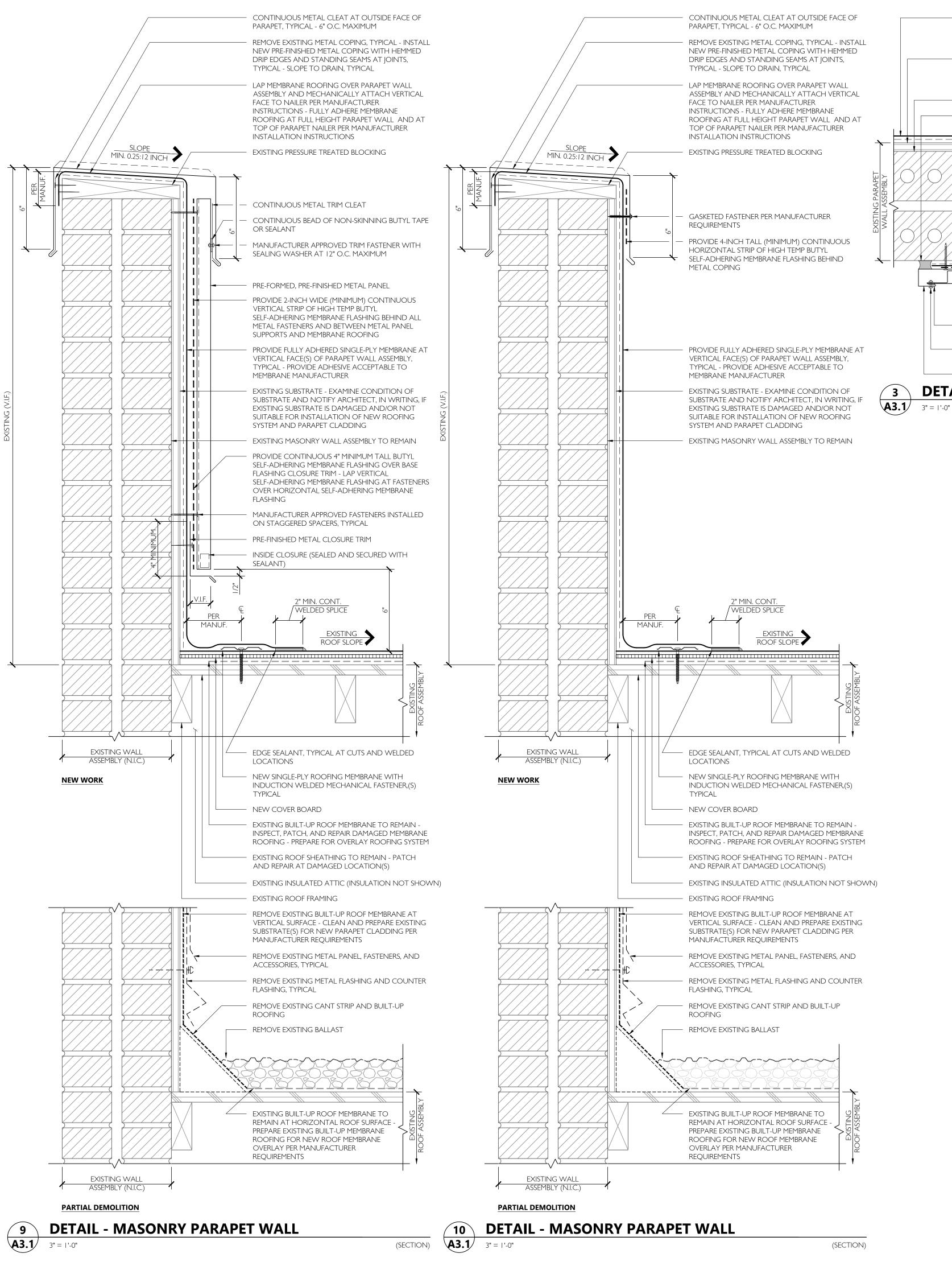
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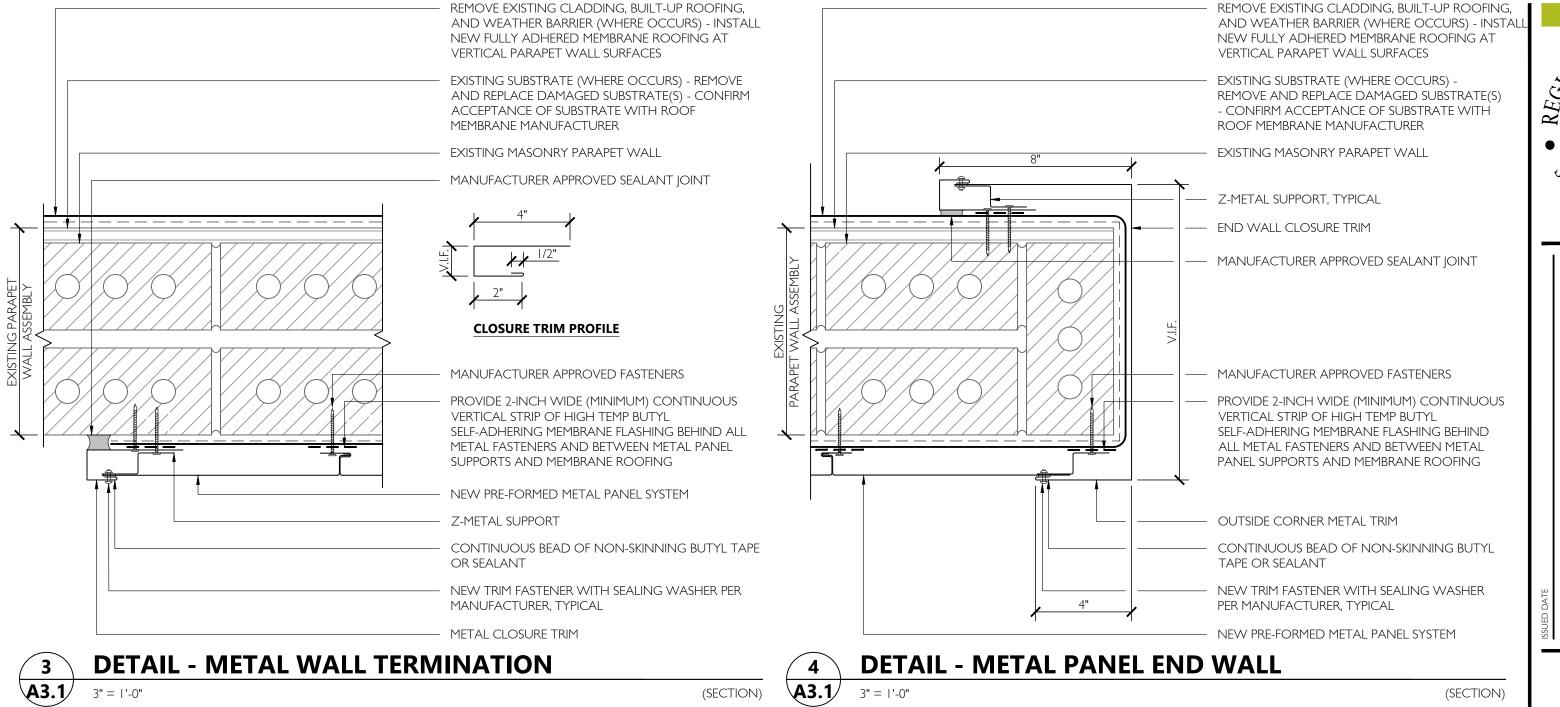
A & B WINGS, GYM

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ELEVATION 'A'

ELEVATION 'B'







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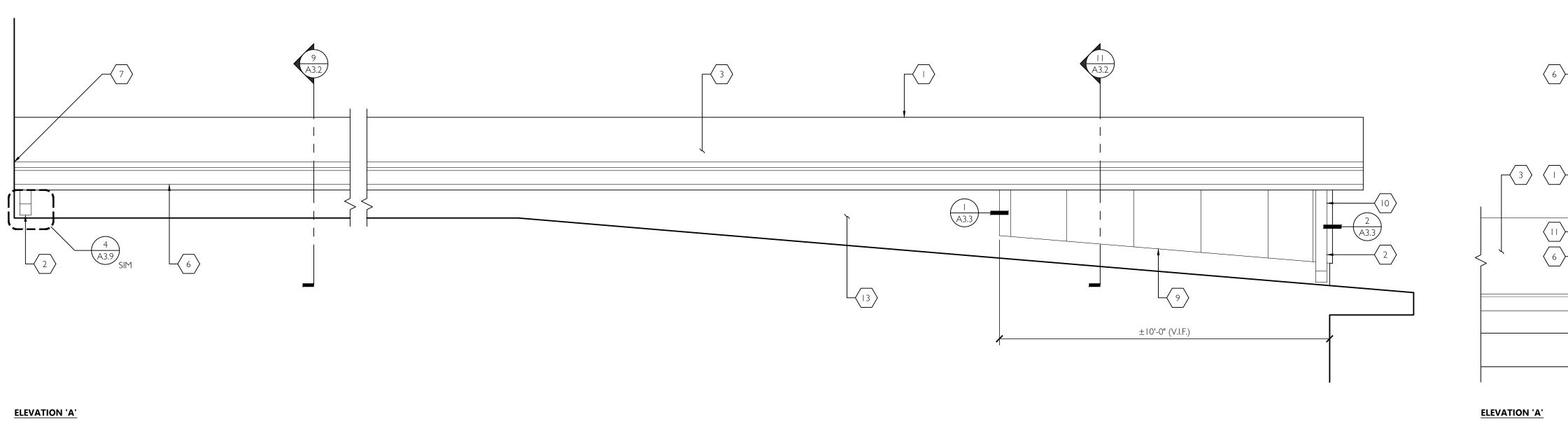
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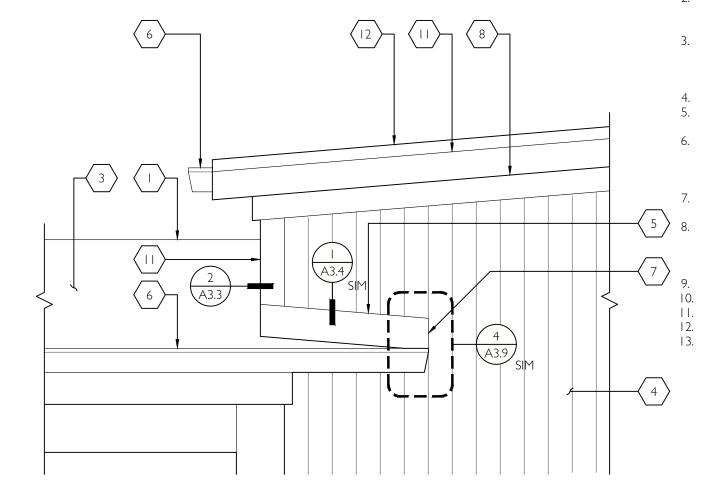
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I. LINE OF ROOF RIDGE (BEYOND). 2. NEW DOWNSPOUT - PROVIDE SPLASH BLOCK AT ROOF TERMINATION - REFER TO DETAIL 7/A3.9.

3. REMOVE EXISTING ROOF BALLAST, TYPICAL. PREPARE EXISTING BUILT-UP ROOF.

KEYNOTES $\langle - \rangle$

MEMBRANE TO RECEIVE NEW MEMBRANE OVERLAY ROOF OVERLAY SYSTEM. EXISTING SIDING TO REMAIN. TRIM BACK EXISTING SIDING AS REQUIRED

INSTALL NEW WELDED STEEL FASCIA STYLE, WIDE BOTTOM GUTTERS, TYPICAL - PRIME AND PAINT TO MATCH EXISTING COLOR, UNLESS OTHERWISE NOTED. INSTALL NEW DIVERTER FLASHING AT NEW GUTTER TERMINATION AT EXTERIOR WALL. EXISTING WOOD TRIM TO REMAIN -

TO INSTALL NEW ROOF MEMBRANE SYSTEM.

REMOVE AND REPLACE IF EXISTING TRIM IS DAMAGED - MATCH EXISTING TRIM DIMENSIONS, TYPICAL. NEW METAL PANEL WALL CLADDING. NEW METAL TRIM CLOSURE.

(ELEVATION)

EXISTING FASCIA TRIM TO REMAIN. NEW RAKE EDGE METAL FLASHING. REMOVE EXISTING METAL CLADDING.

PARTIAL EXTERIOR ELEVATION (AT ROOF) **A3.2** 1/2" = 1'-0"

REMOVE EXISTING BALLAST REMOVE EXISTING BUILT-UP ROOF MEMBRANE AT VERTICAL SURFACE - CLEAN AND PREPARE EXISTING SUBSTRATE(S) FOR NEW PARAPET CLADDING PER MANUFACTURER REQUIREMENTS NEW SINGLE-PLY ROOFING MEMBRANE WITH NEW SINGLE-PLY ROOFING MEMBRANE WITH INDUCTION INDUCTION WELDED MECHANICAL FASTENERS, EXISTING ROOF SHEATHING TO REMAIN - PATCH WELDED MECHANICAL FASTENERS, TYPICAL TYPICAL AND REPAIR AT DAMAGED LOCATION(S) NEW COVER BOARD NEW COVER BOARD EXISTING ROOF FRAMING EDGE SEALANT, TYPICAL AT CUTS AND WELDED LOCATIONS EDGE SEALANT, TYPICAL AT CUTS AND WELDED REMOVE EXISTING GRAVEL STOP PERIMETER LOCATIONS FLASHING NEW MEMBRANE COATED DRIP EDGE FLASHING NEW MEMBRANE COATED DRIP EDGE FLASHING (E) SLOPE ◆ REMOVE EXISTING GUTTER (E) SLOPE ◆ (E) SLOPE APPROVED SEALING MASTIC APPROVED SEALING MASTIC CONTINUOUS METAL CLEAT CONTINUOUS METAL CLEAT NEW WIDE BOTTOM, FASCIA STYLE METAL GUTTER WITH NEW WIDE BOTTOM, FASCIA STYLE METAL GUTTER WITH HIDDEN GUTTER HANGER, HIDDEN GUTTER HANGER, TYPICAL - ATTACH AT RAFTER TAILS, TYPICAL - ATTACH AT RAFTER TAILS, TYPICAL GASKETED FASTENER, TYPICAL GASKETED FASTENER, TYPICAL EXTEND MEMBRANE ROOFING DOWN VERTICAL FACE OF TRIM EXTEND MEMBRANE ROOFING DOWN VERTICAL FACE OF TRIM AND SECURE PER MANUFACTURER AND SECURE PER MANUFACTURER REQUIREMENTS REQUIREMENTS EXISTING WOOD TRIM - REMOVE AND REPLACE IF EXISTING TRIM IS DAMAGED - MATCH EXISTING SIZE(S), TYPICAL EXISTING WOOD TRIM - REMOVE AND REPLACE IF EXISTING TRIM IS DAMAGED - MATCH EXISTING SIZE(S), TYPICAL EXISTING SOFFIT TO REMAIN LAP EXISTING WEATHER RESISTANT BARRIER OVER NEW METAL LAP EXISTING WEATHER RESISTANT BARRIER COUNTER FLASHING OVER NEW METAL HEAD FLASHING EXISTING WOOD TRIM TO REMAIN GASKETED FASTENER, TYPICAL GASKETED FASTENER, TYPICAL REMOVE EXISTING CANT STRIP AND BUILT-UP ROOFING NEW METAL COUNTER FLASHING WITH HEMMED DRIP EDGE, PRE-FINISHED CLOSURE TRIM / HEAD FLASHING - REMOVE EXISTING BALLAST TYPICAL - REFER TO **DETAIL 5/A3.9** WITH CONCEALED CONTINUOUS CLEAT PRE-FORMED, PRE-FINISHED METAL PANEL MANUFACTURERS STANDARD TERMINATION BAR PROVIDE CONTINUOUS 4" MINIMUM TALL BUTYL EDGE SEALANT, TYPICAL AT CUTS AND WELDED LOCATIONS SELF-ADHERING MEMBRANE FLASHING OVER BASE FLASHING CLOSURE TRIM - LAP VERTICAL SELF-ADHERING MEMBRANE FLASHING AT FASTENERS OVER HORIZONTAL SELF-ADHERING MEMBRANE FLASHING MANUFACTURER APPROVED FASTENERS INSTALLED ON STAGGERED SPACERS, TYPICAL PRE-FINISHED METAL CLOSURE TRIM INSIDE CLOSURE (SEALED AND SECURED WITH SEALANT) NEW SINGLE-PLY ROOFING MEMBRANE WITH INDUCTION WELDED MECHANICAL FASTENERS, TYPICAL - EXTEND SINGLE-PLY ROOFING REMOVE EXISTING BUILT-UP ROOF MEMBRANE AT NEW COVER BOARD MEMBRANE UP VERTICAL FACE OF WALL AND VERTICAL SURFACE - CLEAN AND PREPARE EXISTING TERMINATE UNDER COUNTER FLASHING -NEW SINGLE-PLY ROOFING MEMBRANE WITH INDUCTION SUBSTRATE(S) FOR NEW PARAPET CLADDING PER MEMBRANE TO BE FULLY ADHERED AT VERTICAL WELDED MECHANICAL FASTENERS, TYPICAL - EXTEND SINGLE-PLY (E) SLOPE ♠ MANUFACTURER REQUIREMENTS FACE(S) ROOFING MEMBRANE UP VERTICAL FACE OF WALL AND EXISTING ROOF SHEATHING TO REMAIN - PATCH TERMINATE UNDER COUNTER FLASHING - MEMBRANE TO BE NEW COVER BOARD FULLY ADHERED AT VERTICAL FACE(S) AND REPAIR AT DAMAGED LOCATION(S) EXISTING ROOF FRAMING WALL ASSEMBLY WALL ASSEMBLY

STREET N 97078 SCHOOL 17770 SW BLA BEAVERTON,

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DETAILS A & B WINGS, GYM

JOB NO. 20Y105.01

DETAIL - ROOF TO WALL TRANSITION A3.2 3" = 1'-0"

PARTIAL DEMOLITION

DETAIL - ROOF TO WALL TRANSITION

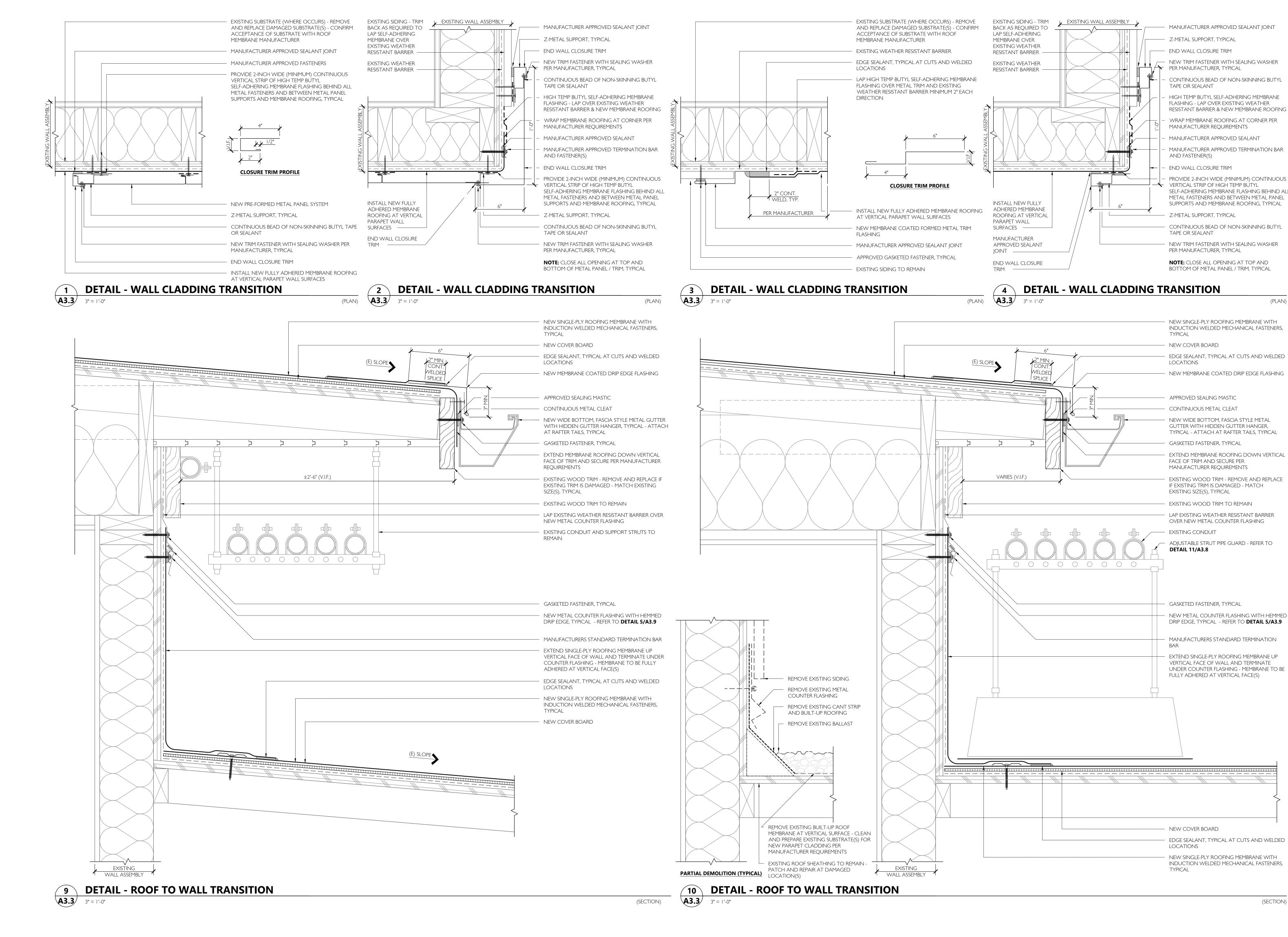
(SECTION) **A3.2** 3" = 1'-0"

DEMOLITION NOTES.

NOTE: REFER TO DETAIL 9/A3.2 FOR

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(SECTION)



WINTER

(PLAN)

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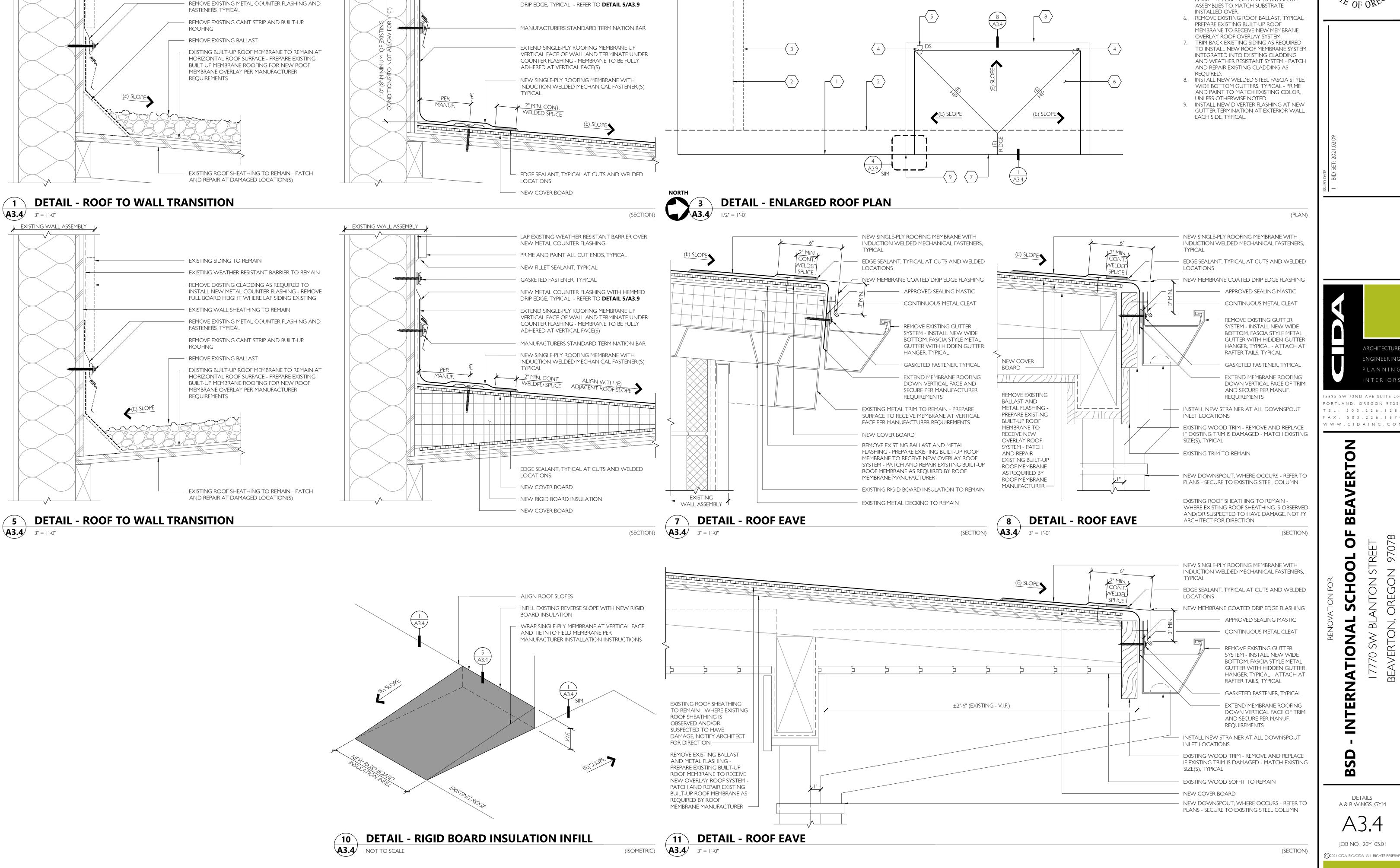
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DETAILS A & B WINGS, GYM

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LAP EXISTING WEATHER RESISTANT BARRIER OVER

NEW METAL COUNTER FLASHING WITH HEMMED

NEW METAL COUNTER FLASHING

NEW FILLET SEALANT, TYPICAL

GASKETED FASTENER, TYPICAL

PRIME AND PAINT ALL CUT ENDS, TYPICAL

EXISTING WALL ASSEMBLY

EXISTING SIDING TO REMAIN

EXISTING WEATHER RESISTANT BARRIER TO REMAIN

INSTALL NEW METAL COUNTER FLASHING - REMOVE

FULL BOARD HEIGHT WHERE LAP SIDING EXISTING

REMOVE EXISTING CLADDING AS REQUIRED TO

EXISTING WALL SHEATHING TO REMAIN

DOWNSPOUT - RECONNECT TO EXISTING SUB-GRADE DRAINAGE SYSTEM - PRIME AND

KEYNOTES (-)

LINE OF ROOF (ABOVE).

LINE OF GUTTER (ABOVE).

I. LINE OF EXISTING EXTERIOR WALL

EXISTING STEEL COLUMN (BELOW).

EXISTING DOWNSPOUT - REMOVE AND

REPLACE WITH NEW 2" x 3" WELDED STEEL

PAINT PREPARE FOR NEW DOWNSPOUT

PLANNIN

15895 SW 72ND AVE SUITE 2

PORTLAND, OREGON 9722 T E L : 5 0 3 . 2 2 6 . I 2 8

97078

OREGON

17770 SW BLA BEAVERTON,

STREET

NOLV

F A X : 5 0 3 . 2 2 6 . I 6 7 W W W . C I D A I N C . C O NO O

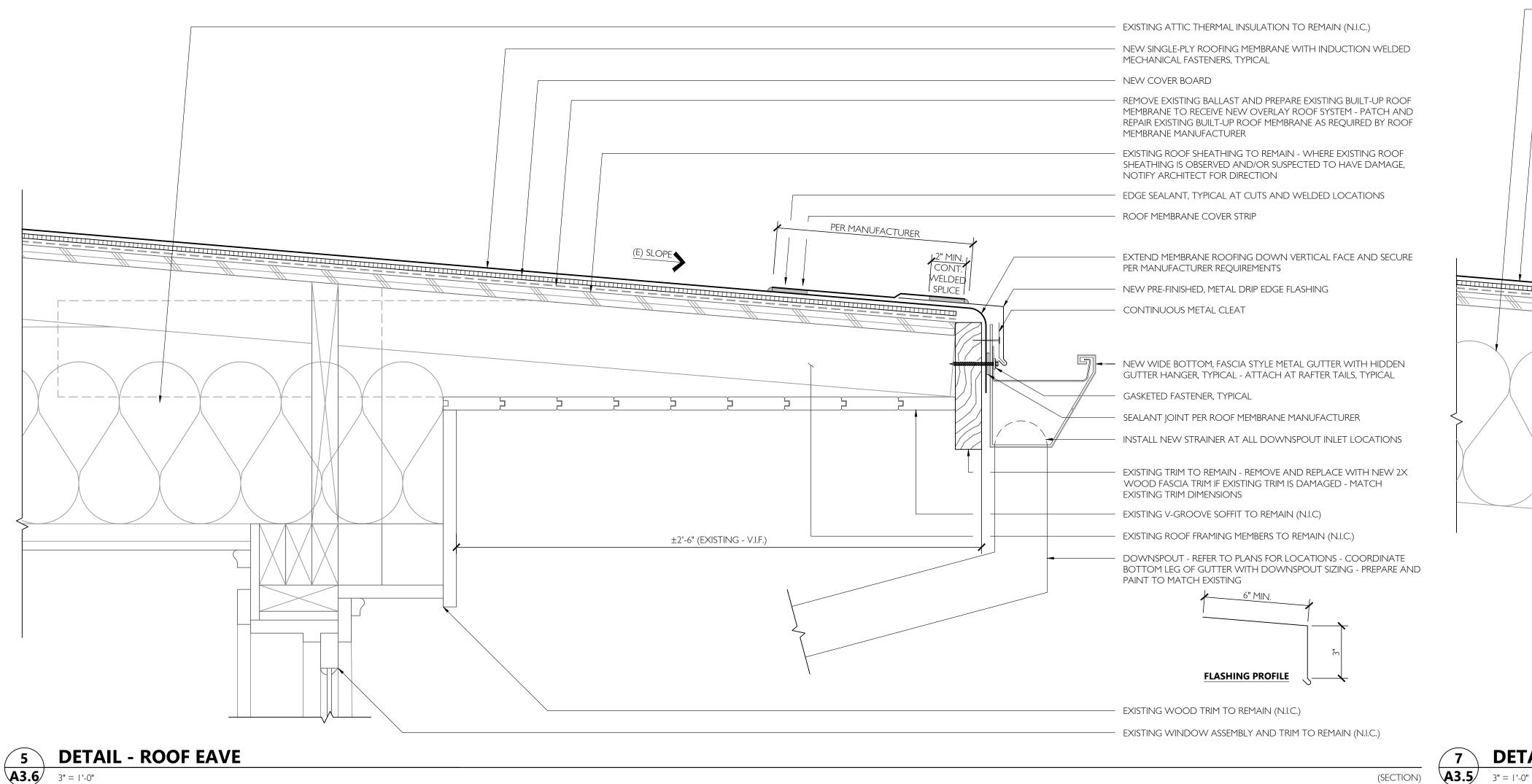
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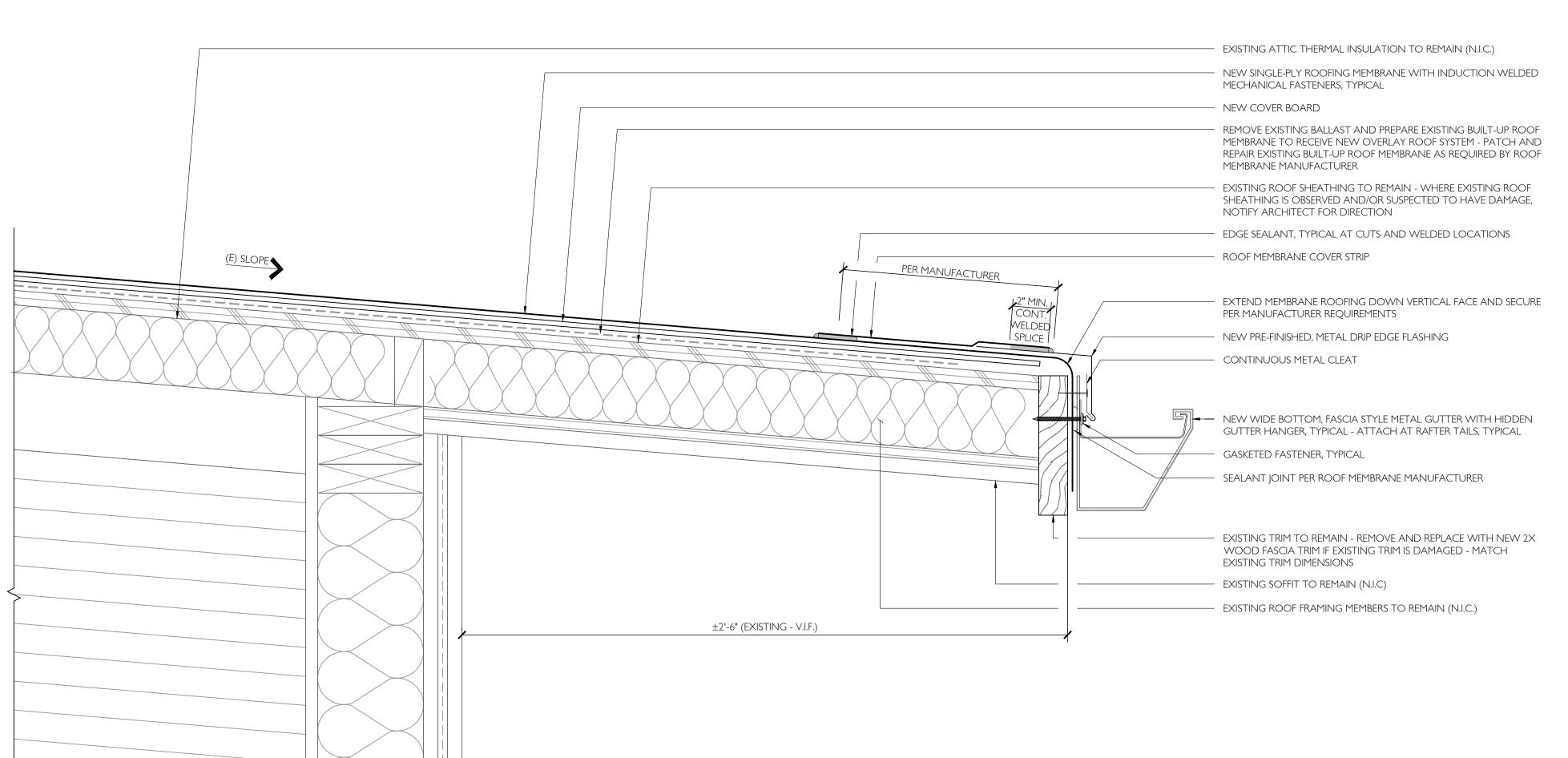
SCHOOL

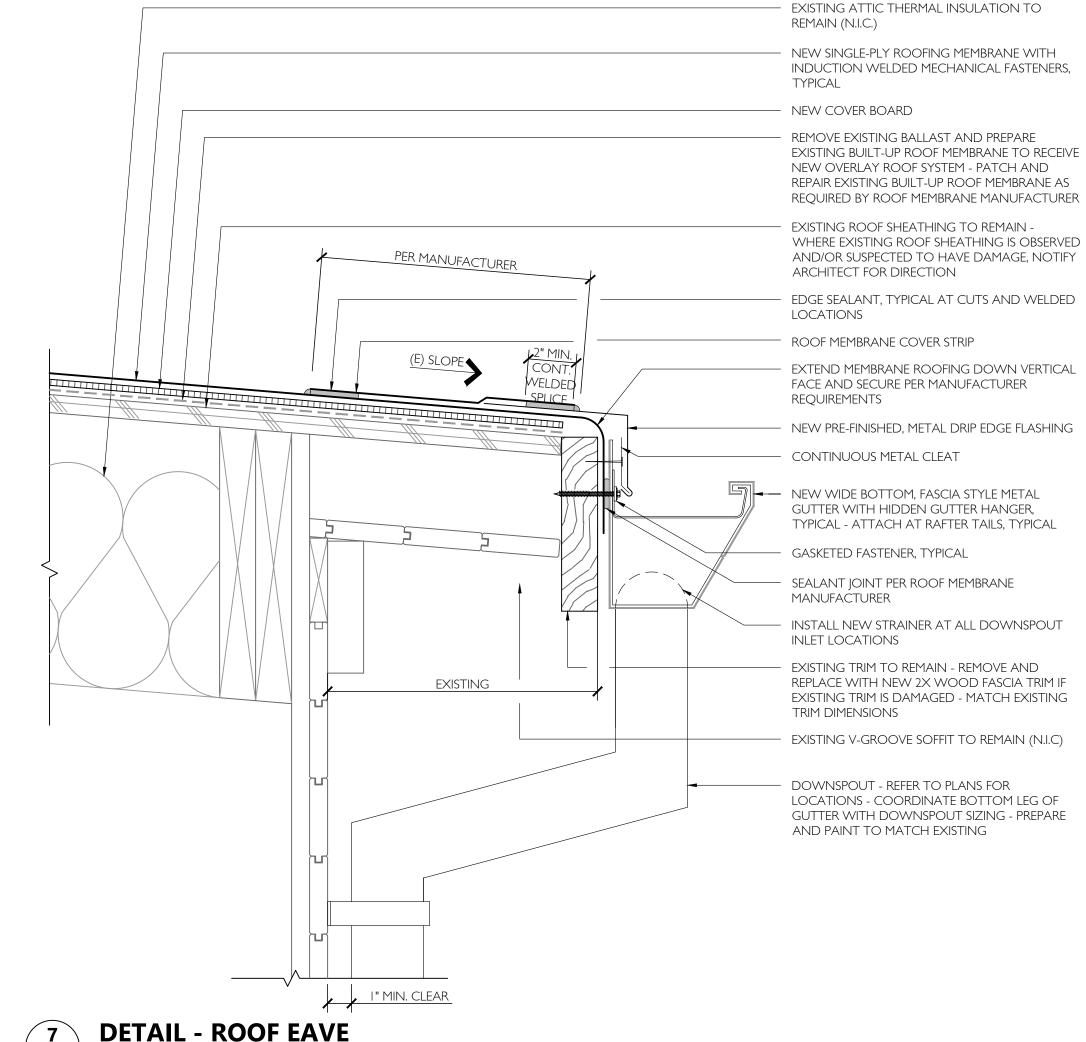
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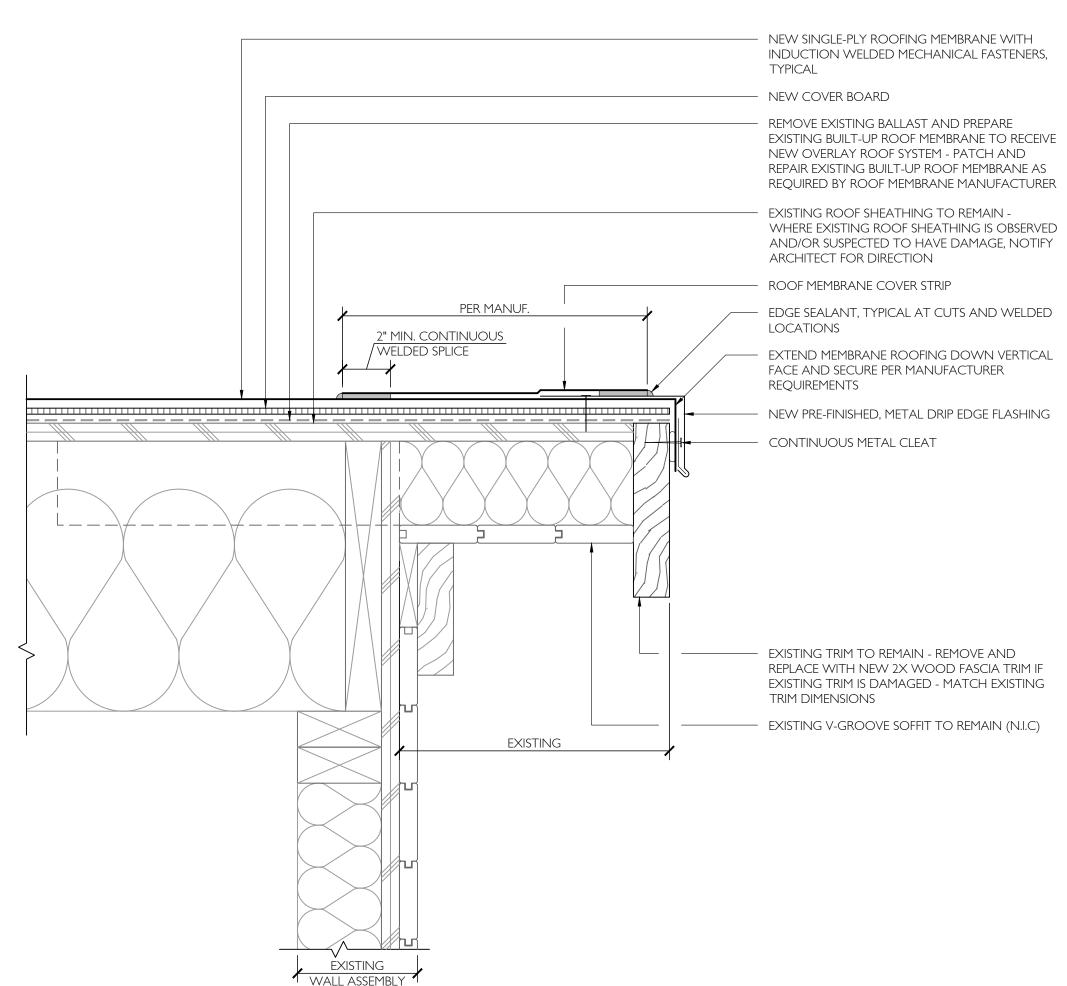
DETAILS A & B WINGS, GYM

JOB NO. 20Y105.01











(SECTION)

15895 SW 72ND AVE SUITE 2 PORTLAND, OREGON 9722 T E L : 5 0 3 . 2 2 6 . I 2 8 F A X : 5 0 3 . 2 2 6 . I 6 7

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STREET SCHO **ATIONAL**

17770 SW E BEAVERTON RN

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DETAILS A & B WINGS, GYM

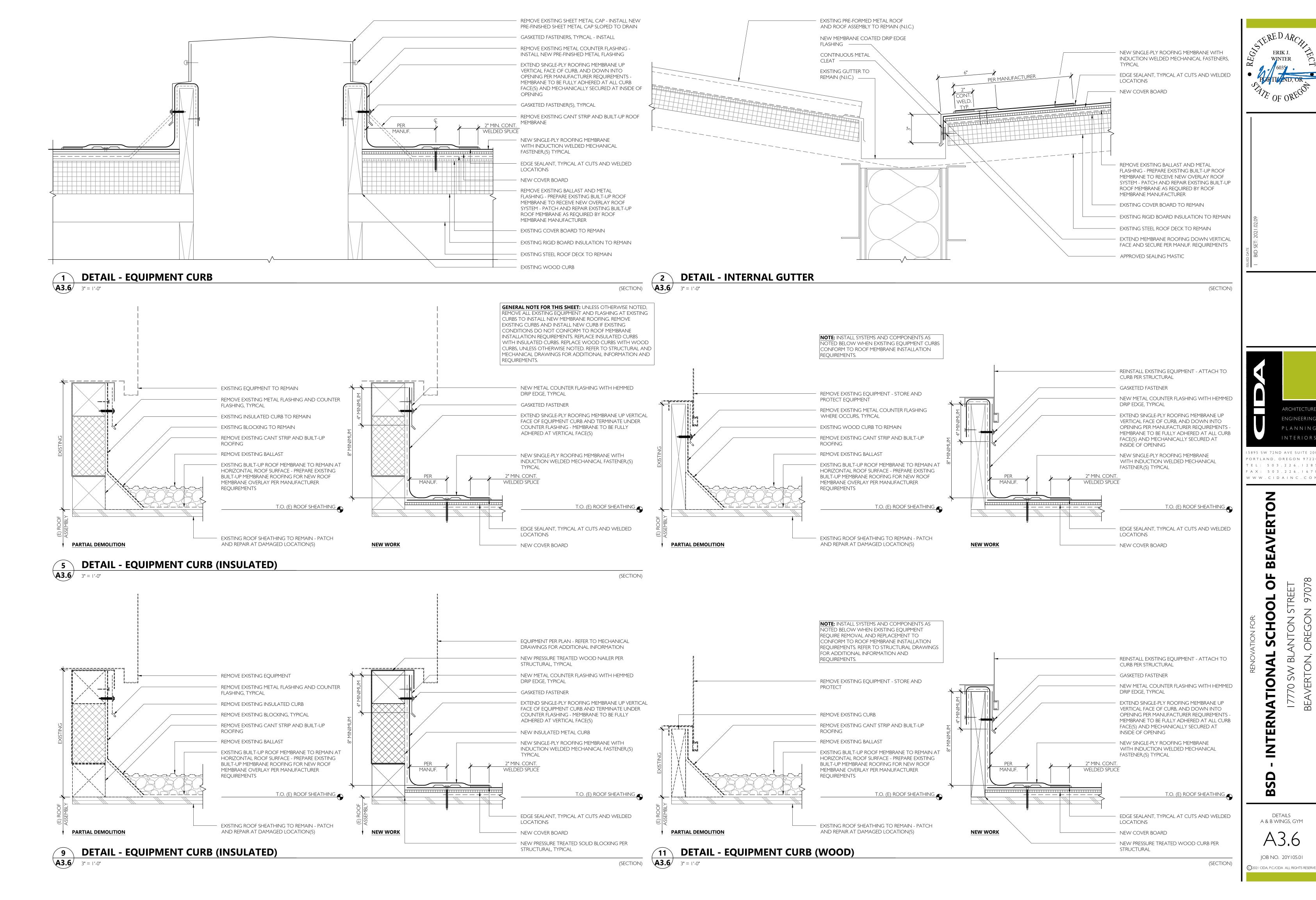
JOB NO. 20Y105.01 ©2021 CIDA, P.C./CIDA ALL RIGHTS RESERVE

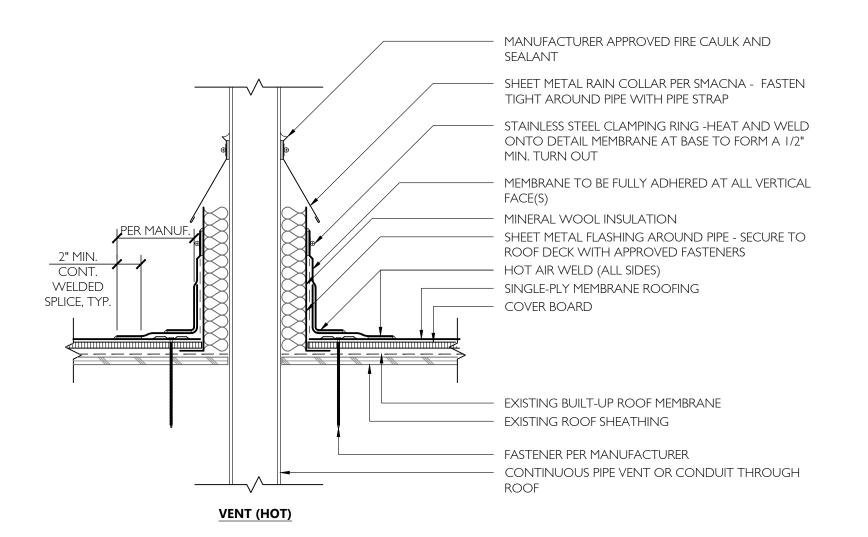
DETAIL - ROOF EAVE A3.5/ 3" = 1'-0"

(SECTION) **A3.5** 3" = 1'-0"

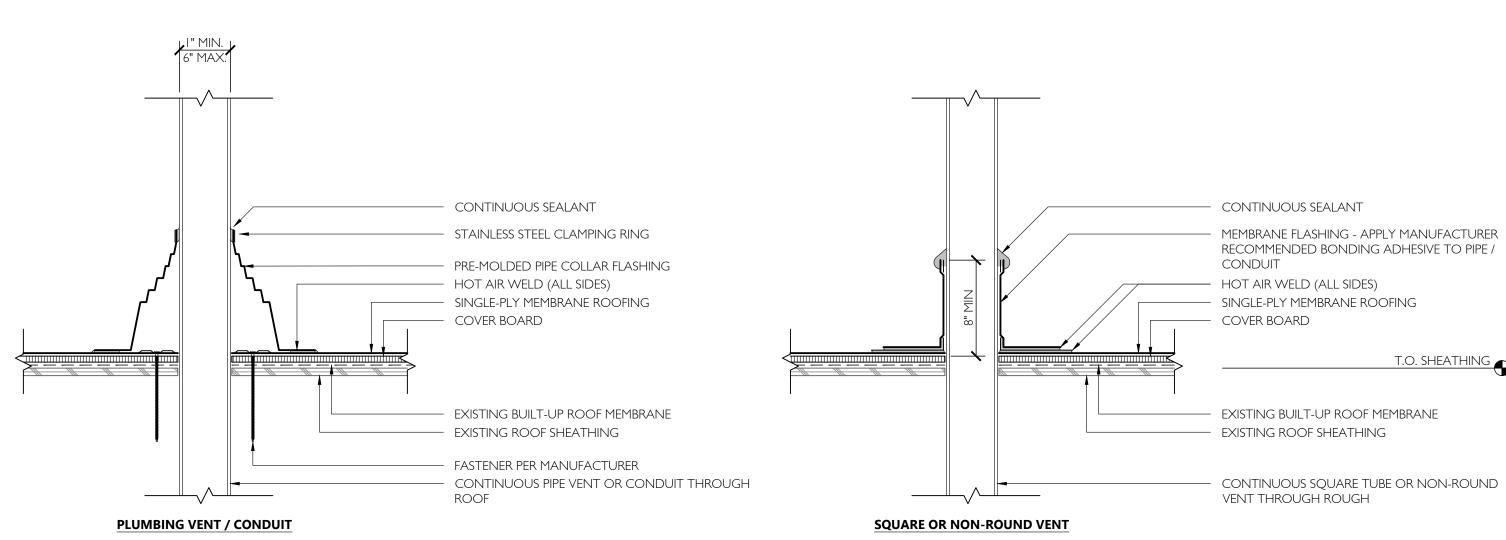
DETAIL - ROOF RAKE

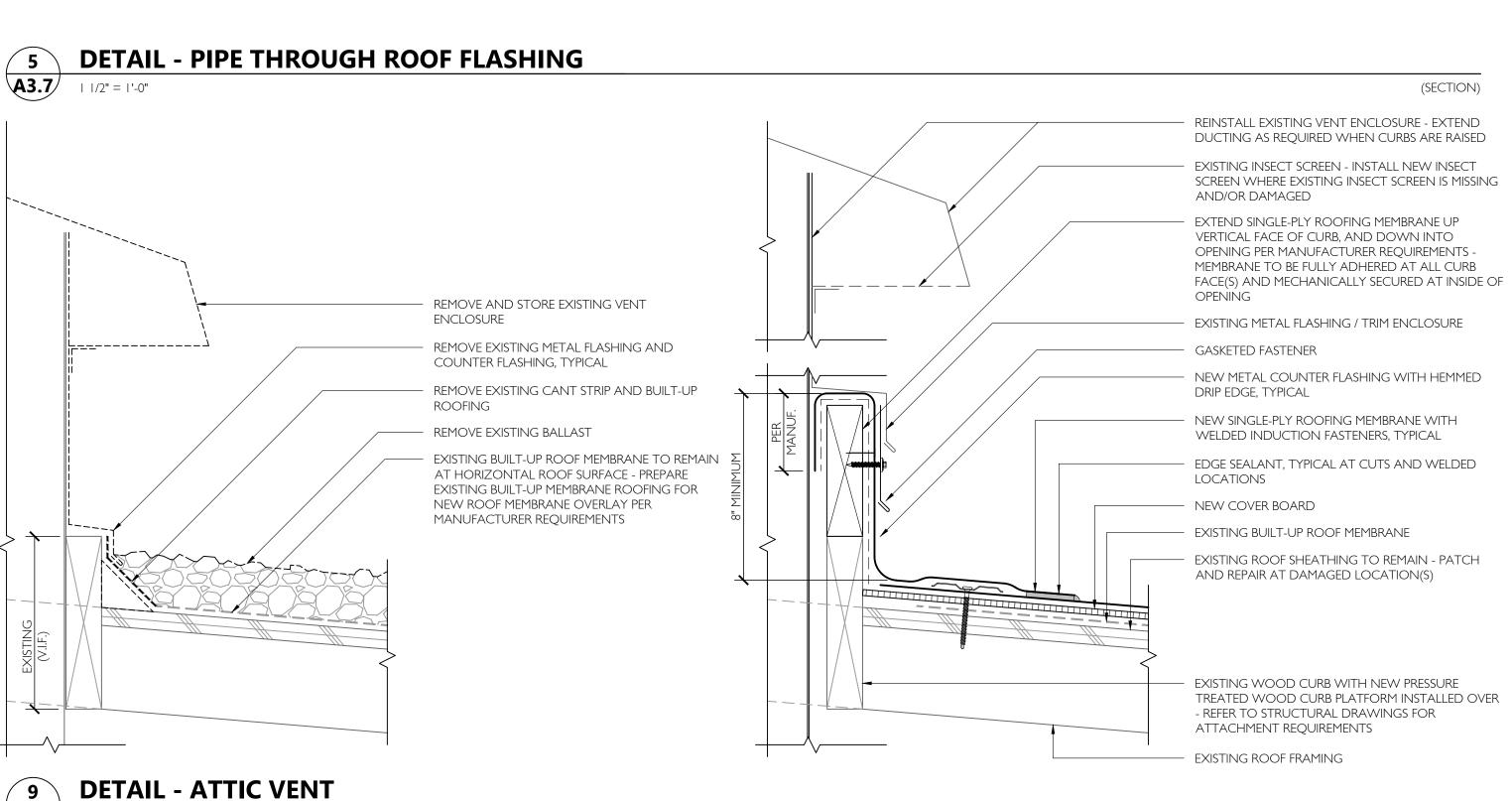
(SECTION)

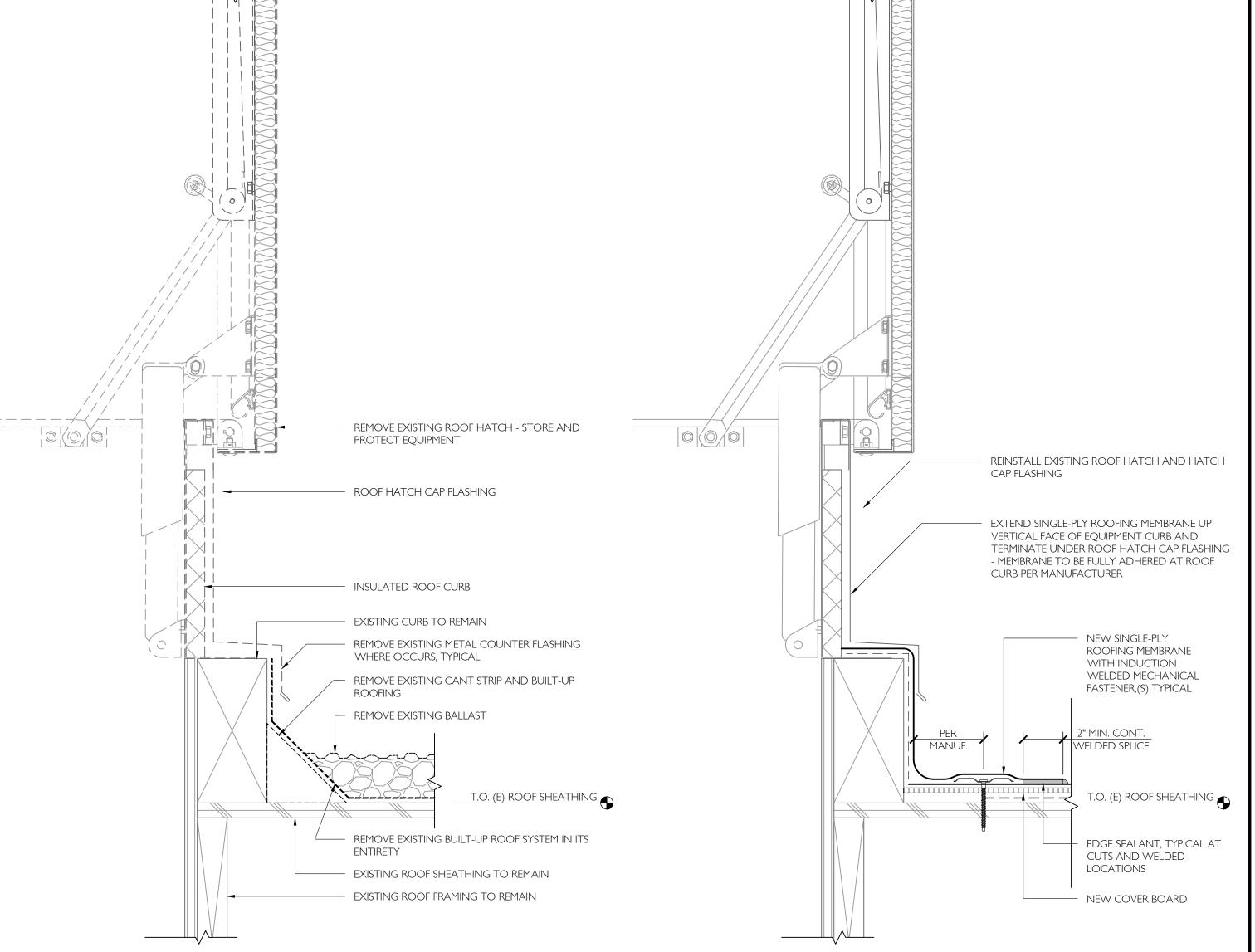


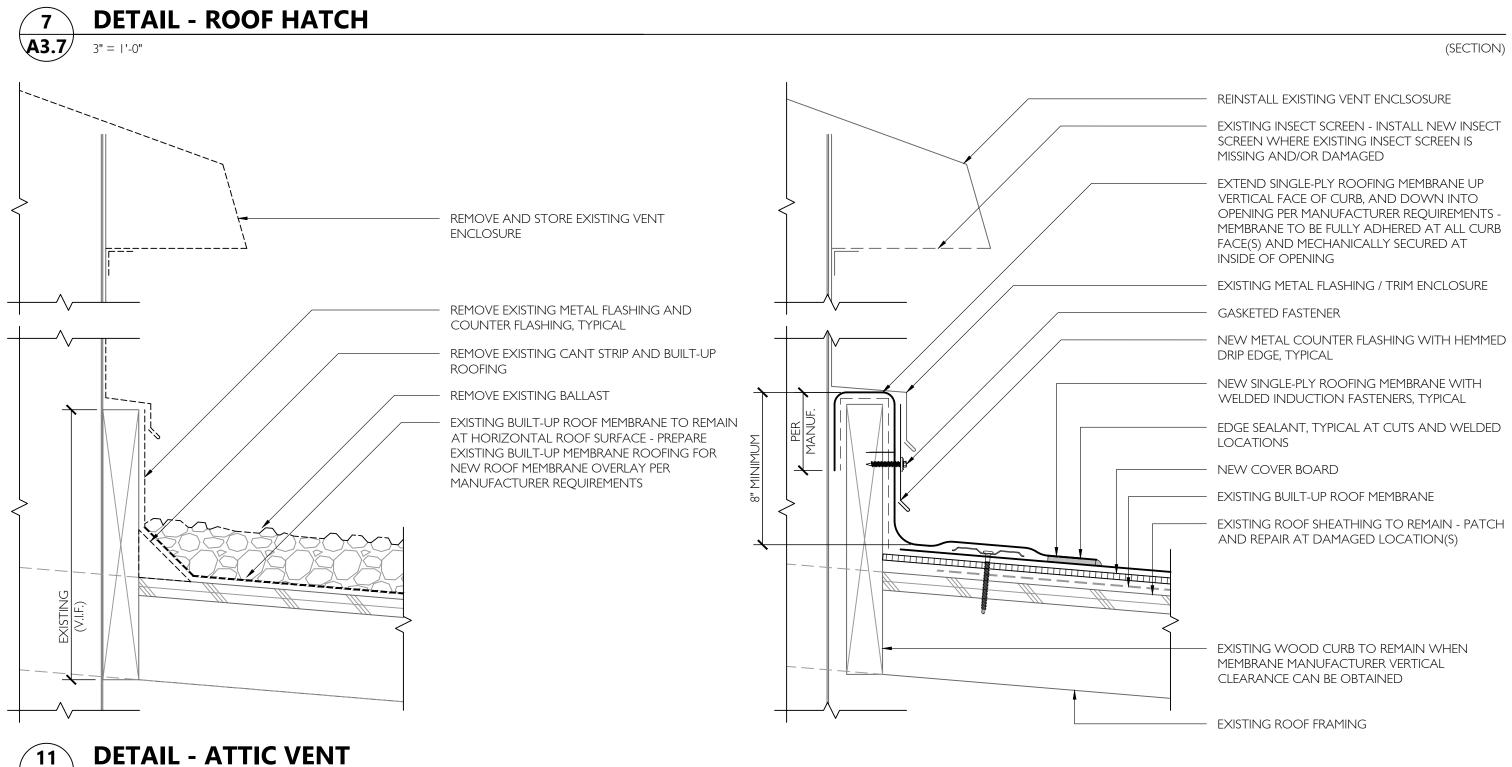


A3.7/ 3" = 1'-0"









(SECTION) (A3.7) 3" = 1'-0"



15895 SW 72ND AVE SUITE 20 PORTLAND, OREGON 9722 T E L: 5 0 3 . 2 2 6 . I 2 8 . FAX: 503.226.167 W W W . C I D A I N C . C O

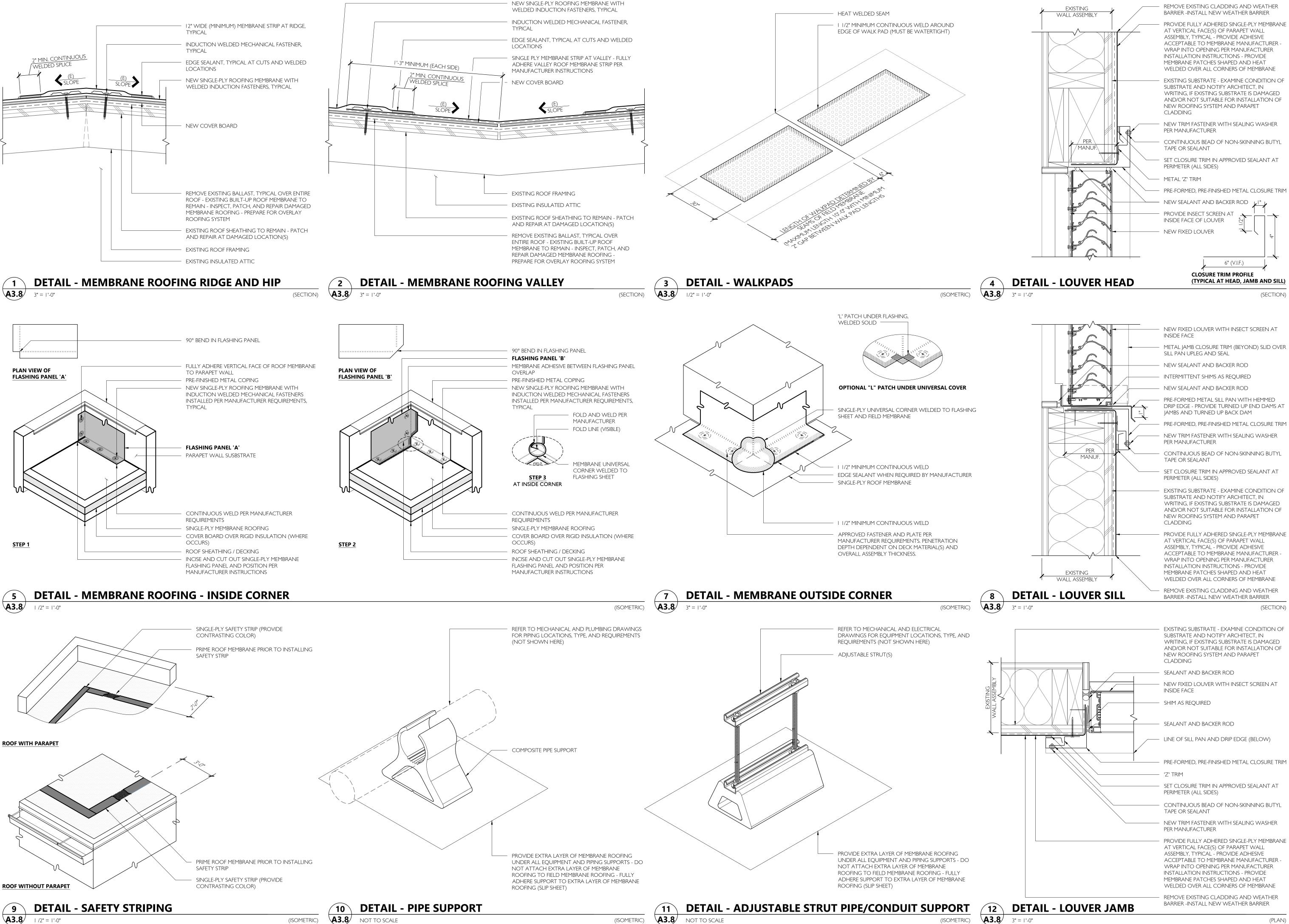
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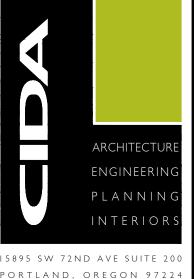
STREET N 97078 SCHOOL 17770 SW E BEAVERTON

DETAILS A & B WINGS, GYM

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(SECTION)





97078

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17770

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(SECTION)

SET CLOSURE TRIM IN APPROVED SEALANT AT

NEW TRIM FASTENER WITH SEALING WASHER

ACCEPTABLE TO MEMBRANE MANUFACTURER -WRAP INTO OPENING PER MANUFACTURER

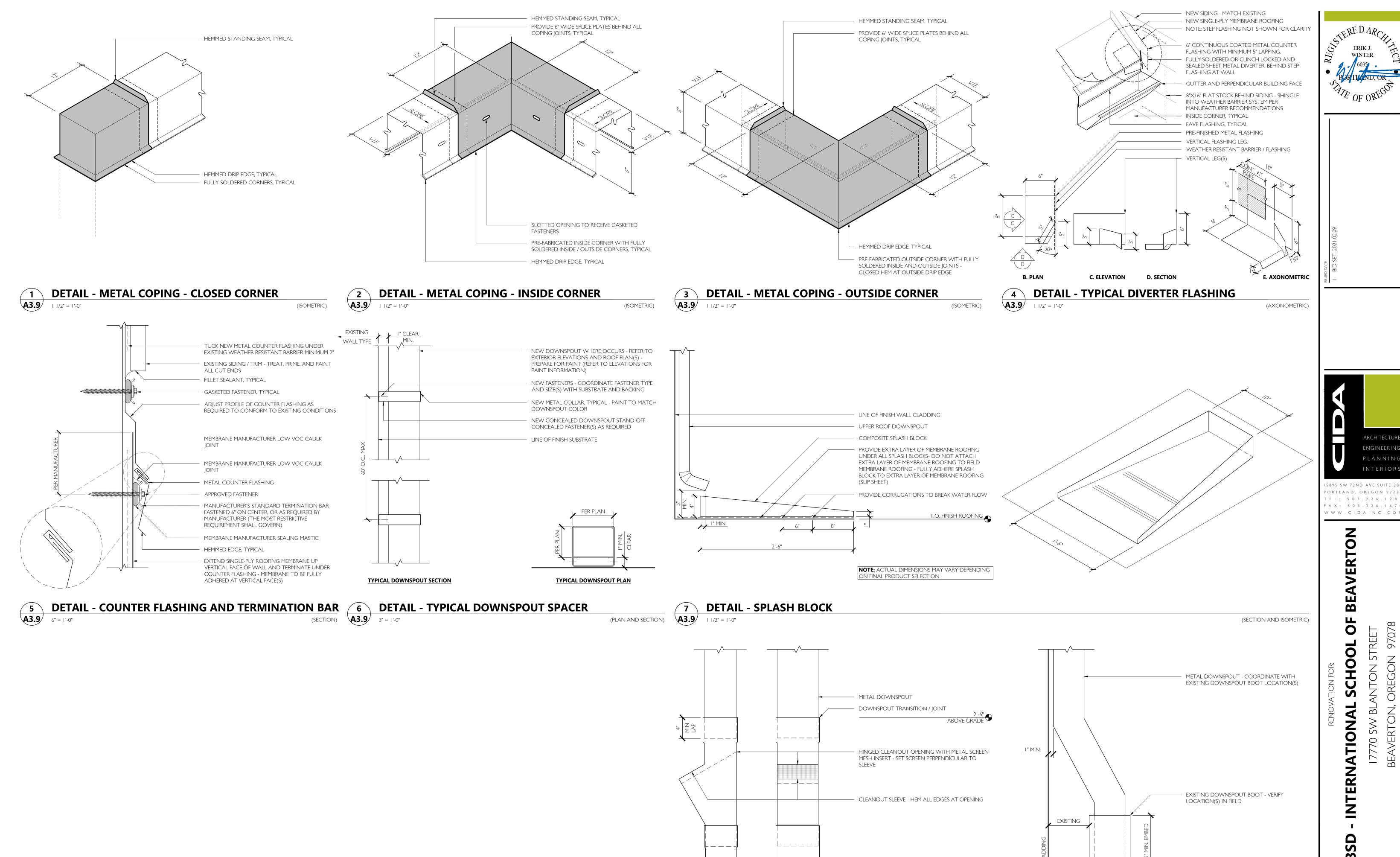
INSTALLATION INSTRUCTIONS - PROVIDE MEMBRANE PATCHES SHAPED AND HEAT WELDED OVER ALL CORNERS OF MEMBRANE

JOB NO. 20Y105.01

DETAILS

A & B WINGS, GYM

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97078 STREET OREGON BEAVERTON DETAILS A & B WINGS, GYM

DETAIL - TYPICAL DOWNSPOUT COLLECTOR A3.9 3" = 1'-0"

METAL DOWNSPOUT - CONNECT TO EXISTING PERIMETER FOUNDATION DRAINAGE SYSTEM

FRONT

A3.9 3" = 1'-0"

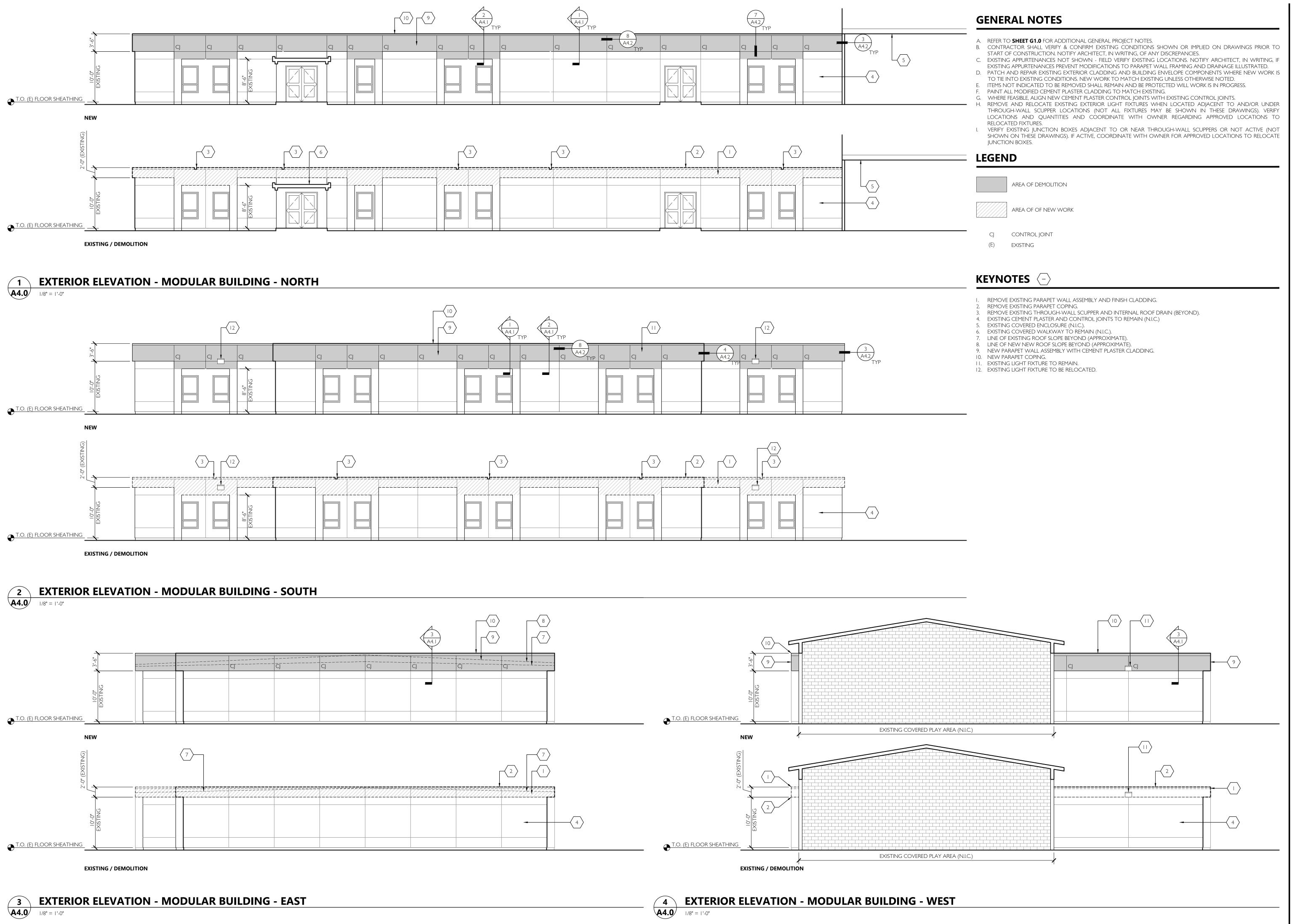
DETAIL - TYPICAL DOWNSPOUT CLEANOUT

COLLECTOR, TYPICAL - REFER TO DETAIL 12/A3.9

(ELEVATION AND SECTION)

T.O. (E) GRADE / (E) SLAB-ON-GRADE

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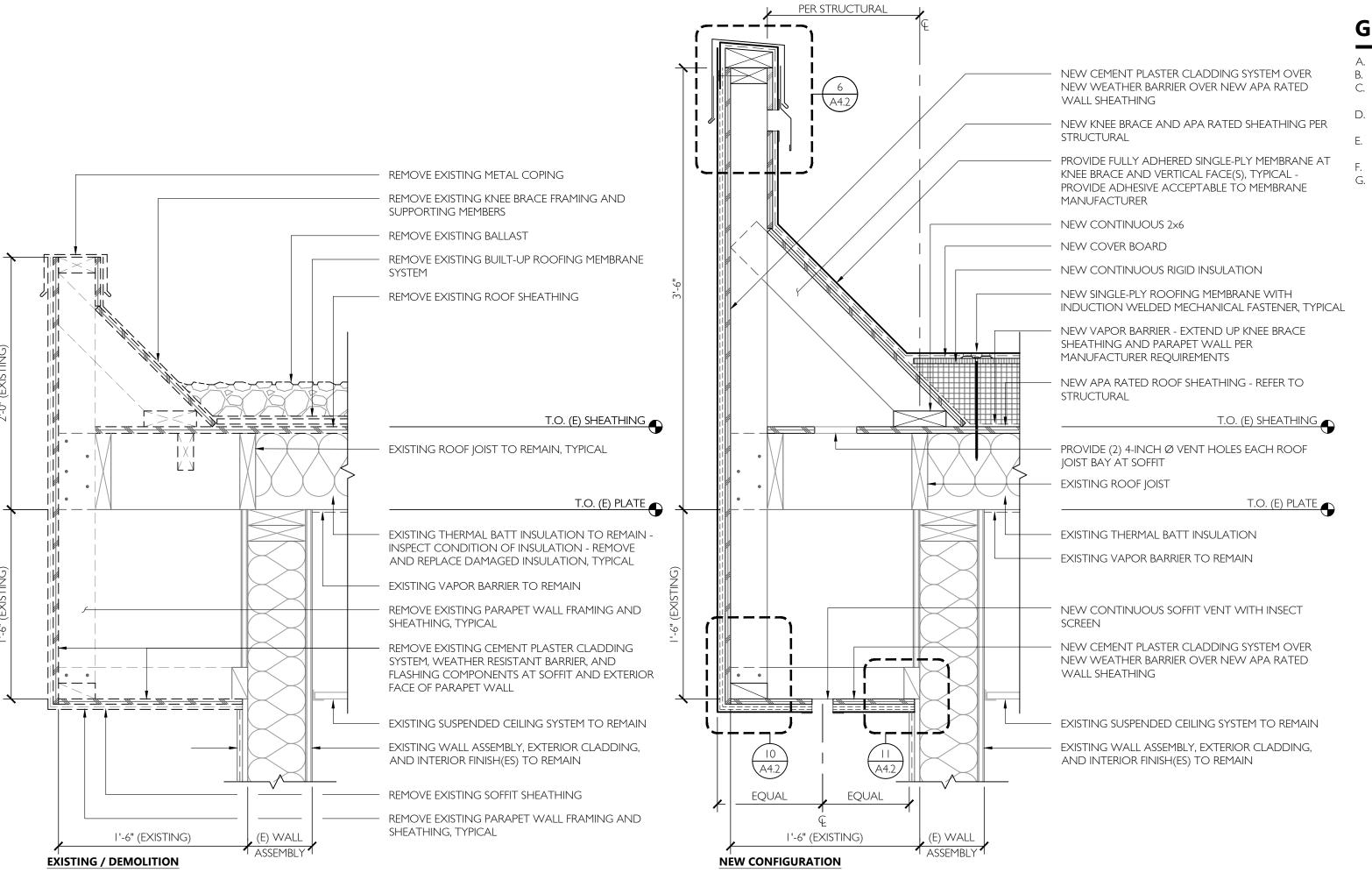


15895 SW 72ND AVE SUITE 20 PORTLAND, OREGON 9722

T E L : 5 0 3 . 2 2 6 . I 2 8 F A X : 5 0 3 . 2 2 6 . I 6 7 $\mathsf{W} \ \mathsf{W} \ \mathsf{W} \ . \ \mathsf{C} \ \mathsf{I} \ \mathsf{D} \ \mathsf{A} \ \mathsf{I} \ \mathsf{N} \ \mathsf{C} \ . \ \mathsf{C} \ \mathsf{O}$

MODULAR BUILDING

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GENERAL DETAIL NOTES

A. THESE GENERAL NOTES SHALL APPLY TO THE ENTIRE PROJECT UNLESS SPECIFICALLY NOTED OTHERWISE WITHIN THE CONTRACT DOCUMENTS.

B. REFER TO GENERAL PROJECT NOTES ON **SHEET G1.0** FOR ADDITIONAL REQUIREMENTS. C. EXISTING CONCEALED ASSEMBLY(S) AND ASSEMBLY COMPONENTS/INSTALLATION(S) SHOWN ARE DIAGRAMMATIC AND ILLUSTRATE THE ASSUMED, EXISTING CONDITIONS. CONTRACTOR SHALL VERIFY, IN FIELD, ALL EXISTING CONDITIONS

REQUIRED TO COMPLETE THE SCOPE OF WORK DESCRIBED WITHIN THESE CONTRACT DOCUMENTS AND NOTIFY THE ARCHITECT, IN WRITING, WHEN EXISTING CONDITIONS DIFFER THAN THOSE DESCRIBED HEREIN. D. CONTRACTOR SHALL VERIFY CONDITION(S) OF EXISTING WALL AND ROOF SHEATHING COMPONENTS, WHERE VISIBLE OR WHEN MADE VISIBLE AS PART OF THE REPAIR SCOPE OF WORK DESCRIBED WITHIN THESE CONTRACT DOCUMENTS.

CONTRACTOR SHALL NOTIFY THE ARCHITECT. IN WRITING, OF ANY KNOWN DEFECTS IN EXISTING SYSTEM COMPONENTS PRIOR TO INSTALLING NEW WORK. E. AT REMOVED AND/OR DEMOLISHED ITEMS, ELEMENTS, SYSTEMS, ASSEMBLIES AND THE LIKE, CONTRACTOR SHALL PATCH AND REPAIR EXISTING SURFACES, SYSTEMS, SUBSTRATES, AND THE LIKE, TO REMAIN. PATCH AND REPAIR WORK TO MATCH SURFACES, SYSTEMS, SUBSTRATES, FINISHES, AND THE LIKE, OF EXISTING ADJACENT SURFACES TO REMAIN.

F. PROVIDE BOND-BREAKER TAPE AT ALL NEW SEALANT LOCATIONS WHERE THREE-POINT ADHESION MAY OCCUR. G. ALL TRIM AND CLADDING COMPONENTS END CUTS TO BE PRIMED TO RECEIVING PAINT, TYPICAL

EXTEND SINGLE-PLY MEMBRANE UP VERTICAL FACE OF PARAPET WALL, TYPICAL MECHANICAL FASTENER(S) AS REQUIRED BY ROOF MEMBRANE MANUFACTURER - PROVIDE BLOCKING AS REQUIRED BY MANUFACTURER NEW KNEE BRACE FRAMING PER STRUCTURAL NEW APA RATED SHEATHING PER STRUCTURAL PROVIDE FULLY ADHERED SINGLE-PLY MEMBRANE AT KNEE BRACE AND VERTICAL FACE(S), TYPICAL - PROVIDE ADHESIVE ACCEPTABLE TO MEMBRANE MANUFACTURER NEW SINGLE-PLY ROOFING MEMBRANE WITH INDUCTION WELDED MECHANICAL FASTENER, TYPICAL - NEW COVER BOARD - NEW CONTINUOUS RIGID INSULATION WELDED SPLICE PER MANUFACTURER EDGE SEALANT, TYPICAL AT CUTS AND WELDED LOCATIONS NEW VAPOR BARRIER - EXTEND UP KNEE BRACE SHEATHING AND PARAPET WALL PER MANUFACTURER REQUIREMENTS NEW APA RATED ROOF SHEATHING - REFER TO STRUCTURAL T.O. (E) SHEATHING EXISTING THERMAL BATT INSULATION TO REMAIN

EXISTING ROOF JOIST **DETAIL - KNEE WALL BRACE TIE-IN** - NEW CONTINUOUS 2x6

NEW CEMENT PLASTER CLADDING SYSTEM OVER NEW WEATHER BARRIER OVER NEW APA RATED WALL SHEATHING NEW KNEE BRACE AND APA RATED SHEATHING PER STRUCTURAL PROVIDE FULLY ADHERED SINGLE-PLY MEMBRANE REMOVE EXISTING METAL COPING AT KNEE BRACE AND VERTICAL FACE(S), TYPICAL - PROVIDE ADHESIVE ACCEPTABLE TO REMOVE EXISTING KNEE BRACE FRAMING AND MEMBRANE MANUFACTURER SUPPORTING MEMBERS NEW CONTINUOUS 2×6 REMOVE EXISTING BALLAST NEW COVER BOARD REMOVE EXISTING BUILT-UP ROOFING MEMBRANE NEW CONTINUOUS RIGID INSULATION SYSTEM NEW SINGLE-PLY ROOFING MEMBRANE WITH REMOVE EXISTING ROOF SHEATHING INDUCTION WELDED MECHANICAL FASTENER, TYPICAL NEW VAPOR BARRIER - EXTEND UP KNEE BRACE SHEATHING AND PARAPET WALL PER MANUFACTURER REQUIREMENTS T.O. (E) SHEATHING T.O. (E) SHEATHING EXISTING ROOF JOIST TO REMAIN, TYPICAL T.O. (E) PLATE T.O. (E) PLATE

> EXISTING THERMAL BATT INSULATION TO REMAIN -NEW BLOCKING PER STRUCTURAL INSPECT CONDITION OF INSULATION - REMOVE AND REPLACE DAMAGED INSULATION, TYPICAL NEW APA RATED ROOF SHEATHING - REFER TO A4.2 STRUCTURAL EXISTING VAPOR BARRIER TO REMAIN EXISTING THERMAL BATT INSULATION EXISTING VAPOR BARRIER TO REMAIN

> > EXISTING SUSPENDED CEILING SYSTEM TO REMAIN EXISTING WALL ASSEMBLY, EXTERIOR CLADDING,

EXISTING WALL ASSEMBLY, EXTERIOR CLADDING, AND INTERIOR FINISH(ES) TO REMAIN AND INTERIOR FINISH(ES) TO REMAIN

REMOVE EXISTING CEMENT PLASTER CLADDING SYSTEM, WEATHER RESISTANT BARRIER, AND **EXISTING / DEMOLITION NEW CONFIGURATION** FLASHING COMPONENTS AT SOFFIT AND EXTERIOR FACE OF PARAPET WALL

REMOVE EXISTING PARAPET WALL FRAMING AND

EXISTING SUSPENDED CEILING SYSTEM TO REMAIN

SHEATHING, TYPICAL

DETAILS MODULAR BUILDING

PLANNIN

15895 SW 72ND AVE SUITE 2 PORTLAND, OREGON 9722 TEL: 503.226.128 F A X : 5 0 3 . 2 2 6 . I 6 7 V W W . C I D A I N C . C O

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(SECTION)

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DETAIL - PARAPET WALL

I'-6" (EXISTING)

REMOVE EXISTING METAL COPING

— REMOVE EXISTING ROOF SHEATHING

- EXISTING ROOF JOIST TO REMAIN, TYPICAL

EXISTING THERMAL BATT INSULATION TO REMAIN -

INSPECT CONDITION OF INSULATION - REMOVE

AND REPLACE DAMAGED INSULATION, TYPICAL

REMOVE EXISTING PARAPET WALL FRAMING AND

EXISTING SUSPENDED CEILING SYSTEM TO REMAIN

EXISTING WALL ASSEMBLY, EXTERIOR CLADDING,

REMOVE EXISTING CEMENT PLASTER CLADDING

SYSTEM, WEATHER RESISTANT BARRIER, AND

EXISTING VAPOR BARRIER TO REMAIN

REMOVE EXISTING SOFFIT SHEATHING

AND INTERIOR FINISH(ES) TO REMAIN

REMOVE EXISTING NAILER

SHEATHING, TYPICAL

SUPPORTING MEMBERS

SYSTEM

REMOVE EXISTING BALLAST

REMOVE EXISTING KNEE BRACE FRAMING AND

REMOVE EXISTING BUILT-UP ROOFING MEMBRANE

T.O. (E) SHEATHING

T.O. (E) PLATE

A4.2

EQUAL

NEW CONFIGURATION

A4.2

EQUAL

I'-6" (MATCH EXISTING)

DETAIL - PARAPET WALL A4.1/ | | | | /2" = | '-0"

(E) WALI

A4.1 3" = 1'-0"

(SECTION)

NEW CEMENT PLASTER CLADDING SYSTEM OVER

NEW WEATHER BARRIER OVER NEW APA RATED

NEW KNEE BRACE AND APA RATED SHEATHING PER

PROVIDE FULLY ADHERED SINGLE-PLY MEMBRANE AT

KNEE BRACE AND VERTICAL FACE(S), TYPICAL -

NEW CONTINUOUS RIGID INSULATION

SHEATHING AND PARAPET WALL PER MANUFACTURER REQUIREMENTS

- EXISTING THERMAL BATT INSULATION

- EXISTING VAPOR BARRIER TO REMAIN

NEW SINGLE-PLY ROOFING MEMBRANE WITH

NEW VAPOR BARRIER - EXTEND UP KNEE BRACE

NEW APA RATED ROOF SHEATHING - REFER TO

PROVIDE (2) 4-INCH Ø VENT HOLES EACH ROOF

NEW CEMENT PLASTER CLADDING SYSTEM OVER

NEW WEATHER BARRIER OVER NEW APA RATED

NEW CONTINUOUS SOFFIT VENT WITH INSECT

EXISTING SUSPENDED CEILING SYSTEM TO REMAIN

EXISTING WALL ASSEMBLY, EXTERIOR CLADDING,

AND INTERIOR FINISH(ES) TO REMAIN

INDUCTION WELDED MECHANICAL FASTENER, TYPICAL

T.O. (E) SHEATHING

T.O. (E) PLATE

PROVIDE ADHESIVE ACCEPTABLE TO MEMBRANE

WALL SHEATHING

STRUCTURAL

MANUFACTURER

NEW CONTINUOUS 2x6

NEW COVER BOARD

STRUCTURAL

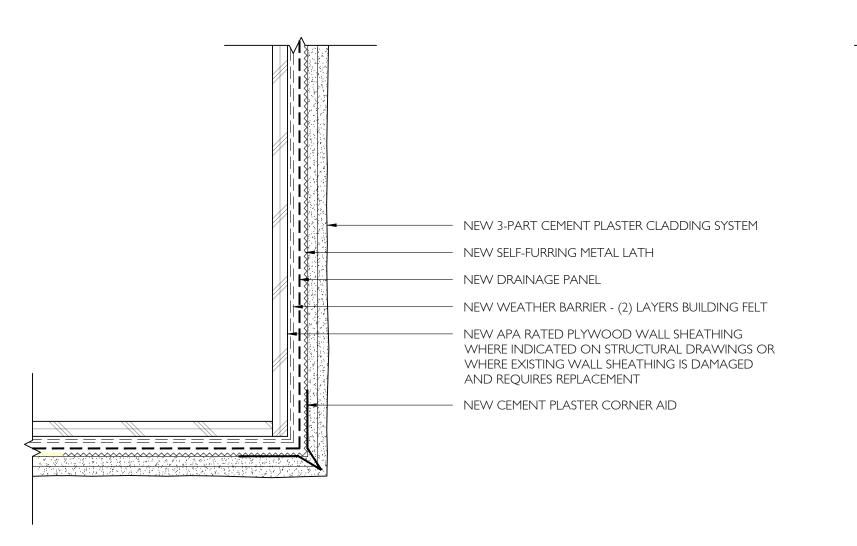
JOIST BAY AT SOFFIT

EXISTING ROOF JOIST

WALL SHEATHING

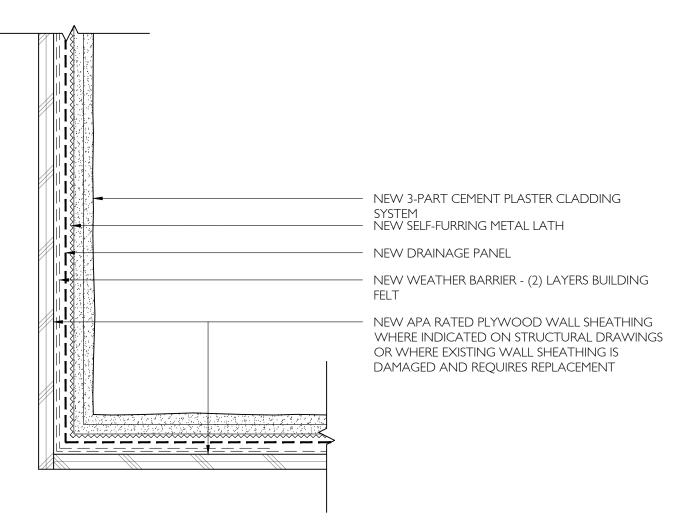
SCREEN

(SECTION)



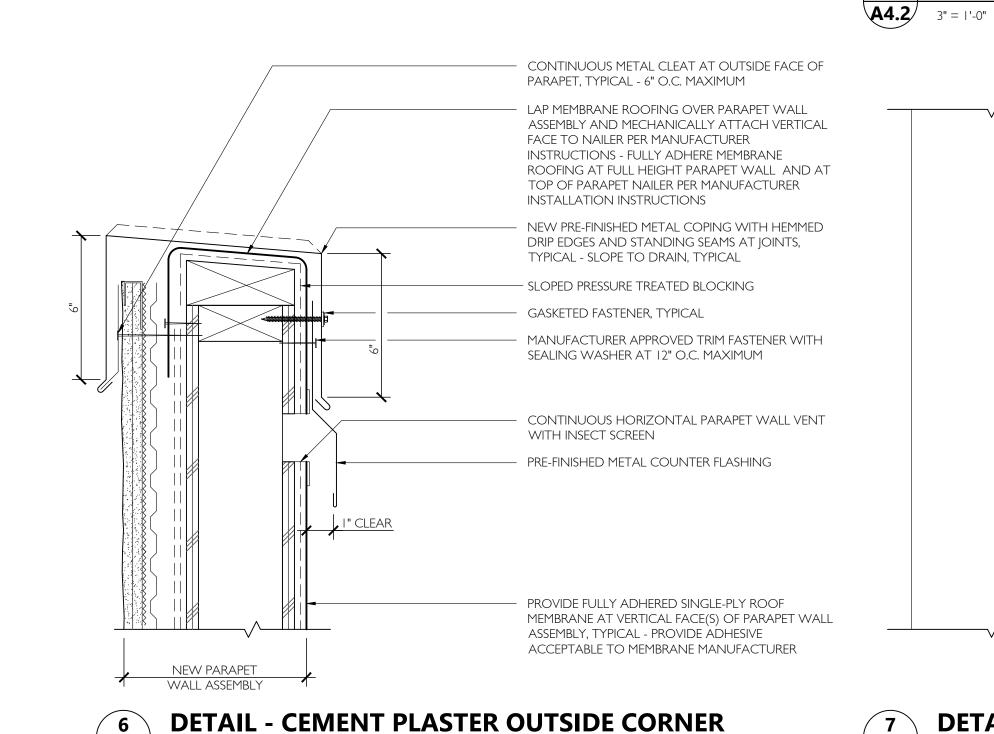
DETAIL - CEMENT PLASTER OUTSIDE CORNER

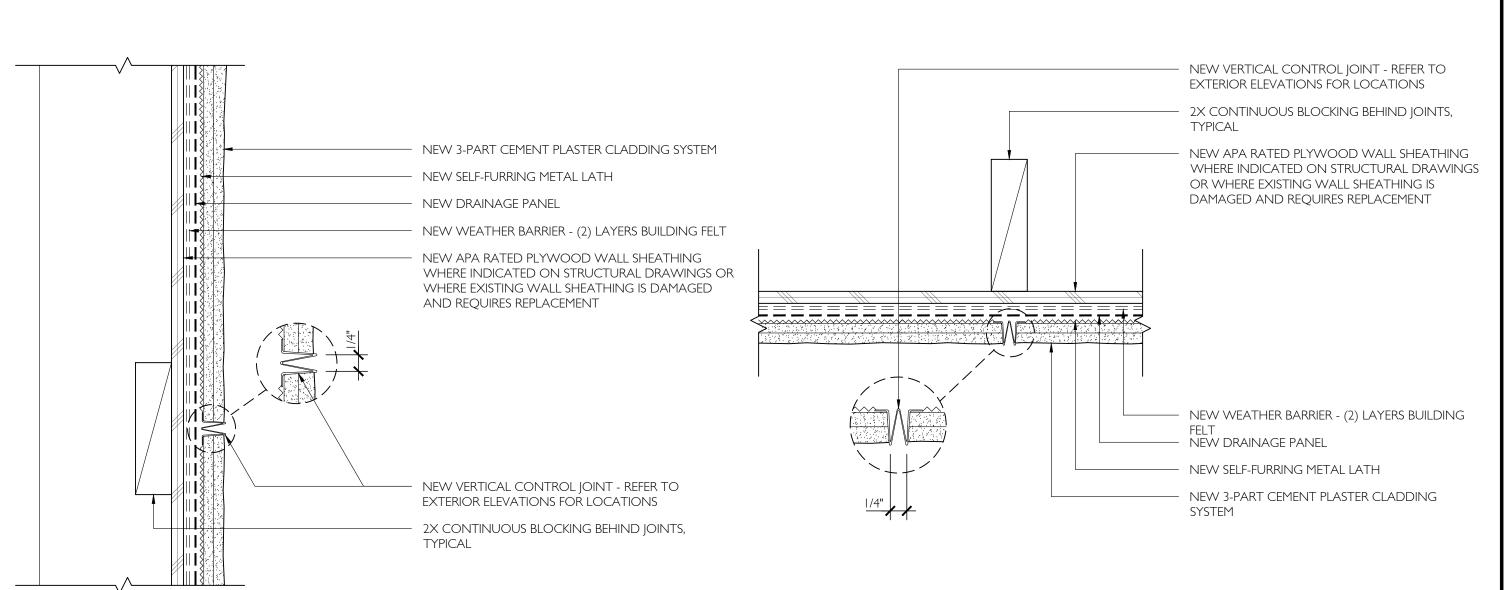
DETAIL - CEMENT PLASTER HORIZ. CONTROL JOINT



DETAIL - CEMENT PLASTER INSIDE CORNER

DETAIL - CEMENT PLASTER VERTICAL CONTROL JOINT

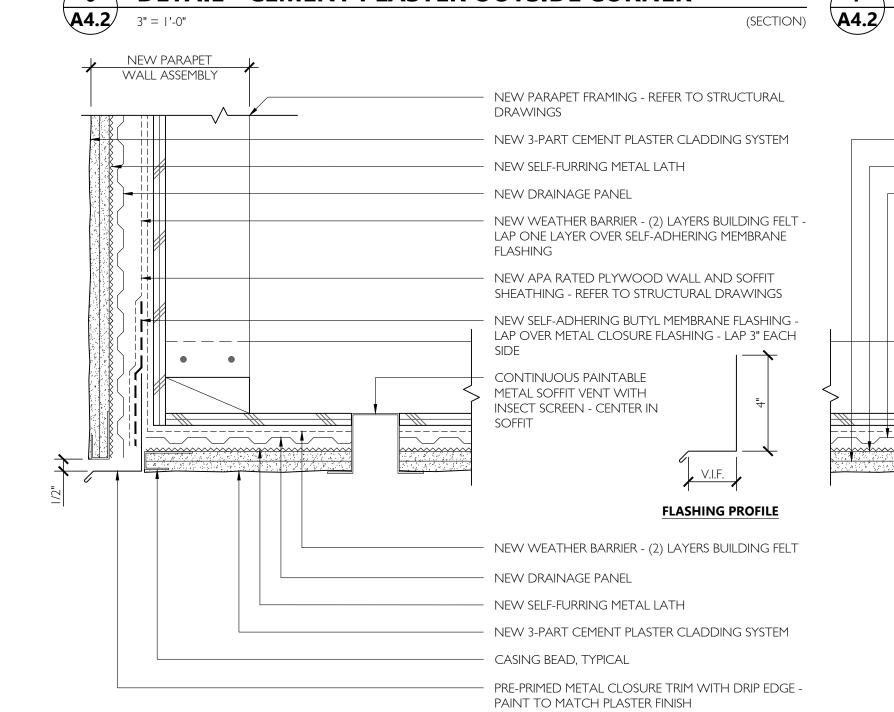




A4.2 3" = 1'-0"

A4.2 3" = 1'-0"

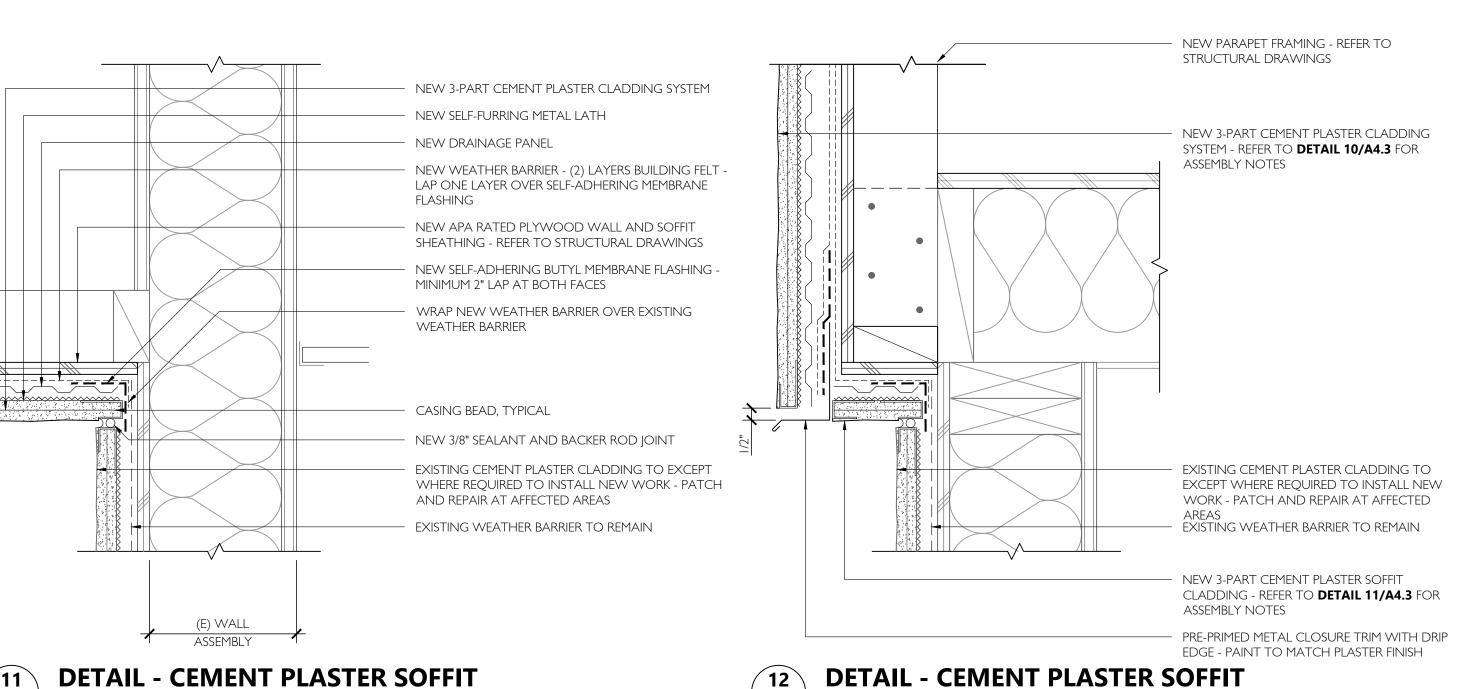
(PLAN) **A4.2** 3" = 1'-0"



(SECTION) (44.2) 3" = 1'-0"

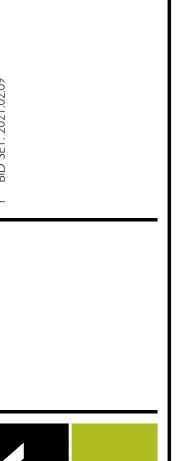
DETAIL - CEMENT PLASTER SOFFIT

A4.2 3" = 1'-0"



(SECTION)

(SECTION)



(PLAN)



15895 SW 72ND AVE SUITE 20

PORTLAND, OREGON 9722 T E L : 5 0 3 . 2 2 6 . I 2 8 . F A X : 5 0 3 . 2 2 6 . I 6 7 W W W . C I D A I N C . C O

OF

97078 STREET SCHOOL

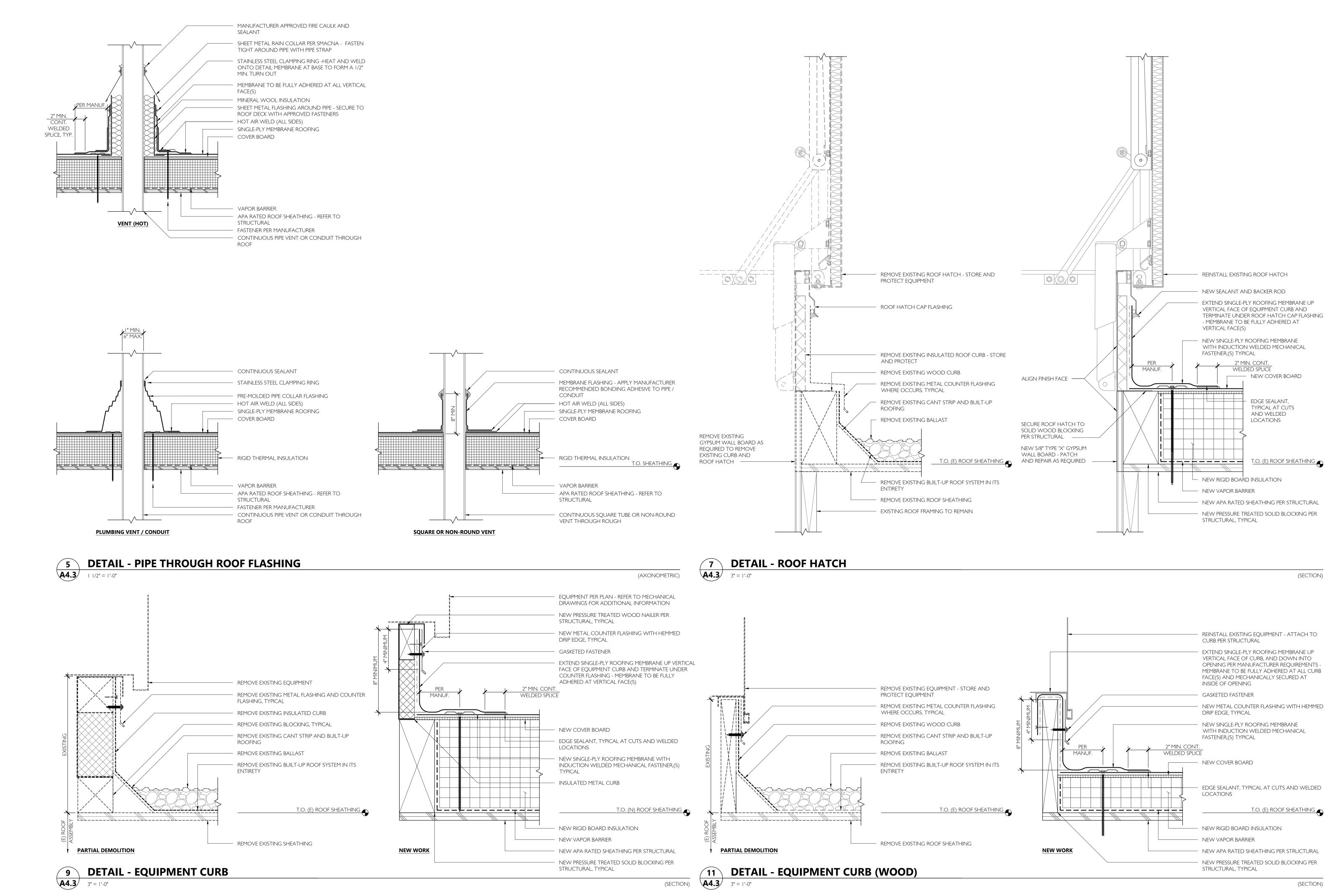
OREG(BEAVERTO

MODULAR BUILDING

S

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(SECTION)



ARCHITECTUR ENGINEERIN PLANNIN INTERIOF 15895 SW 72ND AVE SUITE 20 PORTLAND, OREGON 9722 T E L : 5 0 3 . 2 2 6 . I 2 8 F A X : 5 0 3 . 2 2 6 . I 6 7 W W W . C I D A I N C . C O

(SECTION)

T.O. (E) ROOF SHEATHING

EDGE SEALANT,

AND WELDED

LOCATIONS

TYPICAL AT CUTS

STREET

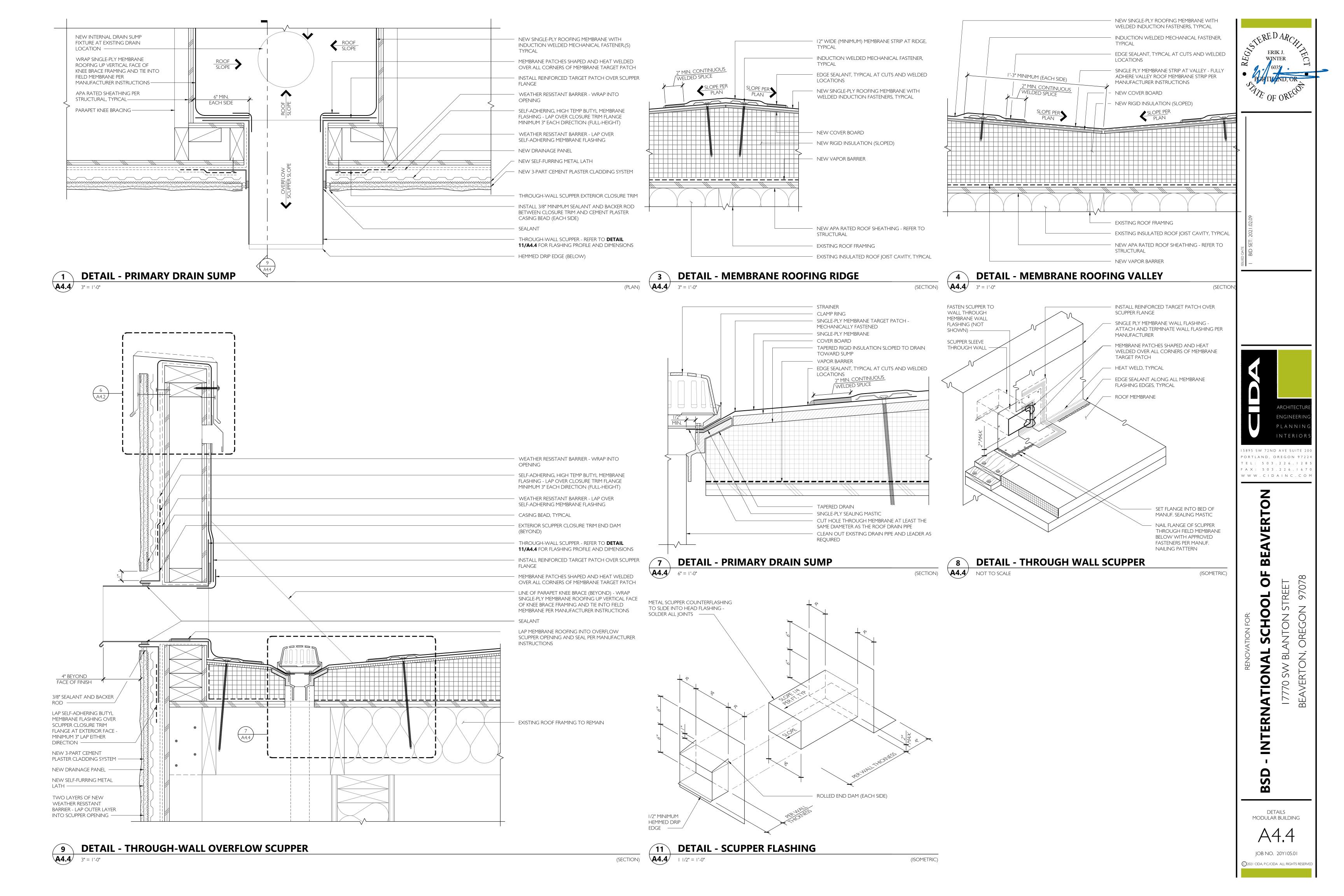
BEAVERTON 17770

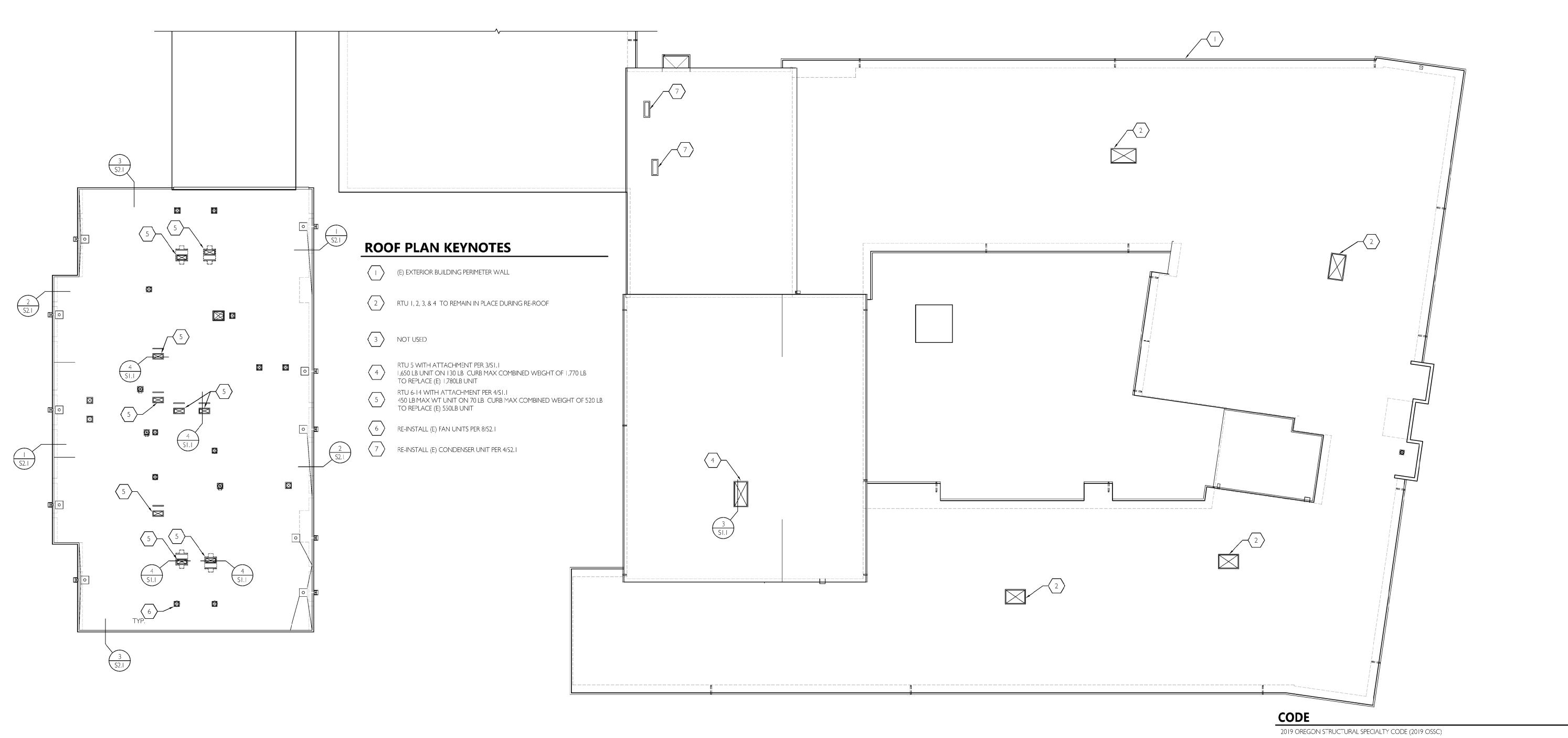
M

DETAILS MODULAR BUILDING

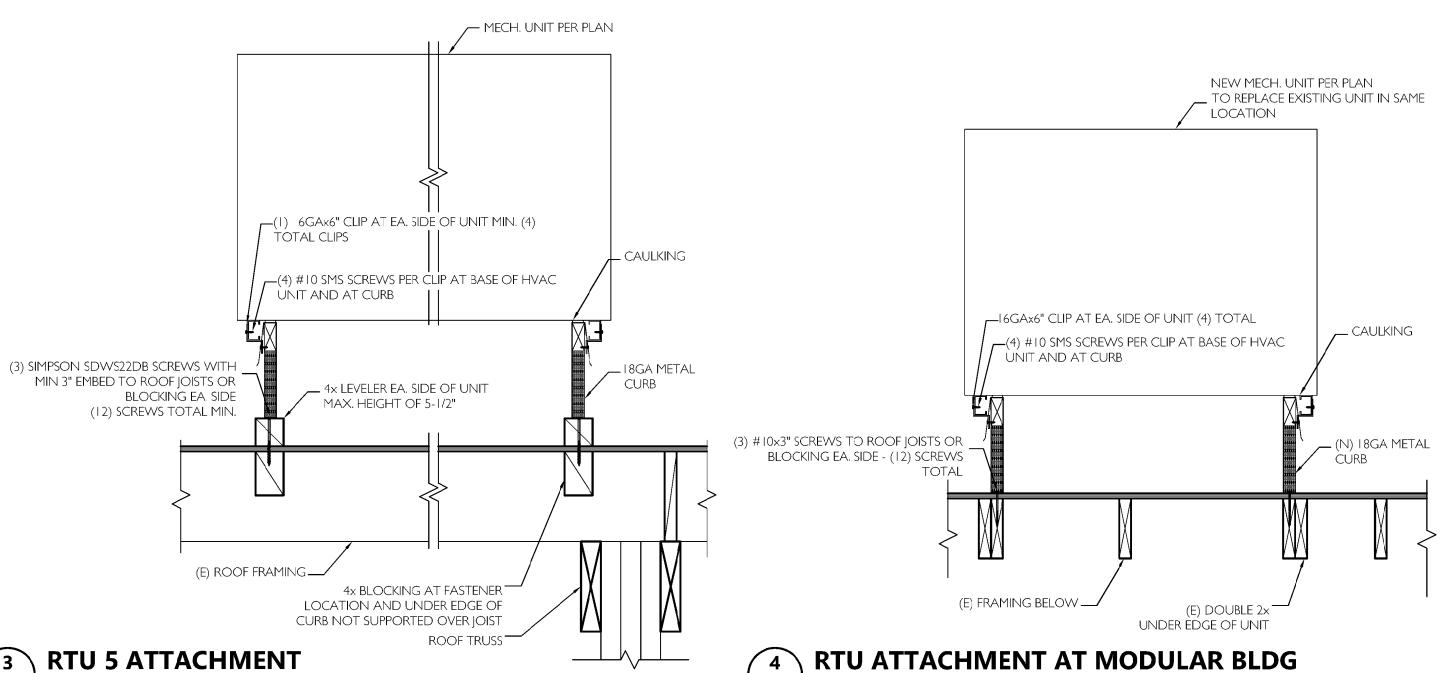
JOB NO. 20Y105.01

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2 NOT USED

4 RTU ATTACHMENT AT MODULAR BLDG

\$1.1 |" = |'-0"



 $\frac{\text{WIND LOADS:}}{\text{BASIC WIND SPEED (3 SECOND GUST)} = 97 \text{ MPH}}$ EXPOSURE CATEGORY = B F = 24.1 PSF (LRFD) $F_{UPLIFT} = 19.0 PSF (LRFD)$

EARTHQUAKE: SEISMIC PARAMETERS: OCCUPANCY CAT. III

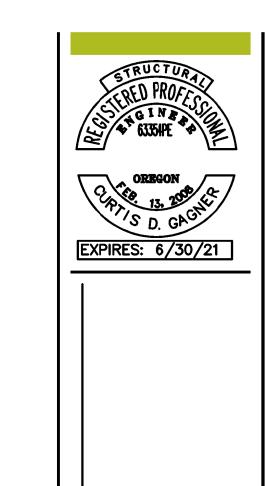
IMPORTANCE FACTOR = 1.0 (FOR MECHANICAL UNIT ANCHORAGE DESIGN) MAPPED: $S_S = 0.990$ SITE CLASS: D

SEISMIC DESIGN CATEGORY = DDESIGN: $S_{DS} = 0.728$ LATERAL FORCES

MECHANICAL EQUIPMENT: $F_P = 0.36*$ WT FOR NON-ISOLATED AIR SIDE EQUIPMENT

GENERAL

- I. THE CONTRACT STRUCTURAL DRAWINGS AND SPECIFICATIONS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE METHOD OF CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL MEASURES NECESSARY TO PROTECT THE STRUCTURE DURING CONSTRUCTION. SUCH MEASURES SHALL INCLUDE, BUT NOT BE LIMITED TO, BRACING, SHORING OF LOADS DUE TO CONSTRUCTION EQUIPMENT, ETC. OBSERVATION VISITS TO THE SITE BY THE A/E SHALL NOT INCLUDE INSPECTION OF THE ABOVE ITEMS.
- 2. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL DIMENSIONS WITH DRAWINGS PRIOR TO START OF CONSTRUCTION. RESOLVE ANY DISCREPANCY WITH
- 3. CONSTRUCTION MATERIAL SHALL BE SPREAD OUT IF PLACED ON FRAMED FLOORS OR ROOF. LOAD SHALL NOT EXCEED THE DESIGN LIVE LOAD PER SQUARE FOOT.
- 4. Where reference is made to various test standards for materials, such standards shall be the latest edition and/or addendum.
- 5. ESTABLISH AND VERIFY ALL OPENINGS AND INSERTS FOR ARCHITECTURAL, MECHANICAL, ELECTRICAL AND PLUMBING WITH APPROPRIATE TRADES, DRAWINGS
- AND SUBCONTRACTORS PRIOR TO CONSTRUCTION. 6. OPTIONS ARE FOR CONTRACTOR'S CONVENIENCE. HE SHALL BE RESPONSIBLE FOR ALL CHANGES NECESSARY IF HE CHOOSES AN OPTION AND HE SHALL COORDINATE
- 7. WHERE ANY DISCREPANCIES OCCUR BETWEEN PLANS, DETAILS, GENERAL STRUCTURAL NOTES AND SPECIFICATIONS, THE GREATER REQUIREMENTS SHALL
- 8. ANY ENGINEERING DESIGN PROVIDED BY OTHERS AND SUBMITTED FOR REVIEW SHALL BEAR THE SEAL OF A CIVIL OR STRUCTURAL ENGINEER REGISTERED IN THE STATE OF OREGON
- 9. ALL DETAIL CUTS SHOULD BE CONSIDERED TYPICAL @ LIKE CONDITIONS





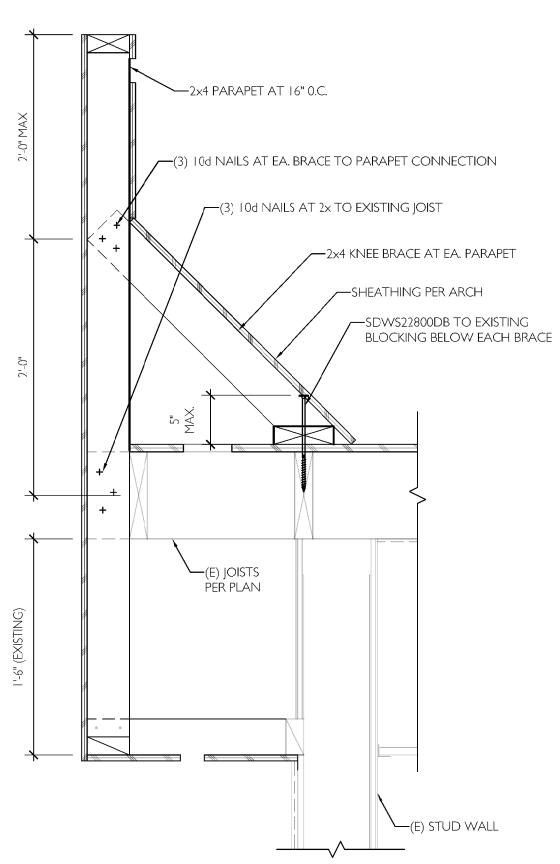
PORTLAND, GREGON 9722 T E L : 5 0 3 . 2 2 6 . I 2 8 ! = A X : 5 0 3 . 2 2 6 . I 6 7 0

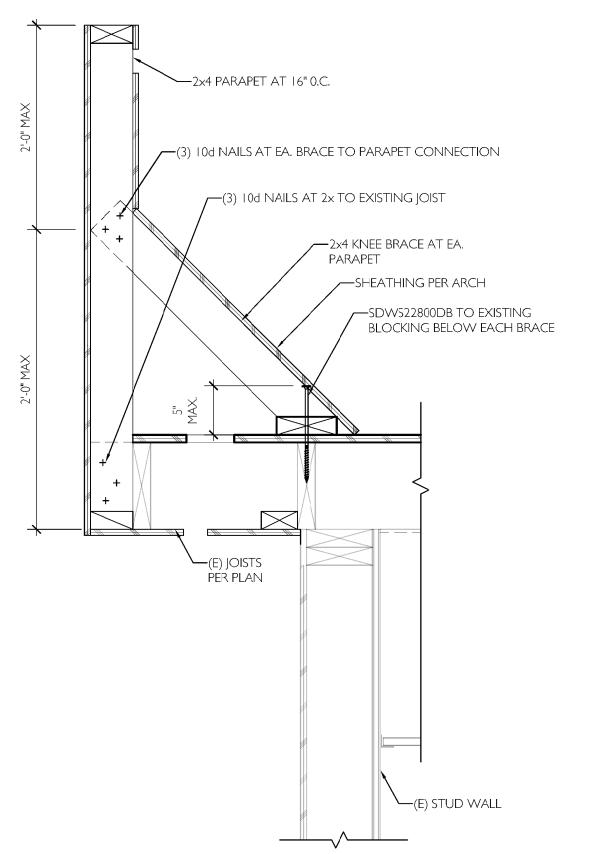
 $\mathsf{W} \ \mathsf{W} \ \mathsf{W} \ \mathsf{.} \ \mathsf{C} \ \mathsf{I} \ \mathsf{D} \ \mathsf{A} \ \mathsf{I} \ \mathsf{N} \ \mathsf{C} \ \mathsf{.} \ \mathsf{C} \ \mathsf{O}$

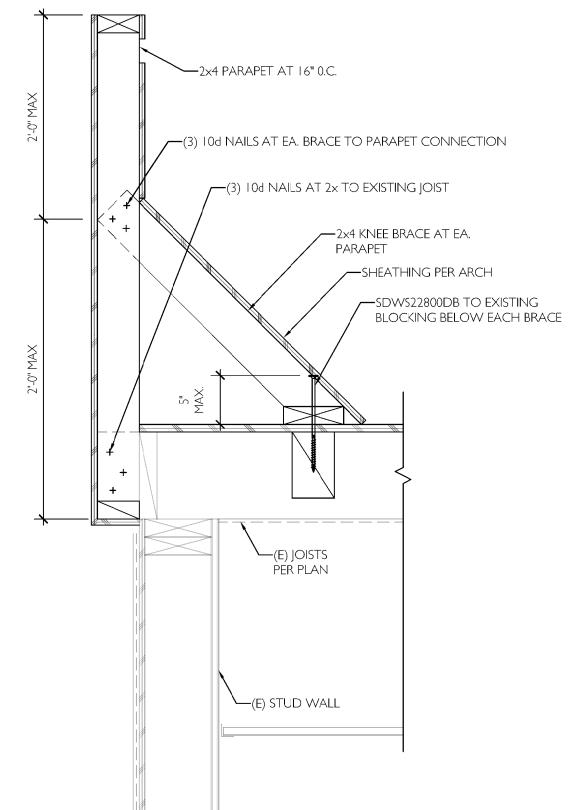
OF STREET N 97078 SCHOOL

17770 SW BLANTON ST BEAVERTON, OREGON

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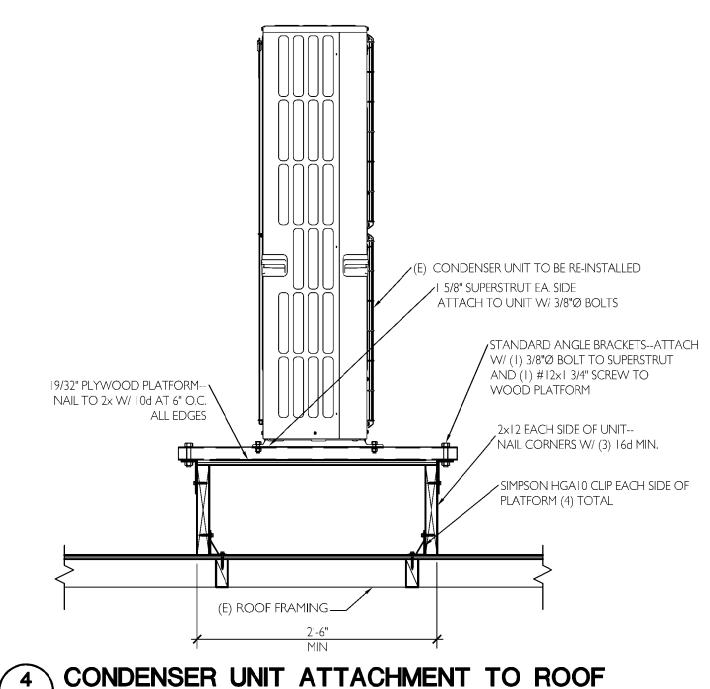


3 DETAIL - PARAPET

DETAIL - ROOF LADDER

S2.1

1/2" = 1'-0"

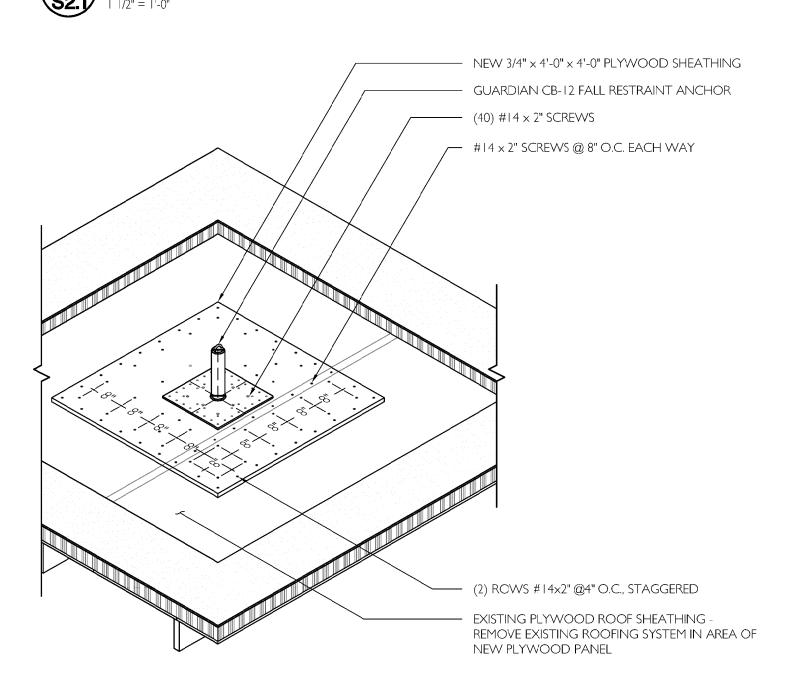


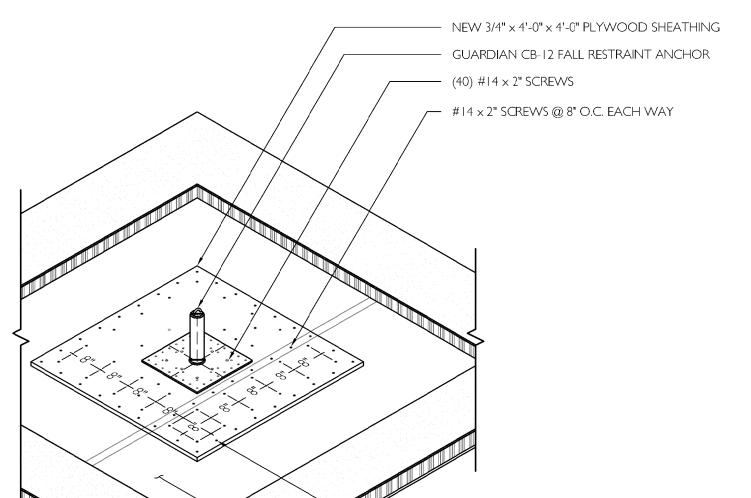


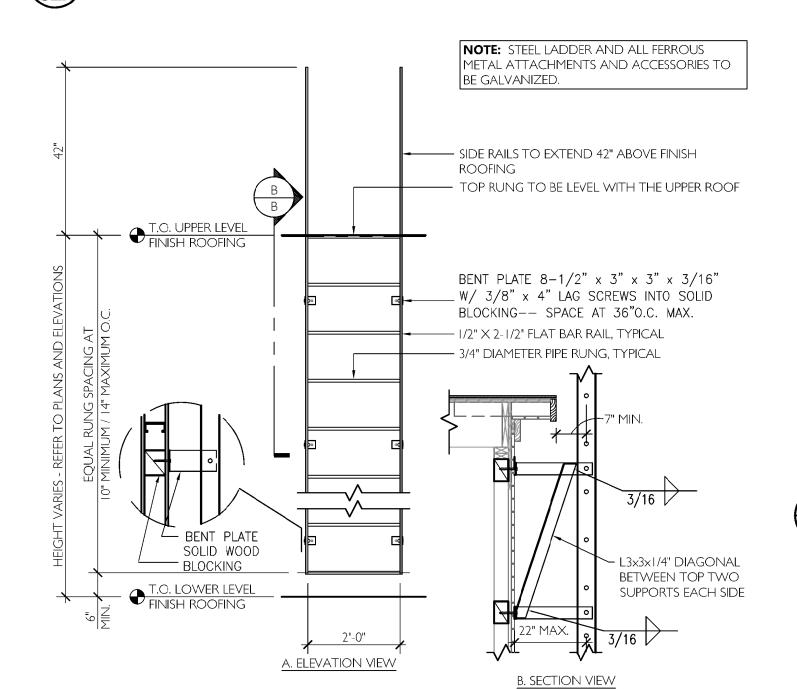
1 DETAIL - PARAPET
| \$2.1 | |/2" = |'-0"

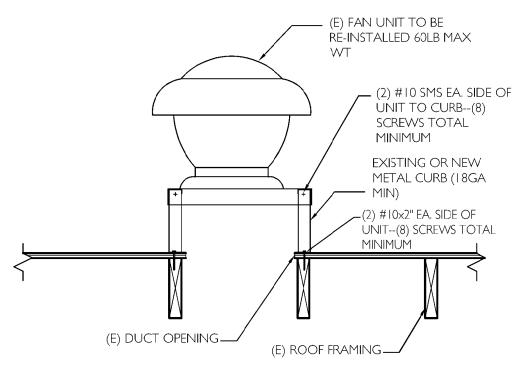
| 1/2" = 1'-0"

9 FAN UNIT ATTACHMENT









DETAIL - FALL RESTRAINT ANCHOR AT DECKING S2.I

| |/2" = |'-0" (SECTION)

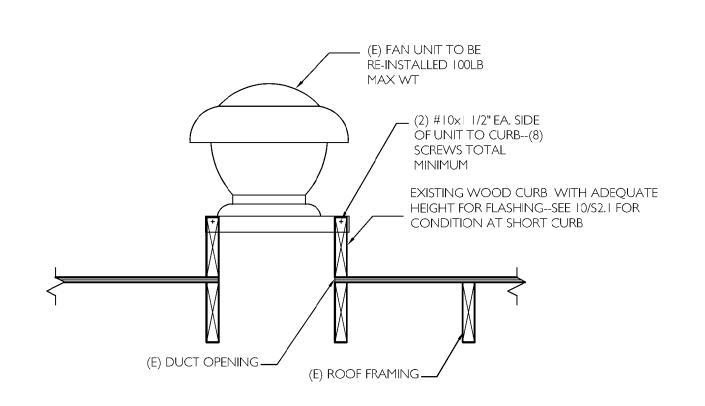
. (E) FAN UNIT TO BE RE-INSTALLED 100LB

— (2) ROWS #14×2" @4" O.C., STAGGERED

NEW PLYWOOD PANEL

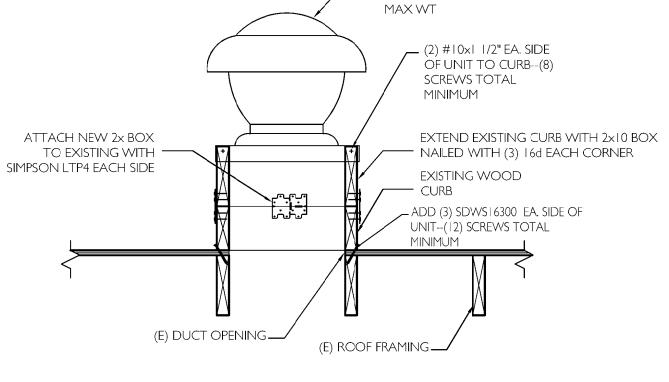
EXISTING I X TONGUE AND GROOVE DECKING -REMOVE EXISTING ROOFING SYSTEM IN AREA OF





DETAIL - FALL RESTRAINT ANCHOR AT SHEATHING

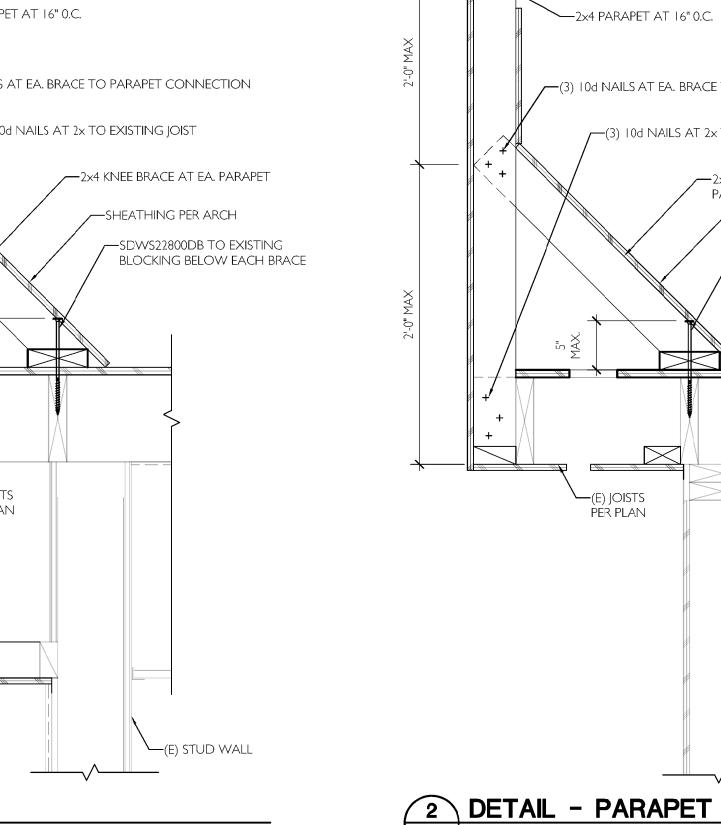
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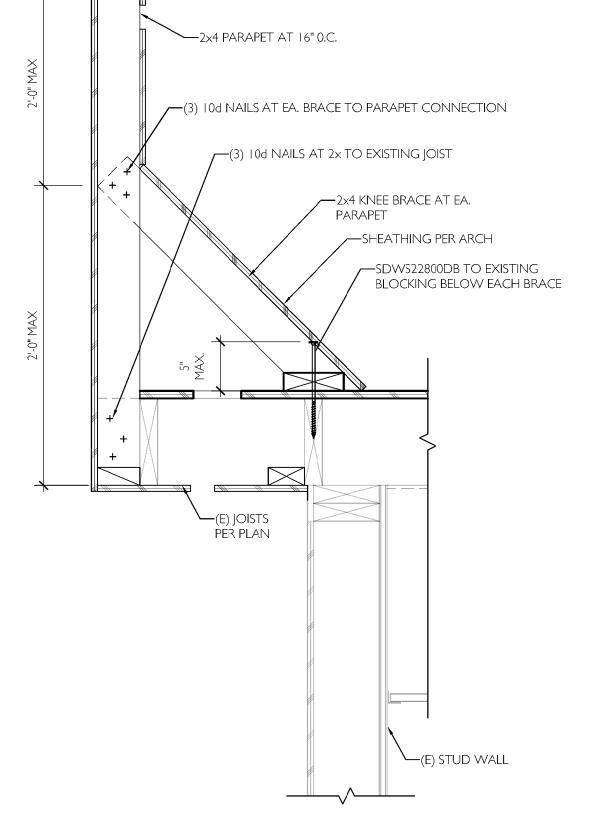


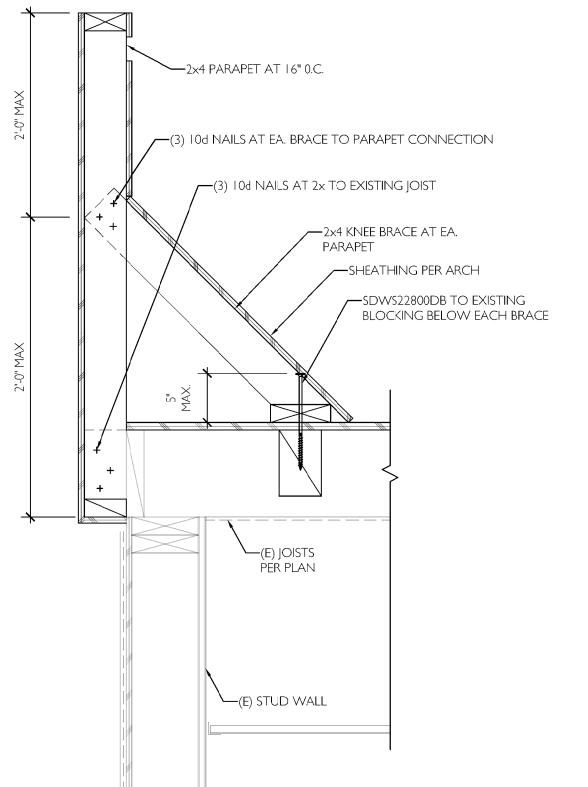






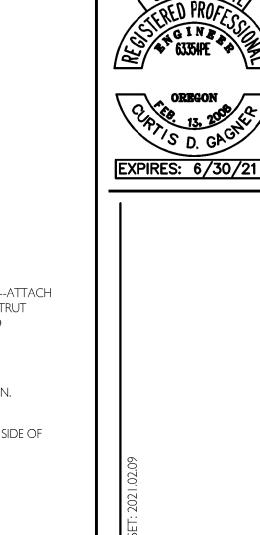








(PLAN AND SECTION)



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PORTLAND, GREGON 9722 T E L: 503.226.128 = A X : 5 0 3 . 2 2 6 . I 6 7 (W W W . C | D A | N C . C O

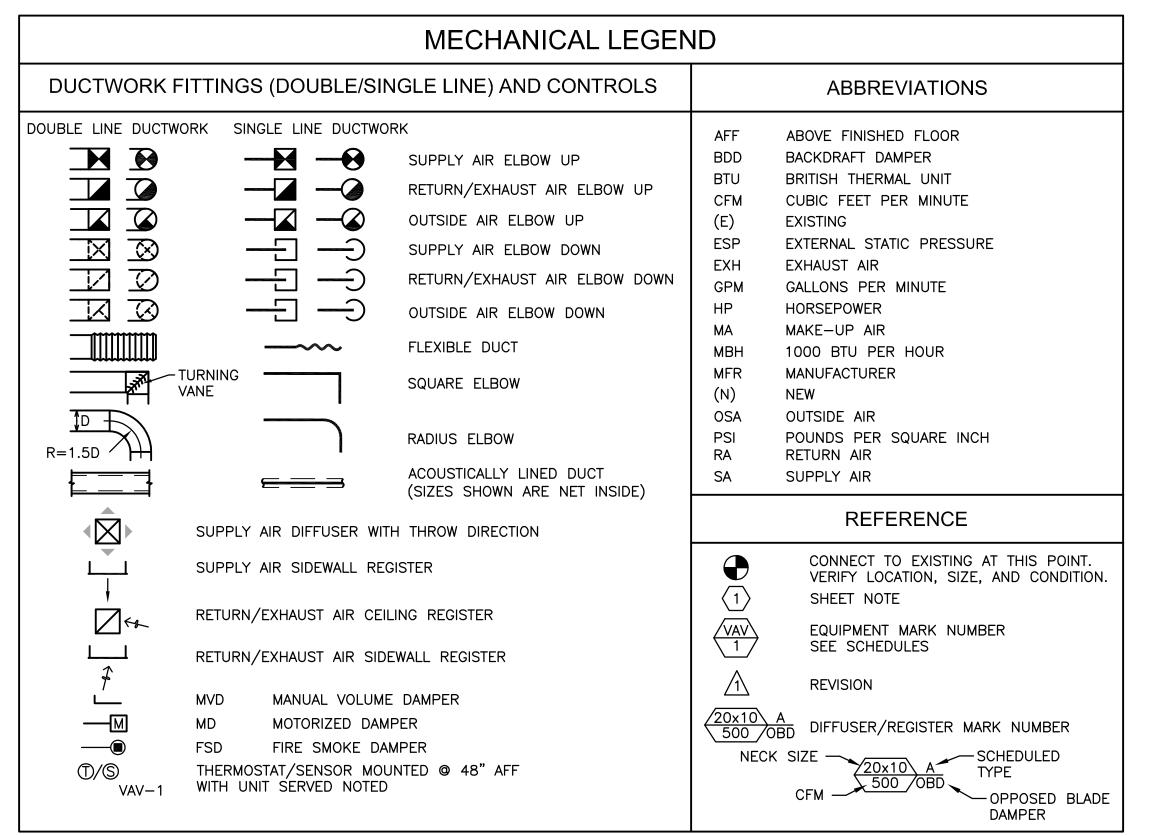
DETAILS

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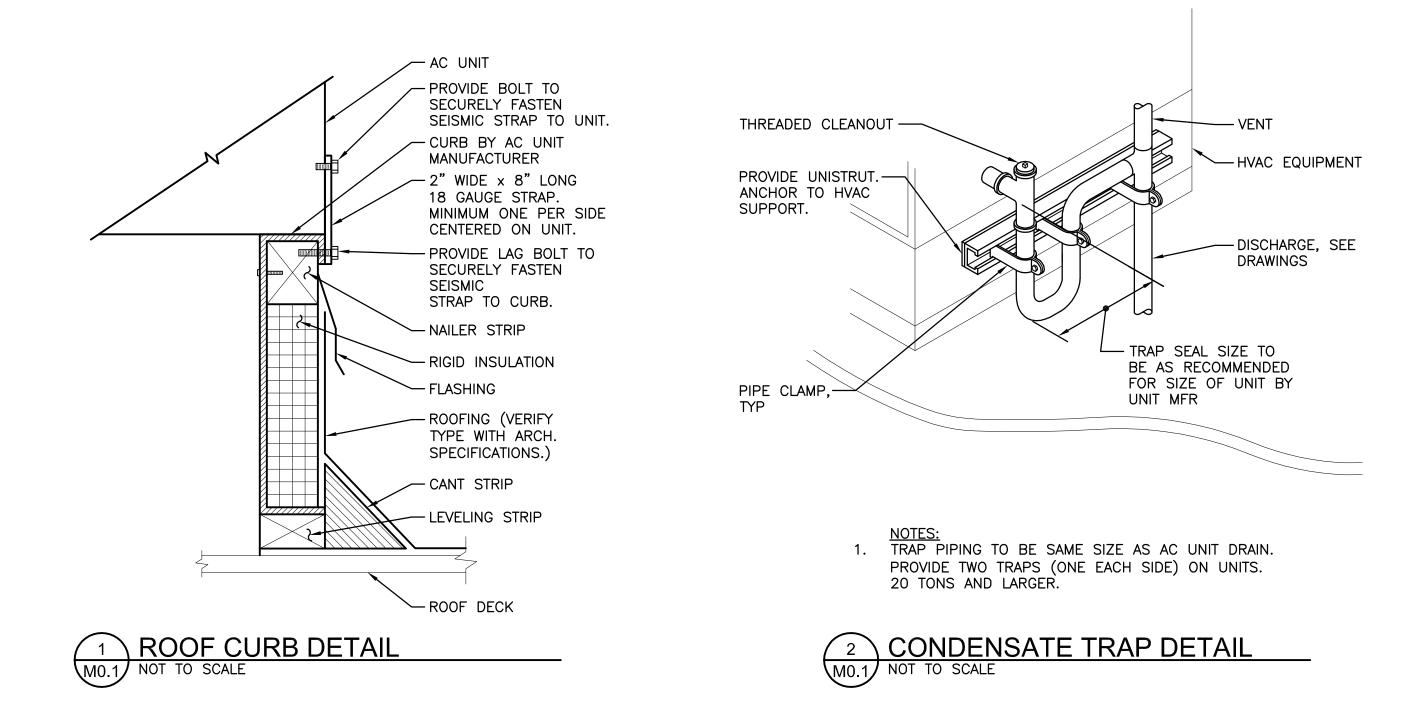
0010										
	1	Cond.	2019 OSM Default	Occ.	Actual	CFM	People	Area	Area	Req'd
System	Application	Area (SF)	Occ. Density	Load	No.of Occ.or	per Occ. or	or Fixture Outdoor	Outdoor Airflow	Outdoor Airflow	OSA (CFM)
			# per 1000 SF		No. of Fixtures	Fixture	Airflow (CFM)	(CFM/SF)	(CFM)	
RTU-1	Classroom	4965	35	174	100	5	500	0.12	596	1096
	Corridor	1585	0	0	0	0	0	0.06	95	95
	Storage	460	0	0	0	5	0	0.12	55	55
								OTAL REQ'D		1096
					TO	OTAL REQ'D		IN BREATH		1315
DTIL 0		0700	75	0.5				PROVIDED		1315
RIU-2	Classroom	2700 1125	35	95 0	60	5	300 0	0.12 0.06	324 68	624 68
	Media Center	800	25	20	20	10	200	0.00	96	296
	Faculty	1285	100	129	64	7.5	482	0.12	77	559
	T doubty	1200	100	123	01	7.0	l	DTAL REQ'D		1546
					TO	OTAL REQ'D		IN BREATH		1856
						JINE REGIS		. PROVIDED		1860
RTU-3	Classroom (9+)	2010	35	70	40	5	200	0.12	241	441
	Storage	200	0	0	0	5	0	0.12	24	24
	Corridor	880	0	0	0	0	0	0.06	53	53
							TC	TAL REQ'D	OSA CFM	441
RTU-3 Cic St. St. St. Co. St. St. St. St. St. St. St. St. St. St					TO	OTAL REQ'D	OSA CFM	IN BREATH	IING ZONE	529
							TOTAL	PROVIDED	OSA CFM	530
RTU-4	Corridor	1220	0	0	0	5	0	0.06	73	73
	Classroom (9+)	3215	35	113	80	5	400	0.12	386	786
	Office	630	5	3	5	5	25	0.06	38	63
	Locker Room	465	_	_	_	_	_	_	_	0
								OTAL REQ'D		922
					TO	OTAL REQ'C	OSA CFM	IN BREATH	HING ZONE	1106
						I	I	PROVIDED		1110
RTU-5	Gym	4485	25	112	20	10		0.18	807	1007
								OTAL REQ'D		1007
	TU-5 Gym 4485 25 112 20 10 200 0 TOTAL TOTAL REQ'D OSA CFM IN 1 TOTAL PRI TU-6 Science Classroom 980 25 25 20 10 200 0			1209						
DTIL 0	0 : 0		- 05	0.5		10	ı	ı		1210
RTU-6	Science Classroom	980	25	25	20	10		0.18	176	376
						OTAL DEG'S		OTAL REQ'D		376
					10	JIAL REQ'L				452
DTII 7	Science Classroom	980	25	25	20	10	200	0.18	176	455 376
KIU-/	Science Classroom	960	25	25	20	10		TAL REQ'D		376 376
					TO	TAL REO'D		IN BREATH		452
						JIAL NEW D		. PROVIDED		455
RTU-8	Science Classroom	980	25	25	20	10	200	0.18	176	376
								TAL REQ'D		376
					TO	OTAL REQ'D	OSA CFM	IN BREATH	HING ZONE	452
							TOTAL	PROVIDED	OSA CFM	455
RTU-9	Science Classroom	1110	25	28	25	10	250	0.18	200	450
RTU-1 Cic Co Std Co Me Fair Co							TC	TAL REQ'D	OSA CFM	450
					TO	OTAL REQ'D	OSA CFM	IN BREATH	IING ZONE	540
							TOTAL	PROVIDED	OSA CFM	540
RTU-10	Corridor	1340	25	34	20	10	200	0.18	241	441
	Break Room	210	100	21	11	7.5	79	0.06	13	91
	Storage	70	0	0	0	5	0	0.12	8	8
	Restrooms	525	0	0	0	0	0	0	0	0
			 			· ·		OTAL REQ'D		541
					TC	JIAL REQ'D		IN BREATH		649
DTU 44	Cataman Olym	4000		05	05	4.0	I	. PROVIDED		650
K1U-11	Science Classroom	1000	25	25	25	10	250	O.18 OTAL REQ'D	180	430 430
			+		т/			IN BREATH		516
			+			SIME NEW L		. PROVIDED		520
RTU-12	Science Classroom	980	25	25	20	10	200	0.18	176	376
	25.555 5.655.6511							TAL REQ'D		376
					ТС	OTAL REQ'D		IN BREATH		452
								PROVIDED		455
	Science Classroom	980	25	25	20	10	200	0.18	176	376
RTU-13						· ·		TAL REQ'D		376
RTU-13		1		t	1			·		
RTU-13					T0	DTAL REQ'D	OSA CFM	IN BREATH	HING ZONE	452
RTU-13					TO	DTAL REQ'D		IN BREATH PROVIDED		452 455
	Science Classroom	980	25	25	20	OTAL REQ'D				
	Science Classroom	980	25	25		ı	TOTAL 200	PROVIDED	OSA CFM 176	455

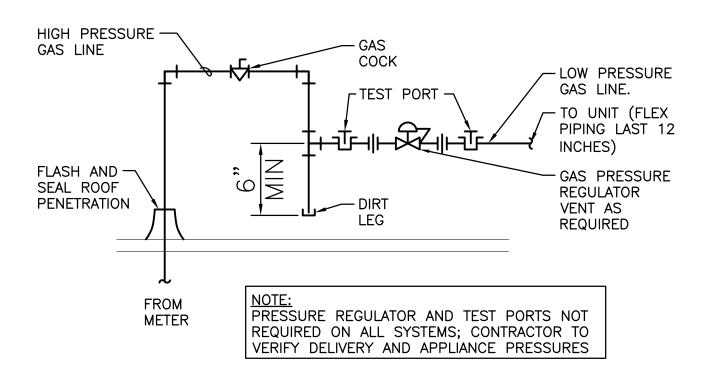
GENERAL NOTES

- A. MECHANICAL SHEETS TO INCLUDE DISCPLINE—SPECIFIC INFORMATION FOR THE BASE BID, WITH A BID ALTERNATE AS NOTED. SEE ARCHITECTURAL AND ELECTRICAL SHEETS FOR DISCIPLINE—SPECIFIC DETAILS
- B. BASE BID: EXISTING A/B BUILDING RTUS 1 THROUGH 4 AND ASSOCIATED ACCESSORIES AND EQUIPMENT TO REMAIN. ANY ASSOCIATED EQUIPMENT WITH RTUS 1 THROUGH 4 IS ONLY TO BE DISCONNECTED AS REQUIRED FOR INSTALLATION OF ROOF WORK. REMOVE BUILDING A/B EXISTING RTU 5, BUILDING M EXISTING RTUS 6 THROUGH 14, AND THEIR EXISTING CURBS. INSTALL NEW CURBS AS REQUIRED TO MEET NEW ROOF MEMBRANE MANUFACTURER REQUIREMENTS. INSTALL AND INTEGRATE NEW ROOFING AND FLASHING INTO AND AROUND EXISTING CONDITIONS, INCLUDING NOT SHOWN ROOFTOP EQUIPMENT, AND RTUS 1 THROUGH 4 TO REMAIN. REINSTALL ANY DISCONNECTED EQUIPMENT AND CONNECT TO EXISTING BUILDING SYSTEMS, EXISTING RTU, CURB, AND SYSTEM COMPONENTS AS CURRENTLY INSTALLED.
- C. ALTERNATE: REMOVE AND REPLACE EXISTING A/B BUILDING RTUS 1 THROUGH 4, CURBS, AND SYSTEM COMPONENTS AS INDICATED ON MECHANICAL AND ELECTRICAL DRAWINGS. INSTALL NEW INSULATED MECHANICAL CURB AND SECURE TO ROOF STRUCTURE PER STRUCTURAL DRAWINGS. INSTALL AND INTEGRATED NEW ROOF MEMBRANE SYSTEM AND FLASHING COMPONENTS INTO NEW ROOF CURB ASSEMBLY. INSTALL NEW RTU EQUIPMENT AND CONNECT TO EXISTING BUILDING SYSTEMS PER MECHANICAL AND ELECTRICAL DRAWINGS.
- D. SEE SPECIFICATIONS FOR REQUIREMENTS ON INSTALLING A BUTTON TO SHUT OFF BUILDING HVAC SYSTEM.

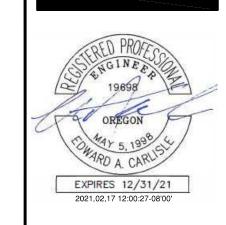


NOTE: NOT ALL SYMBOLS OR ABBREVIATIONS CONTAINED IN THIS LEGEND WILL APPEAR ON DRAWINGS.





3 GAS CONNECTION DETAIL (THROUGH ROOF)
M0.1 NOT TO SCALE



D SET: 2021.02.09

ENGINEERING, INC.
"Engineering Integrated Solutions"
9615 S.W. Allen Blvd., Suite 107
Beaverton, Oregon 97005
Phone: (503) 726-3325
Fax: (503) 726-3326
E-mail: rweng@rweng.com
Project No.: 382.121.001
Contact: W. SCHLOTFEDLT



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CHOOL OF BEAVERTO

17770 SW BLANTON S BEAVERTON, OREGON

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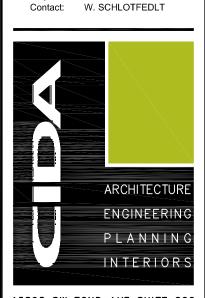
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BSD - IN

MECHANICAL LEGEND, SCHEDULES, DETAIL

JOB NO. 20Y105.01

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MECHANICAL SCHEDULES

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MARK NUMBER	RTU 1	RTU 2	RTU 3	RTU 4	RTU 5	RTU 6	RTU 7	RTU 8	RTU 9	RTU 10	RTU 11	RTU 12	RTU 13	RTU 14
SYSTEM	BUILDING A	BUILDING A	BUILDING A	BUILDING A	BLDG B GYM	BUILDING M	BUILDING M							
TYPE	GAS/DX	GAS/DX	GAS/DX	GAS/DX	GAS/DX	GAS/DX	GAS/DX	GAS/DX	GAS/DX	GAS/DX	GAS/DX	GAS/DX	GAS/DX	GAS/DX
FAN SECTION	•	•	•											
AIRFLOW (CFM)	7000	7000	2650	7000	7000	1200	1200	1200	1200	1400	1200	1200	1200	1200
MIN OSA (CFM)	1315	1860	530	1110	1210	455	455	455	540	650	520	455	455	455
E.S.P. ('H20)	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.55	0.5	0.5	0.5	0.5
MOTOR (HP)	5	5	2	5	5	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
FAN (RPM)	1170	1170	1760	1170	965					_				
DISCHARGE DIRECTION	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL	VERTICAL
HEATING		•												
FUEL TYPE	NAT. GAS	NAT. GAS	NAT. GAS	NAT. GAS	NAT. GAS	NAT. GAS	NAT. GAS	NAT. GAS	NAT. GAS	NAT. GAS	NAT. GAS	NAT. GAS	NAT. GAS	NAT. GAS
INPUT (MBH)	405	270	210	405	540	100	100	100	100	100	100	100	100	100
OUTPUT (MBH)	328	219	168	328	432	80	80	80	80	80	80	80	80	80
MIN. EFF. (AFUE %)	80	80	80	80	80	80	80	80	80	80	80	80	80	80
COOLING														
ENT AIR (DB/WB °F)	80.1/63.6	80.1/63.6	86.3/69.8	80.1/63.6	N/A	80/67	80/67	80/67	80/67	80/67	80/67	80/67	80/67	80/67
SENSIBLE (MBH)	195.3	195.3	77.4	216.9	N/A	27.2	27.2	27.2	27.2	30.9	27.2	27.2	27.2	27.2
TOTAL (MBH)	230	230	100.1	270.5	N/A	37.3	37.3	37.3	37.3	41.8	37.3	37.3	37.3	37.3
MIN. EFF. (EER)	12	12	12	11.3	N/A	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
CONDENSER AIR (°F)	95	95	95	95	N/A	95	95	95	95	95	95	95	95	95
CONTROLLED BY	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC	DDC
RELIEF AIR	BAROMETRIC	BAROMETRIC	BAROMETRIC	BAROMETRIC	BAROMETRIC	BAROMETRIC	BAROMETRIC	BAROMETRIC	BAROMETRIC	BAROMETRIC	BAROMETRIC	BAROMETRIC	BAROMETRIC	BAROMETRIC
ECONOMIZER TYPE	DRY BULB	DRY BULB	DRY BULB	DRY BULB	DRY BULB	DRY BULB	DRY BULB	DRY BULB	DRY BULB	DRY BULB	DRY BULB	DRY BULB	DRY BULB	DRY BULB
SMOKE DETECTOR	YES	YES	YES	YES	YES	NO	NO							
PRE-MFG'D ROOF CURB	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
ELECTRICAL (V-PH)	208–3	208-3	208-3	208-3	208-3	230-1	230-1	230-1	230-1	230-1	230-1	230-1	230-1	230-1
DESIGN WEIGHT (LBS)	2946	2921	1310	3005	1648	383	383	383	383	402	383	383	383	383
NOTES	1., 2.	1., 2.	1., 2.	1., 2.	2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
MANUFACTURER/ MODEL	AAON/ RN02080BA0228	AAON/ 4 RN02080BA0224	AAON/ RN0880CB012L4	AAON/ RN02580BA02284	AAON/ RN0208003C4	GUARDIAN/ PCG4A361002X4	GUARDIAN/ PCG4A361002X4	GUARDIAN/ PCG4A361002X4	GUARDIAN/ PCG4A361002X4	GUARDIAN/ PCG4A421002X4	GUARDIAN/ PCG4A361002X4	GUARDIAN/ PCG4A361002X4	GUARDIAN/ PCG4A361002X4	GUARDIAN/ PCG4A361002

GAS CONNECTION SCHEDULE

LOCATION

BUILDING M ROOF

PIPE SIZING BASED ON 2 PSI DELIVERY PER NFPA 54, TABLE 6.2(e), 685' TOTAL DEVELOPED LENGTH

TOTAL

<u> MBH</u>

160

334

598

1,230

1,840 3,540 **І**мвн

100

100

100

100

100

100

100

100

100

900

PIPE

1/2"

1/2"

1/2"

1-1/4"

EQUIPMENT

ROOFTOP UNIT

ROOFTOP UNIT

ROOFTOP UNIT

ROOFTOP UNIT

RTU-10 ROOFTOP UNIT

RTU-11 ROOFTOP UNIT

RTU-12 ROOFTOP UNIT

RTU-13 ROOFTOP UNIT

RTU-14 ROOFTOP UNIT

1/2"

3/4"

1-1/4"

1-1/2"

<u>PIPE SIZE</u>

RTU-6

RTU-7

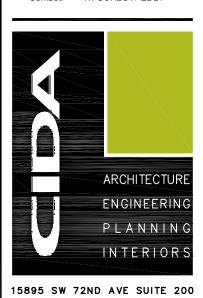
RTU-8

RTU-9

- **GENERAL NOTES** A. MECHANICAL SHEETS TO INCLUDE DISCPLINE-SPECIFIC INFORMATION FOR THE BASE BID, WITH A BID ALTERNATE AS NOTED. SEE ARCHITECTURAL AND ELECTRICAL SHEETS FOR DISCIPLINE-SPECIFIC
- B. <u>BASE</u> <u>BID</u>: EXISTING A/B BUILDING RTUS 1 THROUGH 4 AND ASSOCIATED ACCESSORIES AND EQUIPMENT TO REMAIN. ANY ASSOCIATED EQUIPMENT WITH RTUS 1 THROUGH 4 IS ONLY TO BE DISCONNECTED AS REQUIRED FOR INSTALLATION OF ROOF WORK. REMOVE BUILDING A/B EXISTING RTU 5, BUILDING M EXISTING RTUS 6 THROUGH 14, AND THEIR EXISTING CURBS. INSTALL NEW CURBS AS REQUIRED TO MEET NEW ROOF MEMBRANE MANUFACTURER REQUIREMENTS. INSTALL AND INTEGRATE NEW ROOFING AND FLASHING INTO AND AROUND EXISTING CONDITIONS, INCLUDING NOT SHOWN ROOFTOP EQUIPMENT, AND RTUS 1 THROUGH 4 TO REMAIN. REINSTALL ANY DISCONNECTED EQUIPMENT AND CONNECT TO EXISTING BUILDING SYSTEMS, EXISTING RTU, CURB, AND SYSTEM COMPONENTS AS CURRENTLY INSTALLED.
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- D. SEE SPECIFICATIONS FOR REQUIREMENTS ON INSTALLING A BUTTON TO SHUT OFF BUILDING HVAC SYSTEM.

PIPE	
1"	
3/4"	
3/4"	
1"	
1"	
1-1/2"	
٠,	EVELOPED LENGT

TAG	EQUIPMENT	LOCATION	MBH	PIPE
RTU-1	ROOFTOP UNIT	BUILDING A/B ROOF	405	1"
RTU-2	ROOFTOP UNIT	BUILDING A/B ROOF	270	3/4"
RTU-3	ROOFTOP UNIT	BUILDING A/B ROOF	210	3/4"
RTU-4	ROOFTOP UNIT	BUILDING A/B ROOF	405	1"
RTU-5	ROOFTOP UNIT	BUILDING A/B ROOF	540	1"
		TOTAL	1,830	1-1/2"
	PIPE SIZE	MBH		
	1/2"	192		
	3/4"	401		
	1"	717		
	1-1/4"	1,470		
	1-1/2"	2,210		
	2"	4,250		



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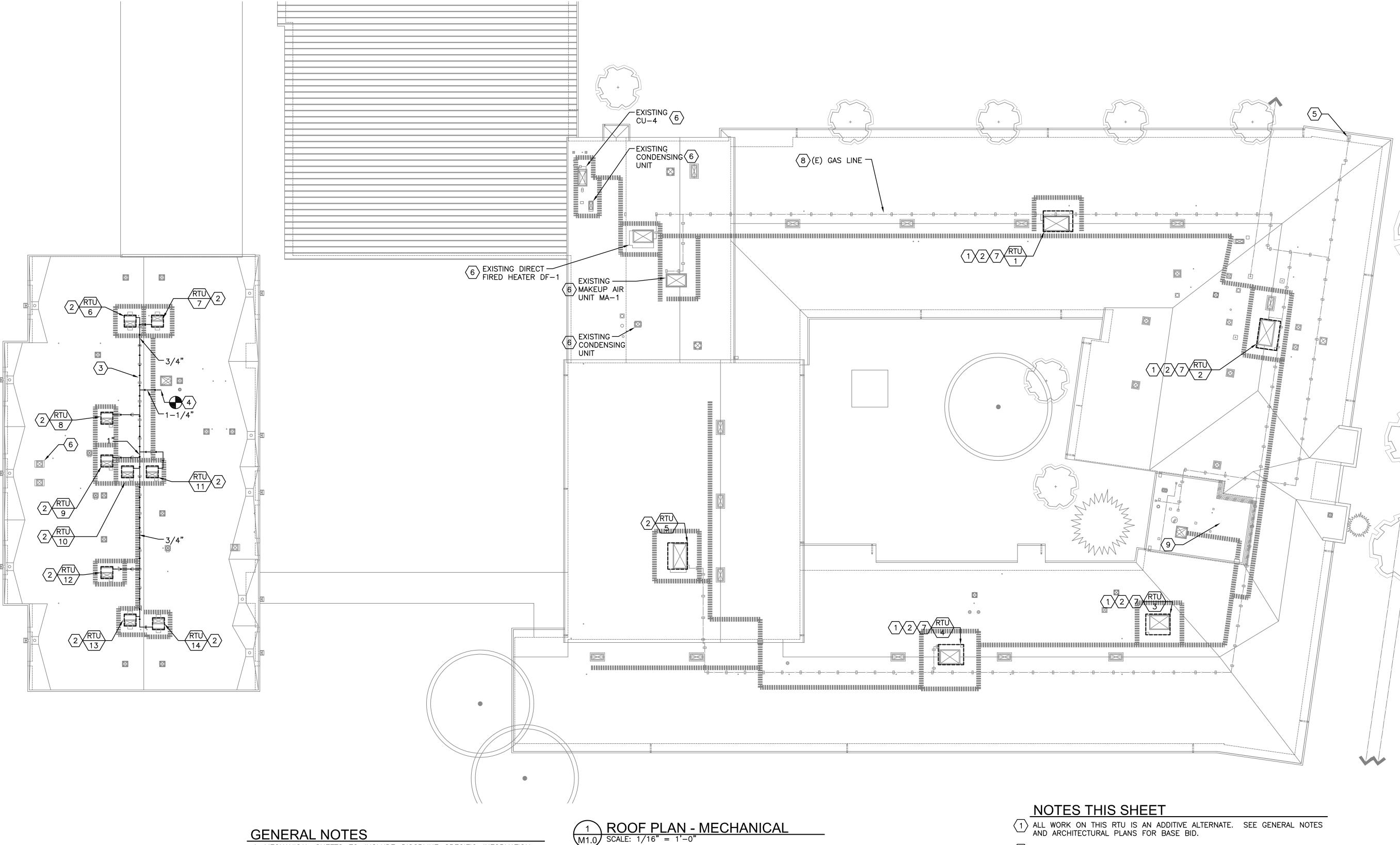
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ROOF PLAN -MECHANICAL

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A. MECHANICAL SHEETS TO INCLUDE DISCPLINE-SPECIFIC INFORMATION FOR THE BASE BID, WITH A BID ALTERNATE AS NOTED. SEE ARCHITECTURAL AND ELECTRICAL SHEETS FOR DISCIPLINE-SPECIFIC DETAILS.

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D. SEE SPECIFICATIONS FOR REQUIREMENTS ON INSTALLING A BUTTON TO SHUT OFF BUILDING HVAC SYSTEM.

- 2 PROVIDE NEW UNIT CURB. CONNECT UNIT TO EXISTING DUCTWORK. SEE DETAILS 1/MO.1, 2/MO.1, 3/MO.1.
- (3) NEW GAS PIPING. TYPICAL.
- 4 CONNECT TO EXISTING GAS PIPING IN STORAGE ROOM M53.
- 5 EXISTING GAS PIPING AT ROOF PENETRATION. RECONNECT ANY ROOFTOP GAS PIPING REMOVED PER BASE BID TO EXISTING. SEE GENERAL NOTES.
- REMOVE AND SECURELY STORE ALL EXISTING MECHANICAL EQUIPMENT AND FLASHING IN BASE BID TO INSTALL NEW MEMBRANE ROOFING PER MANUFACTURER SPECIFICATIONS. REMOVE AND INSTALL NEW CURBS WHERE EXISTING CURBS DO NOT CONFORM TO MEMBRANE MANUFACTURER REQUIREMENTS. REINSTALL AND CONNECT EXISTING EQUIPMENT PER STRUCTURAL, MECHANICAL, AND ELECTRICAL REQUIREMENTS. PROVIDE NEW FLASHING AT ALL LOCATIONS. FIELD VERIFY ALL EXISTING CONFIGURATIONS AND DIMENSIONS. SEE ARCHITECTURAL SHEETS AD1.2 AND A1.2 FOR ADDITIONAL INFORMATION. REFER TO CURB DETAILS ON SHEET A3.6 FOR TYPICAL CONDITIONS.
- CONNECT TO EXISTING GAS PIPING PER GAS CONNECTION SCHEDULE ON SHEFT MO 2 FOR BASE RID REPLACE CONDENSATE TRAP ON EXISTING UNITS OF THE PROPERTY OF THE PROPERT SHEET MO.2. FOR BASE BID, REPLACE CONDENSATE TRAP ON EXISTING UNIT WHEN REINSTALLING. FOR ALTERNATE BID, SEE GENERAL NOTES.
- REMOVE EXISTING GAS PIPING FOR STORAGE AND REINSTALLATION AS PER BASE OR ALTERNATE BID. SEE GENERAL NOTES. REPLACE STANCHUIONS BASE OR ALTERNATE BID. SEE GENERAL NOTES. REPLACE STANCHUIONS WHEN REINSTALLING.
- 9 NEW LOUVER TO REPLACE EXISTING. SEE ARCHITECTURAL SHEETS FOR NEW LOUVER EXACT LOCATION AND SPECIFICATIONS. FIELD VERIFY DIMENSIONS PRIOR TO ORDERING. REBALANCE NEW LOUVER TO EXISTING AIRFLOW.

MOD

MS

FCU

FDN

FAN COIL UNIT

FOUNDATION

MOTOR OPERATED DISCONNECT SWITCH

MOTOR STARTER

SUSP

SUSPENDED

SOLENOID VALVE

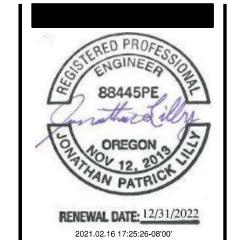
DRAWING NOTE

134

ELECTRICAL CIRCUIT IDENTIFICATION

MULTIPLE ELECTRICAL CIRCUITS, SEPARATE CONDUITS

MULTIPLE ELECTRICAL CIRCUITS, COMMON CONDUIT (SIZE SHOWN)



9615 S.W. Allen Blvd., Suite 107 Beaverton, Oregon 97005 Phone: (503) 726-3346 Fax: (503) 726-3326 E-mail: rweng@rweng.cor Project No.: 382.121.001

Contact: MICHAEL FOSTER



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AND CONTROL ELEMENTS (FLOAT SWITCHES, ETC.)

ARE DERIVED FROM ANSI/ISA-S5.1, AND ARE

NOT NECESSARILY LISTED HERE.

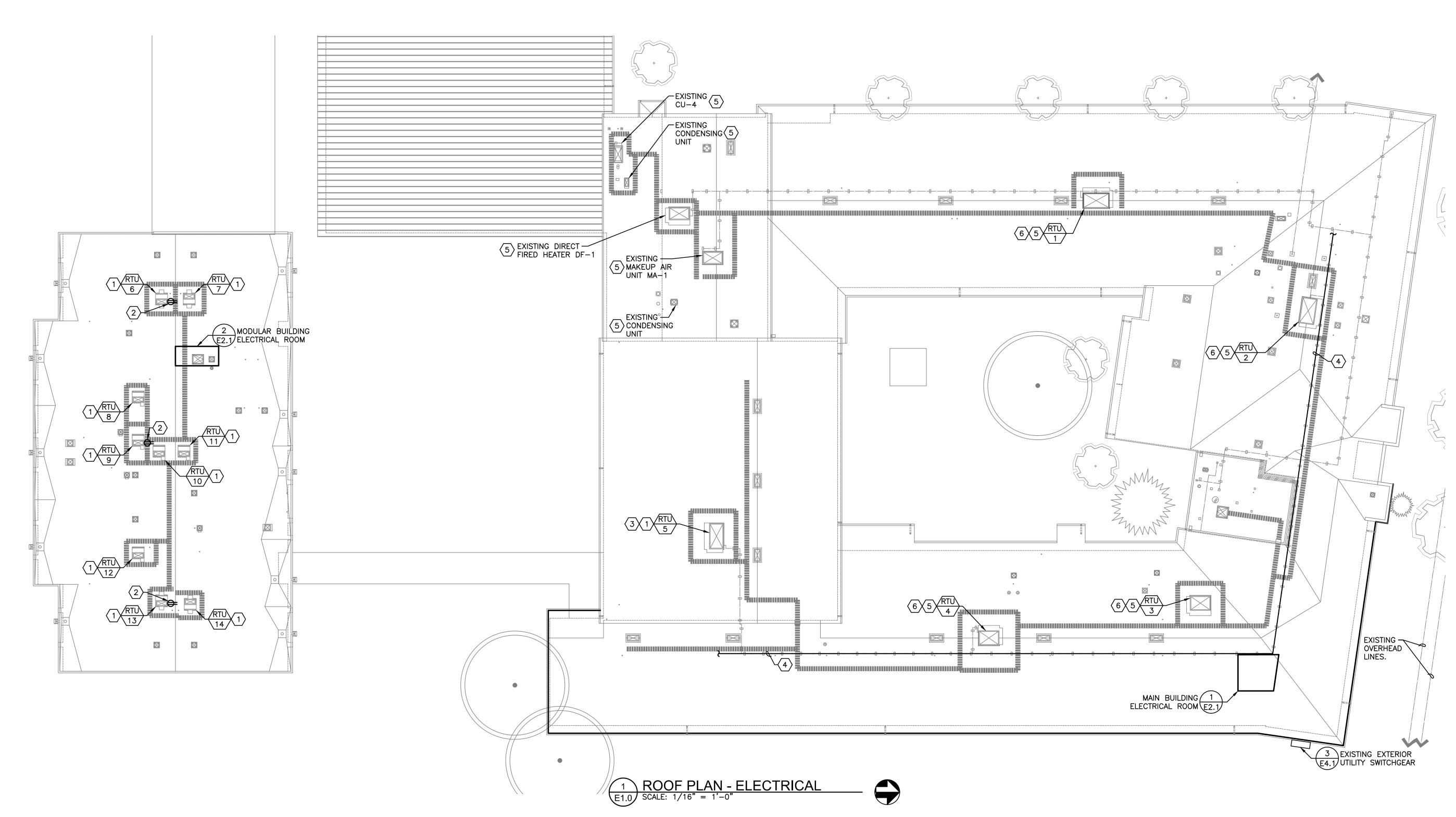
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ELECTRICAL COVER SHEET

S $\mathbf{\Omega}$

E0.1 JOB NO. 20Y105.01

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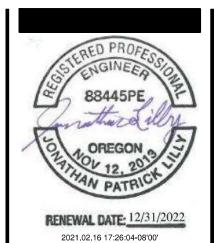


NOTES THIS SHEET

- RECONNECT NEW EQUIPMENT TO EXISTING CIRCUIT. FIELD VERIFY EXISTING CONDUIT RUN AND ALERT ENGINEER OF ANY DAMAGE NOTICED IN THE FIELD. IF THERE ARE ADDITIONAL UNUSED EXISTING CONDUCTORS, ABANDON IN PLACE. PROVIDE NAME PLATE STATING UNIT NAME AND WHERE IT IS FED FROM.
- FIELD COORDINATE LOCATION OF ROOFTOP SERVICE GFCI RECEPTACLE IN WEATHER-PROOF ENCLOSURE. LOCATE RECEPTACLES TO BE WITHIN 25-FEET OF ALL ROOFTOP EQUIPMENT PER NEC REQUIREMENTS. RE-USE ONE OF THE EXISTING CONDUCTORS THAT IS NOT BEING USED FOR THE RTU AS A NEUTRAL IF THEY MEET THE REQUIREMENTS OF NEC 200.6. IF NOT, A NEW NEUTRAL WILL NEED TO BE RAN FROM THE SAME PANEL AS THE UNIT'S POWER FEEDER. VERIFY EXISTING CONDUIT HAS CAPACITY PER NEC FILL CALCULATIONS. CONNECT RECEPTACLE TO LINE SIDE OF UNIT DISCONNECT, ALERT ENGINEER OF ANY DISCREPANCIES.
- VERIFY THIS UNIT HAS AN INTEGRAL CONVENIENCE RECEPTACLE. IF NOT, AN EXTERNAL SERVICE GFCI RECEPTACLE IN WEATHER-PROOF ENCLOSURE WILL NEED TO BE SUPPLIED. RUN A #12 NEUTRAL FROM THE SAME PANEL AS THE UNIT'S POWER FEEDER AND CONNECT RECEPTACLE TO THE LINE SIDE OF UNIT DISCONNECT, VERIFY EXISTING CONDUIT HAS CAPACITY PER NEC FILL CALCULATIONS. ALERT ENGINEER OF ANY DISCREPANCIES.
- 4 APPROXIMATE LOCATION OF EXISTING EXPOSED CABLE ON ROOF, FIELD VERIFY EXACT LOCATION AND CONNECTION POINTS. RELOCATE CABLE TO ATTIC SPACE, FIELD COORDINATE ROUTING. COORDINATE SPECIFIC REQUIREMENTS WITH SCHOOL DISTRICT. COORDINATE WITH ENGINEER AS NECESSARY.
- RECONNECT EXISTING EQUIPMENT TO EXISTING CIRCUIT AFTER ROOF REPLACEMENT. FIELD VERIFY EXISTING CONDUIT RUN AND ALERT ENGINEER OF ANY DAMAGE NOTICED IN THE FIELD. PROVIDE NAME PLATE STATING UNIT NAME AND WHERE IT IS FED FROM.
- ALTERNATE NO. 1. REPLACE EXISTING EQUIPMENT WITH NEW UNITS, REFER TO EQUIPMENT CONNECTION SCHEDULE ON SHEET E4.2 FOR MORE INFORMATION. RECONNECT NEW EQUIPMENT TO EXISTING CIRCUIT. FIELD VERIFY EXISTING CONDUIT RUN AND ALERT ENGINEER OF ANY DAMAGE NOTICED IN THE FIELD. SEE NOTE 3.

GENERAL NOTES

- A. SEE SHEET EO.1 FOR ELECTRICAL SYMBOL LEGEND.
- B. SEE SHEET E4.1 FOR ELECTRICAL ONE-LINE DIAGRAM.
- C. SEE SHEET E4.2 FOR FEEDER, DISCONNECT, AND CIRCUIT INFORMATION ON EQUIPMENT CONNECTION SCHEDULE.



ATE) SFT: 2021.02.09

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OL OF BEAVERTON
STREET

IONAL SCHOOL

SW BLANTON STR

RTON, OREGON 9

97078

17770 SW BL/ BEAVERTON, O

SITE PLAN -

E1.0JOB NO. 20Y105.01

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ELECTRICAL

2 ENLARGED FLOOR PLAN - ELECTRICAL E2.1 SCALE: 1" = 1'-0"



GENERAL NOTES

A. SEE EO.1 FOR SYMBOL LEGEND.

B. SEE E4.1 FOR ONE-LINE DIAGRAM.

C. SEE E4.2 FOR PANEL SCHEDULES.

RENEWAL DATE 12/31/2022 2021.02.16 17:26:35-08'00'

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F A X: 5 0 3 . 2 2 6 . 1 6 7 0 W W W . C I D A I N C . C O M

STREET 97078

SCHOOL OF BEAVERTON

BLANTON 1, OREGON

17770 SW B BEAVERTON,

- INTERNATIONAL

ENLARGED FLOOR PLANS — ELECTRICAL

BSD

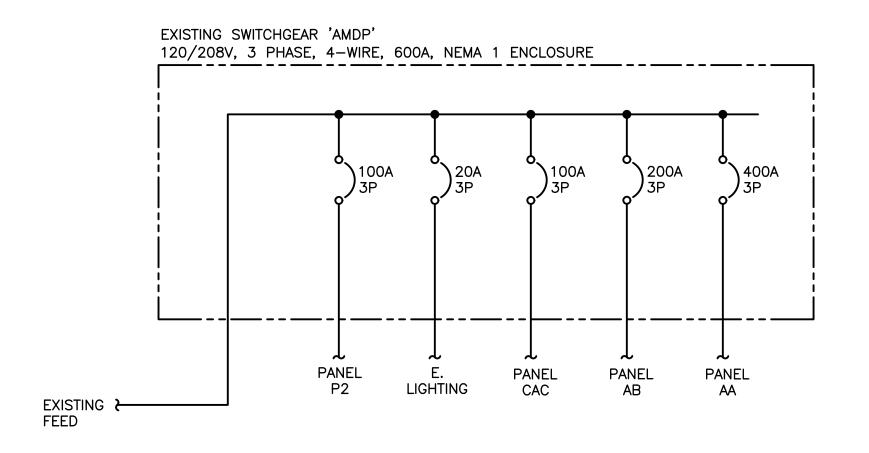
E2.1

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A. ALL EQUIPMENT AND CIRCUITS ARE EXISTING UNLESS OTHERWISE NOTED.

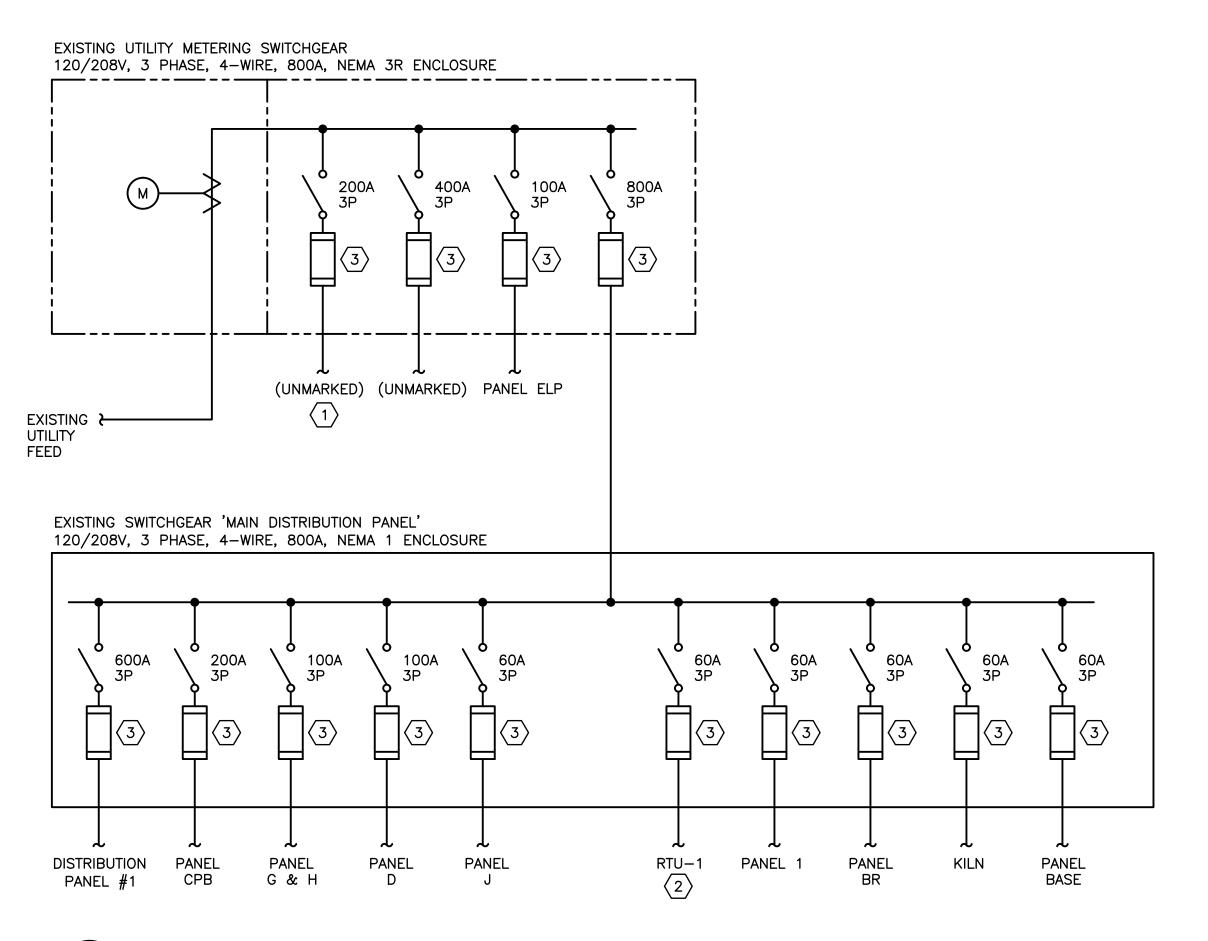
NOTES THIS SHEET

- CIRCUIT IS UNMARKED BUT CONFIRMED TO FEED RTU-4. CONTRACTOR TO INSTALL NAMEPLATE THAT READS 'RTU-4'. IF BID ALTERNATE IS CHOSEN, THIS CIRCUIT WILL RE-FEED THE NEW RTU-4.
- THE EXISTING TAG FOR THIS CIRCUIT READS RTU-3, UPDATE TAGS IN ALL APPLICABLE LOCATIONS TO READ RTU-1 PER THE SITE PLAN. IF BID ALTERNATE IS CHOSEN, THIS FUSED SWITCH WILL BE REPLACED WITH A NEW 100A SWITCH WITH A 70A FUSE FOR THE NEW RTU-1.
- 3 FUSE IS EXISTING, SIZE HAS NOT BEEN VERIFIED.



PARTIAL EXISTING ONE-LINE DIAGRAM - MODULAR BUILDING

NOT TO SCALE



— EXISTING PGE

UTILITY PULL SECTION

METER #31040419

1 PARTIAL EXISTING ONE-LINE DIAGRAM - MAIN BUILDING

SPACE

200A FUSED SWITCH (UNMARKED)

400A FUSED SWITCH (UNMARKED)

100A FUSED SWITCH

'PANEL ELP'

800A FUSED SWITCH

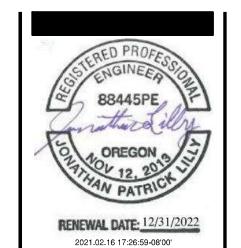
SPACE

600A FUSED SWITCH 'DISTRIBUTION PANEL #1' 200A FUSED SWITCH 'PANEL CB' 100A FUSED SWITCH 100A FUSED SWITCH 'PANEL D' 'PANEL G & H' 60A FUSED SWITCH 60A FUSED SWITCH 'PANEL J' 'RTU-1' 60A FUSED SWITCH 60A FUSED SWITCH 'PANEL BR' 'PANEL I' 60A FUSED SWITCH 60A FUSED SWITCH 'PANEL BASE' 'KILN' SPACE

4 EXISTING SWICHGEAR 'MAIN DISTRIBUTION PANEL' ELEVATION
E4.1 NOT TO SCALE

SPACE 20A BREAKER 100A BREAKER 'PANEL P2' 'E. LIGHTING' 30A BREAKER 100A BREAKER SPARE 'PANEL CAC' SPACE 200A BREAKER 'PANEL AB' 400A BREAKER 'PANEL AA'

5 EXISTING SWICHGEAR 'AMDP' ELEVATION
E4.1 NOT TO SCALE



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> **BEAVERTON** 97078 **9F** STREE 70

LANTON B

SCHO(INTERNATIONAL

17770 SW B BEAVERTON,

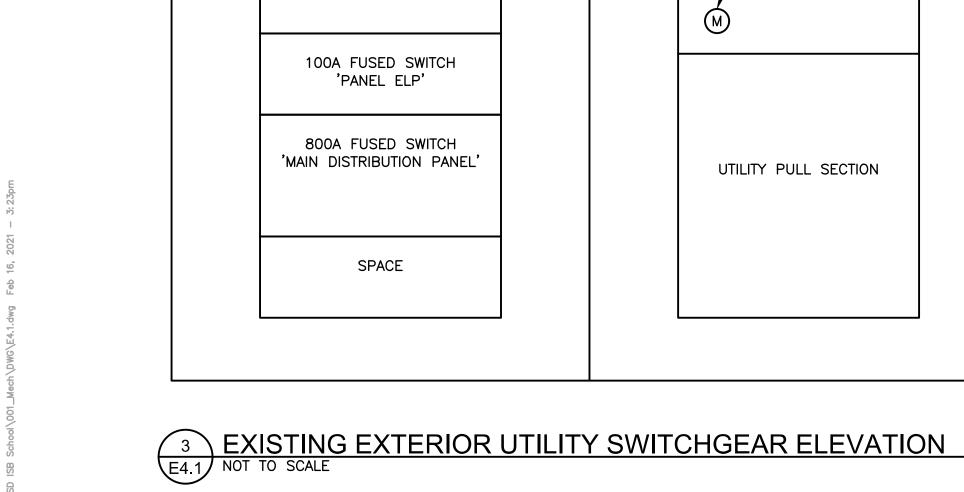
ELECTRICAL ONE-LINE

SD

 $\mathbf{\Omega}$

E4.1 JOB NO. 20Y105.01

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ANEL: (EXISTING) '1998 – A'	BUS:	400 A	1	DATE:	02/01/21		VOLTAGE	: 120 / 208 VOLTS, 3 PHASE, 4 WIRE	
EEDER: SEE ONE-LINE DIAGRAM	MAIN BRKR:	MLO					MOUNTING	: SURFACE	
CKT	CKT BKR	LOAD	LOAD		LOAD	LOAD	CKT BKR		CKT
NO. CIRCUIT DESCRIPTION	AMPS/POLE	TYPE	VA	PHASE	VA	TYPE	AMPS/POLE	CIRCUIT DESCRIPTION	NO.
1 ART CENTER RTU	70/3	М	7320	Α	2880	М	40/3	RTU-5 (NOTE 3.)	2
3 –	_	М	7320	В	2880	М	_	-	4
5 –	_	М	7320	С	2880	М	_	-	6
7 HOT WATER PUMP	20/3			Α			20/3	WATER HEATER PUMP	8
9 –	_			В			_	_	10
11 –	_			С			_	_	12
13 FDSC CIRCD	20/1			Α			20/1	VAV POWER	14
15 FDS CIRCG	20/1			В			20/1	_	16
17 ROOF TOP OUTLET	20/1			С			20/1	_	18
19 FSD CIRC. A	20/1			Α			20/1	HOT WATER CONTROL	20
21 FSD CIRC. B/E	20/1			В			20/3	LOCKER ROOM EXHAUST FAN	22
23 VAV POWER	20/1			С			_	_	24
25 –	20/1			Α			_	_	26
27 HVAC CONTROL/ROOF TOP OUTLET	20/1			В			20/1	LOCKER ROOM GFI'S	28
29 LOCKER ROOM LIGHTS	20/1			С			20/1	LOCKER ROOM RECEPTACLES	30
31 HAND DRYER - LOCKER ROOM - GIRLS	20/1			Α			20/1	HAND DRYER - LOCKER ROOM - BOYS	32
33 SPACE				В			20/1	SPARE	34
35 SPACE				С				SPACE	36
37 SPACE				Α				SPACE	38
39 SPACE				В				SPACE	40
41 SPACE				С				SPACE	42
43 RTU-2 (NOTE 1, 2.)	125/3	LM	12480	Α	12480	М	125/3	RTU-3 (NOTE 1, 2.)	44
45 –	_	LM	12480	В	12480	М	_	_	46
47 –	_	LM	12480	С	12480	М	_	-	48
		CONNECT	ED LOAD		NOTES	•••••			
LOAD PER PHASE (VA)		A=	35,160	VA		1. THIS B	REAKER IS LO	OCATED AT THE BASE OF THE PANEL AND	
		B=	35,160	VA		DOES I	NOT HAVE AN'	Y ASSIGNED CIRCUIT NUMBERS.	
		C=	35,160	VA	2. SHOWN LOADS ARE BASED ON EXISTING NAMEPLATE INFORMATION GATHERED IN THE FIELD.				
LOAD PER PHASE (AMPS)		A=	293.0	A				TO OR LESS THAN PREVIOUS EXISTING LOAD.	
, ,		B=	293.0						
		C=	293.0		4	4. THE EX	KISTING TAGS	FOR THESE UNITS ARE RTU-1 AND RTU-2.	
								GS TO RTU-2 AND RTU-3 PER SITE PLAN,	
	TOTAL LOAD (KVA)	105.5	KVA				IOR TO UPDATE.	
1		MPS	292.8			2/1/2		· -· ·· —·	

BUS:	400 A		DATE:	01/18/21		VOLTAGE	: 120 / 208 VOLTS, 3 PHASE, 4 WIRE	
MAIN BRKR:	MLO					MOUNTING	: SURFACE	
CKT BKR	LOAD	LOAD		LOAD	LOAD	CKT BKR		CI
AMPS/POLE	TYPE	VA	PHASE	VA	TYPE	AMPS/POLE	CIRCUIT DESCRIPTION	NO
50/2	М	3060	Α			50/2	SPARE (NOTE 1.)	
_	М	3060	В			_	_	
50/2	Н	3060	С			50/2	SPARE (NOTE 1.)	
_	Н	3060	Α			_	_	
50/2	М	3060	В			50/2	SPARE (NOTE 1.)	1
	м	3060	С			_		1
50/2	Н	3060	A			50/2	SPARE (NOTE 1.)	1
<u> </u>	Н	3060	В			_		1
50/2	м	3060	С			50/2	SPARE (NOTE 1.)	1
<u> </u>	М	3060	A			_	_	2
50/2	Н	3060	В			50/2	SPARE (NOTE 1.)	2
<u> </u>	Н	3060	С			_		2
50/2	М	3060	A			50/2	SPARE (NOTE 1.)	2
<u> </u>	М	3060	В			_	_	2
50/2	Н	3240	С			90/2	SPARE (NOTE 1.)	3
<u> </u>	Н	3240	Α			-	_	3
50/2	М	3060	В			20/2	BATH HEAT	3
_	М	3060	С			_	_	3
50/2			Α			20/1	FIRE AT VINCENT VAULT SUMP PUMP	3
_			В			20/2	OUTSIDE POLE LIGHTS	4
			С			_	-	4
	CONNECT	ED LOAD		NOTES	••••			
	A=	18,540	VA		1. MARK E	EXISTING BRE	AKER AS SPARE.	
	B=	18,360	VA					
	C=	18,540	VA		2. CONNEC	CT EXISTING	CIRCUIT TO NEW RTU UNIT, USE EXISTING	
					CONDU	CTORS. NEW	LOAD IS EQUAL TO OR LESS THAN EXISTING	
	A=	154.5	Α		LOAD.			
	B=		I					
	C=		I		3.			
TOTAL LOAD (KVA)	55 <i>4</i>	KVA					
•					4 /40 /6			
	MAIN BRKR: CKT BKR AMPS/POLE 50/2 50/2 50/2 50/2 50/2 50/2 50/2 50/2 50/2 50/2 50/2 50/2 50/2 50/2 50/2 50/2	MAIN BRKR: MLO CKT BKR LOAD AMPS/POLE TYPE 50/2 M - M 50/2 H - H 50/2 M - M 50/2 H - H 50/2 M - A 50/2 H - C CONNECT A= B= C= A= B=	MAIN BRKR: MLO CKT BKR LOAD LOAD AMPS/POLE TYPE VA 50/2 M 3060 - M 3060 50/2 H 3060 - H 3060 50/2 M 3060 - M 3060 50/2 H 3060 - M 3060 50/2 H 3060 - H 3060 50/2 H 3060 - H 3060 50/2 H 3060 - H 3060 50/2 M 3060 - H 3060 50/2 M 3060 - M 3060 50/2 H 3060 - H 3060 50/2 H 3060 - H 3060 50/2 H 3060 - H 3060 50/2 M 3060 - H 3060 50/2 M 3060 - M 3060 50/2 M 3060 - CONNECTED LOAD A= 18,540 A= 18,540 A= 154.5 B= 153.0 C= 154.5	MAIN BRKR: MLO CKT BKR LOAD LOAD AMPS/POLE TYPE VA PHASE 50/2 M 3060 B 50/2 H 3060 C - H 3060 C - H 3060 C 50/2 M 3060 B 50/2 M 3060 B - M 3060 C 50/2 H 3060 C 50/2 H 3060 C 50/2 H 3060 A - H 3060 B 50/2 M 3060 B 50/2 M 3060 C - H 3060 B 50/2 M 3060 C - M 3060 C - M 3060 B 50/2 H 3060 B 50/2 H 3060 B - H 3060 C 50/2 H 3060 B - H 3060 C 50/2 M 3060 B - H 3060 C 50/2 M 3060 B - H 3060 C 50/2 M 3060 B - C M 3060 B - C M 3060 B - C M 3060 C - H 3240 C - H 3240 A - D B - C CONNECTED LOAD A= 18,540 VA B= 18,360 VA C= 18,540 VA A= 154.5 A B= 153.0 A C= 154.5 A	MAIN BRKR: MLO CKT BKR LOAD LOAD LOAD AMPS/POLE TYPE VA PHASE VA 50/2 M 3060 A - M 3060 B 50/2 H 3060 C - H 3060 A 50/2 M 3060 B - M 3060 B - M 3060 B - M 3060 C 50/2 H 3060 A - H 3060 A - H 3060 A - H 3060 B 50/2 H 3060 A - H 3060 B 50/2 M 3060 C - M 3060 C - M 3060 B 50/2 M 3060 C - M 3060 B 50/2 H 3060 B - H 3060 B - H 3060 B - H 3060 C 50/2 H 3060 B - H 3060 C 50/2 M 3060 B - H 3060 C 50/2 M 3060 B - H 3060 C 50/2 M 3060 B - H 3060 C - H 3060 B - C CONNECTED LOAD A= 18,540 VA B= 18,360 VA C= 18,540 VA A= 154.5 A B= 153.0 A C= 154.5 A B= 153.0 A C= 154.5 A	MAIN BRKR: MLO CKT BKR LOAD LOAD LOAD LOAD LOAD AMPS/POLE TYPE VA PHASE VA TYPE 50/2 M 3060 A TYPE - M 3060 B 50/2 H 3060 C - H 3060 A S 50/2 M 3060 B - M 3060 B - M 3060 B - M 3060 B - M 3060 C 50/2 H 3060 A S - H 3060 A S - H 3060 B S 50/2 M 3060 B S - H 3060 B S 50/2 M 3060 B S 50/2 M 3060 B S 50/2 M 3060 B S - H 3060 B S 50/2 M 3060 B S - H 3060 B S 50/2 M 3060 B S - H 3060 B S	MAIN BRKR: MLO	MAIN BRKR: MLO

		LQUITIVIL	.INT COINT		SCHEDULE			
TAG	DESCRIPTION	LOCATION	LOAD	VOLT/PH	CIRCUIT	DISCONNECT	FEEDER	NOT
RTU-1	ROOF TOP UNIT (BID ALTERNATE NO.1)	BUILDING A	52 MCA 70A MOCP	208V / 3PH	MAIN DISTRIBUTION PANEL	100AS, 70AF	(3) #4 AWG (1) #8 GND IN 1.5" C.	1,
RTU-2	ROOF TOP UNIT (BID ALTERNATE NO.1)	BUILDING A	112 MCA 125 MOCP	208V / 3PH	A - 43,45,47	200AS, 125AF	(3) #1 AWG (1) #6 GND IN 2" C.	1, 2
RTU-3	ROOF TOP UNIT (BID ALTERNATE NO.1)	BUILDING A	112 MCA 125 MOCP	208V / 3PH	A - 44,46,48	200AS, 125AF	(3) #1 AWG (1) #6 GND IN 2" C.	1, 2
RTU-4	ROOF TOP UNIT (BID ALTERNATE NO.1)	BUILDING A	158 MCA 200A MOCP	208V / 3PH	EXTERIOR UTILITY SWITCH GEAR	200AS, 200AF	(3) #3/0 AWG (1) #6 GND IN 2.5" C	1, 2
RTU-5	ROOF TOP UNIT	BUILDING B GYM	24 MCA 40A MOCP	208V / 3PH	A - 2,4,6	60AS, 40AF	(3) #8 AWG (1) #10 GND IN 1" C.	2,
RTU-6	ROOF TOP UNIT	BUILDING M	25.5 MCA 40A MOCP	208V / 1PH	AA - 1,3	60AS, 40AF	(2) #8 AWG (1) #10 GND IN 1" C.	2,
RTU-7	ROOF TOP UNIT	BUILDING M	25.5 MCA 40A MOCP	208V / 1PH	AA - 5,7	60AS, 40AF	(2) #8 AWG (1) #10 GND IN 1" C.	2,
RTU-8	ROOF TOP UNIT	BUILDING M	25.5 MCA 40A MOCP	208V / 1PH	AA — 9,11	60AS, 40AF	(2) #8 AWG (1) #10 GND IN 1" C.	2,
RTU-9	ROOF TOP UNIT	BUILDING M	25.5 MCA 40A MOCP	208V / 1PH	AA - 13,15	60AS, 40AF	(2) #8 AWG (1) #10 GND IN 1" C.	2,
RTU-10	ROOF TOP UNIT	BUILDING M	25.5 MCA 40A MOCP	208V / 1PH	AA — 17,19	60AS, 40AF	(2) #8 AWG (1) #10 GND IN 1" C.	2,
RTU-11	ROOF TOP UNIT	BUILDING M	25.5 MCA 40A MOCP	208V / 1PH	AA - 21,23	60AS, 40AF	(2) #8 AWG (1) #10 GND IN 1" C.	2,
RTU-12	ROOF TOP UNIT	BUILDING M	25.5 MCA 40A MOCP	208V / 1PH	AA - 25,27	60AS, 40AF	(2) #8 AWG (1) #10 GND IN 1" C.	2,
RTU-13	ROOF TOP UNIT	BUILDING M	27 MCA 40A MOCP	208V / 1PH	AA - 29,31	60AS, 40AF	(2) #8 AWG (1) #10 GND IN 1" C.	2,
RTU-14	ROOF TOP UNIT	BUILDING M	25.5 MCA 40A MOCP	208V / 1PH	AA - 33,35	60AS, 40AF	(2) #8 AWG (1) #10 GND IN 1" C.	2,

1. ALTERNATE NO. 1. IF CHOSEN, EQUIIPMENT SHOWN WILL BE USED TO REPLACE THE EXISTING UNITS, EXISTING UNITS ARE TO REMAIN OTHERWISE.

3. VERIFY DISCONNECT IS NOT INTEGRAL TO EQUIPMENT PRIOR TO PURCHASE AND INSTALLATION.

2. FEEDER INFORMATION SHOWN FOR REFERENCE, EXISTING FEEDERS TO BE USED. FIELD VERIFY CONDITION OF CONDUIT, ALERT ENGINEER OF DAMAGE.

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Fax: (503) 726-3326

E-mail: rweng@rweng.com

Project No.: 382.121.001

Contact: MICHAEL FOSTER

> ARCHITECTURE ENGINEERING PLANNING INTERIORS

RENEWAL DATE: 12/31/2022 2021.02.16 17:27:29-08'00'

15895 SW 72ND AVE SUITE 200 PORTLAND, OREGON 97224 TEL: 503.226.1285 F A X: 5 0 3 . 2 2 6 . 1 6 7 0 W W W . C I D A I N C . C O M

- INTERNATIONAL SCHOOL OF BEAVERTON

STREET 97078

17770 SW BLANTON BEAVERTON, OREGON

BSD

ELECTRICAL PANEL SCHEDULES

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ATTACHMENT K

INTERNATIONAL SCHOOL OF BEAVERTON RE-ROOF

TECHNICAL SPECIFICATIONS

February 9, 2021

RELEASE PHASE: Bid Set



PREPARED FOR: Beaverton School District

CIDA PROJECT NUMBER: 20Y105.01.01



Project Number: 20Y105.01 Release Phase: Bid Set

SECTION 000103 - CONSULTANTS

NOTICE TO BIDDERS: Bidders shall not contact anybody listed below during the Solicitation (from when ITB is posted until Contract has been executed). Any questions, comments, substitution requests, etc. during the Solicitation shall only be emailed to contact may be made with the below members as appropriate/stated in these Specifications after the Contract has been executed.

ARCHITECT: STRUCTURAL ENGINEER:

CIDA, Inc. CIDA, Inc.

15895 SW 72nd Avenue, Suite 200 15895 SW 72nd Avenue, Suite 200

Portland, Oregon 97224 Portland, Oregon 97224

Phone: (503) 226-1285 Phone: (503) 226-1285 Contact: Erik Winter Contact: Curtis Gagner

<u>erikw@cidainc.com</u> <u>curtisg@cidainc.com</u>

CONSULTANTS (CONTRACTED TO CIDA, INC.):

MECHANICAL ENGINEER: PLUMBING ENGINEER:

R&W Engineering R&W Engineering

9615 SW Allen Boulevard, Suite 107 9615 SW Allen Boulevard, Suite 107

Beaverton, Oregon 97005 Beaverton, Oregon 97005 Phone: (503) 292-6000 Phone: (503) 292-6000

Contact: Ed Carlisle Contact: Ed Carlisle

<u>ecarlisle@rweng.com</u> <u>ecarlisle@rweng.com</u>

ELECTRICAL ENGINEER: ROOF CONSULTANT:

R&W Engineering RDH Building Science

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Beaverton, Oregon 97005 Portland, Oregon 97224

Phone: (503) 292-6000 Phone: (503) 867-8519 Contact: Ed Carlisle Contact: Scott Mecalis

ecarlisle@rweng.com smecalis@rdh.com

CONSULTANTS (CONTRACTED TO OWNER):

HAZARDOUS MATERIAL TESTING AND ABATEMENT DESIGN PROFESSIONALS

TRC

4105 SE International Way, Suite 505

Milwaukie, Oregon 97222 Phone: (503) 387-3251 Contact: Ron Landolt

rlandolt@trccompanies.com

CONSULTANTS 000103-1

Project Number: 20Y105.01 Release Phase: Bid Set

OWNER'S REPRESENTATIVE:

Beaverton School District 16550 SW Merlo Road Beaverton, Oregon 97003 Phone: (503) 863-9083 Contact: Doaa El Haggan

doaa_el_haggan@beaverton.k12.or.us

CONSULTANTS 000103-2

Project Number: 20Y105.01 Release Phase: Bid Set

SECTION 000110 – TABLE OF CONTENTS

000101	Cover
000103	Consultants
000110	Table of Contents
000115	List of Drawings

003119 Existing Conditions Information

STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

Modified AIA Document A101, 2017 Edition (BSD Document – Incorporated by reference only)

GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION

Modified AIA Document A201, 2017 Edition (BSD Document – Incorporated by reference only)

DIVISION 01 GENERAL CONDITIONS

011000	Summary
012200	Unit Prices
012300	Alternates
012500	Substitution Procedures
012600	Contract Modification Procedures
012900	Payment Procedures
013100	Project Management And Coordination
013123	Project Management Database (E-Builder)
013200	Construction Progress Documentation
013233	Photographic Documentation
013300	Submittal Procedures
013553	Security Procedures
014000	Quality Requirements
014100	Deferred Submittals
014110	Delegated Design Requirements
014200	References
015000	Temporary Facilities And Controls
016000	Product Requirements
016550	Product Delivery, Storage, and Handling Requirements
017300	Execution
017400	Cleaning
017419	Construction Waste Management And Disposal
017700	Closeout Procedures
017701	Closeout Log Template - form
017823	Operation And Maintenance Data
017839	Project Record Documents
017900	Demonstration And Training

DIVISION 02 EXISTING CONDITIONS

022623	Asbestos	Abatement	Contractor	Bid	Documents	and	Specifications	-	Prepared	b	V
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Owners Consultant

024119 Selective Structure Demolition

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Thermoplastic Polyolefin (TPO) Membrane Roofing 075423

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077200 **Roof Accessories**

078413 Penetration Firestopping

Joint Sealants 079200

DIVISION 08 OPENINGS

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APPENDIX A: ROOF MOISTURE SURVEY REPORT

• Prepared by RDH Building Science, dated 12/18/2020.

APPENDIX B: SUPPLEMENTAL ASBESTOS SURVEY REPORT

• Prepared by TRC, dated 10/27/2020.

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SECTION 000115 - LIST OF DRAWINGS

PART 1 - GENERAL

- A. Drawings: Drawings consist of the Contract Drawings and other drawings listed on the Table of Contents page of the separately bound drawing set titled "BSD International School of Beaverton: Re-Roof", dated February 9, 2021, as modified by subsequent Addenda and Contract modifications.
- B. List of Drawings: Drawings consist of the following Contract Drawings and other drawings of type indicated:
 - 1. CS1 Cover Sheer
 - 2. G1.0 General Project Notes
 - 3. AD0.1 Existing Conditions Floor Plan
 - 4. AD0.2 Existing Conditions Roof Plan
 - 5. AD1.1 Demolition Floor Plan
 - 6. AD1.2 Demolition Roof Plan
 - 7. A1.1 Floor Plan
 - 8. A1.2 Roof Plan
 - 9. A2.1 Roof Plan Fall Restraint
 - 10. A3.0 Details A& B Wings, Gym
 - 11. A3.1 Details A& B Wings, Gym
 - 12. A3.2 Details A& B Wings, Gym
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 - 15. A3.5 Details A& B Wings, Gym
 - 16. A3.6 Details A& B Wings, Gym
 - 17. A3.7 Details A& B Wings, Gym
 - 18. A3.8 Details A& B Wings, Gym
 - 19. A3.9 Details A& B Wings, Gym
 - 20. A4.0 Details Modular Building
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 - 23. A4.3 Details Modular Building
 - 24. A4.4 Details Modular Building
 - 25. S1.1 Roof Plan
 - 26. S2.1 Details
 - 27. M0.1 Mechanical Legend & Schedules
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 - 29. M1.0 Roof Plan Mechanical
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 - 31. E1.0 Site Plan Electrical
 - 32. E2.1 Enlarged Floor Plans Electrical
 - 33. E4.1 Electrical One-Line Diagram
 - 34. E4.2 Electrical Panel Schedules

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PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 000115

Project Number: 20Y105.01 Release Phase: Bid Set

SECTION 003119 – EXISTING CONDITIONS INFORMATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes information that is made available to the Contractor and are part of the Contract Documents. Any information made available is for Contractors' convenience and are intended to supplement rather than serve in lieu of Contractors' own investigations. Information supplied are not warranty or guarantee, either expressed or implied, of existing conditions.

1.2 AVAILABILITY

- A. Referenced Available Project Information may be bound under separate cover, unless indicated otherwise, and is available for viewing at the office of Owner.
- B. Additional available project information may be released without notice by the Owner or Architect.

1.3 AVAILIBLE PROJECT INFORMATION

- A. Available existing record documentation will be made available by the Owner to the awarded General Contractor(s) following the award of this Project's scope of work to the successful bidder and following the Owner's receipt of the Contractor's written request.
- B. Exhibit A: Roof Moisture Survey Report. Report prepared by RDH Building Science, dated December 18, 2020, has been included within these specifications for reference and for bidder's convenience.
- C. Exhibit B: Supplemental Asbestos Survey. Report and Documents prepared by Beaverton School District's Consultant TRC and dated October 27, 2020, has been included within these specifications for reference and for bidder's convenience.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 003119

Project Number: 20Y105.01 Release Phase: Bid Set

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Project information.
- 2. Work covered by Contract Documents.
- 3. Phased construction.
- 4. Work by Owner.
- 5. Excluded from Architect and its Consultant's Scope of Services.
- 6. Work under separate contracts.
- 7. Owner-furnished/Contractor-installed (OFCI) products.
- 8. Regulatory requirements.
- 9. Contractor's use of site and premises.
- 10. Occupied structures.
- 11. Work restrictions.
- 12. Start of Work.
- 13. Completion of Work.
- 14. Interpretation of Contract Documents.
- 15. Oral Modifications (will not be permitted).
- 16. Specification and Drawing conventions.

B. Related Requirements:

- 1. Section "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
- 2. Division 01, Section "Deferred Submittals".
- 3. Division 01, Section "Design-Build Requirements".

1.3 PROJECT INFORMATION

A. Project Identification: International School of Beaverton

17770 SW Blanton Street | Beaverton, Oregon | 97078

Project Number: 20Y105.01 Release Phase: Bid Set

B. Owner: Beaverton School District

16550 SW Merlo Road | Beaverton, Oregon 97003 Contact: Doaa El Haggan, Construction Project Manager P: (503) 863-9083 | E: doaa_el_haggan@beaverton.k12.or.us

C. Architect: CIDA, Inc.

15895 SW 72nd Avenue, Suite 200 | Portland, Oregon 97224

Contact: Erik Winter, Architect

P: (503) 226-1285 | E: erikw@cidainc.com

- D. Architect's Consultants: Architect has retained the following design professionals, who have prepared designated portions of the Contract Documents:
 - 1. <u>Structural Engineering</u>:

CIDA, Inc.

15895 SW 72nd Avenue, Suite 200 | Portland, Oregon 97224

Contact: Curtis Gagner

2. Mechanical Engineering:

R&W Engineering

9715 SW Allen Boulevard, Suite 117 | Beaverton, Oregon 97239

Contact: Ed Carlisle

3. <u>Plumbing Engineering:</u>

R&W Engineering

9715 SW Allen Boulevard, Suite 117 | Beaverton, Oregon 97239

Contact: Ed Carlisle

4. Electrical Engineering:

R&W Engineering

9715 SW Allen Boulevard, Suite 117 | Beaverton, Oregon 97239

Contact: Ed Carlisle

5. <u>Roof Consultant</u>:

RDH Building Science

5331 South Macadam Avenue, Suite 314 | Portland, Oregon 97224

Contact(s): Scott Mecalis

- E. Contractor: The following General Contractor has been engaged as Contractor for this Project.
 - 1. As may be awarded as a result of the Solicitation.
- F. General Contractor Design Professional Consultants: The General Contractor will or shall retain the following delegated design professional entities who have prepared designated portions of the Project's Contract Documents (under separate cover):
 - 1. Tapered Insulation Design:

Unknown at this time.

2. Temporary Shoring (as required):

Unknown at this time.

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1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of the following:
 - 1. The Work to be performed includes all labor, tools and equipment necessary to furnish and install all materials and equipment shown on the Contract drawings and specification documents and described herein, to provide complete and operating systems to the extent specified and shown on the Contract Documents. The Contractor shall furnish all equipment, material and supplies as required by the Contract Documents. The exception is where Contract Documents specifically indicates:
 - a. Owner Furnished and Owner Installed (OFOI), whereupon the owner shall furnish and install for a complete installation.
 - b. Owner Furnished and Contractor Installed (OFCI), whereupon the Owner shall furnish and the Contactor shall install as required for a complete installation.
 - 2. Brief Project Description: In brief and without force and effect on the requirements of the Contract drawings and specification documents, the Project consists of the following:
 - a. General: The Work includes the exterior partial renovation of an existing single-story school and accessory structures.
 - b. The Project includes the following exterior Work:
 - 1) Partial removal and replacement (overlay) of the roof and drainage system components at locations indicated on the Drawings.
 - 2) Removal and replacement of the roof, parapet, and drainage system components at locations indicated on the Drawings.
 - 3) Installation of new fall restraint anchors and system components at locations indicated on the Drawings.
 - 4) Removal and replacement of existing mechanical roof top units (RTU's), including associated electrical improvements.
 - c. The Project includes the following interior Work:
 - 1) Energy efficiency upgrades related to thermal insulation at roof assembly(s) noted in the Drawings.
 - d. Miscellaneous Project Elements:
 - 1) Shoring (temporary and permanent).
 - 3. "Deferred" and "Design-Build" systems and/or components known at this time are indicated on the Contract drawing documents.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.5 PHASED CONSTRUCTION

A. The Work shall be conducted in a single phase of construction.

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1.6 WORK BY OWNER

A. General: Cooperate fully with Owner so work may be carried out smoothly, without interfering with or delaying work under this Contract or work by Owner. Coordinate the Work of this Contract with work performed by Owner.

- B. Concurrent Work: Owner will perform the following operations or activities during the Contractor's construction process and activities for this Project. Those operations or activities will be conducted simultaneously with Work under this Contract.
 - 1. Owner shall perform the listed services in some fashion by Owner's own forces or by others that the Owner has elected to pursue. Refer to this specification Section, Part 1.7 "Excluded from the Architect and its Consultants Scope of Services" for all items not being performed by the Architect and its Consultants. The Owner, or others contracted by the Owner, will be selecting specific interior products, finish materials and associated color selections that are briefly expressed in of this specification section, Part 1.7.

1.7 EXCLUDED FROM THE ARCHITECT AND ITS CONSULTANTS' SCOPE OF SERVICES

- A. Excluded from both the Architect and its Consultants' scope of services for this Project consists of, but is not necessarily limited to, the following:
 - 1. Owner Contracted Consultant(s): Architect will endeavor to coordinate their work with work prepared by the Owner's Consultant. Coordination of Owner contracted consultant(s) beyond coordination of design intent for this Project, is excluded.
 - 2. "Design-Build" and/or "Deferred Submittals": All Work indicated on the Contract drawings or within the Project Manual specification documents described as "Design-Build" and/or "Deferred Submittals", is excluded.
 - 3. Unknown Owner Contracted Consultant(s): Coordination with any unknown Owner contracted consultant(s) that are not indicated in Division 00, Section "Consultants", is excluded.
 - 4. Modifications to the existing interior layout, finishes, fixtures, equipment, and/or building systems is excluded.
 - 5. Hazardous material surveying and abatement is excluded.
- B. All scope of services that are excluded from the Architect and its Consultants' scope of services that have not been selected or documented by the design team will not be reviewed during construction or as part of the Contractor's "Punch List" during Substantial Completion or Final Closeout.

1.8 WORK UNDER SEPARATE CONTRACTS

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying Work under this Contract or other contracts. Coordinate the Work of this Contract with work performed under separate contracts.

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- 1. The Contractor shall be responsible for coordinating operations with Work performed under separate contracts with the Owner.
- 2. Products furnished by Owner and installed by Owner are identified as OFOI (Owner Furnished, Owner Installed).
- 3. Products furnished by Owner and installed by Contractor are identified as OFCI (Owner Furnished, Contractor Installed).
- 4. Provide access to site and coordinate work according to the General Conditions of the Contract.
- B. Contractor recognizes that Owner is entitled, under the Contract Documents, to perform Work on site during the course of Contractor's performance, whether by Owner's employees, Owner's Consultants, separate contractors or services provided by the Architect and its Consultant.

1.9 OWNER-FURNISHED/CONTRACTOR-INSTALLED (OFCI) PRODUCTS

- A. Owner's Responsibilities: Owner will furnish products indicated and perform the following, as applicable:
 - 1. Provide to Contractor Owner-reviewed Product Data, Shop Drawings, and Samples.
 - 2. Provide for delivery of Owner-furnished products to Project site.
 - 3. Upon delivery, inspect, with Contractor present, delivered items.
 - a. If Owner-furnished products are damaged, defective, or missing, arrange for replacement.
 - 4. Obtain manufacturer's inspections, service, and warranties.
 - 5. Inform Contractor of earliest available delivery date for Owner-furnished products.
- B. Contractor's Responsibilities: The Work includes the following, as applicable:
 - 1. Designate delivery dates of Owner-furnished products in Contractor's construction schedule, utilizing Owner-furnished earliest available delivery dates.
 - 2. Review Owner-reviewed Product Data, Shop Drawings, and Samples, noting discrepancies and other issues in providing for Owner-furnished products in the Work.
 - 3. Receive, unload, handle, store, protect, and install Owner-furnished products.
 - 4. Make building services connections for Owner-furnished products.
 - 5. Protect Owner-furnished products from damage during storage, handling, and installation and prior to Substantial Completion.
 - 6. Repair or replace Owner-furnished products damaged following receipt.
- C. Owner-Furnished/Contractor-Installed (OFCI) Products:
 - 1. As indicated on Drawings.

1.10 REGULATORY REQUIREMENTS

A. Refer to the Contract drawings and specifications for the building code and other codes that are referenced for this Project.

B. Contractor shall make arrangements with Authorities Having Jurisdiction (AHJ) for use of public property for construction purposes and pay all fees required for such use.

1.11 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Unrestricted Use of Site: Contractor shall have full use of Project site for construction operations during construction period. Contractor's use of Project site is limited only by Owner's right to perform work or to retain other contractors on portions of Project. Confine operations of work to areas within contract limits indicated. Do not disturb portions of the site beyond areas in which work is indicated.
- B. Limits on Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 - 1. Limits on Use of Site: Confine construction operations areas of Work indicated in the Contract Documents.
 - 2. Driveways, Walkways, and Entrances: Keep driveways carports, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, building occupants, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.
- E. Contractor is responsible for necessary cleaning and repair of adjacent roads and drives resulting from Contractor's operations.

1.12 OCCUPIED STRUCTURES

- A. Full Owner Occupancy: Owner will occupy site and existing building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits unless otherwise indicated.
 - 1. Provide not less than 72-hours written notice to Owner of activities that will affect Owner's operations.
- B. Owner Limited Occupancy of Completed Areas of Construction: Owner reserves the right to occupy and to place and install equipment in completed portions of the Work, prior to Substantial Completion of the Work, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and limited occupancy shall not constitute acceptance of the total Work.

C. The Work includes repairs to units and structure that will be occupied by and open to the tenants during construction. While performing the Work described within the Contract Documents, the Contractor shall, at all times, adhere to the following requirements, including any and all additional requirements that the governing Authorities Having Jurisdiction (AHJ) may also require:

- 1. Contractor shall maintain and not compromise the existing building's vertical and lateral load capacities of the existing structure.
- 2. Contractor shall maintain and not compromise the existing building's fire alarms, automatic fire extinguishing systems and their monitoring alarms, standpipes, smoke control systems, exit signs, egress lighting, and fire resistive construction assemblies.
- 3. Any portion(s) of the existing structure which is determined to provide inadequate structural integrity, fire protection, or occupant life safety, must be closed to the tenants during the time in which the structure is being compromised. The affected areas shall not be re-opened to the tenants until the Authorities Having Jurisdiction determine that the affected areas meet the requirements for structural integrity, fire protection and occupant life safety.
- 4. If it is determined that the building occupant's safety cannot be accomplished at all times, the Contractor shall immediately stop work and notify the Owner, Architect, and the Authorities Having Jurisdiction in writing. The Contractor shall provide to the Owner, Architect, and the Authorities Having Jurisdiction a written schedule of times of closure to the Tenants along with the plans illustrating the area and/or areas of closure for review and approval prior to commencing with the work.
- 5. Contractor is solely responsible for and shall provide all necessary safety measures to protect the public, the building occupants, and their employees during construction, including but not limited to protection and safeguards to prevent the public and building tenants from entering the construction area(s) at all times during construction.
- 6. The building's existing means of egress including, but not limited to, exit stairways, common paths of egress, and exit discharge areas, shall not be used by construction personnel during construction for material staging and/or the removal of construction debris and shall remain unobstructed and fully functional in each of their intended use during the entirety of the construction duration.
- 7. The requirements of the International Fire Code Section 901.7 shall be implemented upon commencement of construction. If any part/portion of the existing fire protection system is taken out of service at any time during construction and specifically affects the building's ability to comply with International Fire Code Section 901.7, the requirements of International Fire Code Section 901.7.4 shall be met in their entirety, including, but not limited to the necessary notifications.

1.13 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
 - 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of Authorities Having Jurisdiction (AHJ).
 - 2. Coordinate and comply with limitations of construction activities that the adjacent property may have concerning specific privacy issues that the Owner of the adjacent property may require during construction activities of this Project.

- B. On-Site Work Hours: Limit work in the existing building to normal business working hours as approved by the Owner and permitted by the Authorities Having Jurisdiction (AHJ), Monday through Friday, unless otherwise indicated.
 - 1. Weekend Hours: As approved by the Owner and permitted by the AHJ.
 - 2. Early Morning Hours: As approved by the Owner and permitted by the AHJ.
 - 3. Hours for Utility Shutdowns: As approved by the Owner and permitted by the AHJ.
 - 4. Hours for noisy activity: As approved by the Owner and permitted by the AHJ.
- C. Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
 - 1. Notify Owner, in writing, not less than two (2) days in advance of proposed utility interruptions.
 - 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
 - 1. Notify Owner, in writing, not less than two (2) days in advance of proposed disruptive operations.
 - 2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances on Owner's property is not permitted.
- F. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- G. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
 - 1. Maintain list of approved screened personnel with Owner's representative.

1.14 START OF WORK

- A. "Notice to Proceed" (NTP) may be issued by the Owner following the execution of the Owner-Contractor Agreement that will permit the Contractor to commence the construction operations for the Work.
- B. Contractor shall give Owner written notice not less than five (5) working days in advance of the actual date on which the Work on-site will physically commence. Contractor shall be entirely responsible for any delay in the Work which may be caused by Contractor's failure to give such notice.

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1.15 COMPLETION OF WORK

A. Division 01 Specification Sections related to completion of work, project closet, final cleaning and other applicable sections shall apply to this Section.

B. Certificate of Occupancy:

- 1. Obtain a Certificate of Occupancy from Authorities Having Jurisdiction (AHJ) for areas where work is being performed before Owner occupancy. **NOTE: Building will be partially occupied during construction- Refer to Section 1.12 of this Section for additional requirements.**
- 2. Before Owner occupancy, mechanical, plumbing and electrical systems, as well as all life safety systems and equipment, shall be fully operational, and required tests and inspections shall be successfully completed. Upon occupancy, Owner will operate and maintain mechanical, plumbing and electrical systems serving occupied portions of Work.
- 3. Owner will assume responsibility for maintenance and custodial service for occupied portions of Work.

1.16 INTERPRETATION OF CONTRACT DOCUMENTS

A. Should the Contractor find discrepancies or omissions within the contract drawings or specifications documentation, or should the Contractor be in doubt as to their meaning, the Contractor shall at once notify the Architect in writing utilizing the request for interpretation process expressed in this Project Manual, refer to Division 00, Section "Request for Information" (RFI) for the form. Should it be found by the Architect or its Consultants that the Contractor's inquiry requires further clarification, the response shall be in writing by the Architect or its Consultants using the appropriate document.

1.17 ORAL MODIFICATIONS (Will Not Be Permitted.)

- A. It shall be distinctly understood by the Contractor that no oral statement by any person during the course of construction will be allowed to modify or change the Work or any of the Contract Drawings or Specification documents. Any modifications or changes to the Work that are expressed in the Contract Drawings or Specifications documents can only be made in writing by utilizing the appropriate documentation expressed in Division 00 and Division 01 of this Project Manual.
 - 1. The ONLY exception is in the case of an emergency endangering life or property.

1.18 SPECIFICATION AND DRAWING CONVENTIONS

- A. Project Manual Format: The Project Manual (commonly referred to as the "specifications") is organized into Divisions and Sections; and uses Division 01 through Division 33 as used by the Construction Specifications Institute (CSI) "MasterFormat" numbering system.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

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- 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
- 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- C. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- D. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- E. Drawing Coordination: Requirements for materials and products identified on the drawings are described in the specifications. One or more of the following are used on the drawings to identify materials and products:
 - 1. Terminology: Materials and products are identified by the typical generic terms used in the individual specifications sections.
 - 2. Abbreviations: Materials and products are identified by abbreviations scheduled on the drawings.
 - 3. Keynoting: Materials and products are identified by utilizing reference keynotes for materials and products found within the Project Manual.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

Project Number: 20Y105.01 Release Phase: Bid Set

SECTION 012200 - UNIT PRICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Requirements:
 - 1. Division 01, Section "Allowances" for procedures for using unit prices to adjust quantity allowances.
 - 2. Division 01, Section "Temporary Facilities and Controls" for temporary facilities and scaffolding as may be required.

1.3 DEFINITIONS

A. Unit price is an amount incorporated into the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Unit Pricing General: Contractor shall provide Owner with schedule of all unit pricing at time of Bid.
- C. Measurement and Payment: See individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- D. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.
- E. List of Unit Prices: A schedule of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

UNIT PRICES 012200 - 1

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

- A. Refer to Bid Form and fully executed Owner-Contractor Agreement for the complete list of Owner-Contractor approved unit prices not listed below:
 - 1. Unit Price No. 01: Roof Sheathing Replacement at Roof Overlay Areas.
 - a. Description: Removal and replacement of roof sheathing at areas discovered during construction to be damaged. This item includes roof sheathing found to be rotted or damaged as a result of physical investigation by the Contractor.
 - b. Unit of Measurement: Per (1) 4'-0" x 8'-0" full panel of roof sheathing installation (installed cost shall include all material(s) and labor costs, overhead and profit).

END OF SECTION 012200

UNIT PRICES 012200 - 2

Project Number: 20Y105.01 Release Phase: Bid Set

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for alternates.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other work of the Contract.
- C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

ALTERNATES 012300 - 1

Project Number: 20Y105.01 Release Phase: Bid Set

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Refer to Bid Form and fully executed Owner-Contractor Agreement for the complete list of Owner-Contractor approved Alternates not listed below:

1. Alternate No. 01: Roof Top Unit (RTU) No.'s 01-04 Removal and Replacement.

- a. <u>Base Bid</u>: Existing RTU's and curbs to remain installed. Remove existing counterflashing, cant strips and ballast at curbs. Prepare remaining roof assembly for new membrane overlay system.
- b. <u>Alternate</u>: Remove, replace and install new RTU's, curbs, and system components as indicated on Contract Drawings. Install new insulated mechanical curbs and secure to roof structure per structural drawings. Install and integrated new roof membrane system and flashing components into new roof curb assembly. Install new RTU equipment and connect to existing building systems per Mechanical and Electrical Drawings.

END OF SECTION 012300

ALTERNATES 012300 - 2

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SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements governing product substitution procedures, but limited to, the following:
 - 1. Definitions.
 - 2. Contractor's responsibilities.
 - 3. Substitution submittal procedures.
 - 4. Substitutions requirements during the bidding period.
 - 5. Substitutions requested after award of Contract.
 - 6. Substitutions not permitted.

B. Related Requirements:

- 1. Division 00, Section "Substitution Request (form)".
- 2. Document 01, Section "Reference", for applicability of industry standards to products specified.
- 3. Division 01, Section "Product Requirements" for requirements governing Contractor's selection of products and product options.

1.3 DEFINITIONS

- A. Substitutions: Contractor proposals for changes in products, materials, equipment, and methods of construction from those required by the Contract Documents made during bidding and negotiation, and after award of Contract are considered to be requests for substitution by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.
- B. The following are not considered to be requests for substitution:
 - 1. Revisions to the Contract Documents requested by Owner or Architect.

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2. Specified options of products and construction methods included in the Contract Documents.

- 3. Contractor's determination of and compliance with regulations and orders issued by governing authorities.
- C. Substitutions accepted during the bidding period are accepted by Addendum prior to award of Contract, and thereafter are included in the Contract Documents.
- D. Substitutions requested and accepted after award of contract are accepted only by Change Order, and thereafter are included in the Contract Documents. Such a request shall be in accordance with Articles 1.4, 1.5, 1.9 and 1.10 of this specification Section.

1.4 CONTRACTOR'S RESPONSIBILITIES

- A. Contractor's responsibilities for substitution requests made after award of Contract are as follows:
 - 1. Investigate proposed products and determine they are equal or superior in all respects to products specified.
 - 2. Provide same guarantee for accepted substitutions as for products specified.
 - 3. Make changes in, and coordinate, the Work as may be required to incorporate and install accepted substitutions.
 - 4. Waive all claims for additional costs which subsequently become apparent which are related to substitutions.

1.5 ACTION SUBMITTALS

- A. Substitution Requests: Submit three (3) copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use form provided in Project Manual or form acceptable to Architect.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.

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- e. Samples, where applicable or requested.
- f. Certificates and qualification data, where applicable or requested.
- g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
- h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
- i. Research reports evidencing compliance with building code in effect for Project.
- j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
- k. Cost information, including a proposal of change, if any, in the Contract Sum.
- 1. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
- m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
- 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
 - a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
 - b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.
 - c. Architect will be sole judge of acceptability of any proposed substitution, as it relates to architectural design intent, and decision of Architect will be final.

1.6 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.7 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.8 SUBSTITUTION REQUIREMENTS DURING THE BIDDING PERIOD

A. Submit full executed (and signed) request for approval of a substitution.

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1. Form included under Division 00, Section "Substitution Request – (form)."

- 2. Submit three (3) sets of signed form together with the required attachments.
- B. All substitution requests must be received in the Architect's office no less than ten (10) working days prior to Bid Date, unless a longer time frame is otherwise stipulated in the Instructions to Bidders.

1.9 SUBSTITUTIONS REQUESTED AFTER AWARD OF CONTRACT

- A. Substitutions will normally not be considered after award of Contract, except due to unforeseen circumstances. No substitutions after award of contract, unless specified item is no longer available.
- B. Substitutions for Cause: Architect will receive and consider Contractor's request for substitution after award of Contract when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not met, Architect will return the requests without action except to record noncompliance with these requirements.
 - 1. The specified product cannot be provided within the Contract time.
 - a. Architect will not consider the request if the product cannot be provided as a result of failure to pursue the Work promptly or coordinate activities properly.
 - 2. The specified product cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
 - 3. The specified product cannot be coordinated with other materials and the Contractor certifies that the proposed substitution can be coordinated.
 - 4. The specified product cannot provide the required warranty and the Contractor certifies that the proposed substitution provides the warranty.
 - 5. The requested substitution offers the Owner a substantial advantage in cost, time, or other considerations after deducting additional Owner's cost of compensation to the Architect for redesign and evaluation services, increased cost of other construction, and similar considerations.
- C. Contractor's submittal and Architect's acceptance of Shop Drawings, Product Data, or Samples for construction activities not complying with the Contract Documents do not constitute an acceptable or valid request for substitution, nor do they constitute approval.
- D. Substitutions for Convenience: Not allowed.

1.10 SUBSTITUTIONS NOT PERMITTED

- A. Substitutions indicated or implied on submitted Shop Drawings or Product Data without first requesting approval in accordance with requirements of this Section.
- B. Where manufacturers, products, or systems listed in the Specifications are not followed with "or approved" or "Substitutions: Provide in accordance with requirements of Section Product Substitution Procedures," it is intended that substitutions are not permitted.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

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SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
 - 1. Architect's Supplemental Instructions (ASI).
 - 2. Proposal Request (PR).
 - 3. Change Order (CO).
 - 4. Construction Change Directive (CCD).
 - 5. Documentation for contract modifications.
 - 6. Correlating change orders with other contract requirements.

B. Related Sections.

- 1. Division 00, Section "Project Forms" for ASI, CCD, PR, and CO.
- 2. Division 01, Section "Product Substitution Procedures" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 ARCHITECT'S SUPPLEMENTAL INSTRUCTIONS (ASI)

A. Architect will issue supplemental instructions (ASI) authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on Architect's office form included in Division 01, Section "Project Forms".

B. Definition:

- 1. Architect's written order of instructions to Contractor, signed by Architect, that authorizes minor changes in Work that do not change Contract Sum or Contract Time.
- C. Architect's Supplemental Instructions may include supplementary or revised Drawings and/or Specifications to describe minor changes to Contract Documents.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

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1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.

- 2. Within ten (10) days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may propose changes by submitting a request to Architect.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - 6. Comply with requirements in Division 01, Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

C. Proposal Request Form:

- 1. The Architect will use the Architect's office form included in Division 00, Section "Project Forms".
- 2. The Contractor shall use that entities office form based upon AIA Document G709 for Contractor's Proposal Requests (CPR). Contractor's form shall be approved by the Architect prior to its use.

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1.5 CHANGE ORDER (CO)

A. Definition:

1. Prepared by Architect and signed by Owner, Contractor, and Architect stating their agreement to a change to Contract Documents and adjustment to Contract Sum and/or Contract Time.

- B. On Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.
- C. Changes to Project Contract Sum and/or Contract Time listed or indicated in Change Orders shall include or be determined by methods described in the General Conditions, and as follows:
 - 1. Proposal Requests approved for change to Contract Documents by Owner and Architect that have not been converted to a Construction Change Directive.
 - 2. Construction Change Directives where Owner, Architect, and Contractor have agreed to change in Project Contract Sum and/or Contract Time.
 - 3. Changes to Project Contract Sum and/or Contract Time that have not been documented by Proposal Request or Construction Change Directive, but have been agreed upon in writing by Owner, Architect, and Contractor.

1.6 CONSTRUCTION CHANGE DIRECTIVE (CCD)

A. Definition:

- 1. Written order prepared by Architect, signed by Owner and Architect, directing Contractor to proceed with change to Contract Documents which affect Contract Sum and/or Contract Time, for subsequent inclusion in a Change Order after change to Contract Sum and/or Contract Time has been determined.
- B. A Construction Change Directive is issued in lieu of a Proposal Request when time is of the essence and change to Contract Sum and/or Contract Time cannot be determined prior to start of the work.
- C. Construction Change Directive: Architect may issue a Construction Change Directive on Architect's office form included in Division 00, Section "Project Forms". Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- D. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

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E. Contractor shall submit to Architect itemized change to Contract Sum and/or Contract Time within ten (10) working days when possible, and no more than thirty (30) calendar days, except for the following conditions:

- 1. Unit prices have been agreed upon and quantities cannot be determined until work described in the CCD has been completed.
- 2. Owner has agreed that Contract Sum and/or Contract Time can be determined at completion of work described in the CCD.
- F. Both Owner and Architect will sign and date a Construction Change Directive which directs the Contractor to proceed with change to the Contract Documents prior to determination of cost and/or time.

1.7 CONTRACTOR MARK-UP LIMITS

- A. The amounts of General Contractor's overhead, profit, and general conditions shall be negotiable on each Change Order Request (COR) and may vary according to the nature, extent, and complexity of the work. General Contractor markups shall comply with the following maximum limits:
 - 1. The General Contractor shall be limited to ten percent (10%) maximum combined Profit / Overhead (Fee) markup for work self-performed, and materials purchased by their own forces.
 - 2. Likewise, the General Contractor's Subcontractors shall be limited to ten percent (10%) maximum combined Profit / Overhead (Fee) markup for work self-performed by the Subcontractor, and materials purchased by their own forces.
 - 3. The General Contractor shall be limited to five percent (5%) maximum combined Profit / Overhead (Fee) markup for work performed, and materials purchased by their subcontractors.
 - 4. Likewise, the General Contractor's Subcontractors shall be limited to five percent (5%) maximum combined Profit / Overhead (Fee) markup for work performed, and materials purchased by their sub-tier subcontractors.
 - 5. In no case shall the General Contractors and/or Subcontractor's combined cumulative total for Profit / Overhead / and General Conditions exceed fourteen percent (14%).

1.8 DOCUMENTATION FOR CONTRACT MODIFICATIONS

- A. Cost and Time Quotations: Support quotation for changes in the Work with sufficient substantiating data to allow Architect to evaluate quotation, to include the following:
 - 1. Labor expended in hours and unit cost.
 - 2. Equipment cost.
 - 3. Products, with quantities used and unit cost, including purchase source.
 - 4. Taxes, Insurance, and Bonds.
 - 5. Credit for deleted work where applicable with same documentation as required for cost increases for additional work.
 - 6. Overhead and profit, determined after credits have been deducted from additions.
 - 7. Justification for change in Contract Time.

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B. For claims for work not authorized through Proposal Requests or Construction Change Directives, provide supporting documentation for each claim for additional cost as indicated above the cost and time quotations with the following additional information:

- 1. Name of Owner's authorized agent who ordered work, and date of Order.
- 2. Dates and hours work performed, and by whom.
- 3. Timecard records, including summary of hours worked, and hourly rates paid.
- 4. Receipts and invoices for products used including quantities and unit costs.
- 5. Receipts and invoices for equipment utilized, including dates and time of use.
- 6. Provide the same documentation indicated above for subcontracts same as required for Contractor's own forces.
- C. Approved document requests for Product substitutions.

1.9 CORRELATING CHANGE ORDERS WITH OTHER CONTRACT REQUIREMENTS

- A. Revise Schedule of Values and Applications for Payment to record each Change Order as separate item of work with adjustment to Contract Sum and Contract Time as described in Division 01, Section "Payment Procedures".
- B. Revise Construction Schedule to reflect each change in Contract Time.
- C. Revise Sub-contractors schedules to show changes for other items of work affected by modifications to Contract Documents.
- D. Record modifications in Record Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

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SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Sections:

- 1. Division 00, Section "Contracting Forms and Supplements" for administrative forms.
 - a. Administrative Forms Include: "Conditional Release" and "Unconditional Release" forms as part of the Payment Application procedures.
- 2. Division 01, Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
- 3. Division 01, Section "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with continuation sheets.
 - b. Contractor's Construction Schedule.
 - c. Submittals Schedule.
 - d. List of Subcontractors.

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- e. List of principle Suppliers and Products.
- f. List of fabricators.
- 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven (7) days before the date scheduled for submittal of initial Applications for Payment.
- 3. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules showing values correlated with each phase of payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Name of Architect (firm name).
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Arrange schedule of values consistent with format of AIA Document G703.
 - 3. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.
 - f. Change Orders (numbers) that affect value.
 - g. Dollar value.
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 - 4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide several line items for principal subcontract amounts, where appropriate.
 - 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 - 6. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. If specified, include evidence of insurance or bonded warehousing.
 - 7. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

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- 8. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
- 9. Purchase Contracts: Provide a separate line item in the schedule of values for each purchase contract. Show line-item value of purchase contract. Indicate owner payments or deposits, if any, and balance to be paid by Contractor.
- 10. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
- 11. Overhead Costs: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
- 12. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements.
- 13. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.
- 14. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
- 15. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Architect paid for by Owner.
 - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.

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2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.

- 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
- E. Electronic Transmittal: Electronically submit via e-mail one (1) signed and notarized original copy of each Application for Payment to Architect by a method ensuring receipt. Each Application for Payment shall include waivers of lien and similar attachments. Architect shall retain one (1) copy and electronically forward the Application for Payment and attachments to the Owner after review by Architect.
 - 1. The electronic email subject lie shall clearly list "Application for Payment" number and record appropriate information about application and attachments in the body of the email.
- F. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.
 - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
 - 2. When an application shows completion of an item, submit conditional final or full waivers.
 - 3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 - 4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 - 5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 - 1. List of subcontractors.
 - 2. Schedule of values.
 - 3. Contractor's construction schedule (preliminary if not final).
 - 4. Combined Contractor's construction schedule (preliminary if not final) incorporating Work of multiple contracts, with indication of acceptance of schedule by each Contractor.
 - 5. Products list (preliminary if not final).
 - 6. Schedule of unit prices.
 - 7. Submittal schedule (preliminary if not final).
 - 8. List of Contractor's staff assignments.
 - 9. List of Contractor's principal consultants.
 - 10. Copies of building permits.
 - 11. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 - 12. Initial progress report.
 - 13. Report of preconstruction conference.
 - 14. Certificates of insurance and insurance policies.
 - 15. Performance and payment bonds.

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- 16. Data needed to acquire Owner's insurance.
- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 - 1. Evidence of completion of Project closeout requirements.
 - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 - 3. Updated final statement, accounting for final changes to the Contract Sum.
 - 4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims".
 - 5. AIA Document G706A, "Contractor's Affidavit of Release Liens".
 - 6. AIA Document G707, "Consent of Surety to Final Payment".
 - 7. Evidence that claims have been settled.
 - 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 - 9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

Project Number: 20Y105.01 Release Phase: Bid Set

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Coordination drawings.
 - 3. Key personnel.
 - 4. Request for Information (RFI).
 - 5. Digital project management procedures.
 - 6. Project meetings.

B. Related Requirements:

- 1. Division 00, Section "Project Forms."
- 2. Division 01, Section "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
- 3. Division 01, Section "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
- 4. Division 01, Section "Closeout Procedures" for coordinating closeout of the Contract

1.3 DEFINITIONS

A. Request For Information (RFI): Request from Owner, Architect, or Contractor seeking interpretation from each other during construction.

1.4 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.

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1.5 GENERAL COORDINATION PROCEDURES

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.

- 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
- 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
- 3. Make adequate provisions to accommodate items scheduled for later installation.
- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
 - 1. Preparation of Contractor's construction schedule.
 - 2. Preparation of the schedule of values.
 - 3. Installation and removal of temporary facilities and controls.
 - 4. Delivery and processing of submittals.
 - 5. Progress meetings.
 - 6. Preinstallation conferences.
 - 7. Project closeout activities.
 - 8. Startup and adjustment of systems.
 - 9. Project closeout activities.
- D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.6 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is

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required to facilitate integration of products and materials fabricated or installed by more than one entity.

- 1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, plumbing, fire protection, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
 - 1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Supplement plan drawings with section drawings where required to adequately represent the Work.
 - 2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
 - 3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
 - 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
 - 5. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
 - 6. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1-1/4 inch diameter and larger.

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- b. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
- c. Location of pull boxes and junction boxes, dimensioned from column center lines.
- 7. Fire Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
- 8. Review: Architect will review coordination drawings to confirm that, in general, the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Architect will so inform Contractor, who shall make suitable modifications and resubmit.
 - a. Coordination Drawing Prints: Prepare coordination drawing prints for review in accordance with requirements of Division 01 Section "Submittal Procedures".
- C. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
 - 1. File Preparation Format:
 - a. Same digital data software program, version, and operating system as original Drawings.
 - 2. File Submittal Format: Submit or post coordination drawing files using PDF format.

1.7 KEY PERSONNEL

- A. Key Personnel Names: Within fifteen (15) days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
 - 1. Post copies of list in project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

1.8 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
 - 1. Architect will return without response those RFI's submitted to Architect by other entities controlled by Contractor.

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2. Coordinate and submit RFI's in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
 - 1. Project name and address.
 - 2. Owner name.
 - 3. Owner's Project number.
 - 4. Name of Architect.
 - 5. Architect's Project number.
 - 6. Date.
 - 7. Name of Contractor.
 - 8. RFI number, numbered sequentially.
 - 9. RFI subject.
 - 10. Specification Section number and title and related paragraphs, as appropriate.
 - 11. Drawing number and detail references, as appropriate.
 - 12. Field dimensions and conditions, as appropriate.
 - 13. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 - 14. Contractor's signature.
 - 15. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Owner's standard form or Contractor's standard form if determined to be acceptable to Owner and Architect.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow seven (7) days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
 - 1. The following Contractor-generated RFI's will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFI's or inaccurately prepared RFI's.
 - h. Unreadable facsimile machine RFI's, illegibly written RFI's or RFI's with incomplete information.
 - 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect additional information.

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3. Architect's action on RFI's that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 01, Section ""Contract Modification Procedures".

- a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within five (5) days of receipt of the RFI response.
- E. Contractor, in being fully familiar with the Contract Documents, shall not be relieved of responsibility to coordinate the Work to prevent adverse impact to Project schedule when submitting RFI's to the Architect for interpretation of the Contract Documents.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven (7) days if Contractor disagrees with response.
- G. RFI Log: Prepare, maintain, and submit a tabular log of RFI's organized by the RFI number. Submit log weekly. Include the following:
 - 1. Project name.
 - 2. Name and address of Contractor.
 - 3. Name and address of Architect (firm name).
 - 4. RFI number including RFI's that were returned without action or withdrawn.
 - 5. RFI description.
 - 6. Date the RFI was submitted.
 - 7. Date Architect's response was received.
 - 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 - 9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.
- H. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within three (3) days if Contractor disagrees with response.

1.9 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Architect's Digital Data Files: Electronic copies of CAD Drawings of the Contract Drawings may be provided by Architect at its discretion for Contractor's use in preparing submittals. For bidding purposes, the Contractor shall not assume that the Architect will be releasing said files. However, at the Architect's discretion the following course of action will be considered by the Architect:
 - General: Upon receipt of the General Contractor's written request (not from a subcontractor or other entity) for specific drawing backgrounds, copies of Architect's CAD files may be provided to Contractor for Contractor's use in connection with Project for use in preparing Shop Drawings and Project record drawings, subject to the following conditions:

a. Architect makes no representations as to the accuracy or completeness of digital

- a. Architect makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings. The User may use at their own risk pertaining to this specific Project.
- b. The office of the Architect may furnish only the Architectural CAD backgrounds that already exist without the Architect's title block upon receipt of written request by the General Contractor at the discretion of the Architect's office. The General Contractor shall use their own title block as appropriate when developing Contractor drawings.
- c. There may be limitations on availability of Architect's consultant files, limitations of CAD system formats, limitations on CAD entity attributes and layering.
- B. Web-Based Project Management Software Package: The Owner requires that the Contractor use the Owner's web-bade project management software (e-Builder) for project management.
 - 1. Owner will provide awarded Contractor access at no cost.
 - 2. Refer to Division 01, Section "Project Management Database (e-Builder)" for additional information and requirements.
- C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
 - 1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 - 2. Name file with submittal number or other unique identifier, including revision identifier.
 - 3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.10 PROJECT MEETINGS

- A. General: Contractor shall schedule and conduct meetings and conferences at Project site unless otherwise indicated.
 - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times.
 - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
 - 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three (3) days of the meeting.
- B. Preconstruction Conference: Contractor shall schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than fifteen (15) days after execution of the Agreement. The conference will be held at the Project site or another convenient location as mutually agreed upon by the Owner and the Architect.
 - 1. Conduct the conference to review responsibilities and personnel assignments.
 - 2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned

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parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.

- 3. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Contractor's construction schedule.
 - b. Phasing, if applicable for this Project.
 - c. Responsibilities and personnel assignments.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFI's.
 - j. Procedures for testing and inspecting.
 - k. Procedures for processing Applications for Payment.
 - 1. Distribution of the Contract Documents.
 - m. Submittal procedures.
 - n. Sustainable design requirements.
 - o. Preparation of Record Documents.
 - p. Use of the premises and existing building.
 - q. Work restrictions.
 - r. Working hours.
 - s. Owner's occupancy requirements.
 - t. Responsibility for temporary facilities and controls.
 - u. Procedures for moisture and mold control.
 - v. Procedures for disruptions and shutdowns.
 - w. Construction waste management and recycling.
 - x. Parking availability.
 - y. Office, work, and storage areas.
 - z. Equipment deliveries and priorities.
 - aa. First aid.
 - bb. Security.
 - cc. Progress cleaning.
 - dd. Contractor's safety procedures and requirements that Contractor will be initiating and be responsible for during the entire project.
- 4. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.
 - 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Owner, Architect of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.

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- b. Related RFI's.
- c. Related Change Orders.
- d. Purchases.
- e. Deliveries.
- f. Submittals.
- g. Review of mockups.
- h. Possible conflicts.
- i. Compatibility requirements.
- i. Time schedules.
- k. Weather limitations.
- 1. Manufacturer's written instructions.
- m. Warranty requirements.
- n. Compatibility of materials.
- o. Acceptability of substrates.
- p. Temporary facilities and controls.
- q. Space and access limitations.
- r. Regulations of authorities having jurisdiction.
- s. Testing and inspecting requirements.
- t. Installation procedures.
- u. Coordination with other work.
- v. Required performance results.
- w. Protection of adjacent work.
- x. Protection of construction and personnel.
- 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
- 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
- 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at weekly intervals.
 - 1. Coordinate dates of meetings with preparation of payment requests.
 - 2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

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- 1) Review schedule for next period.
- b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Status of correction of deficient items.
 - 14) Field observations.
 - 15) Status of RFI's.
 - 16) Status of Proposal Requests.
 - 17) Pending changes.
 - 18) Status of Change Orders.
 - 19) Pending claims and disputes.
 - 20) Documentation of information for payment requests.
- 4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information. Distribute minutes of the meeting to each party present and to parties who should have been present.
 - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- E. Coordination Meetings: Conduct Project coordination meetings as determined to be appropriate/required by specification Sections of this Project Manual. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
 - 1. Attendees: In addition to inviting representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure

- commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
- b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
- c. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.
 - 12) Quality and work standards.
 - 13) Change Orders.
- 3. Reporting: Record meeting results and distribute copies to Owner and Architect and to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
- F. Mock-up Meetings: Conduct mock-up meetings as determined to be appropriate/required by specification Sections of this Project Manual.
 - 1. Attendees: In addition to inviting representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Review items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site utilization.
 - 8) Temporary facilities and controls.
 - 9) Work hours.
 - 10) Hazards and risks.
 - 11) Progress cleaning.

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- 12) Quality and work standards.
- 13) Change Orders.
- 3. Reporting: Record meeting results and distribute copies to Owner and Architect and to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
- G. Project Closeout Conference: Schedule and conduct a Project closeout conference, at a time convenient to Owner and Architect, but no later than thirty (30) days prior to the scheduled date of Substantial Completion.
 - 1. Conduct the conference to review requirements and responsibilities related to Project closeout
 - 2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of record documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Submittal of written warranties.
 - d. Requirements for preparing sustainable design documentation.
 - e. Requirements for preparing operations and maintenance data.
 - f. Requirements for demonstration and training.
 - g. Preparation of Contractor's punch list.
 - h. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - i. Submittal procedures.
 - j. Coordination of separate contracts.
 - k. Owner's partial occupancy requirements.
 - 1. Installation of Owner's furniture, fixtures, and equipment.
 - m. Responsibility for removing temporary facilities and controls.
 - 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

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SECTION 013123 - PROJECT MANAGEMENT DATABASE (e-Builder)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating web-based project management operations for Project including, but limited to, the following:
 - 1. General Requirements.
 - 2. System Requirements.
 - 3. System Access.
 - 4. System Use.

B. Related Requirements:

- 1. Division 00, Section "Project Forms".
- 2. Division 01, Section "Project Management and Coordination".
- 3. Division 01, Section "Payment Procedures".
- 4. Division 01, Section "Closeout Procedures".
- C. Project Management Communications: The Owner, Contractor, and Architect shall use the Internet web based project Management communications tool, E-Builder ASP software and protocols included in that software during this project. The use of project management communications as herein described does not replace or change any contractual responsibilities of the participants.
- D. Purpose: The intent of using e-Builder is to improve project work efforts by promoting timely initial communications and responses and to reduce the number of paper documents while providing improved record keeping by creation of electronic document files.

1.3 GENERAL REQUIREMENTS:

- A. Project management communications is available through e-Builder as provided by "e-Builder" in the form and manner required by the Owner.
- B. The project communications database is on-line and fully functional. User registration, electronic and computer equipment, and internet connections are the responsibility of each project participant. The sharing of user accounts is prohibited.

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C. Support: e-Builder will provide on-going support through on-line help files and with website's training documents uploaded to the project folder.

- D. Authorized Users: Access to the web site will be by individuals who are licensed users as required by the Owner.
- E. Licenses Granted by Owner's Representative: Owner shall pay for and provide licenses/access for the following members of the project team.
 - 1. Lead member of Architect's/Consultant's design team responsible.
 - 2. Contractor's project manager or lead member of Contractor's project staff.
 - 3. Others as deemed appropriate by Owner's Representative.

1.4 SYSTEM REQUIREMENTS:

A. System Configuration:

- 1. PC system 500 MHz Intel Pentium III or equivalent AMD processor.
- 2. 128 MB Ram.
- 3. Display capable of SVGA (1024 x 768 pixels) 256 colors display.
- 4. 101 key keyboard.
- 5. Mouse or other pointing device.

B. Operating System and software configuration:

- 1. All software shall be properly licensed with vendors or developers. Use of "e-Builder" does not convey any rights or licensure for use of any software, hardware or internet service provider.
- 2. Software Configuration:
 - a. Most current version of Microsoft Internet Explorer (current version is a free distribution for download). This specification is not intended to restrict the host server or client computers provided that industry standard HTTP clients ay access the published content.
 - b. Most current version of Adobe Acrobat Reader (Current version is a free distribution for download).
 - c. Other plug-ins specified by e-Builder as applicable to the system (current versions are a free distribution for download from www.e-builder.net).
 - d. Users are recommended to have a properly licensed version of the standard Microsoft Office Suite (current version must be purchased) or the equivalent.

1.5 SYSTEM ACCESS

A. Minimum Equipment and Internet Connection: In addition to other requirements specified in this Section, the Contractor shall be responsible for providing suitable computer systems for each licensed user at the user's normal work location with high-speed Internet access, i.e. DSL, local cable company's Internet connection, or T1 connection.

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B. Authorized users will be contacted directly by the web site provider, e-Builder, who will assign the temporary user password.

C. Individuals shall be responsible for the proper use of their passwords and access to data as agents of the company in which they are employed.

1.6 SYSTEM USE

- A. Owner's Administrative Users: Owner administrative users have access and control of user licenses and all posted items. DO NOT POST PRIVATE OR YOUR COMPANY'S CONFIDENTIAL ITEMS IN THE DATABASE.
- B. Improper or abusive language toward any party or repeated posting of items intended to deceive or disrupt the work of the project will not be tolerated and will result in deletion of the offensive items and revocation of user license at the sole discretion of the Administrative User(s). Costs incurred or associated with such issues shall be the financial responsibility of the party responsible for the transgression.
- C. Communications: Communication for this project for the items listed below shall be solely through e-Builder:
 - 1. RFI, Requests for Information.
 - 2. Change Order Requests.
 - 3. Architect's Supplemental Instructions.
 - 4. All other communication shall be conducted in an industry standard manner.
 - 5. Submittals, contracts, meeting minutes, and other project records.
 - 6. Application for payments.
 - 7. Project closeout.

D. Document Integrity and Revisions:

- Documents, comments, drawings and other records posted to the system shall remain for the project record. The authorship time and date shall be recorded for each document submitted to the system. Submitting a new document or record with a unique ID, authorship, and time stamp shall be the method used to make modifications or corrections.
- 2. The system shall identify revised or superseded documents and their predecessors.
- 3. Server or Client side software enhancements during the life of the project shall not alter or restrict the content of data published by the system. System upgrades shall not affect access to older documents or software.
- E. Document security: The system shall provide a method for communications of documents. Documents shall allow security group assignment to respect the contractual parties communication except for Administrative Users.
- F. Document Integration: Documents of various types shall be logically related to one another and discoverable,.

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G. Notifications and Distribution: Document distribution to project members shall be accomplished both within the extranet system and via email as appropriate. Project document distribution to parties outside of the project communication system shall be accomplished by secure email of outgoing documents and attachments readable by a standard email client.

H. Ownership of Documents and Information: All documents, files or other information posted on the system shall become the property of the Owner.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 013123

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SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Preliminary Construction Schedule.
 - 2. Contractor's Construction Schedule.
 - 3. Contractor's Construction Schedule (Gantt-Chart) Requirements.
 - 4. Daily construction reports.
 - 5. Material location reports.
 - 6. Field condition reports.
 - 7. Special reports.

B. Related Sections include the following:

- 1. Division 01, Section "Payment Procedures" for submitting the Schedule of Values.
- 2. Division 01, Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
- 3. Division 01, Section "Submittal Procedures" for submitting schedules and reports.
- 4. Division 01, Section "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Critical Path Method (CPM): Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

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C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

- D. Event: The starting or ending point of an activity.
- E. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- F. Major Area: A story of construction, a separate building, or a similar significant construction element.
- G. Milestone: A key or critical point in time for reference or measurement.

1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. Working electronic copy of schedule file.
 - 2. PDF file.
 - 3. Hard copy of sufficient size to display entire period or schedule, as required.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
 - 1. Submit a working digital copy of schedule, using software indicated, and labeled to comply with requirements for submittals.
- C. Material Location Reports: submit at monthly intervals.
- D. Field Condition Reports: Submit at time of discovery of differing conditions.
- E. Special Reports: Submit at time of unusual event.
- F. Special Inspections: Submit at time of special inspection as required by Authorities Having Jurisdiction (AHJ) and as indicated on Drawings and within specification Sections of this Project Manual.
- G. Construction Schedule Updating Reports: Submit with Applications for Payment.

1.5 QUALITY ASSURANCE

A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Division 01, Section "Project Management and Coordination". Review methods and procedures

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related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:

- 1. Review software limitations and content and format for reports.
- 2. Verify availability of qualified personnel needed to develop and update schedule.
- 3. Discuss constraints, including work stages, interim milestones and partial Owner occupancy.
- 4. Review delivery dates for Owner-furnished products.
- 5. Review schedule for work of Owner's separate contracts.
- 6. Review time required for review of submittals and resubmittals.
- 7. Review requirements for tests and inspections by independent testing and inspecting agencies.
- 8. Review time required for completion and startup procedures.
- 9. Review and finalize list of construction activities to be included in schedule.
- 10. Review submittal requirements and procedures.
- 11. Review procedures for updating schedule.

1.6 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from entities involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.7 PRELIMINARY CONSTRUCTION SCHEDULE

- A. Bar-Chart Schedule: Submit preliminary horizontal bar-chart-type construction schedule within seven (7) days of date established for commencement of the Work.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first sixty (60) days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

1.8 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling".
- B. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

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C. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.

- 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- D. Activities: Treat each area of work as a separate numbered activity for each main element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than twenty (20) days, unless specifically allowed by Owner and Architect.
 - 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than sixty (60) days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 3. Submittal Review Time: Include review and resubmittal times indicated in Division 01, Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
 - 4. Startup and Testing Time: Include no fewer than fifteen (15) days for startup and testing.
 - 5. Commissioning Time: Include no fewer than fifteen (15) days for commissioning.
 - 6. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 - 7. Punch List and Final Completion: Include not more than thirty (30) days for completion of punch list items and final completion.
- E. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 - 1. Phasing (if applicable to the Project): Arrange list of activities on schedule by phase.
 - 2. Work under More Than One Contract: Include a separate activity for each contract.
 - 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 - 4. Products Ordered in Advance: Include a separate activity for each product. Include delivery dates.
 - 5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 01, Section "Summary". Delivery dates indicated stipulate the earliest possible delivery date.
 - 6. Work Restrictions: Show the effect of the following items on the schedule, where applicable for this Project:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Partial occupancy before Substantial Completion.
 - e. Use-of-premises restrictions.
 - f. Provisions for future construction.
 - g. Seasonal variations.
 - h. Environmental control.

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- 7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.
 - 1. Startup and placement into final use and operation.
- 8. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
 - a. Structural completion.
 - b. Permanent space enclosure.
 - c. Completion of mechanical installation.
 - d. Completion of electrical installation.
 - e. Substantial Completion.
- F. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the following interim milestones:
 - 1. Temporary enclosure and space conditioning.
- G. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
 - 1. Unresolved issues.
 - 2. Unanswered Requests for Information (RFI's).
 - 3. Rejected or unreturned submittals.
 - 4. Notations on returned submittals.
 - 5. Pending modifications affecting the Work and the Contract Time.
- H. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate final completion percentage for each activity.

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- I. Recovery Schedule: When periodic update indicates the Work is fourteen (14) or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.
- J. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
 - 1. Post copies in Project meeting rooms and temporary field offices.
 - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.9 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT-CHART) REQUIREMENTS

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within thirty (30) days of date established for commencement of the Work. Base schedule on the Preliminary Construction Schedule and whatever updates and feedback were received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 - 1. For construction activities that require three (3) months or longer to complete, indicate an estimated completion percentage in ten (10) percent increments within time bar.

1.10 REPORTS

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

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- 16. Services connected and disconnected.
- 17. Equipment or system tests and startups.
- 18. Partial completions and occupancies.
- 19. Substantial Completions authorized.
- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.
- C. Field Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

1.11 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner and Architect within one (1) day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner and Architect in advance when these events are known or predictable.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

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SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Requirements:

- 1. Division 01, Section "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.
- 2. Division 02, Section "Selective Demolition" for photographic documentation before selective demolition operations commence.

1.3 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files within three (3) days of taking photographs.
 - 1. Submit photos on a thumb-drive or by uploading to an Owner and Architect approved web-based Project management software site. Include copy of key plan indicating each photograph's location and direction.
 - 2. Identification: Provide the following information with each image description in file metadata tag:
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Name of Architect (firm name).
 - d. Name of Contractor.
 - e. Date photograph was taken.
 - f. Description of location, vantage point, and direction.
 - g. Unique sequential identifier keyed to accompanying key plan.

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1.4 FORMATS AND MEDIA

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

- B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- C. Metadata: Record accurate date and time from camera.
- D. File Names: Name media files with date and Project area and sequential numbering suffix.

1.5 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs with maximum depth of field and in focus.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Preconstruction Photographs: Before commencement of the Work, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Owner.
 - 1. Flag construction limits before taking construction photographs.
 - 2. Take adequate quantities of photographs to show existing conditions adjacent to property before starting the Work.
 - 3. Take adequate quantities of photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
 - 4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- C. Concealed Work Photographs: Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:
 - 1. Piping.
 - 2. Electrical conduit.
 - 3. Waterproofing and weather-resistant barriers.
 - 4. Sheathing replacement.
 - 5. Framing repairs.
- D. Periodic Construction Photographs: Take adequate quantities of photographs weekly coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- E. Final Completion Construction Photographs: Take adequate quantities of photographs after date of Substantial Completion for submission as Project Record Documents.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013233

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes requirements for the submittal schedule and administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals:
 - 1. Submittal schedule requirements.
 - 2. Administrative and procedural requirements for submittals.
- B. Architect and Architect's Consultants shall review Submittals for specification sections prepared by the Architect and Architect's Consultants (respectively).
- C. Submittals for scopes of work and/or specification sections not prepared by Architect or Architect's Consultants will be returned without review.

D. Related Sections:

- 1. Division 01, Section "Payment Procedures" for submitting Applications for Payment and the schedule of values.
- 2. Division 01, Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
- 3. Division 01, Section "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
- 4. Division 01, Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
- 5. Division 01, Section "Deferred Submittals" for General Contractor's responsibility for certain components of the Work that is being deferred for submittal the local governing iurisdiction.
- 6. Division 01, Section "Delegated Design Requirements" for General Contractor's responsibility for certain components of the Work for design-build systems and/or components under this project.
- 7. Division 01, Section "Closeout Procedures" for submitting warranties.
- 8. Division 01, Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
- 9. Division 01, Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
- 10. Division 02, through Division 33 for specific requirements for submittals in those Sections.

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1.3 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Submittals may be rejected for not complying with requirements. Action submittals are those submittals indicated in individual Specification Sections as action submittals.

B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as informational submittals.

1.4 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
 - 1. Contractor shall provide a complete "Submittal Schedule" prior to its mobilization onsite.
 - 2. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - 3. Initial Submittal: Submit concurrently with preliminary construction schedule. Include submittals required during the first sixty (60) days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - 4. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 - 5. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category: Action, informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.

1.5 SUBMITTAL FORMATS

A. Submittal Identification and Information: Place a permanent label or titleblock on each paper copy submittal, or electronic copy submittal, item for identification.

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1. General Contractor shall review submittal in its entirety, stamp with its appropriate firm's stamp, sign and date prior to submitting said submittal to the Architect.

- 2. Indicate name of firm or entity that prepared each submittal on label or title block.
- 3. Provide not less than one space having a 3- by 4-inch area (provide two locations where both Architect and Design Discipline need to stamp) on label or beside title block to record Contractor's review and approval markings and action taken by Architect. In addition, provide size of space required to record Contractor's review and approval markings.
- 4. Include the following information for processing and recording action taken:
 - a. Project name.
 - b. Date (and any revision dates).
 - c. Name of Architectural firm, address and phone number.
 - d. Retain first subparagraph below if a construction manager has been retained for Project.
 - e. Name of Construction Manager (if any on project), address and phone number.
 - f. Name of Contractor, address and phone number.
 - g. Name of subcontractor, address and phone number.
 - h. Name of manufacturer, address and phone number.
 - i. Name of supplier, address and phone number.
 - j. Revise first subparagraph below to suit Project and office practice.
 - k. Unique submittal number, including revision identifier.
 - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 087100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 087100.01.A).
 - 1. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 - m. Drawing number and detail references, as appropriate.
 - n. Indication of full or partial submittal.
 - o. Location(s) where product is to be installed, as appropriate.
 - p. Other necessary identification.
 - q. Remarks.
 - r. Signature of transmitter.
- B. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
 - 1. Assemble complete submittal package into a single indexed electronic file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 - 2. Name file with submittal number or other unique identifier, including revision identifier.
 - a. Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 087100.01). Resubmittals_shall include an alphabetic suffix after another decimal point (e.g., 087100.01.A).
 - 3. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Architect.

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4. Transmittal Form for Electronic Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Architect will discard submittals received from sources other than Contractor. Use electronic form acceptable to Architect, containing the following information:

- a. Project name.
- b. Date (and any revision dates).
- c. Name of Architectural firm, address and phone number.
- d. Architect's Project Number.
- e. Name of Construction Manager (if any on project), address and phone number.
- f. Name of Contractor, address and phone number.
- g. Name of firm or entity that prepared submittal.
- h. Name of subcontractor, address and phone number.
- i. Name of supplier, address and phone number.
- j. Name of manufacturer, address and phone number.
- k. Submittal number or other unique identifier, including revision identifier.
- 1. Number and title of appropriate Specification Section
- m. Drawing number and detail references, as appropriate.
- n. Location(s) where product is to be installed, as appropriate.
- o. Other necessary identification.
- 5. Metadata: Include the following information as keywords in the electronic submittal file metadata:
 - a. Project name.
 - b. Number and title of appropriate Specification Section.
 - c. Manufacturer name.
 - d. Product name.
- 6. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect or Architect's Consultants on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same identification information as related submittal.
- C. Submittals for Utilizing Web-Based Project Management Software: Prepare submittals as PDF files, or other format indicated by Project management software.
- D. Options: Identify options requiring selection by Architect.
- E. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- F. Electronic submittal procedures shall be required for this Project as follows:
 - 1. Action Submittals: Submit one (1) electronic submittal via e-mail of each submittal, unless otherwise indicated. Architect will return one (1) electronic submittal via e-mail.

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2. Informational Submittals: Submit one (1) electronic submittal via e-mail of each submittal, unless otherwise indicated. Architect will return one (1) electronic submittal via e-mail.

- 3. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 01, Section "Closeout Procedures".
- 4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked with approval notation from Architect and/or its Consultant's action stamp.
- J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- K. Use for Construction: Use only final submittals that are marked with approval notation from Architect or its Consultant's action stamp.

1.6 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 - 1. Email: Prepare submittals as PDF package, and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.
 - 2. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 - 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 - 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

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- a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. Submittal having been received after 1:00 PM at the office of the Architect, it shall be deemed as having been received on the next business working day. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
 - 1. Initial Review: Allow ten (10) business days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
- D. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow fifteen (15) business days for initial review of each submittal.
- E. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 - 1. Resubmittal Review: Allow ten (10) business days for review of each resubmittal.
- F. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- G. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.7 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. General: Architect may furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.
 - 1. Refer to Division 01, Section "Project Management and Coordination" for requirements related to use of Architect's digital data files.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 - 1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
 - 2. Mark each copy of each submittal to show which products and options are applicable.
 - 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts (strike through non-specific project items).
 - b. Manufacturer's product specifications (strike through non-specific project items).
 - c. Manufacturer's written recommendations.
 - d. Manufacturer's installation instructions.

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- e. Standard color charts (full range).
- f. Statement of compliance with specified referenced standards.
- g. Testing by recognized testing agency.
- h. Application of testing agency labels and seals.
- i. Notation of coordination requirements.
- j. Availability and delivery time information.
- k. Mill reports.
- 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
- 5. Submit Product Data concurrent with Samples.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Dimension: Clearly identify dimensions established by field measurement.
 - c. Fabrication and installation drawings.
 - d. Rough-in and setting diagrams.
 - e. Wiring diagrams showing field installed wiring; differentiate between manufacturer installed and field installed wiring.
 - f. Shop-work manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Compliance with specified standards.
 - j. Notation of coordination requirements.
 - k. Relationship and attachment to adjoining construction elements, systems, and components clearly indicated.
 - 1. Seal and signature of professional engineer and/or design professional if specified.
 - 2. Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm), but no larger than 24 by 36 inches (750 by 1067 mm).
 - 3. Shop drawing quality:
 - a. All line work shall be clean and crisp with no feathering or fading.
 - b. Line work important to the drawing shall be emphasized by increasing the line weight and density.
 - c. Text size shall be a minimum of 1/8-inch in height and shall be of a style easy to read, such as Helvetica style font.
 - d. Notes shall be clear and concise.

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D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

- 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
- 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
- 3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.
- 4. Web-Based Project Management Software: Prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
- 5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
- 6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one (1) full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
- 7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three (3) sets of Samples. Architect Owner will each retain one (1) sample sets; remainder will be returned. Contractor shall mark up and retain one returned Sample set as a project record Sample.

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1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.

- 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three (3) sets of paired units that show approximate limits of variations.
- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 - 1. Type of product. Include unique identifier for each product indicated in the Contract Documents.
 - 2. Manufacturer and product name, and model number if applicable.
 - 3. Number and name of room or space.
 - 4. Location within room or space.
- F. Contractor's Construction Schedule: Comply with requirements specified in Division 01, Section "Construction Progress Documentation."
- G. Application for Payment: Comply with requirements specified in Division 01, Section "Payment Procedures."
- H. Schedule of Values: Comply with requirements specified in Division 01, Section "Payment Procedures."
- I. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- J. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- K. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- L. Maintenance Data: Comply with requirements specified in Division 01, Section "Operation and Maintenance Data".

M. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be

- signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
- 2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- 4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- 5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- 6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on American Welding Society (AWS) forms. Include names of firms and personnel certified.

N. Test and Research Reports:

- 1. General: Comply with requirements specified in Division 01, Section "Quality Requirements".
- Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required
- 3. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- 4. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- 5. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- 6. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- 7. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.

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1.8 DELEGATED-DESIGN SERVICES

A. DISCLAIMER NOTICE: Known "Deferred Submittals" and "Design-Build" requirements will be indicated on the Architectural drawing cover sheet for this Project. When any Specification Section in this Project Manual or with the Contract Documents requires delegated-design services for this Project, then this Article 1.8 of this Specification Section shall apply as indicated below.

- B. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents per Divisions 01, "Deferred Submittals" and "Delegated Design Requirements", provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.
- C. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals (refer to "Article 1.5 Submittal Formats" and Article 1.6 Submittal Procedures" above for quantity and routing procedures), submit paper and/or electronic copies of certificate, signed and sealed by the responsible design professional in the State where the Project is located, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
 - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

1.9 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect. Submittals that do not include the Contractor's approval stamp, date, and signature will be returned without action.
- B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Division 01, Section "Closeout Procedures."
- C. Contractor's Approval: Stamp each submittal with a uniform, approval stamp indicating Contractor's approval. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1.10 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp, date and signature; and those will return them without action.

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B. Action Submittals: Architect and/or its Consultant will review each submittal, make marks to indicate corrections, modifications, or revisions required, and return it. Architect and/or its Consultant will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action, as follows:

- 1. Final Unrestricted Release: When a submittal is marked "NO EXCEPTION TAKEN," Work covered by submittal may proceed provided it complies with requirements of Contract Documents.
- 2. Final-But-Restricted Release: When a submittal is marked "MAKE CORRECTIONS NOTED," Work covered by submittal may proceed provided it complies with notations or corrections on submittal and requirements of Contract Documents.
- 3. Returned for Resubmittal: When a submittal is marked "REVISE AND RESUBMIT," do not proceed with Work covered by submittal, including purchasing, fabrication, delivery, or other activity.
 - a. Revise or prepare a new submittal according to notations and resubmit. Repeat as necessary to obtain an action releasing submittal.
 - b. Do not use, or allow others to use, submittals marked "REVISE AND RESUBMIT," at Project site or elsewhere where Work is in progress.
- 4. Returned for Resubmittal: When a submittal is marked "SUBMIT SPECIFIED ITEM," do not proceed with Work covered by submittal, including purchasing, fabrication, delivery, or other activity.
 - a. Revise or prepare a new submittal according to notations and resubmit. Repeat as necessary to obtain an action releasing submittal.
 - b. Do not use, or allow others to use, submittals marked "SUBMIT SPECIFIED ITEM," at Project site or elsewhere where Work is in progress.
- 5. Rejected Submittal: When a submittal is marked "REJECTED," do not proceed with Work covered by submittal, including purchasing, fabrication, delivery, or other activity.
 - a. Prepare a new submittal according to notations and resubmit. Repeat as necessary to obtain an action releasing submittal.
 - b. Do not use, or allow others to use, submittals marked "REJECTED," at Project site or elsewhere Work is in progress.
- 6. Submittals for Record: Where a submittal is for record purposes or special processing or other activity, Architect and/or its Consultant will return submittal marked "RECORD ONLY."
- 7. Final Unrestricted Release: When a submittal is marked "REVIEWED." Work covered by submittal has been received at the office of the Architect and/or its Consultant and has been reviewed and generally complies with the overall project design intent and may proceed provided it complies with requirements of Contract Document. This is usually reserved for "Design-Build" or "Delegated-Design" submittal systems or components that has been stamped and sealed by a Professional Engineer who is licensed in the State where the Project is located. The submittal review shall not be construed as a complete check and indicates only that information presented has been reviewed for general

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conformance with design intent for the overall project. The Architect and/or its Consultant are entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by the responsible delegated-design professional.

- C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- Partial submittals prepared for a portion of the Work will be reviewed when use of partial D. submittals has received prior approval from Architect.
- E. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- Architect will not review and will discard submittals received from sources other than F. Contractor.
- Unsolicited Submittals: Submittals not required by the Contract Documents will not be G. reviewed and will be discarded.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

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SECTION 013553 SECURITY PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 CONSTRUCTION/ MAINTENANCE BUILDING SECURITY RULES

- A. The Contractor shall enforce strict discipline and good order among the Contractor's employees, Subcontractors, and other persons carrying out the contract on District property. The Owner may require that the Contractor immediately remove from the project site and District property any employee or other person carrying out the contract that the District considers objectionable.
- B. District Personnel (i.e., Building Administrator, Custodian, or a building monitor etc.) must be present when a contractor is performing work within an existing school facility.
- C. Only District Personnel will deactivate the security system upon arriving and reactivate the system when they leave the facility.
 - 1. If the responsible District Personnel for a particular day changes during the day, the District Personnel shall coordinate this change in responsibility and advise the contractor's superintendent.
- D. Contractor personnel will not be furnished District security badges and/or access codes to the Building security system.
- E. The Contractor shall have a responsible party such as a superintendent, foreman, or supervisor on site during any work being performed by either their own forces or that of their subcontractors.
- F. The superintendent shall check in with the responsible District Personnel upon arrival and advise when all work is complete, contract personnel have left, and the area is secure.
- G. The Contractor's superintendent shall be responsible for security in areas where work is being performed as well as ingress and egress to that area.
- H. At the Owner's Representative's discretion, the superintendent may be issued a building key to allow access to areas where work is being performed.
- I. The superintendent shall maintain a daily log defining what areas within the building were accessed by Contractor personnel, which personnel from their firm were in the building, and which subcontracting firms were in the building.,

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J. Each of the Contractor's employees, Subcontractors' employees, and principals/owners involved at the site may, at the option of the District, be subject to a security check, at any time, through the Beaverton Police Department or other authority.

- K. Contractor shall perform or have performed criminal background checks for every employee on all active campus (i.e., children are present) projects prior to that employee's admittance to the project site. Once an employee passes the criminal background check, they need to get an ID badge and a hard hat sticker (not provided by BSD), which they must wear while they are on site at all times. Contractor may be fined up to \$500 for every worker working on site without the proper ID badge and a hat sticker. The following are the convicted crimes that may appear on the background check:
 - 1. Aggravated Murder of Murder
 - 2. Assault in the First Degree
 - 3. Kidnapping in the First Degree
 - 4. Rape in the First, Second, or Third Degree
 - 5. Sodomy in the First, Second, or Third Degree
 - 6. Unlawful Sex Penetration in the First or Second Degree
 - 7. Arson in the First Degree
 - 8. Sexual Abuse in the First, Second, or Third Degree
 - 9. Contributing to the Sexual Delinquency of a Minor
 - 10. Sexual Misconduct
 - 11. Public Misconduct
 - 12. Public Indecency
 - 13. Bigamy
 - 14. Incest
 - 15. Chile Neglect in the First Degree
 - 16. Endangering the Welfare of a Minor
 - 17. Using Child in Display of Sexually Explicit Conduct
 - 18. Sale or Exhibition of Visual Reproduction of Sexual Conduct by a Child
 - 19. Paying for Viewing of Sexual Conduct Involving a Child
 - 20. Encouraging Child Sex Abuse in First, Second or Third Degree
 - 21. Possession of Materials Depicting Sexual Explicit Conduct of a Child in the First or Second Degree
 - 22. Arson in the First Degree
 - 23. Robbery in the First Degree
 - 24. Treason
 - 25. Abuse of a Corpse in the First Degree
 - 26. Prostitution, Promoting Prostitution, or Compelling Prostitution
 - 27. Sadomasochistic Abuse or Sexual Conduct in a Live Show
 - 28. Furnishing, Sending, or Displaying Obscene Materials to Minors
 - 29. Exhibiting an Obscene Performance to a Minor
 - 30. Disseminating Obscene Materials
 - 31. Publicly Displaying Nudity or Sex for Advertising Purposes
 - 32. Distribution of Controlled Substance to Minors
 - 33. Manufacture or Delivery of Controlled Substance to Minor or Student within 1000 Feet of a School
 - 34. Attempt to Commit Any of the Above-Listed Crimes

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L. Smoking and any use of tobacco products is not allowed within 50 feet of the campus property. Contractor may be fined up to \$500 for each incident of tobacco use within the area of work by the Contractor or Subcontractors.

- M. Firearms are not allowed on campus property. Law enforcement will be contacted if any contractor personnel are in possession of a firearm on site (Including firearms located in a locked vehicle).
- N. Abusive, inappropriate, and/or foul language is strictly prohibited on active campus projects. Employees who abuse this rule will be asked to leave the project site.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013553

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SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner or Authorities Having Jurisdiction (AHJ) are not limited by provisions of this Section.

C. Related Sections:

- 1. Division 01, Section "Construction Progress Documentation" for developing a schedule of required tests and inspections.
- 2. Divisions 02 through 33 Sections for specific test and inspection requirements.

1.3 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five (5) previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

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C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

- 1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).
- D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
 - 1. Laboratory Mockups: Full-size physical assemblies constructed and tested at testing facility to verify performance characteristics.
 - 2. Integrated Exterior Mockups: Mockups of the exterior envelope constructed on-site as freestanding temporary built elements or as indicated in-place portions of permanent construction, consisting of multiple products, assemblies, and subassemblies, with cutaways enabling inspection of concealed portions of the Work.
 - a. Include each system, assembly, component, and part of the exterior wall and roof (where applicable) to be constructed for the Project. Colors of components shall be those selected by the Architect for use in the Project.
 - 3. Product Mockups: Mockups that may include multiple products, materials, or systems specified in a single Section.
 - 4. In-Place Mockups: Mockups constructed on-site in their actual final location as part of permanent construction.
- E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.
- F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to Authorities Having Jurisdiction (AHJ), to establish product performance and compliance with specified requirements.
- G. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- H. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

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I. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

J. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall have the same meaning as testing agency.

1.4 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Statement: Submit a statement, signed and sealed by the responsible design professional in the State where the Project is located, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.5 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two (2) or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect, in writing, for clarification before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect, in writing, for a decision before proceeding.

1.6 ACTION SUBMITTALS

- A. Mockup Shop Drawings: For integrated exterior mockups.
 - 1. Include plans, sections, elevations, and details, indicating material types, interfacing with other elements and systems, and size of mockup construction.
 - 2. Indicate manufacturer and model number of individual components.
 - 3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

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1.7 INFORMATIONAL SUBMITTALS

A. Contractor's Statement of Responsibility: When required by Authorities Having Jurisdiction, submit copy of written statement of responsibility submitted to Authorities Having Jurisdiction before starting work on the following systems:

- 1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
- 2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- B. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- C. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.
- D. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Description of test and inspection.
 - 3. Identification of applicable standards.
 - 4. Identification of test and inspection methods.
 - 5. Number of tests and inspections required.
 - 6. Time schedule or time span for tests and inspections.
 - 7. Entity responsible for performing tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.

1.8 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, telephone number, and email address of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.

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- 12. Name and signature of laboratory inspector.
- 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
 - 1. Name, address, and telephone number of technical representative making report.
 - 2. Statement on condition of substrates and their acceptability for installation of product.
 - 3. Statement that products at Project site comply with requirements.
 - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - 6. Statement whether conditions, products, and installation will affect warranty.
 - 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
 - 1. Name, address, and telephone number of factory-authorized service representative making report.
 - 2. Statement that equipment complies with requirements.
 - 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - 4. Statement whether conditions, products, and installation will affect warranty.
 - 5. Other required items indicated in individual Specification Sections.

1.9 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing

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engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 - 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- I. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens and test assemblies, mockups, and laboratory mockups; do not reuse products on Project.
 - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

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- J. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups at locations and at size(s) recommended by Contractor and approved by Owner and Architect.
 - 2. Notify Architect and Owner seven (7) days in advance of dates and times when mockups will be constructed.
 - 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
 - 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 5. Obtain Architect and Owner approval of mockups before starting corresponding work, fabrication, or construction.
 - a. Allow seven (7) days for initial review and each re-review of each mockup.
 - 6. Promptly correct unsatisfactory conditions noted by Architect's preliminary review, to the satisfaction of the Architect and Owner, before completion of final mockup.
 - 7. Approval of mockups by the Architect and Owner does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 8. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 9. Demolish and remove mockups when directed unless otherwise indicated.
- K. Integrated Exterior Mockups: Construct integrated exterior mockup according to approved Shop Drawings. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials. Comply with requirements in "Mockups" Paragraph.
 - 1. Coordinate construction of the mockup to allow observation of air barrier installation, flashings, air barrier integration with fenestration systems, and other portions of the building air/moisture barrier and drainage assemblies, prior to installation of veneer, cladding elements, and other components that will obscure the work.

1.10 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 - 2. Costs for retesting and re-inspecting construction that replaces or is necessitated by Work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

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- 1. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
- 2. Notify testing agencies at least twenty-four (24) hours in advance of time when Work that requires testing or inspection will be performed.
- 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
- 4. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
- 5. Submit additional copies of each written report directly to Authorities Having Jurisdiction, when they so direct.
- C. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - 1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 - 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected Work complies with or deviates from requirements.
 - 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 - 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 - 6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 01, Section "Submittal Procedures".
- F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. Contractor's Associated Requirements and Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
 - 1. Access to the Work.
 - 2. Incidental labor and facilities necessary to facilitate tests and inspections.

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- 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
- 4. Facilities for storage and field curing of test samples.
- 5. Delivery of samples to testing agencies.
- 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
- 7. Security and protection for samples and for testing and inspection equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Submit schedule within thirty (30) days of date established for commencement of the Work.
 - 1. Distribution: Distribute schedule to Owner, Architect, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.11 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by Authorities Having Jurisdiction as the responsibility of Owner, and as follows:
 - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 - 2. Notifying Owner, Architect and its Consultants, and Contractor promptly, in writing, of irregularities and deficiencies observed in the Work during performance of its services.
 - 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Owner, Architect and its Consultants, with copy to Contractor and to Authorities Having Jurisdiction.
 - 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 - 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 - 6. Retesting and re-inspecting corrected Work.

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PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's and Authorities' Having Jurisdiction reference during normal working hours.
 - 1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
 - 2. Comply with the Contract Document requirements for cutting and patching in Division 01, Section "Execution".
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

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SECTION 014100 - DEFERRED SUBMITTALS

PART 1 - GENERAL

A. Related Sections:

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

B. General Contractor Responsibilities:

- 1. The General Contractor shall provide the Name of the Manufacturer and the Name of the Professional Engineer, who is licensed in the State where the Work is being provided and installed, and be responsible for all submittals, including re-submittals to the local governing jurisdiction. The then named Professional Engineer shall stamp and seal the calculations and submittal documents for the systems and/or components being "Design-Build" by the General Contractor. This information shall be inserted within the local governing jurisdiction's permit sets of documents by the General Contractor. If the Architect and/or its Consultant's review is required by the Authorities Having Jurisdiction (AHJ), the Contractor, after fist reviewing for accuracy and compliance with the Contract Documents, shall provide the submittal to the Architect in accordance with Division 01, Section "Submittal Procedures". Drawings, Material Specifications, and calculations meeting specified requirements are to be submitted to the Architect and/or its Consultant for review for general compliance with the design intent and information expressed within the Contract Documents. Copies of the reviewed submittal documents will then be returned to the General Contractor for submittal to the local governing jurisdiction for their final approval and/or issuance of separate permit issued by the local governing jurisdiction, which shall be obtained by the General Contractor prior to installation.
- C. Deferred Submittals known at this time are indicated in the Contract Drawings.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION 014100

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SECTION 014110 - DELEGATED DESIGN REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Certain systems and/or components of the Work under this project are Design-Build. It is the General Contractor's responsibility to coordinate and assume or assign to a Design-Build Engineer the complete responsibility for the design, calculations, submittals, fabrication, transportation, and installation of the Design-Build systems and/or components as required in this Section. The Applicant is responsible for submitting to the local jurisdiction having authority all Design-Build documents required for the separate approval for each Design-Build system and/or component. There are no exceptions. Design-Build systems and/or components of this Work are defined as complete, operational systems, provided and ready for their intended use.
- B. The Architect's (or its consulting Engineer of Record) review of Design-Build submittals shall be for design intent and shall not lessen nor shift the responsibility from the Applicant or the assigned subcontractor to the Owner nor to the Architect (or its consulting Engineer of Record) design professional. The Owner shall not be responsible for paying for any delays, additional products, additional hours of work or overtime, restocking or rework required due to failure by the Applicant or the subcontractor to coordinate their work with the work of other trades on the project or to provide the Design-Build system and/or component in a timely manner to meet the Contractor's construction schedule for the project.
- C. Government Requirements: Follow the requirements of the governing authorities having jurisdiction over the project where the Work is being performed for code or regulated requirements current at the time of submission. The Applicant is responsible for coordinating and submitting all material required by the local governing jurisdiction so that the governing jurisdiction's review will not adversely affect the construction schedule. At or before the time of application, the Applicant shall meet with the local governing jurisdiction to identify Design-Build systems and/or components and how they are to be submitted and processed.
- D. Design-Build systems and/or components of the Work: Refer to Drawing documents for design-build and deferred submittals known at this time.
- E. Refer to Division 01, Section "Deferred Submittals" for requirements.
- F. Refer to systems descriptions in technical Sections of these Specifications for additional information on Design-Build work.

1.2 DEFINITIONS

A. Applicant: The entity applying for the Design-Build building permit and coordinating Design-Build systems and/or components with the basic building systems and/or components and with each other; which includes coordination with the other project required submittals.

B. Architect or Engineer of Record (which is to mean the firm/entity): Architect or Engineer registered and licensed in the State where the Project is located, engaged by the Owner to provide plans and computations, and establish design criteria for Design-Build systems and/or components and specifications required by the governing authorities having jurisdiction for principle project systems and/or components.

- C. Contractor/General Contractor (which is to mean the firm/entity): Contractor registered and licensed in the State where the Project is located, engaged by the Owner to construct the Project in accordance with the Contract Drawing and Specification Documents.
- D. Design-Build Engineer: Professional Engineer registered and licensed in the State where the Project is located, engaged by the Contractor to provide and seal the plans, computations, and specifications required by the governing authorities having jurisdiction for the designated design-build specialty system and/or component, in accordance with criteria set forth in Contract Drawing and Specification Documents.
- E. Design-Build Engineer's Seal: Certification, located on the plans, computations, and specifications signifying that they were designed and prepared under the direct supervision of the Design-Build Engineer whose name appears thereon.
- F. Review Stamp: Certification that the Architect or Engineer of Record has reviewed plans, computations, and specifications bearing the seal of the Design-Build Engineer, verifying general conformance with information given and design concept set forth in Contract Drawing and Specification Documents.
- G. Approval Stamp: Certification that the governing authorities having jurisdiction has reviewed the Design-Build submittal and finds it acceptable with respect to applicable code compliance.

1.3 SUBMITTALS

- A. Comply with pertinent provisions of Division 01, Section "Submittal Procedures".
- B. Design-Build submittals are required to show complete criteria, design assumptions, details, calculations, submittals, instructions for fabrication, assembly, installation and interface with other trades, unless noted otherwise in the specific Specification Section.
- C. Complete submittals shall be submitted with the Design-Build Engineer's seal and calculations for that portion of Work. Submittals without required calculations, without the Design-Build Engineer's seal, and which have not been reviewed by the Contractor will not be reviewed by the Architect and its Consultants.

1.4 SPECIFIC REQUIREMENTS

A. Some Design-Build systems and/or components are indicated in the Contract Documents for design intent. The purpose is to have the Contractor be responsible for providing, coordinating, and installing the Design-Build system and/or component.

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B. Design-Build components attached to the structural frame or supplemental to the structural frame shall be designed for the anticipated loads as outlined in the Contract Documents. These Design-Build components shall be coordinated with the appropriate subcontractors.

C. Load reactions at the interface between the Design-Build systems and/or components and the structural frame shall be clearly defined to allow for a review by the Architect or Engineer of Record.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014110

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SECTION 014200 - REFERENCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- H. "Provide": Furnish and install, complete and ready for the intended use.
- I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

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

- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
 - 1. For standards referenced by applicable building codes, comply with dates of standards as listed in building codes.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. The information in this list is subject to change and is believed to be accurate as of the date of the Contract Documents.
 - 1. AABC Associated Air Balance Council; <u>www.aabc.com</u>.
 - 2. AAMA American Architectural Manufacturers Association; www.aamanet.org.
 - 3. AAPFCO Association of American Plant Food Control Officials; www.aapfco.org.
 - 4. AASHTO American Association of State Highway and Transportation Officials; www.transportation.org.
 - 5. AATCC American Association of Textile Chemists and Colorists; www.aatcc.org.
 - 6. ABMA American Bearing Manufacturers Association; www.americanbearings.org.
 - 7. ABMA American Boiler Manufacturers Association; www.abma.com.
 - 8. ACI American Concrete Institute; (Formerly: ACI International); www.concrete.org.
 - 9. ACPA American Concrete Pipe Association; <u>www.concrete-pipe.org</u>.
 - 10. AEIC Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
 - 11. AF&PA American Forest & Paper Association; www.afandpa.org.
 - 12. AGA American Gas Association; www.aga.org.
 - 13. AHAM Association of Home Appliance Manufacturers; www.aham.org.
 - 14. AHRI Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
 - 15. AI Asphalt Institute; www.asphaltinstitute.org.
 - 16. AIA American Institute of Architects (The); www.aia.org.
 - 17. AISC American Institute of Steel Construction; www.aisc.org.
 - 18. AISI American Iron and Steel Institute; www.steel.org.
 - 19. AITC American Institute of Timber Construction; www.aitc-glulam.org.
 - 20. AMCA Air Movement and Control Association International, Inc.; www.amca.org.
 - 21. ANSI American National Standards Institute; www.ansi.org.
 - 22. AOSA Association of Official Seed Analysts, Inc.; www.aosaseed.com.
 - 23. APA APA The Engineered Wood Association; www.apawood.org.
 - 24. APA Architectural Precast Association; www.archprecast.org.

- 25. API American Petroleum Institute; www.api.org.
- 26. ARI Air-Conditioning & Refrigeration Institute; (See AHRI).
- 27. ARI American Refrigeration Institute; (See AHRI).
- 28. ARMA Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
- 29. ASCE American Society of Civil Engineers; www.asce.org.
- 30. ASCE/SEI American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
- 31. ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
- 32. ASME ASME International; (American Society of Mechanical Engineers); www.asme.org.
- 33. ASSE American Society of Sanitary Engineering; www.asse-plumbing.org.
- 34. ASSP American Society of Safety Professionals (The); www.assp.org.
- 35. ASTM ASTM International; <u>www.astm.org</u>.
- 36. ATIS Alliance for Telecommunications Industry Solutions; www.atis.org.
- 37. AVIXA Audiovisual and Integrated Experience Association; (Formerly: Infocomm International); www.soundandcommunications.com.
- 38. AWEA American Wind Energy Association; www.awea.org.
- 39. AWI Architectural Woodwork Institute; www.awinet.org.
- 40. AWMAC Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
- 41. AWPA American Wood Protection Association; www.awpa.com.
- 42. AWS American Welding Society; <u>www.aws.org</u>.
- 43. AWWA American Water Works Association; www.awwa.org.
- 44. BHMA Builders Hardware Manufacturers Association; www.buildershardware.com.
- 45. BIA Brick Industry Association (The); www.gobrick.com.
- 46. BICSI BICSI, Inc.; www.bicsi.org.
- 47. BIFMA BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
- 48. BISSC Baking Industry Sanitation Standards Committee; <u>www.bissc.org</u>.
- 49. BWF Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
- 50. CDA Copper Development Association; www.copper.org.
- 51. CE Conformite Europeenne; http://ec.europa.eu/growth/single-market/ce-marking/.
- 52. CEA Canadian Electricity Association; www.electricity.ca.
- 53. CFFA Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
- 54. CFSEI Cold-Formed Steel Engineers Institute; <u>www.cfsei.org</u>.
- 55. CGA Compressed Gas Association; <u>www.cganet.com</u>.
- 56. CIMA Cellulose Insulation Manufacturers Association; www.cellulose.org.
- 57. CISCA Ceilings & Interior Systems Construction Association; www.cisca.org.
- 58. CISPI Cast Iron Soil Pipe Institute; www.cispi.org.
- 59. CLFMI Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
- 60. CPA Composite Panel Association; www.compositepanel.org.
- 61. CRI Carpet and Rug Institute (The); www.carpet-rug.org.
- 62. CRRC Cool Roof Rating Council; www.coolroofs.org.
- 63. CRSI Concrete Reinforcing Steel Institute; www.crsi.org.
- 64. CSA CSA Group; www.csa-group.org.
- 65. CSI Construction Specifications Institute (The); www.csiresources.org.
- 66. CSSB Cedar Shake & Shingle Bureau; www.cedarbureau.org.
- 67. CTA Consumer Technology Association; www.cta.tech.

- 68. CTI Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.coolingtechnology.org.
- 69. CWC Composite Wood Council; (See CPA).
- 70. DASMA Door and Access Systems Manufacturers Association; www.dasma.com.
- 71. DHA Decorative Hardwoods Association; (Formerly: Hardwood Plywood & Veneer Association); www.decorativehardwoods.org.
- 72. DHI Door and Hardware Institute; www.dhi.org.
- 73. ECA Electronic Components Association; (See ECIA).
- 74. ECAMA Electronic Components Assemblies & Materials Association; (See ECIA).
- 75. ECIA Electronic Components Industry Association; <u>www.eciaonline.org</u>.
- 76. EIA Electronic Industries Alliance; (See TIA).
- 77. EIMA EIFS Industry Members Association; <u>www.eima.com</u>.
- 78. EJMA Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
- 79. EOS/ESD Association; (Electrostatic Discharge Association); www.esda.org.
- 80. ESTA Entertainment Services and Technology Association; (See PLASA).
- 81. ETL Intertek (See Intertek); <u>www.intertek.com</u>.
- 82. EVO Efficiency Valuation Organization; <u>www.evo-world.org</u>.
- 83. FCI Fluid Controls Institute; www.fluidcontrolsinstitute.org.
- 84. FIBA Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
- 85. FIVB Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
- 86. FM Approvals FM Approvals LLC; <u>www.fmglobal.com</u>.
- 87. FM Global FM Global; (Formerly: FMG FM Global); www.fmglobal.com.
- 88. FRSA Florida Roofing, Sheet Metal Contractors Association, Inc.; www.floridaroof.com.
- 89. FSA Fluid Sealing Association; www.fluidsealing.com.
- 90. FSC Forest Stewardship Council U.S.; <u>www.fscus.org</u>.
- 91. GA Gypsum Association; www.gypsum.org.
- 92. GANA Glass Association of North America; (See NGA).
- 93. GS Green Seal; www.greenseal.org.
- 94. HI Hydraulic Institute; www.pumps.org.
- 95. HI/GAMA Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
- 96. HMMA Hollow Metal Manufacturers Association; (See NAAMM).
- 97. HPVA Hardwood Plywood & Veneer Association; (See DHA).
- 98. HPW H. P. White Laboratory, Inc.; www.hpwhite.com.
- 99. IAPSC International Association of Professional Security Consultants; www.iapsc.org.
- 100. IAS International Accreditation Service; <u>www.iasonline.org</u>.
- 101. ICBO International Conference of Building Officials; (See ICC).
- 102. ICC International Code Council; www.iccsafe.org.
- 103. ICEA Insulated Cable Engineers Association, Inc.; www.icea.net.
- 104. ICPA International Cast Polymer Alliance; www.icpa-hq.org.
- 105. ICRI International Concrete Repair Institute, Inc.; www.icri.org.
- 106. IEC International Electrotechnical Commission; www.iec.ch.
- 107. IEEE Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
- 108. IES Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
- 109. IESNA Illuminating Engineering Society of North America; (See IES).
- 110. IEST Institute of Environmental Sciences and Technology; www.iest.org.
- 111. IGMA Insulating Glass Manufacturers Alliance; www.igmaonline.org.
- 112. IGSHPA International Ground Source Heat Pump Association; www.igshpa.org.

- 113. II Infocomm International; (See AVIXA).
- 114. ILI Indiana Limestone Institute of America, Inc.; www.iliai.com.
- 115. Intertek Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
- 116. ISA International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
- 117. ISAS Instrumentation, Systems, and Automation Society (The); (See ISA).
- 118. ISFA International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
- 119. ISO International Organization for Standardization; www.iso.org.
- 120. ISSFA International Solid Surface Fabricators Association; (See ISFA).
- 121. ITU International Telecommunication Union; www.itu.int/home.
- 122. KCMA Kitchen Cabinet Manufacturers Association; www.kcma.org.
- 123. LMA Laminating Materials Association; (See CPA).
- 124. LPI Lightning Protection Institute; www.lightning.org.
- 125. MBMA Metal Building Manufacturers Association; www.mbma.com.
- 126. MCA Metal Construction Association; <u>www.metalconstruction.org</u>.
- 127. MFMA Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
- 128. MFMA Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
- 129. MHIA Material Handling Industry of America; www.mhia.org.
- 130. MIA Marble Institute of America; (See NSI).
- 131. MMPA Moulding & Millwork Producers Association; www.wmmpa.com.
- 132. MPI Master Painters Institute; www.paintinfo.com.
- 133. MSS Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
- 134. NAAMM National Association of Architectural Metal Manufacturers; www.naamm.org.
- 135. NACE NACE International; (National Association of Corrosion Engineers International); www.nace.org.
- 136. NADCA National Air Duct Cleaners Association; www.nadca.com.
- 137. NAIMA North American Insulation Manufacturers Association; www.naima.org.
- 138. NALP National Association of Landscape Professionals; www.landscapeprofessionals.org.
- 139. NBGOA National Building Granite Quarries Association, Inc.; www.nbgqa.com.
- 140. NBI New Buildings Institute; www.newbuildings.org.
- 141. NCAA National Collegiate Athletic Association (The); www.ncaa.org.
- 142. NCMA National Concrete Masonry Association; www.ncma.org.
- 143. NEBB National Environmental Balancing Bureau; www.nebb.org.
- 144. NECA National Electrical Contractors Association; www.necanet.org.
- 145. NeLMA Northeastern Lumber Manufacturers Association; www.nelma.org.
- 146. NEMA National Electrical Manufacturers Association; www.nema.org.
- 147. NETA InterNational Electrical Testing Association; www.netaworld.org.
- 148. NFHS National Federation of State High School Associations; www.nfhs.org.
- 149. NFPA National Fire Protection Association; www.nfpa.org.
- 150. NFPA NFPA International; (See NFPA).
- 151. NFRC National Fenestration Rating Council; www.nfrc.org.
- 152. NGA National Glass Association (The); (Formerly: Glass Association of North America); www.glass.org.
- 153. NHLA National Hardwood Lumber Association; www.nhla.com.
- 154. NLGA National Lumber Grades Authority; www.nlga.org.
- 155. NOFMA National Oak Flooring Manufacturers Association; (See NWFA).

- 156. NOMMA National Ornamental & Miscellaneous Metals Association; www.nomma.org.
- 157. NRCA National Roofing Contractors Association; www.nrca.net.
- 158. NRMCA National Ready Mixed Concrete Association; www.nrmca.org.
- 159. NSF NSF International; www.nsf.org.
- 160. NSI National Stone Institute; (Formerly: Marble Institute of America); www.naturalstoneinstitute.org.
- 161. NSPE National Society of Professional Engineers; www.nspe.org.
- 162. NSSGA National Stone, Sand & Gravel Association; www.nssga.org.
- 163. NTMA National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
- 164. NWFA National Wood Flooring Association; www.nwfa.org.
- 165. PCI Precast/Prestressed Concrete Institute; www.pci.org.
- 166. PDI Plumbing & Drainage Institute; www.pdionline.org.
- 167. PLASA PLASA; (Formerly: ESTA Entertainment Services and Technology Association); www.plasa.org.
- 168. RCSC Research Council on Structural Connections; www.boltcouncil.org.
- 169. RFCI Resilient Floor Covering Institute; www.rfci.com.
- 170. RIS Redwood Inspection Service; <u>www.redwoodinspection.com</u>.
- 171. SAE SAE International; www.sae.org.
- 172. SCTE Society of Cable Telecommunications Engineers; www.scte.org.
- 173. SDI Steel Deck Institute; www.sdi.org.
- 174. SDI Steel Door Institute; www.steeldoor.org.
- 175. SEFA Scientific Equipment and Furniture Association (The); www.sefalabs.com.
- 176. SEI/ASCE Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
- 177. SIA Security Industry Association; <u>www.siaonline.org</u>.
- 178. SJI Steel Joist Institute; www.steeljoist.org.
- 179. SMA Screen Manufacturers Association; www.smainfo.org.
- 180. SMACNA Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
- 181. SMPTE Society of Motion Picture and Television Engineers; www.smpte.org.
- 182. SPFA Spray Polyurethane Foam Alliance; www.sprayfoam.org.
- 183. SPIB Southern Pine Inspection Bureau; www.spib.org.
- 184. SPRI Single Ply Roofing Industry; www.spri.org.
- 185. SRCC Solar Rating & Certification Corporation; www.solar-rating.org.
- 186. SSINA Specialty Steel Industry of North America; www.ssina.com.
- 187. SSPC SSPC: The Society for Protective Coatings; www.sspc.org.
- 188. STI Steel Tank Institute; www.steeltank.com.
- 189. SWI Steel Window Institute; www.steelwindows.com.
- 190. SWPA Submersible Wastewater Pump Association; www.swpa.org.
- 191. TCA Tilt-Up Concrete Association; www.tilt-up.org.
- 192. TCNA Tile Council of North America, Inc.; www.tileusa.com.
- 193. TEMA Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
- 194. TIA Telecommunications Industry Association (The); (Formerly: TIA/EIA Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
- 195. TIA/EIA Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
- 196. TMS The Masonry Society; www.masonrysociety.org.
- 197. TPI Truss Plate Institute; www.tpinst.org.
- 198. TPI Turfgrass Producers International; www.turfgrasssod.org.
- 199. TRI Tile Roofing Institute; www.tileroofing.org.

- 200. UL Underwriters Laboratories Inc.; www.ul.com.
- 201. UNI Uni-Bell PVC Pipe Association; www.uni-bell.org.
- 202. USAV USA Volleyball; www.usavolleyball.org.
- 203. USGBC U.S. Green Building Council; www.usgbc.org.
- 204. USITT United States Institute for Theatre Technology, Inc.; www.usitt.org.
- 205. WA Wallcoverings Association; www.wallcoverings.org.
- 206. WASTEC Waste Equipment Technology Association; www.wastec.org.
- 207. WCLIB West Coast Lumber Inspection Bureau; www.wclib.org.
- 208. WCMA Window Covering Manufacturers Association; www.wcmanet.org.
- 209. WDMA Window & Door Manufacturers Association; www.wdma.com.
- 210. WI Woodwork Institute; www.wicnet.org.
- 211. WSRCA Western States Roofing Contractors Association; www.wsrca.com.
- 212. WWPA Western Wood Products Association; www.wwpa.org.
- C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
 - 1. DIN Deutsches Institut für Normung e.V.; www.din.de.
 - 2. IAPMO International Association of Plumbing and Mechanical Officials; www.iapmo.org.
 - 3. ICC International Code Council; www.iccsafe.org.
 - 4. ICC-ES ICC Evaluation Service, LLC; www.icc-es.org.
- D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.
 - 1. COE Army Corps of Engineers; www.usace.army.mil.
 - 2. CPSC Consumer Product Safety Commission; www.cpsc.gov.
 - 3. DOC Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
 - 4. DOD Department of Defense; www.quicksearch.dla.mil.
 - 5. DOE Department of Energy; <u>www.energy.gov</u>.
 - 6. EPA Environmental Protection Agency; <u>www.epa.gov</u>.
 - 7. FAA Federal Aviation Administration; www.faa.gov.
 - 8. FG Federal Government Publications; www.gpo.gov/fdsys.
 - 9. GSA General Services Administration; www.gsa.gov.
 - 10. HUD Department of Housing and Urban Development; www.hud.gov.
 - 11. LBL Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
 - 12. OSHA Occupational Safety & Health Administration; www.osha.gov.
 - 13. SD Department of State; <u>www.state.gov</u>.
 - 14. TRB Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
 - 15. USDA Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
 - 16. USDA Department of Agriculture; Rural Utilities Service; www.usda.gov.
 - 17. USDOJ Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
 - 18. USP U.S. Pharmacopeial Convention; www.usp.org.

- 19. USPS United States Postal Service; www.usps.com.
- E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
 - 1. CFR Code of Federal Regulations; Available from Government Printing Office; www.govinfo.gov.
 - 2. DOD Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
 - 3. DSCC Defense Supply Center Columbus; (See FS).
 - 4. FED-STD Federal Standard; (See FS).
 - 5. FS Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.
 - a. Available from Defense Standardization Program; www.dsp.dla.mil.
 - b. Available from General Services Administration; <u>www.gsa.gov</u>.
 - c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org.
 - 6. MILSPEC Military Specification and Standards; (See DOD).
 - 7. USAB United States Access Board; www.access-board.gov.
 - 8. USATBCB U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).
- F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
 - 1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
 - 2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
 - 3. CDHS; California Department of Health Services; (See CDPH).
 - 4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.caliaq.org.
 - 5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
 - 6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
 - 7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservice.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

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SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Related Requirements:

- 1. Division 01, Section "Summary" for work restrictions and limitations on utility interruptions.
- 2. Division 01, Section "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
- 3. Division 01, Section "Execution" for progress cleaning requirements.
- 4. Division 22 Plumbing; Division 23 Heating, Ventilation and Air Conditioning; and Division 26 Electrical for temporary piping, heat, ventilation, and humidity requirements for products in those Sections.
- 5. Division 31 Earthwork and Division 33 Utilities for temporary work requirements for products in those Sections.

1.3 USE CHARGES

- A. General: Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to Architect, occupants of Project, testing agencies, and Authorities Having Jurisdiction.
- B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

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1.4 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

- B. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and Authorities Having Jurisdiction. Indicate Contractor personnel responsible for management of fireprevention program.
- D. Moisture- and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.
 - 1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.
 - 2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
 - 3. Indicate methods to be used to avoid trapping water in finished work.
- E. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste handling procedures.
 - 5. Other dust-control measures.
- F. Site Dewatering Plan: Submit coordination drawing and narrative that indicates intended site dewatering plan during construction.
- G. Integrated Pest Management (IPM) Plan:
 - 1. Definition: An approach to pest management that uses current, comprehensive information on the life cycles of pests and their interactions with the environment to identify and implement effective methods of pest control with the least possible hazard to people, property, and the environment.
 - 2. Plan shall describe procedures and controls for protecting resident, construction and materials from pests and rodents during construction and shall include the following:
 - a. Initial building and site inspection.

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- b. Developing an IPM Plan appropriate to the building, site, and local ecosystems to manage and/or mitigate pest and rodents at and around the Project site during construction.
- c. Implementing the approved IPM Plan.
- d. Documenting IPM services.
- 3. After award of Contract and prior to the commencement of the Work, schedule and conduct meeting with Owner and Architect to discuss the proposed IPM Plan and to develop mutual understanding relative to details of environmental protection.
- 4. Pesticides: When use of pesticides is approved by Owner, Contractor shall be responsible for application of pesticides according to the label.
 - a. Regulatory compliance.
 - 1) All pesticides used by the Contractor must be registered with the U.S. Environmental Protection Agency (EPA) and applicable jurisdictions.
 - 2) Transport, handling, and use of all pesticides shall be in strict accordance with the manufacturer's label instructions and all applicable laws and regulations.
 - b. Contractor shall not store any pesticide product in the project building(s) and site.
 - c. Prohibited Pesticides: Contractor shall not apply any pesticide product that has not been included in the approved IPM Plan or approved in writing by the Owner.
 - d. Minimization of Risk:
 - 1) When pesticide use is necessary, Contractor shall employ the least risk pesticide, most precise application technique, and minimum quantity of pesticide necessary to achieve control.
 - 2) Application of pesticides in any inside or outside area shall not occur unless visual inspection or monitoring devices indicate the presence of pests in that specific area.
 - 3) Recommendations for preventive pesticide treatments in areas where inspection indicates a potential insect or rodent infestation will be evaluated by the Owner on a case-by-case basis. Written approval must be granted by the Owner prior to any preventive pesticide application.
 - 4) Notification: Contractor shall notify Owner at least forty-eight (48) hours in advance of the application of any pesticide. Exceptions may be made for applications made for emergencies, where an imminent threat to health exists (e.g., stinging insects). For emergency applications, notification must be made as soon as practical.
 - e. Pest Removal: Remove traps, bait boxes, and their contents according to the approved IPM Plan and as requested by Owner.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for Authorities Having Jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

- C. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction, including but not limited to:
 - 1. Building Code requirements.
 - 2. Local Zoning regulations and requirements.
 - 3. Occupational Safety and Health Association (OSHA) in the State where the Work is being performed.
 - 4. Utility company regulations.
 - 5. Fire and Rescue Department rules, regulations and requirements.
 - 6. Police laws, rules and regulations.
 - 7. Environmental protection regulations.
- D. Accessible Temporary Egress: Comply with applicable provisions in the United States Access Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Portable Chain-Link Fencing: Minimum 2-inch (50-mm), 0.148-inch- (3.8-mm-) thick, galvanized steel, chain-link fabric fencing; minimum 6 feet (1.8 m) high with galvanized steel pipe posts; minimum 2-3/8-inch- (60-mm-) OD line posts and 2-7/8-inch- (73-mm-) OD corner and pull posts, with 1-5/8-inch- (42-mm-) OD top and bottom rails. Provide concrete bases for supporting posts. Provide and secure fabric mesh screening over the chain-link fabric allowing wind to penetrate and while providing minimal pedestrian viewing from the exterior perimeter into the Project Site area.
- B. Lumber and Plywood: Comply with requirements in Division 06, Section "Rough Carpentry".

2.2 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
- B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Architect and construction personnel office activities and to accommodate Project meetings specified in other

Division 01 Sections. Keep office clean and orderly. Furnish and equip office (as a minimum) as follows:

- 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
- 2. Conference room of sufficient size to accommodate meetings of twelve (12) individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- (1.2-m-) square tack board.
- 3. Drinking water.
- 4. Coffee machine and supplies.
- 5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F (20 to 22 deg C).
- 6. General lighting fixtures capable of maintaining average illumination of 20 fc (215 lx) at desk height.
- 7. Temporary Stairs: Provide temporary stair access to the mobile unit.
- 8. Lighting: 50 foot candles at desks.
- 9. Provide Project Identification sign on trailer with name of A/E Team members.
- 10. Emergency First Aid supplies complying with governing regulations.
- 11. Bulletin Board (4' high x 6' long) in its entirety.
- 12. (2) two metal office desks (5' long x 3' wide).
- 13. (2) two office chairs.
- 14. (2) four drawer legal size metal file cabinets (lockable).
- 15. (2) metal book shelf unit 4' long with (4) shelves.
- 16. (1) layout/conference table (6'long x 2'-6" wide x 2'-6" high) with (6) chairs.
- 17. White Marker Board (4' high x 6' long).
- 18. Hanging drawing rack with hangers for (12) sets of 30" x 42" drawings.
- 19. (1) complete set of current local building code books.
- 20. (2) metal waste paper trash cans.
- 21. Bottled water cooler unit that will allow both hot and cold water dispensing
- 22. Provide both heating and air conditioning throughout the unit.
- 23. Provide payment for all utility charges for the duration of the construction project.
- 24. Provide payment for and services for cleaning and maintenance of the facility for the duration of the construction project.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.
- D. Temporary Toilet Units: Provide lockable self-contained single-occupant toilet units of the chemical, aerated recirculation type, properly vented and fully enclosed with a glass fiber reinforced polyester shell or similar nonabsorbent material that comply with governing jurisdiction requirements.
 - 1. The Contractor and all construction personnel may not use completed toilet rooms where they are being installed for this Project.
- E. Temporary Scaffolding and Shoring: As may be required for this Project, the Contractor shall provide OSHA approved temporary scaffolding and shoring during the course of construction to

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accommodate installation of Project elements and construction operation activities for this Project.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to Authorities Having Jurisdiction, and marked for intended location and application.
 - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Division 01, Section "Closeout Procedures."
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Division 01, Section "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

3.3 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
- B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, safety shower and eyewash facilities, and drinking water for use of construction personnel. Comply with requirements of Authorities Having Jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
- E. Temporary Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
 - 1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.
- F. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
 - 1. Install electric power service overhead unless otherwise indicated.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
 - 2. Install lighting for Project identification sign.
- H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line for each field office.
 - 1. Post a list of important telephone numbers, including but not limited to:
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Contractor's emergency after-hours telephone number.

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- e. Architect's office.
- f. Engineer's office.
- g. Owner's office.
- h. Principal sub-contractors' field and home offices.
- 2. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.
- I. Electronic Communication Service: When required by the Owner or required by the Contractor to perform the Work of this Project, Contractor shall provide secure WiFi wireless connection to internet with provisions for access by Architect and Owner.
- J. Project Computer: Provide a desktop computer in the primary field office adequate for use by Architect and Owner to access Project electronic documents and maintain electronic communications. Equip computer with not less than the following:
 - 1. Processor: Intel Core i5 or i7.
 - 2. Memory: Sixteen (16) gigabyte.
 - 3. Disk Storage: 1-terrabyte hard-disk drive and combination DVD-RW/CD-RW drive.
 - 4. Display: 24-inch (610-mm) LCD monitor with 256-Mb dedicated video RAM.
 - 5. Full-size keyboard and mouse.
 - 6. Network Connectivity: Gigabit.
 - 7. Operating System: Microsoft Windows 10 Professional.
 - 8. Productivity Software:
 - a. Microsoft Office Professional, 2013 or higher, including Word, Excel, and Outlook.
 - b. Adobe Reader DC, 11.0 or higher.
 - c. Bluebeam version 2017 or higher.
 - 9. Printer: "All-in-one" unit equipped with printer server, combining color printing, photocopying, scanning, and faxing, or separate units for each of these three functions.
 - 10. Internet Service: Broadband modem, router, and ISP, equipped with hardware firewall, providing minimum 50-Mbps upload and 50-Mbps download speeds at each computer.
 - 11. Internet Security: Integrated software, providing software firewall, virus, spyware, phishing, and spam protection in a combined application.
 - 12. Backup: External hard drive, minimum (2) terrabytes, with automated backup software providing daily backups.

3.4 SUPPORT FACILITIES INSTALLATION

A. Comply with the following:

- 1. Provide construction for temporary field offices, shops, and sheds located within construction area or within 30 feet (9 m) of building lines that is noncombustible according to ASTM E136. Comply with NFPA 241.
- 2. Utilize designated area within existing building for temporary field offices.
- 3. Maintain support facilities until Architect schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial

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Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

- B. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations.
 - 1. Provide dust-control treatment that is nonpolluting and non-tracking. Reapply treatment as required to minimize dust.
- C. Traffic Controls: Comply with requirements of Authorities Having Jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- D. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- E. Storage and Staging: Use Owner designated areas of Project site for storage and staging needs.
- F. Dewatering Facilities and Drains: Comply with requirements of Authorities Having Jurisdiction. Maintain Project site, excavations, and construction free of water.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.
 - 2. Remove snow and ice as required to minimize accumulations.
- G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Identification Signs: Provide Project identification signs as indicated on Drawings.
 - 2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 - 3. Project team Member Signs: Provide an area for the Architect and its design consultant firms to display their firms' temporary signage. The Architect and it consultants will provide their firms' temporary signage. The Contractor shall install said signage and return it to the respective design firm upon project completion.
 - 4. Maintain and touch up signs so they are legible at all times.
- H. Waste Disposal Facilities: Comply with requirements specified in Division 01, Section "Construction Waste Management and Disposal."
- I. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of Authorities Having Jurisdiction. Comply with progress cleaning requirements in Division 01, Section "Execution."
- J. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.
 - 1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

K. Existing Elevator Use: Use of Owner's existing elevator will be permitted, provided elevator is cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore elevator to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.

- 1. Do not load elevator beyond their rated weight capacity.
- 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
- L. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
 - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.
- M. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
- C. Temporary Erosion and Sedimentation Control: Comply with requirements of EPA Construction General Permit or Authorities Having Jurisdiction, whichever is more stringent.
- D. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to undisturbed areas and to adjacent properties and walkways, according to requirements of EPA Construction General Permit or Authorities Having Jurisdiction, whichever is more stringent.
 - 1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
 - 2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.

3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.

- 4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.
- E. Stormwater Control: Comply with requirements of Authorities Having Jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- F. Tree and Plant Protection: Comply with requirements specified in Division 01, Section "Temporary Tree and Plant Protection."
- G. Tree and Plant Protection: Install temporary fencing located as indicated or outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.
- H. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by Authorities Having Jurisdiction.
- I. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- J. Barricades, Warning Signs, and Lights: Comply with requirements of Authorities Having Jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- K. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by Authorities Having Jurisdiction. Provide signage directing occupants to temporary egress.
- L. Covered Walkway: When required by authorities having jurisdiction, Owner's insurance or Contractor's safety program: Erect protective, covered walkway for passage of individuals through or adjacent to Project site. Coordinate with entrance gates, other facilities, and obstructions. Comply with regulations of authorities having jurisdiction.
 - 1. Construct covered walkways using scaffold or shoring framing.
 - 2. Provide overhead decking, protective enclosure walls, handrails, barricades, warning signs, exit signs, lights, safe and well-drained walkways, and similar provisions for protection and safe passage.
 - 3. Paint and maintain appearance of walkway for duration of the Work.
- M. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is incomplete, insulate temporary enclosures.

2. Contractor shall provide a Weather Mitigation Plan for the Owner to review and approve in the event of a rain event during construction of this Project. The Plan shall establish procedures for temporary protection as well as indicated emergency contacts. Refer to Division 07, Section "Preparation for Re-Roofing" for additional requirements.

- N. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
 - 2. Where fire-resistance-rated temporary partitions are indicated or are required by Authorities Having Jurisdiction, construct partitions according to the rated assemblies.
 - 3. Provide walk-off mats at each entrance through temporary partition.
- O. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of Authorities Having Jurisdiction.
 - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
 - 4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

- A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.
- B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 - 1. Protect porous materials from water damage.
 - 2. Protect stored and installed material from flowing or standing water.
 - 3. Keep porous and organic materials from coming into prolonged contact with concrete.
 - 4. Remove standing water from decks.
 - 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
 - 1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 - 2. Keep interior spaces reasonably clean and protected from water damage.

3. Periodically collect and remove waste containing cellulose or other organic matter.

- 4. Discard or replace water-damaged material.
- 5. Do not install material that is wet.
- 6. Discard and replace stored or installed material that begins to grow mold.
- 7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.
- D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
 - 1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 - 2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
 - 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

3.7 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
 - 2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 01, Section "Closeout Procedures."

END OF SECTION 015000

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SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

B. Related Requirements:

- 1. Division 01, Section "Substitution Request form" to be used when requesting a substitution.
- 2. Division 01, Section ""References" for applicable industry standards for products specified.
- 3. Division 01, Section "Substitution Procedures" for administrative and procedural requirements governing requests for product substitutions.
- 4. Division 01, Section "Closeout Procedures" for administrative and procedural requirements for Substantial Completion procedures, Final Completion procedures, Warranties and Final Cleaning for Contract closeout.
- 5. Divisions 02 through 33 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-

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service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
 - 1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification.
- D. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- E. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
 - 1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
 - 2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.
- F. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Division, 01, Section "Submittal Procedures."
- G. Substitution: Refer to Division 01, Section "Substitution Procedures" for definition and limitations on substitutions.

1.4 SUBMITTALS

A. Product List: Submit a list, in tabular from, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.

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1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.

- 2. Form: Tabulate information for each product under the following column headings:
 - a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.
 - h. Identification of items that require early submittal approval for scheduled delivery date.
- 3. Initial Submittal: Within thirty (30) days after date of commencement of the Work, submit three (3) copies of initial product list. Include a written explanation for omissions of data and for variations from Contract requirements.
 - a. At Contractor's option, initial submittal may be limited to product selections and designations that must be established early in Contract period.
- 4. Completed List: Within sixty (60) days after date of commencement of the Work, submit three (3) copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
- 5. Architect's Action: Architect will respond in writing to Contractor within fifteen (15) days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.
- B. Comparable Product Requests: Submit three (3) copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of a comparable product request. Architect will notify Contractor of approval or rejection of proposed comparable product request within fifteen (15) days of receipt of request, or seven (7) days of receipt of additional information or documentation, whichever is later.
 - a. Form of Approval: As specified in Division 01, Section "Submittal Procedures".
 - b. Use product specified if Architect cannot make a decision on use of a comparable product request within time allocated.
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 01, Section "Submittal Procedures". Show compliance with requirements.

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1.5 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling:

- 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
- 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
- 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

- 1. Store products to allow for inspection and measurement of quantity or counting of units.
- 2. Store materials in a manner that will not endanger Project structure.
- 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
- 4. Store cementitious products and materials on elevated platforms.
- 5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
- 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
- 7. Protect stored products from damage and liquids from freezing.
- 8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location(s) with Owner.

1.7 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

1. Manufacturer's Warranty: Written standard warranty form furnished by individual

- manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.Special Warranty: Written warranty required by the Contract Documents to extend time
- 2. Special Warranty: Written warranty required by the Contract Documents to extend time limit(s) provided by manufacturer's warranty or to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
 - 3. Refer to Divisions 02 through 33 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 01, Section "Closeout Procedures".

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Architect will make selection.
 - 5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
 - 6. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
 - 7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved", comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

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- a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."
- 2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."
- 3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."
- 4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.
 - a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.
- 5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
- 6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.
 - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.
- 7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and

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other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

- a. For approval of products by unnamed manufacturers, comply with requirements in Division 01, Section "Substitution Procedures" for substitutions for convenience.
- C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 01, Section "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.
- E. Sustainable Product Selection: Where Specifications require product to meet sustainable product characteristics, select products complying with indicated requirements. Comply with requirements in Division 01 sustainability requirements Section and individual Specification Sections.
 - 1. Select products for which sustainable design documentation submittals are available from manufacturer.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with the following requirements:
 - 1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.

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- 3. Evidence that proposed product provides specified warranty.
- 4. List of similar installations for completed projects, with project names and addresses and names and addresses of architects and owners, if requested.
- 5. Samples, if requested.
- B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation, as specified in Division 01, Section "Submittal Procedures."
 - 1. Form of Approval of Submittal: As specified in Division 01, Section "Submittal Procedures."
 - 2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.
- C. Submittal Requirements, Two-Step Process: Approval by the Architect of Contractor's request for use of comparable product is not intended to satisfy other submittal requirements. Comply with specified submittal requirements.
- D. Submittal Requirements, Single-Step Process: When acceptable to Architect, incorporate specified submittal requirements of individual Specification Section in combined submittal for comparable products. Approval by the Architect of Contractor's request for use of comparable product and of individual submittal requirements will also satisfy other submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

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SECTION 016550 - PRODUCT DELIVERY, STORAGE, AND HANDLING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Quality Assurance.
- 2. Product delivery.
- 3. Product storage.
- 4. Product handling.
- 5. Protection of installed Products.
- 6. Damaged Products.

1.3 DEFINITIONS

A. Product: Materials, systems and equipment provided by Contractor.

1.4 QUALITY ASSURANCE

- A. Deliver in accordance with manufacturer's instructions, using means and methods that will limit damage, deterioration, loss, and theft.
- B. Source Limitations: Wherever possible, select related Products and Products of same kind from single source suppliers and manufacturers.
- C. Compatibility: Where Product choice is an option, furnish Product based upon compatibility with other Product options, specified Products, and approved Products.
- D. Where possible, provide interchangeable components by same manufacture for each Product.
- E. Labels and Nameplates: Do not permanently attach or imprint labels or trademarks on surfaces of Products exposed to view and at building exterior.
 - 1. This does not apply to operating instructions on equipment and life safety warning labels.
 - 2. Where labels are required to indicate code compliance, locate on inconspicuous surfaces.

1.5 PRODUCT DELIVERY

A. Schedule Product deliveries to meet construction schedule and in time to facilitate inspection prior to installation.

- B. Associated cost increases due to failure to meet accelerated delivery schedules and deliveries of long lead-time products are responsibility of Contractor.
- C. Coordinate to avoid conflict with work and site conditions.
 - 1. Limit long term site storage, overcrowding of limited storage space, and conflict with available equipment and personnel for handling Products.
 - 2. Move site storage that interferes with work of separate contacts.
- D. Coordinate delivery to limit storage time for Product that are flammable, hazardous, easily damaged, subject to deterioration, or liable for theft or loss.
- E. Deliver Products in manufacturer's original protective containers or packaging, complete with intact and legible identifying labels and instructions for handling, storing, unpacking, protecting and installing.
- F. Clearly mark component parts of partial deliveries of Products to permit ease of identification, consolidation, and assembly.
- G. Promptly inspect shipment. Verify that quantities are correct and that products are protected and undamaged.

1.6 PRODUCT STORAGE

- A. Store Products immediately upon delivery, and protect until installed in the Work. Store in accordance with manufacturer's written instructions, with seals and labels intact and legible.
- B. Store sensitive Products in weather tight, climate-controlled environment, maintaining temperatures and humidity, favorable to Product.
- C. Store unpacked Products on shelves, in bins, or neatly stacked, accessible for inspection.
- D. For exterior storage of fabricated products, place on sloped platforms, blocking, or skids to support minimum 4 inches above ground.
- E. Cover Products subject to discoloration or deterioration with impervious sheet covering.
 - 1. Provide ventilation to avoid moisture condensation or potential degradation of Product.
 - 2. Avoid use of non-vented plastic or canvas shelters that could create humidity chambers.
- F. Store loose granular materials on solid surfaces such as paved areas, plywood, or sheet materials in a well-drain area. Prevent mixing with foreign matter.
- G. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.

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

1.7 PRODUCT HANDLING

- A. Provide equipment and personnel necessary to handle Products, including those furnished by Owner, by methods to prevent soiling, damage, or loss of Products and protective packaging.
- B. Provide additional protection during handling as necessary to prevent scraping, marring, and other damage to Products and surrounding surfaces.
- C. Handle Products by methods to prevent bending or overstressing.
- D. Lift heavy components only at designated lifting points.

1.8 PROTECTION OF INSTALLED PRODUCTS

- A. Protect installed Products to prevent damage from subsequent operations. Remove protective devices when no longer needed, prior to completion of work.
- B. Provide protective coverings and control traffic to prevent surface damage to finished installations. Make allowance to protect from subsequent work.

1.9 DAMAGED PRODUCTS

A. Promptly remove damaged and deteriorated Products from premises. Replace with new undamaged materials conforming to manufacturer's written recommendation.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 016550

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SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:
 - 1. Examination.
 - 2. Preparation.
 - 3. Construction Layout.
 - 4. Installation of the Work.
 - 5. Cutting and patching.
 - 6. Coordination of Owner's portion of the Work.
 - 7. Coordination of Owner-installed products.
 - 8. Progress cleaning.
 - 9. Starting and adjusting.
 - 10. Protection of installed construction.

B. Related Requirements:

- 1. Division 01, Section "Summary" for coordination of Owner-furnished products, Owner-performed work, Owner's separate contracts, and limits on use of Project site.
- 2. Division 01, Section "Closeout Procedures" for final Project Record Documents and final cleaning.
- 3. Division 02, Section "Selective Demolition" for demolition and removal of selected portions of the building.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.4 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

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- 1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
- 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
- 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
- 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Comply with requirements specified in other Sections.
 - 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with sustainable design requirements.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.
- C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
 - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - 1. Description of the Work, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.
 - 2. List of detrimental conditions, including substrates.
 - 3. List of unacceptable installation tolerances.
 - Recommended corrections.
- D. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with Authorities Having Jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before

fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect in accordance with requirements in Division 01, Section "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks and existing conditions. If discrepancies are discovered, notify Architect promptly in writing.
- B. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.
- C. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- D. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
 - 1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 - 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

3.5 INSTALLATION

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb, and make horizontal work level.

- 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
- 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
- 4. Maintain minimum headroom clearance per code in occupied spaces and in unoccupied spaces, unless otherwise indicated on Drawings.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure satisfactory results as judged by Architect. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.
- F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels or noise levels above 95db, whichever is determined to be lower.
- G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 - 2. Allow for building movement, including thermal expansion and contraction.
 - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- I. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Architect. Fit exposed connections together to form hairline joints.
- J. Repair or remove and replace damaged, defective, or nonconforming Work.
 - 1. Comply with Division 01, Section "Closeout Procedures" for repairing or removing and replacing defective Work.

K. Hazardous Materials: Use products, cleaners, and installation materials that are not considered or known to be hazardous.

3.6 CUTTING AND PATCHING

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.
- C. Temporary Support: Provide temporary support of Work to be cut.
- D. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- E. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Division 01, Section "Summary."
- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 - 4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 5. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.

- 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
- 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
- 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.
- 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
- 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.7 COORDINATION OF OWNER'S PORTION OF THE WORK

- A. Site Access: Provide access to Project site for Owner's construction personnel and Owner's separate contractors.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel and Owner's separate contractors.
 - 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.

3.8 PROGRESS CLEANING

A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

- 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
- 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
- 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
 - a. Use containers intended for holding waste materials of type to be stored.
- 4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where Work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Division 01, Sections "Temporary Facilities and Controls" and "Construction Waste Management and Disposal".
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to ensure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in the Contract Documents.
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Division 01, Section "Quality Requirements."

3.10 PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.
- C. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- D. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION 017300

SECTION 017400 - CLEANING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes progress cleaning requirements for maintaining Project building(s) and site in a standard of cleanliness during construction period.
- B. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

C. Related Sections:

- 1. Division 01, Section "Temporary Facilities and Control", for rodent and pest control, and removal of temporary facilities.
- 2. Division 01, Section "Construction Waste Management and Disposal" administrative and procedural requirements for recycling nonhazardous demolition and construction waste and Disposing of nonhazardous demolition and construction waste.
- 3. Division 01, Section "Closeout Procedures" for final cleaning requirements for Substantial Completion.

1.2 QUALITY ASSURANCE

A. In addition to standards described in this Section, comply with applicable requirements of governmental agencies having jurisdiction.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
- B. Personnel and Equipment: Provide personnel and equipment as needed to maintain specified standard of cleanliness.

PART 3 - EXECUTION

3.1 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.

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- 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 degrees F.
- 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to local jurisdictional regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution and safety of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- G. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- H. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- I. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.2 CLEANING

- A. Cleaning: "Cleaning," for purpose of this Section, except as may be specifically provided elsewhere, shall be interpreted as meaning level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and materials.
- B. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 017400

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SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Implementation.
 - 2. Salvaging nonhazardous demolition and construction waste.
 - 3. Recycling nonhazardous demolition and construction waste (General).
 - 4. Recycling nonhazardous demolition and construction waste.
 - 5. Disposing of nonhazardous demolition and construction waste.

B. Related Requirements:

1. Division 02, Section "Selective Demolition" for disposition of waste resulting from partial demolition of buildings, structures, and site improvements.

1.3 DEFINITIONS

- A. Construction Waste: Building, structure, and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.
- B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.
- C. Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.
- D. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.
- E. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- F. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.

1.4 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within seven (7) days of date established for the Notice to Proceed.

1.5 INFORMATIONAL SUBMITTALS

- A. Waste Reduction Progress Reports: Concurrent with each Application for Payment, submit report. Include the following information:
 - 1. Material category.
 - 2. Generation point of waste.
 - 3. Total quantity of waste in tons (tonnes).
 - 4. Quantity of waste salvaged, both estimated and actual in tons (tonnes).
 - 5. Quantity of waste recycled, both estimated and actual in tons (tonnes).
 - 6. Total quantity of waste recovered (salvaged plus recycled) in tons (tonnes).
 - 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- B. Waste Reduction Calculations: Before request for Substantial Completion, submit calculated end-of-Project rates for salvage, recycling, and disposal as a percentage of total waste generated by the Work.
- C. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
- D. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
- E. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
- F. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.6 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management coordination of projects with similar requirements.

1.7 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Identification: Indicate anticipated types and quantities of demolition, site-clearing and construction waste generated by the Work. Include estimated quantities and assumptions for estimates.

- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
 - 1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
 - 2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - 3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 - 4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 - 5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
 - 6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

- A. General: Implement approved waste management plan. **Contractor shall use "Best Practice" for** handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
- B. Waste Management Coordinator: Engage a waste management coordinator to be responsible for implementing, monitoring, and reporting status of waste management work plan.
- C. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
 - 1. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.
- D. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged and recycled.

2. Comply with Division 01, Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING NONHAZARDOUS DEMOLITION AND CONSTRUCTION WASTE

- A. Comply with requirements in Division 02, Section "Selective Demolition" for salvaging nonhazardous demolition and construction waste.
- B. Salvaged Items for Reuse in the Work:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.
 - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- C. Salvaged Items for Sale and Donation: Not permitted on Project site without Owner's written approval.
- D. Salvaged Items for Owner's Use:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area designated by Owner.
 - 5. Protect items from damage during transport and storage.

3.3 RECYCLING NONHAZARDOUS DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.
- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.

1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.

- a. Inspect containers and bins for contamination and remove contaminated materials if found.
- 2. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
- 3. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
- 4. Store components off the ground and protect from the weather.
- 5. Remove recyclable waste from Owner's property and transport to recycling receiver or processor as often as required to prevent overfilling bins.

3.4 RECYCLING NONHAZARDOUS DEMOLITION AND CONSTRUCTION WASTE

- A. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.
- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
 - 1. Pulverize concrete to maximum 4-inch (100-mm) size (maximum).
- C. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- D. Metals: Separate metals by type.
 - 1. Structural Steel: Stack members according to size, type of member, and length.
 - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- E. Asphalt Shingle Roofing: Separate organic and glass-fiber asphalt shingles and felts. Remove and dispose of nails, staples, and accessories.
- F. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- G. Metal Suspension System: Separate metal members, including trim and other metals from acoustical panels and tile, and sort with other metals.
- H. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
 - 1. Store clean, dry carpet and pad in a closed container or trailer provided by carpet reclamation agency or carpet recycler.
- I. Carpet Tile: Remove debris, trash, and adhesive.
 - 1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by carpet reclamation agency or carpet recycler.

J. Piping: Reduce piping to straight lengths and store by material and size. Separate supports, hangers, valves, sprinklers, and other components by material and size.

- K. Conduit: Reduce conduit to straight lengths and store by material and size.
- L. Lamps: Separate lamps by type and store according to requirements in 40 CFR 273.

3.5 RECYCLING NONHAZARDOUS DEMOLITION AND CONSTRUCTION WASTE

A. Packaging:

- 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
- 2. Polystyrene Packaging: Separate and bag materials.
- 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
- 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.

B. Wood Materials:

- 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
- 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
- D. Paint: Seal containers and store by type.

3.6 DISPOSAL OF NONHAZARDOUS DEMOLITION AND CONSTRUCTION WASTE

- A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to Authorities Having Jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner's property.
- C. Burning: Do not burn waste materials.

END OF SECTION 017419

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SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.

B. Related Requirements:

- 1. Division 01, Section "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
- 2. Division 01, Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
- 3. Division 01, Section "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.3 ACTION SUBMITTALS

- A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- B. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From Authorities Having Jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest-control inspection.

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1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Certificates of Release: Obtain and submit releases from Authorities Having Jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
 - 5. Submit testing, adjusting, and balancing records.
 - 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of ten (10) days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
 - 1. Advise Owner of pending insurance changeover requirements.
 - 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 3. Complete startup and testing of systems and equipment.
 - 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 - 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Division 01, Section "Demonstration and Training."
 - 6. Advise Owner of changeover in utility services.
 - 7. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 8. Complete final cleaning requirements.
 - 9. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of ten (10) days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

- 1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
- 2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
 - 1. Submit a final Application for Payment in accordance with Division 01, Section "Payment Procedures."
 - 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 - 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 - 4. Submit pest-control final inspection report.
- B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of ten (10) days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 - 1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 - 1. Organize list of spaces in sequential order, starting with exterior areas first and then proceeding from lowest floor to highest floor, listed by room or space number.
 - 2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
 - 3. Include the following information at the top of each page:

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- a. Project name.
- b. Date.
- c. Name of Architect.
- d. Name of Contractor.
- e. Page number.
- 4. Submit list of incomplete items in the following format:
 - a. PDF Electronic File: Architect will return annotated file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
 - 1. Submit on digital media acceptable to Architect.

D. Warranties in Paper Form:

- 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
- 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
- 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- E. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

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

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1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
 - b. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - c. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - d. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
 - e. Vacuum and mop concrete.
 - f. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
 - g. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - h. Remove labels that are not permanent.
 - i. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - j. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - k. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - 1. Clean ducts, blowers, and coils.
 - m. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
 - n. Clean strainers.
 - o. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Division 01, Section "Temporary Facilities and Controls." Prepare written report.

D. Construction Waste Disposal: Comply with waste-disposal requirements in Division 01, Sections "Temporary Facilities and Controls" and "Construction Waste Management and Disposal".

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations required by Division 01, Section "Execution" before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces and touching up with matching materials. Where damaged or worn items cannot be repaired or restored, provide replacements. Restore damaged construction and permanent facilities used during construction to specified condition.
 - 1. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - 2. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.

END OF SECTION 017700

CLOSEOUT LOG: BSD International School Re-Roof

	e-B Project number 8314				REQUIREMENTS	PER SPE	REQUIREMENTS PER SPECIFICATIONS (YES/NO)					
SPEC	SPECIFICATION DESCRIPTION	SUBCONTRACTOR	ОВМ	Recvd	WARRANTY	Recvd	EXTRA STOCK MATERIAL	Recvd	OWNER TRAINING	Recvd	AS-BUILT	Recvd
DIVISION	DIVISION 05 - METALS											
0.000	C disk correct in access on	CLE										I
DIVISION	DIVISION 06 - WOOD, PLASTICS AND COMPOSITES	OMPOSITES										
				1								
NOISING	BULLISION ON IMPERMAL AND MOISTING	ш										
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DIVISION (DIVISION 08 - OPENINGS											
				1								
NOINING	DIVISION 23 - HEATING VENTIL ATING AND AIR CONDITIONING	AND AID CONDITION	UNIT									
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DIVISION 2	DIVISION 26 - ELECTRICAL											
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SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Closeout Submittals (Operation and Maintenance manuals).
 - 2. Operation and maintenance documentation directory manuals.
 - 3. Requirements for, Operation, and Maintenance Manuals.

B. Related Requirements:

- 1. Division 01, Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
- 2. Division 01, Section "Closeout Procedures" for warranty manuals. Copies of warranties shall be included in Operation and Maintenance manuals.
- 3. Division 01, Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
- 4. Divisions 02 through 33 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 CLOSEOUT SUBMITTALS

- A. Manual Content: Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, as required by Owner, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Owner will comment on whether content of operation and maintenance submittals is acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Organize Operation and Maintenance manuals into an orderly sequence based on the table of contents of Project Manual. Submit manuals in the following format:
 - 1. Submit in digital format (PDF) on digital media acceptable to Owner. Enable reviewer comments on draft submittals.

C. Initial Manual Submittal: Submit draft hard copy of each manual at least thirty (30) days before commencing demonstration and training. Owner will comment on whether general scope and content of manual are acceptable. Submit electronic copy for initial review and comment by Owner. Owner will return to Contractor for preparing final manual submittal.

- D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least fifteen (15) days before commencing demonstration and training. Owner will return copy with comments.
 - 1. Correct or revise each manual to comply with Owner's comments. Submit copies of each corrected manual within fifteen (15) days of receipt of Owner's comments and prior to commencing demonstration and training.
 - 2. Submit final manuals electronically via Owner's electronic project management system.
- E. Comply with Division 01, Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Bookmark individual documents based on file names in accordance with Owner naming conventions. Name document files to correspond to project specifications used in manual directory and table of contents. Group documents for each specification section into individual composite bookmarked files. Configure electronic manual to display bookmark panel on opening file.
 - 3. Enable inserted reviewer comments on draft submittals.

1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

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PART 2 - PRODUCTS (not used)

PART 3 - PRODUCTS

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each specification section in Owner approved digital format and submittal.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable. Provide documentation in Owner approved digital format and submittal.
 - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- C. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation. Provide documentation in Owner approved digital format and submittal.
 - 1. Do not use original project record documents as part of operation and maintenance manuals.
 - 2. Comply with requirements of newly prepared record Drawings in Division 01, Section "Project Record Documents."
- D. Comply with Division 01, Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017823

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SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Record specifications.
 - 3. Record Product Data.
 - 4. Miscellaneous Record Submittals.

B. Related Requirements:

- 1. Division 01, Section "Contract Modification Procedures" for coordinating and implementing modifications to the Contract Documents during construction.
- 2. Division 01, Section "Project Management and Coordination" for coordinating and implementing modifications to the Contract Documents during construction.
- 3. Division 01, Section "Construction Progress Documentation" for coordinating and implementing modifications to the Contract Documents during construction.
- 4. Division 01, Section "Execution".
- 5. Division 01, Section "Closeout Procedures" for general closeout procedures.
- 6. Division 01, Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
- 7. Divisions 02 through 33 Sections for specific requirements for project record documents of the Work in those Sections.

1.3 DEFINITIONS

A. "Record Drawings" and "Record Specifications": When the term "Record Drawings" and the term "Record Specifications" are used within this specification Section and within the Project Manual itself, those terms shall be defined and shall mean to say "As-Built Drawings" and "As-Built Specifications", as prepared by the Contractor. Furthermore, those documents shall be labeled by the Contractor as such and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as project record documents of the Work as constructed by the Contractor.

CLOSEOUT SUBMITTALS

1.4

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit copies of Record Drawings as follows:
 - a. Initial Submittal:
 - 1) Submit PDF electronic files of scanned record prints and one (1) paper-copy set(s) of marked-up record prints.
 - 2) Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - b. Final Submittal:
 - 1) Submit one (1) complete set of PDF electronic files of scanned record prints.
 - 2) Submit three (3) paper-copy set(s) of marked-up record prints.
 - 3) Print each drawing, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit one (1) complete set of annotated PDF electronic files of scanned Record Project specifications and three (3) paper copies, including addenda and Contract modifications.
- C. Record Product Data: Submit one (1) complete set of annotated PDF electronic files of scanned Record Project Data and three (3) paper copies of each submittal.
 - 1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.
- D. Miscellaneous Record Submittals: Refer to other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit two (2) complete paper copy sets of each submittal.
- E. Reports: Submit written report on a regular bi-monthly basis indicating items incorporated in Project record documents concurrent with progress of the Work, including modifications, concealed conditions, field changes, product selections, and other notations incorporated.

1.5 RECORD DRAWINGS

- A. Record Prints: Maintain one (1) set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.

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- b. Accurately record information in an acceptable drawing technique.
- c. Record data as soon as possible after obtaining it.
- d. Record and check the markup before enclosing concealed installations.
- e. Cross-reference record prints to corresponding photographic documentation.
- 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Architect's written orders.
 - 1. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
- 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
- 4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
- 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
- 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Newly Prepared Record Drawings: Prepare new Drawings instead of preparing Record Drawings where Architect determines that neither the original Contract Drawings nor Shop Drawings are suitable to show actual installation.
 - 1. New Drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.
 - 2. Consult Architect for proper scale and scope of detailing and notations required to record the actual physical installation and its relation to other construction. Integrate newly prepared Record Drawings into Record Drawing sets; comply with procedures for formatting, organizing, copying, binding, and submitting.
- C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
 - 1. Record Prints: Organize record prints into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
 - 2. Format: Annotated PDF electronic file with comment function enabled.

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- 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.
- 4. Identification: As follows:
 - a. Project name.
 - b. Date.
 - c. Designation "PROJECT RECORD DRAWINGS."
 - d. Name of Architect.
 - e. Architect's project number.
 - f. Name of Contractor.

1.6 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, addenda, and Contract modifications.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 - 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 - 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
 - 5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.
- B. Format: Submit record specifications as scanned PDF electronic file(s) of marked-up paper copy of Specifications.

1.7 RECORD PRODUCT DATA

- A. Recording: Maintain one (1) copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.
- B. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - 3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.
- C. Format: Submit Record Product Data as scanned PDF electronic file(s) of marked-up paper copy of Product Data.

1.

Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

MISCELLANEOUS RECORD SUBMITTALS 1.8

- Assemble miscellaneous records required by other Specification Sections for miscellaneous A. record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous Record Submittals as paper copy.
 - Include miscellaneous Record Submittals directory organized by specification section 1. number and title.

1.9 MAINTENANCE OF RECORD DOCUMENTS

- A. Recording: Maintain one (1) copy of each submittal during the construction period for project record document purposes. Post changes and modifications to Project Record Documents as they occur. Do not wait until the end of Project to start updating the Record Documents, start early as possible.
- B. Maintenance of Record Documents: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's and its Consultants' reference during normal working hours during the course of construction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017839

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SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

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

B. Related Sections:

- 1. Division 01, Section "Project Management and Coordination" for requirements for preinstruction conferences.
- 2. Division 01, Section "Operations and Maintenance Data" for assembling training modules into a training manual organized in coordination with requirements of this Section.
- 3. Divisions 02 through 33 Sections for specific requirements for demonstration and training for products in those Sections.

1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Qualification Data: For facilitator and instructor.
- C. Attendance Record: For each training module, submit list of participants and length of instruction time.
- D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

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1.4 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings: Submit two (2) copies within seven (7) days of end of each training module.

- 1. Identification: On each copy, provide the following information:
 - a. Name and address of Project.
 - b. Name and address of Owner.
 - c. Name and address of Instructor.
 - d. Name and address of Architect or Engineer as appropriate.
 - e. Architect's project number.
 - f. Name and address of Contractor.
 - g. Name of Module and Date of Demonstration and Training.
- 2. Transcript: Prepared on 8-1/2-by-11-inch (215-by-280-mm) paper, punched and bound in heavy-duty, three-ring, vinyl-covered binders. Mark appropriate identification on front and spine of each binder.
- 3. At completion of training, submit complete training manual(s) for Owner's use prepared in same paper and PDF file format required for operation and maintenance manuals specified in Division 01, Section "Operation and Maintenance Data."

1.5 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01, Section "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Division 01, Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
 - 1. Inspect and discuss locations and other facilities required for instruction.
 - 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 - 3. Review required content of instruction.
 - 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.6 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.7 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections. The individual training instruction program shall include, as a minimum but not necessarily limited to, the following modules for systems and equipment not part of a system (Please Note The systems or items listed below may or may not be part of this Project. However, where they are part of this Project, their disposition shall be followed.):
 - 1. HVAC System: Including air-handling equipment, air distribution systems, HVAC instrumentation and controls.
 - 2. Fire-protection System: Including fire alarm and fire-extinguishing system.
 - 3. Refrigeration System: Including condensers pumps and distribution piping.
 - 4. Electrical service and distribution: Including transformers, switchboards and panel boards
 - 5. Lighting equipment and controls.
 - 6. Intrusion detection System.
 - 7. Conveying System(s).
 - 8. Residential appliances.
 - 9. Motorized and manual doors: Automatic entrance doors and overhead coiling doors.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 - 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Systems and equipment operation manuals.
 - c. Systems and equipment maintenance manuals.
 - d. Product maintenance manuals.

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- e. Project Record Documents.
- f. Identification systems.
- g. Warranties and bonds.
- h. Maintenance service agreements and similar continuing commitments.
- 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.
 - b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
- 4. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - 1. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
 - a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
 - a. Diagnostic instructions.
 - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
 - a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning.
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.

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- 8. Repairs: Include the following:
 - a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

1.8 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Division 01, Section "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

1.9 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Owner, through Architect, with at least seven (7) days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
- F. Cleanup: Collect used and leftover educational materials and remove from Project site. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

General Specification for **BSD International School of Beaverton Re-Roof**Project Number: **20Y105.01**Date: **February 9, 2021**Release Phase: **Bid Set**

PART 2 - PRODUCTS

PART 3 - EXECUTION

END OF SECTION 017900

Project Number: 20Y105.01 Release Phase: Bid Set

SECTION 022623 - LIMITED SUPPLEMENTAL ASBESTOS SURVEY REPORT

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes information that is made available to the Contractor and is part of the Project's Contract Documents. Information is made available is for Contractors' convenience and is intended to supplement rather than serve in lieu of Contractors' own investigations. Information supplied are not warranty or guarantee, either expressed or implied, of existing conditions.

B. Related Requirements

1. Appendix B: Supplemental Asbestos Survey Report prepared by Beaverton School District's Consultant TRC.

1.2 AVAILIBLE PROJECT INFORMATION

A. Asbestos Abatement Contractor Bid Documents and Specifications, prepared by Beaverton School District's Consultant TRC (next page).

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

ASBESTOS ABATEMENT CONTRACTOR BID DOCUMENT AND SPECIFICATIONS

International School of Beaverton Roof and HVAC Upgrade Project

17770 SW Blanton Street Beaverton, OR 97078

Prepared for:

Beaverton School District

16550 SW Merlo Road Beaverton, Oregon 97006

Submitted: December 28, 2020

Prepared By:



4105 SE International Way, Suite 505 Milwaukie, OR 97222 503.387.3251

TRC Project Number: 414070

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ASBESTOS CONTAINING MATERIALS ABATEMENT SUMMARY OF WORK

The Work includes the abatement of Asbestos Containing Materials (ACM) at 17770 SW Blanton Street, Beaverton, Oregon in order to prepare the site for renovation. The scope of work includes abatement and proper disposal of the asbestos containing materials identified in this document.

Base Bid: The Asbestos Abatement Contractor shall furnish all labor, materials, services, insurance (specifically covering the handling, transportation of asbestos containing material (ACM) and equipment which is specified, shown, or reasonably implied for the following abatement work.

The <u>removal and disposal</u> as required by applicable regulations, of the following non-friable asbestos containing materials identified in the Limited Supplemental Asbestos Survey report prepared by TRC and dated October 27, 2020. The asbestos-containing materials to be abated and their general location(s) are as follows:

Asbestos Containing Materials

Description	Material Location(s)	Friable / non- Friable	Approximate Quantity
HVAC Mastic	Throughout Roof HVAC Units	Non-Friable	500 SF
Roof Perimeter and Penetration Sealant, Black	Throughout Roof – See Figure 1	Non-Friable	2,400 SF

ASBESTOS

PART 1 GENERAL - ASBESTOS

1.01 SCOPE OF WORK

- A. The asbestos abatement and disturbance work related to this Project will consist of the removal and disposal of asbestos containing materials (ACM) and presumed asbestos containing materials (PACM) within portions of International School of Beaverton located at 17770 SW Blanton Street in Beaverton, Oregon 97078 as part of a planned renovation project. This section is intended to provide instruction for requirements in connection with asbestos abatement or disturbance and is complementary to the other contract documents, which apply to this section by reference.
- B. For Work described in this Section, the Abatement Contractor (Contractor) shall furnish all labor, materials, equipment, tools, and any other resources necessary to complete the work in accordance with regulatory requirements and project contract documents, using best available technology and industry standard methods and procedures. The work shall include but not be limited to the removal and proper disposal of ACM and/or presumed ACM (PACM) materials as described below:

Asbestos Containing Materials to be Abated

Description	Material Location(s)	Friable / non- Friable	Approximate Quantity
HVAC Mastic	Throughout Roof HVAC Units	Non-Friable	500 SF
Roof Perimeter and Penetration Sealant, Black	Throughout Roof See Figure 1	Non-Friable	2,400 SF

Please refer to Appendix A, Limited Supplemental Asbestos Survey Report dated, October 27, 2020, for additional and more detailed information on the additional asbestos materials present at the Site.

Estimated quantities are provided as an approximate guide to the Contractor. The material quantities listed above are approximations and TRC is not responsible for the accuracy of the quantities and measurements provided. The Contractor shall field verify material quantities, locations, and make themselves cognizant of existing field conditions prior to submitting bids for the work of this specification. Submitting of bids for work described herein shall take into consideration and utilize the Contractor's field measurements of materials and observations of the conditions verified on site.

- C. The Contractor shall be aware of all conditions of the Project and is responsible for verifying quantities and locations of all Work to be performed. Failure to do so shall not relieve the Contractor of its obligation to furnish all labor, equipment, and materials necessary to perform the Work.
- D. All Work shall be performed in strict accordance with the Project Documents and all governing codes, rules, and regulations. Where conflicts occur between the Project Documents and applicable codes, rules, and regulations, the more stringent requirement shall apply.
- E. Working hours shall be as required and approved by the Owner. ERM abatement activities including, but not limited to, work area preparation, gross removal activities, waste clean-up activities, waste removal, etc. may need to be performed during the specified time period by

the Owner. The Contractor shall coordinate and schedule all Work with the facility and Owner's representative.

1.02 PERMITS AND COMPLIANCE

- A. The Contractor shall assume full responsibility and liability for compliance with all applicable Federal, State, and local laws, rules, and regulations pertaining to Work practices, protection of Workers, authorized visitors to the site, persons, and property adjacent to the Work.
- B. Perform asbestos related Work in accordance with Federal, State and Local Regulations (U.S. Environmental Protection Agency (EPA) 40 CFR 61, Occupational Health and Safety (OSHA) 29 CFR 1926 and Oregon Department of Environmental Quality (ODEQ)). Where more stringent requirements are specified, the Contractor shall adhere to the more stringent requirements.

1.03 SUBMITTALS

- A. Pre-Work Submittals: Within 15 calendar days prior to the pre-construction conference, the Contractor shall submit copies of the documents listed below to Beaverton School District's Environmental Consultant for review and approval prior to the commencement of asbestos abatement activities:
 - Asbestos Removal Work Plan which includes the means, methods and protective measures which will be used to comply with all applicable Federal, State and Local rules and regulations. This plan shall be completed and signed by an EPA accredited Asbestos Project Designer.
 - 2. Current worker and contractor/supervisor training records.
- B. On-Site Submittals: Refer to Part 3.01.C for all submittals, documentation, and postings required to be maintained on-site during abatement activities.
- C. Project Close-out Submittals: Within 30 business days of the completion of the project, the Contractor shall submit digital and hard copies of the documents listed below. The documents shall be transmitted to the Environmental Consultant for review and approval prior to the Contractor's final payment.
 - 1. Originals of all waste disposal manifests, seals, and disposal logs.
 - 2. OSHA personal air monitoring results conducted during the Work.
 - 3. Daily progress log describing in detail the areas of work and ACM/PACM affected by the day's work activities and regulated work area entry/exit logs
 - 4. Project Notifications
 - 5. Safety Meeting Logs
 - 6. Workers Certifications and Medical Monitoring
 - 7. Contractors Licenses

1.04 PRE-CONSTRUCTION CONFERENCE

- A. Prior to start of preparatory Work under this Contract, the Contractor shall attend a preconstruction conference attended by Owner, Architect and Environmental Consultant.
- B. Agenda for this conference shall include but not necessarily be limited to:
 - Contractor's Asbestos Removal Work Plan
 - 2. Environmental Consultant's duties and functions
 - 3. Contractor's Work procedures including:
 - a. Methods of job site preparation and removal methods
 - b. Respiratory protection
 - c. Disposal procedures
 - d. Cleanup procedures
 - e. Fire exits and emergency procedures
 - 4. Contractor's required pre-work and on-site submittals, documentation, and postings
 - 5. Contractor's plan for twenty-four (24) hour project security both for prevention of theft and for barring entry of unauthorized personnel into work areas
 - 6. Temporary utilities
 - 7. Storage of removed asbestos containing materials
 - 8. Waste disposal requirements and procedures, including waste manifest and container seals
- C. In conjunction with the conference the Contractor shall accompany the Owner, Architect and Environmental Consultant on a pre-construction walk-through of the Project site.

1.05 APPLICABLE STANDARDS AND REGULATIONS

All asbestos related work must be performed in accordance with EPA and OSHA regulations (40 CFR 61, 29 CFR 1926) and Oregon Department of Environmental Quality. Where more stringent requirements are specified, the Contractor shall adhere to the more stringent requirements.

1.06 NOTICES

- A. The Contractor shall provide notification of intent to commence asbestos abatement activities at least ten (10) working days prior to beginning abatement activities. Written notification shall be sent to the Oregon Department of Environmental Quality Department (DEQ).
- B. The Contractor shall maintain copies of notices, and provide proof of delivery and receipt.
- C. The Contractor shall be responsible for maintaining current project filings with regulatory agencies for the duration of the project.

1.07 ENVIRONMENTAL CONSULTANT

- A. The Owner shall engage the services of an Environmental Consultant (the Consultant) who shall serve as the Owner's Representative in regard to the performance of the asbestos abatement Project and provide direction as required throughout the entire abatement Project period.
- B. The Contractor is required to ensure cooperation of its personnel with the Consultant for the air sampling and Project monitoring functions described in this section. The Contractor shall comply with all direction given by the Consultant during the course of the Project.
- C. The Consultant shall review and approve all Contractor submittals.
- D. The Consultant shall staff the Project with a trained and certified person(s) to act on the Owner's behalf at the job site.
 - The consultant's representative shall be on-site at all times the Contractor is on-site.
 The Contractor shall not be permitted to conduct any Work unless the consultant's representative is on-site (except for inspection of barriers and negative air system during non-working days).
 - 2. The consultant's representative shall have the authority to direct the actions of the Contractor verbally and in writing to ensure compliance with the Project documents and all regulations. The consultant's representative shall have the authority to Stop Work when gross Work practice deficiencies or unsafe practices are observed, or when ambient fiber concentrations outside the removal area exceed 0.01 f/cc or background level.
 - a. Such Stop Work order(s) shall be effective immediately and remain in effect until corrective measures have been taken and the situation has been corrected.
 - b. Standby time required to resolve the situation shall be at the Contractor's expense.
 - 3. The consultant's representative shall provide the following services:
 - a. Inspection of the Contractor's Work, practices, and procedures, including temporary protection requirements, for compliance with all regulations and Project specifications including provisions required by Variances, the Work Place Safety Plan and Asbestos Work Permit.
 - b. Provide abatement Project air sampling as required by applicable regulations and the Owner. Sampling will include background, work area preparation, asbestos handling, final cleaning and clearance air sampling.
 - c. Verify daily that all Workers used in the performance of the Project are certified by the appropriate regulatory agency.
 - d. Monitor the progress of the Contractor's Work, and report any deviations from the schedule to the Owner.
 - e. Monitor, verify, and document all waste load-out operations.
 - f. Verify that the Contractor is performing personal air monitoring daily, and that results are being returned and posted at the site as required.

- g. The consultant's representative shall maintain a log on site that documents all project related and Consultant and Contractor actions, activities, and occurrences.
- 4. The following minimum inspections shall be conducted by the consultant's representative. Additional inspections shall be conducted as required by Project conditions. Progression from one phase of Work to the next by the Contractor is only permitted with the written approval of the consultant's representative.
 - a. Pre-Construction Inspection: The purpose of this inspection is to verify the existing conditions of the Work Areas and to document these conditions.
 - b. Pre-Commencement Inspection: The purpose of this inspection is to verify the integrity of each containment system prior to disturbance of any asbestos containing material. This inspection shall take place only after the Work Area is fully prepped for removal.
 - c. Work Inspections: The purpose of this inspection is to monitor the Work practices and procedures employed on the Project and to monitor the continued integrity of the containment system. Inspections within the removal areas shall be conducted by the consultant's representative during all preparation, removal, and cleaning activities at least twice every Work shift. Additional inspections shall be conducted as warranted.
 - d. Pre-Encapsulation Inspection: The purpose of this inspection is to ensure the complete removal of ACM and/or PACM, from all surfaces in the Work Area prior to encapsulation.
 - e. Visual Clearance Inspection: The purpose of this inspection is to verify that: all materials in the scope of work have been properly removed; no visible asbestos debris/residue remains; no pools of liquid or condensation remains; and all required cleanings are complete. This inspection shall be conducted before final air clearance testing.
 - f. Post-Clearance Inspection: The purpose of this inspection is to ensure the complete removal of ACM, including debris, from the Work Area after satisfactory final clearance sampling and removal of all isolation and critical barriers and equipment from the Work Area.
- E. The Consultant shall provide abatement Project air sampling and analysis as required by applicable regulations. Sampling will include background, work area preparation, asbestos handling, and final cleaning and clearance air sampling.
 - 1. Unless otherwise required by applicable regulations, the Consultant shall have samples analyzed by Phase Contrast Microscopy (PCM) for daily area and final clearance air monitoring during asbestos removal or disturbance work. Results shall be available at the Project site within 2 hours of completion of sampling. Should TEM analysis be requested/required, results will be provided within 24 hours of receipt of samples by the accredited laboratory.
 - 2. Samples shall be collected as required by applicable regulations and these specifications.

- 3. If the air sampling during any phase of the abatement project reveals airborne fiber levels at or above .01 fibers/cc or the established background level, whichever is greater, outside the regulated Work Area, Work shall stop immediately and corrective measures required by applicable regulations shall be initiated. Notify all employers and occupants in adjacent areas. The Contractor shall bear the burden of any and all costs incurred by this delay.
- 4. At the completion of each abatement phase, the Consultant shall prepare an interim certificate of completion for project records.

1.08 PERSONAL AIR SAMPLING

- A. The Contractor shall perform appropriate personal air monitoring in accordance with 29 CFR 1926.1101, every Work shift in each Work Area during which abatement activities occur in order to determine that appropriate respiratory protection is being worn and utilized.
- B. The Contractor shall conduct air sampling that is representative of both the 8-hour time weighted average and 30-minute short-term exposures to indicate compliance with the permissible exposure and excursion limits.
- C. The Contractor's laboratory analysis of air samples shall be conducted by laboratory accredited by the American Industrial Hygiene Association (AIHA) for PCM analysis.
- D. Results of personnel air sample analyses shall be available within 5 business days of sample collection.

1.09 PROJECT SUPERVISOR

- A. The Contractor shall designate a full-time Project Supervisor who shall meet the following qualifications:
 - 1. The Project Supervisor shall hold an Asbestos Hazard Emergency Response Act (AHERA) certification as an Asbestos Contractor/Supervisor.
 - 2. The Project Supervisor shall meet the requirements of a "Competent Person" as defined by OSHA 1926.1101 and shall have a minimum of one year experience as a supervisor.
 - 3. The Project Supervisor must be able to speak, read, and write English fluently, as well as communicate in the primary language of the Workers and immediate community.
- B. The Project Supervisor shall be responsible for the performance of the Work and shall represent the Contractor in all respects at the Project site. The Supervisor shall be the primary point of contact for the Asbestos Project Monitor.

1.10 RESPIRATORY PROTECTION

- A. Select respirators from those approved by the National Institute for Occupational Safety and Health (NIOSH), Department of Health and Human Services.
- B. High Efficiency Particulate Air (HEPA) respirator filters shall be approved by NIOSH and shall conform to the OSHA requirements in 29 CFR 1910.134 and 29 CFR 1926.1101.

- C. A storage area for respirators shall be provided by the Contractor in the clean room side of the personnel decontamination enclosure where they will be kept in a clean environment.
- D. The Contractor shall provide and make available a sufficient quantity of respirator filters so that filter changes can be made as necessary during the work day. Filters used with negative pressure air purifying respirators shall be changed regularly to comply with OSHA.
- E. Any visitor, Worker, or supervisor found in the Work Area not wearing the required respiratory protection shall be removed from the Project site.

1.11 DELIVERY AND STORAGE

- A. Store all materials at the job site in a suitable and designated area.
 - 1. Store materials subject to deterioration or damage away from wet or damp surfaces and under cover.
 - 2. Protect materials from unintended contamination and theft.
 - 3. Storage areas shall be kept clean and organized.
- B. Remove damaged or deteriorated materials from the job site. Materials contaminated with asbestos shall be disposed of as asbestos debris.

1.12 TEMPORARY UTILITIES

- A. Shut down and lock out all electrical power to the asbestos Work Areas.
- B. Provide temporary electric service with Ground Fault Circuit Interrupters (GFCI) for all electric requirements within the asbestos Work Area.
- C. Provide temporary lighting with "weatherproof" fixtures for all Work Areas.
- D. Utilize domestic water service, if available, from Owner's existing system. Provide hot water heaters with sufficient capacity to meet Project demands.

PART 2 PRODUCTS

2.01 MATERIALS

- A. All materials shall be delivered to the job site in the original packages, containers, or bundles bearing the name of the manufacturer, the brand name and product technical description, with Safety Data Sheets (SDSs) as applicable.
- B. No damaged or deteriorating materials shall be used. If material becomes contaminated the material shall be decontaminated or disposed of as asbestos-containing waste material. The cost to decontaminate and dispose of this material shall be at the expense of the Contractor.
- C. Fire retardant polyethylene sheet shall be in roll size to minimize the frequency of joints, with factory label indicating no less than six (6) mil thickness.

- D. Polyethylene disposable bags shall be no less than six (6) mils thick.
- E. A commercial grade duct tape (or equivalent) capable of sealing joints in adjacent polyethylene sheets and for the attachment of polyethylene sheets to finished or unfinished surfaces must be capable of adhering under both dry and wet conditions.
- F. Any planking, bracing, shoring, barricades and/or temporary sheet piling, necessary to appropriately perform work activities shall conform to all applicable federal, state and local regulations.

2.02 TOOLS AND EQUIPMENT

The Contractor shall provide tools and equipment that are suitable for asbestos related activities and in good working order.

PART 3 EXECUTION

3.01 GENERAL REQUIREMENTS

- A. The following submittals, documentation, and postings shall be maintained on-site by the Contractor during abatement activities:
 - 1. Asbestos worker and contractor/supervisor certification cards for each person employed in the removal, handling, or disturbance of asbestos
 - 2. Daily OSHA personal air monitoring results
 - 3. Project documents (specifications and drawings)
 - 4. Applicable regulations
 - 5. Safety Data Sheets of supplies/chemicals used on the Project
 - 6. Approved Abatement Work Plan
 - 7. List of emergency telephone numbers
 - 8. Daily Project Log
- B. The following documentation shall be maintained on-site by TRC Environmental Corp. during abatement activities:
 - 1. Air sample results
 - 2. Project Monitor Daily Log
 - 3. Asbestos Survey Report
 - 4. A copy of ASTM Standard E1368 "Standard Practice for Visual Inspection of Asbestos Abatement Projects"

- C. Install emergency exit signage and fire extinguishers throughout the Work Area in accordance with OSHA Construction Industry Standards.
- D. Use the following engineering controls and work practices for all asbestos abatement operations, regardless of measured exposure levels:
 - Vacuum cleaners equipped with HEPA filters to collect all asbestos-containing dust and debris
 - 2. Wet methods to control exposures during asbestos removal and clean-up, except where proven to be infeasible
 - 3. Prompt clean-up and disposal of asbestos-contaminated wastes and debris in leakproof containers
- E. Do not use any of the following equipment or work practices during asbestos abatement operations, regardless of measured exposure levels:
 - High-speed abrasive disc saws not equipped with point-of-cut HEPA ventilation or HEPA filtered exhaust air enclosures
 - 2. Blowing with compressed air to remove asbestos-containing materials
 - 3. Dry sweeping, shoveling, or other dry methods to clean up asbestos-containing dust and debris
 - 4. Employee rotation as a means of reducing employee exposure to asbestos
- F. Protect adjacent areas, materials and surfaces from damage due to demolition operations, including but not necessarily limited to the following:
 - 1. Water damage
 - 2. Dirt, dust and debris
 - 3. Abrasion
 - 4. Cuts and scratches
 - 5. Holes from fasteners for temporary barriers

3.02 PROTECTIVE CLOTHING

- A. Provide personnel utilized during the Project with disposable protective whole body clothing, head coverings, gloves and foot coverings. Provide disposable plastic or rubber gloves to protect hands. Cloth gloves may be worn inside the plastic or rubber for comfort, but shall not be used alone. Make sleeves secure at the wrists and make foot coverings secure at the ankles by the use of tape, or provide disposable coverings with elastic wrists or tops.
- B. Authorized visitors shall be provided with suitable protective clothing, headgear, eye protection, and footwear whenever they enter the Work Area.

3.03 SIGNS AND LABELS

- A. Provide warning signs and barrier tapes at all approaches to asbestos Work Areas. Locate signs at such distance that personnel may read the sign and take the necessary protective steps required before entering the area.
 - 1. Provide danger signs in vertical format conforming to 29 CFR 1926.1101, minimum 20" x 14" displaying the following legend.

ASBESTOS CANCER AND LUNG DISEASE HAZARD AUTHORIZED PERSONNEL ONLY RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED IN THIS AREA

- 2. Provide 3" wide OSHA-Approved barrier tape printed with black lettered, "DANGER ASBESTOS REMOVAL". Locate barrier tape across all corridors, entrances and access routes to asbestos Work Area. Install tape 3' to 4' Above Finished Floor AFF.
- B. Provide asbestos danger labels affixed to all asbestos materials, scrap, waste, debris and other products contaminated with asbestos.
 - 1. Provide asbestos danger labels of sufficient size to be clearly legible, displaying the following legend:

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

2. Provide the following asbestos labels, of sufficient size to be clearly legible, for display on waste containers (bags or drums) which will be used to transport asbestos contaminated material in accordance with United States Department of Transportation 49 CFR Parts 171 and 172: (Note: Include "RQ" for friable asbestos waste only.)

RQ, (WASTE) ASBESTOS, 9, NA2212, PGIII

3. Generator identification information shall be affixed to each waste container indicating the following printed in indelible ink:

Generator Name
Facility Name
Facility Address
EPA Generator ID Number

3.04 FRIABLE ACM REMOVAL BY FULL ENCLOSURE METHOD

- A. Preparation of the Work Area
 - 1. Install critical barriers over each opening into the regulated area. The following requirements are in addition to, not in lieu of, other indicated surface and object protection requirements:

- a. Seal each opening between the work area and adjacent areas with not less than 2 layers of 6-mil polyethylene sheeting. Use an expanding-polyurethane foam gun to seal areas with large numbers of pipes, conduits and beams. Openings include, but are not necessarily limited to, windows, skylights, doorways, elevator hoist way openings, corridor entrances, drains, ducts, grills, grates, and diffusers.
- b. Seal intake and exhaust vents and duct seams within the regulated area with not less than 2 layers of 6-mil polyethylene sheeting.
- 2. HVAC System Shutdown: Owner's maintenance personnel will shut down heating, cooling, and air conditioning systems when necessary. Coordinate scheduling with Owner's personnel.
- 3. Protection of Surfaces and Objects: The following requirements are in addition to, not in lieu of, indicated work area sealing requirements. Cover the following surfaces and objects as follows:
 - a. Protect all surfaces beneath all removal activity. Remove moveable objects from the work area, and cover fixed objects with impermeable drop cloths or plastic sheeting with edges securely sealed with tape.
 - b. Provide clean, fresh air to mechanical equipment, where required to maintain proper performance of equipment.
 - c. Fully pre-clean all covered surfaces with amended water and a HEPA vacuum.
 - d. Cover walls with not less than 2 layers of 6-mil polyethylene sheeting. Construct free-standing enclosure walls of not less than 6-mil polyethylene sheeting, with supports spaced not more than 3 feet on center.
 - e. Cover floors with not less than 2 layers of 6-mil polyethylene sheeting. Avoid seams where possible. If seams are necessary, overlap not less than 12 inches and tape joints. Extend sheeting 12 inches up the side walls leaving no seams at the wall and floor joint. Immediately repair punctures and leaks, and clean up seepage.
- 4. Cleaning: Do not use cleaning methods that raise dust, such as sweeping or using vacuum cleaners not equipped with HEPA filters. Do not disturb asbestos materials during pre-cleaning phases. Treat water removed from the enclosure as asbestos contaminated waste. Fully seal floor drains.
- 5. Deactivate or install ground-fault circuit interrupters on each electrical circuit within the enclosure.
- 6. Construct a three-chambered decontamination facility that is adjacent to and connected to the regulated area, and that consists of a dirty room, a shower room, and a clean room in series. Construct decontamination facilities that are exposed to weather of lumber and exterior grade plywood. Secure the facility when not in use.
 - a. Supply the equipment room with properly labeled, impermeable bags and containers for the containment and disposal of contaminated protective equipment.

- b. Construct showers that comply with the requirements of 29 CFR 1910.141 (d) (3), with the shower room adjacent to both the equipment room and the clean room. Filter water waste and shower water through a 5 micron filter, or remove water from site as asbestos waste.
- c. Equip the clean room with a locker or appropriate storage container for each employee.

7. Employee Decontamination Facilities

- a. Access the work area only through an approved decontamination system. Lock or block other entrances. Seal emergency exits (for use during a fire or accident) with polyethylene sheeting and tape.
- b. Seal the waste pass-out, except during the removal of asbestos waste from the enclosure.
- c. Entrance to The Regulated Area: Employees shall enter the decontamination area through the clean room, remove and store clothing, and put on protective clothing and respiratory protection before passing through to the equipment room.
- d. Exit from The Regulated Area: Employees shall exit the regulated area by removing gross contamination and debris from their protective clothing. The clothing shall be removed and disposed of in the equipment room into labeled impermeable bags or containers. Employees shall then shower and enter the clean room before changing into street clothes.
- 8. Local Exhaust Ventilation: Maintain portable air filtration units with a HEPA filter in use during asbestos abatement operations requiring enclosures. Units shall conform to OSHA Standard 1926.1101, Appendix F, and shall be designed in accordance with 40 CFR 61, Subpart M, Section 61.153.
 - a. Exhaust directly to building exterior. Provide a backup portable air filtration unit at each removal enclosure. Startup ventilation units prior to initiating asbestos removal operations and run until the Owner's consultant has approved their shutdown after cleaning, visual inspection, clearance sampling and tear-down.
 - b. Direct air movement within the enclosure away from the employees' work area and toward the air filtration device.
 - c. Provide not less than 4 air changes per hour within the enclosure.
 - d. Within the enclosure, through the period of its use, maintain a pressure differential of not less than minus 0.02 water gage with respect to ambient conditions outside the enclosure. Provide continuous measurement of the pressure differential at each negative pressure enclosure.
- 9. Visually inspect the enclosure for breeches and smoke-test for leaks before work begins, and before the start of each work shift. Make all modifications to the enclosure prior to starting removal work.

B. Work Practices

- 1. Immediately preceding asbestos removal, apply a fine mist of water to the asbestos materials and the surrounding area. Keep surrounding areas wet by spraying periodically with amended water. Maintain a high humidity environment to assist in fiber settling.
- 2. Remove asbestos material using two-person teams, on staging platforms, if necessary.
- 3. Remove the wet asbestos material as intact sections or components. Carefully lower the material to the floor or place directly into container. Never drop or throw asbestos material on the floor.
- 4. At working heights between 15 and 50 feet above the floor, place removed asbestos materials in containers at the elevated levels and lower to floor, or place onto inclined chutes or scaffolding for subsequent collection and placement into containers. Clean all debris at the completion of each workday.
- 5. Once the asbestos material is at ground level, pack in labeled 6-mil polyethylene bags, wet and, if appropriate, hold in drums prior to starting the next section.
- 6. Use 2 sealed and labeled 6-mil thick bags for storage and transportation of asbestos waste. Standing water shall be in each bag
- 7. Wrap large components removed intact in two layers of 6-mil polyethylene sheeting, label, and secure with tape for transport to the landfill. Comply with all wetting requirements.
- 8. Treat wires, hangers, steel bands, nails, screws, metal lath, tin sheeting, and similar sharp objects removed with asbestos material as asbestos waste. Place in drums for disposal.
- 9. Label containerized asbestos waste in accordance with OSHA, EPA, and Department of Transportation regulations, as follows:
 - a. Label each container with OSHA label that contains the following information:

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

- b. Label each container with Owner's and Asbestos Abatement Firm's names and addresses as required by NESHAP.
- c. Label each container with Class 9 Label required by DOT and identify waste as "RQ, Asbestos NA 2212."
- 10. Remove containerized asbestos waste daily from site, or store on site in a locked or secured location until ready for final disposal. Obtain approval of Owner's Representative of the location of disposal containers. Outdoor waste containers shall be fully enclosed and locked. Mark vehicles used to transport waste during the loading and unloading of asbestos waste with a visible sign, as required by NESHAP.

3.05 REMOVAL OF NON-FRIABLE ASBESTOS-CONTAINING MATERIALS

A. Removal of Vinyl Floor Tile (unless rendered Friable)

- 1. Prior to removal, critical barriers shall be placed over openings to the regulated area.
- 2. Prior to removal, clean floors of dirt and debris with vacuums equipped with HEPA filter.
- 3. Sanding the floor or related backing is not permitted.
- 4. Mechanical chipping of vinyl floor tile is prohibited, except when performed in a negative pressure enclosure.
- 5. Thoroughly wet vinyl floor tile with water. Use a slip scraper or equivalent to loosen the floor tile from the floor. Remove the floor tile in an intact state. Keep the floor tile wet throughout the removal and cleanup.
- 6. Place the resilient flooring material and debris in an asbestos disposal bag. Seal the bag and place it in a properly labeled drum. Comply with the disposal and labeling requirements of this document.

B. Asbestos Mastic/Glue Removal

- 1. Prior to removal, critical barriers shall be placed over openings to the regulated area.
- 2. Clean the floor of all debris using a HEPA vacuum, wet sweeping, mopping or equivalent.
- 3. Remove as much mastic as possible using a Consultant approved solvent. Control odors and fumes with engineering controls.
- 4. Perform scraping of residual adhesive using wet methods.
- 5. After all debris is removed, thoroughly mop the floor and allow time to dry.
- 6. Properly dispose of all asbestos and solvent waste according to all applicable regulations, and comply with the disposal and labeling requirements of this Section.

C. Asbestos-Containing Siding and Transite Panels (if applicable)

- 1. Create a regulated work area and place impermeable drop cloths on surfaces beneath removal activity.
- 2. Cutting, abrading, or breaking material is not permitted.
- 3. Wet material with water prior to removal.
- 4. Carefully disassemble material such a manner as to prevent breakage.
- 5. Wrap and seal material in two layers 6-mil thick polyethylene, asbestos disposal bags, or equivalent. Seal bags or packages and properly label them with appropriate asbestos warning signs.

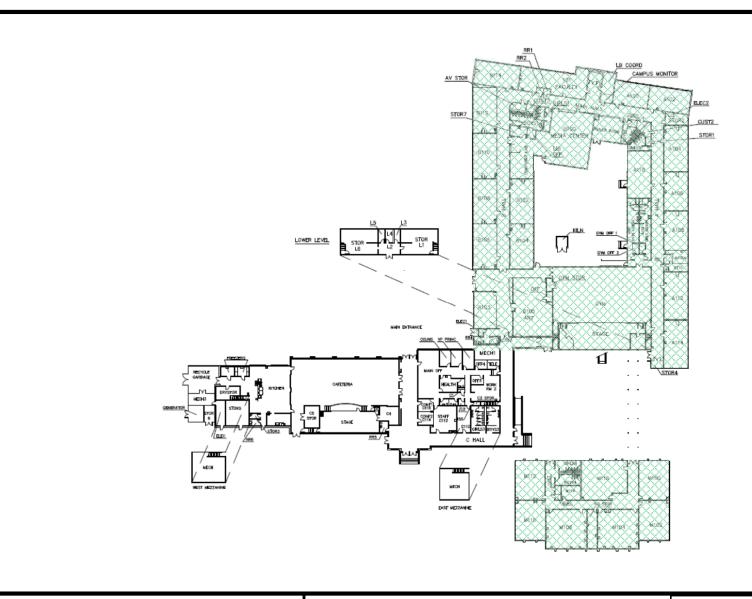
- D. Non-Friable Asbestos Containing Exterior/Roofing Sealant, Caulk, Putty, HVAC Mastic and Window Glazing (if applicable)
 - 1. Create a regulated work area and place impermeable drop cloths on surfaces beneath removal activity.
 - 2. Any existing loose material shall be HEPA vacuumed prior to removal.
 - 3. The material shall be thoroughly wetted prior to and during its removal.
 - 4. The material should be removed as intact as possible. Manual methods shall be used.
 - 5. Removed ACM shall be immediately bagged.
 - 6. The removal of windows and other whole building components without disturbing the asbestos is encouraged.
 - 7. If the material becomes friable during the abatement process, comply with the requirements for friable asbestos removal.

3.06 WORK AREA DECONTAMINATION AND CLEARANCE PROCEDURES

- A. The Asbestos Abatement Contractor's representative, in presence of Owner's consultant, shall inspect the entire work area for asbestos.
- B. If any suspect asbestos dust or debris is found, repeat final cleaning operation, until the visual inspection is satisfactory to the Owner's consultant.
- C. After final visual clearance criteria have been achieved in the work areas, the Owner's consultant will notify the Abatement Contractor to encapsulate all walls, floors, ceilings, other exposed surfaces, and decontamination facilities.
- D. Clearance air sampling will be completed by the Owner's consultant after the encapsulant has dried. Any costs associated with re-cleaning due to failed clearance results will be the sole responsibility of the Abatement Contractor. All clearance air samples shall be at or below 0.01 fibers per cubic centimeter as measured using Phase Contrast Microscopy (NIOSH 7400 method) or below 70 structures per square millimeter by Transmission Electron Microscopy (TEM) using the AHERA analytical method.
- E. After abatement clearance is given by the Asbestos Project Monitor the Abatement Contractor may remove the containment, which shall be disposed of as ACM.

3.07 WASTE DISPOSAL

- A. All waste will be transported and disposed of in compliance with DOT requirements and all applicable Federal, State and local regulations. Disposal must occur at an acceptable landfill accompanied by a waste manifest.
- B. A copy of all waste manifests shall be given to Owner upon completion of the project.



LEGEND

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Asbestos-Containing HVAC Mastic and Roof Penetration Sealant

ABATEMENT SPECIFICATION MATERIAL LOCATION DIAGRAM

INTERNATIONAL SCHOOL OF BEAVERTON 17770 SW BLANTON STREET BEAVERTON, OREGON 97078

TRC Project No.: 414070	Figure: 1	
Drawn by: MC	Reviewed by: RAL	Date: December 2020



4105 SE International Way, Suite 505 Milwaukie, Oregon 97222 Phone: (503) 387-3251 Fax: (503) 908-1318 Project Number: 20Y105.01 Release Phase: Bid Set

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Demolition and removal of selected portions of building element(s) or structure.
- 2. Demolition and removal of selected site elements.
- 3. Salvage of existing items to be reused or recycled.
- 4. Refer to Drawings for areas of demolition Work and disposition of existing building elements with respect to finished Work.

B. Related Requirements:

- 1. Division 01, Section "Summary" for restrictions on use of the premises and Owner-occupancy requirements affecting demolition activities.
- 2. Division 01, Section "Unit Prices" for schedule of unit prices affecting demolition activities.
- 3. Division 01, Section "Temporary Facilities and Controls" for temporary facilities and controls requirements affecting demolition activities.
- 4. Division 01, Section "Execution" for cutting and patching procedures affecting demolition activities.
- 5. Division 07, Section "Preparation for Re-Roofing".

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled on the drawings.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and store.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated on the drawings.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled on the drawings.

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E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled on the drawings.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS

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

1.6 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of selective demolition activities with starting and ending dates for each activity.
 - 1. Indicate the following:
 - a. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - b. Interruption of utility services. Indicate how long utility services will be interrupted.
 - c. Coordination for shutoff, capping, and continuation of utility services.
 - d. Use of existing structure's vertical circulation systems.
 - e. Coordination of Owner's continuing occupancy of portions of existing structures and of Owner's potential partial occupancy of completed Work.
- C. Pre-demolition photographs or video.

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D. Warranties: Documentation indicating that existing warranties are still in effect after completion

1.7 CLOSEOUT SUBMITTALS

of selective demolition.

A. Inventory of items that have been removed and salvaged.

1.8 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect, in writing, of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 - 1. Hazardous materials will be removed by Owner before start of the Work.
 - 2. If suspected hazardous materials are encountered, do not disturb. The Contractor shall immediately notify Owner, in writing, upon discovery. Owner shall provide prompt written direction and/or guidance to the Contractor.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.
- G. Arrange selective demolition schedule so as not to interfere with Owner's operations.

1.9 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties.

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PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations as may be required.
 - 1. Coordinate with Owner prior to shutting off any utilities.
 - 2. Contractor shall notify Owner not less than four (4) days minimum in advance of shutting of any utilities. The Owner will give 48-hour written notice to tenant(s).
- B. Contractor shall engage a professional engineer to perform an engineering survey of condition(s) of existing building, as required to complete the Work included in the Contract Documents, to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
- C. Inventory and record the condition of items to be removed and salvaged.
- D. Verify that hazardous materials have been remediated before proceeding with selective building demolition operations.
- E. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect and copy Owner.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. Arrange to shut off utilities with utility companies.
 - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.

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4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.

- a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
- b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
- c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
- d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
- e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
- f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
- g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.3 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition and work area(s); and to and from occupied portions of existing structures at the Project site.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Comply with requirements for temporary enclosures, OSHA approved scaffolding as may be required for this Project, dust control, heating, and cooling specified in Division 01, Section "Temporary Facilities and Controls".
 - 6. Temporary Protection of Existing Landscape: Provide temporary protection of existing landscape materials as may be required around the exterior of existing building areas to ensure landscape materials are not damaged during demolition Work.
 - 7. Provide temporary protection at decks and elevated walkways that are affected.
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Comply with OSHA requirements.
 - 2. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

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3.4 SELECTIVE DEMOLITION (GENERAL)

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

- 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
- 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
- 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
- 4. Do not use cutting torches.
- 5. Maintain adequate ventilation at all times.
- 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
- 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
- 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- 9. Dispose of demolished items and materials promptly. Comply with requirements in Division 01, Section "Construction Waste Management and Disposal."
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

C. Removed and Salvaged Items:

- 1. Clean salvaged items.
- 2. Pack or crate items after cleaning. Identify contents of containers.
- 3. Store items in a secure area until delivery to Owner.
- 4. Transport items to Owner's storage area designated by Owner.
- 5. Protect items from damage during transport and storage.

D. Removed and Reinstalled Items:

- 1. Clean and repair items to functional condition adequate for intended reuse.
- 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
- 3. Protect items from damage during transport and storage.
- 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition, then cleaned and reinstalled in their original locations after selective demolition operations are complete.

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3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 - 4. Comply with requirements specified in Division 01, Section "Construction Waste Management and Disposal."
- B. Burning: Do not burn demolished materials.

3.6 CLEANING

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

END OF SECTION 024119

Project Number: 20Y105.01 Release Phase: Bid Set

SECTION 055000 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Metal ladders.
 - 2. Metal downspout boots.
- B. Related Requirements:
 - 1. Division 06, Section "Rough Framing" for ladder support and anchorage.
 - 2. Division 07, Section "Preparation for Re-Roofing".
 - 3. Division 07, Section "Themoplastic Polyefin (TPO) Membrane Roofing".
 - 4. Division 09, Section "Exterior Painting".

1.3 COORDINATION

- A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written instructions to ensure that shop primers and topcoats are compatible with one another.
- B. Coordinate installation of metal fabrications that are anchored to or that receive other work. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

1.4 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Fasteners.
 - 2. Shop primers.
 - 3. Manufactured metal ladders.
 - 4. Metal downspout boots.

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- B. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items. Provide Shop Drawings for the following:
 - 1. Metal ladders.
 - 2. Metal downspout boots.

1.5 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
- C. Research Reports: For post-installed anchors.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code Steel."
 - 2. AWS D1.2/D1.2M, "Structural Welding Code Aluminum."
 - 3. AWS D1.6/D1.6M, "Structural Welding Code Stainless Steel."

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of walls, floor slabs, decks, and other construction contiguous with metal fabrications by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance of Ladders: Ladders, including landings, shall withstand the effects of loads and stresses within limits and under conditions specified in ANSI A14.3 and as indicated on Structural Drawings.
- B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

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2.2 METALS

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

- B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- C. Stainless Steel Sheet, Strip, and Plate: ASTM A240/A240M or ASTM A666, Type 304.
- D. Stainless Steel Bars and Shapes: ASTM A276/A276M, Type 304.
- E. Rolled-Steel Floor Plate: ASTM A786/A786M, rolled from plate complying with ASTM A36/A36M or ASTM A283/A283M, Grade C or D.
- F. Rolled-Stainless Steel Floor Plate: ASTM A793.
- G. Steel Tubing: ASTM A500/A500M, cold-formed steel tubing.
- H. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.
- I. Aluminum Plate and Sheet: ASTM B209 (ASTM B209M), Alloy 6061-T6.
- J. Aluminum Extrusions: ASTM B221 (ASTM B221M), Alloy 6063-T6.
- K. Aluminum-Alloy Rolled Tread Plate: ASTM B632/B632M, Alloy 6061-T6.
- L. Aluminum Castings: ASTM B26/B26M, Alloy 443.0-F.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: As indicated on Structural Drawings.
- C. High-Strength Bolts, Nuts, and Washers: As indicated on Structural Drawings.
- D. Stainless Steel Bolts and Nuts: As indicated on Structural Drawings.
- E. Anchor Bolts: As indicated on Structural Drawings.
 - 1. Hot-dip galvanize or provide mechanically deposited, zinc coating where item being fastened is indicated to be galvanized.
- F. Anchors, General: Capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing in accordance with ASTM E488/E488M, conducted by a qualified independent testing agency.

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G. Post-Installed Anchors: As indicated on Structural Drawings.

2.4 MISCELLANEOUS MATERIALS

- A. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
 - 1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated on Structural Drawings; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads and as indicated on Structural Drawings.

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2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.
- C. Galvanize miscellaneous framing and supports where indicated.
- D. Shop prime miscellaneous framing and supports with primer compatible with specified finish where indicated.

2.7 METAL LADDERS

- A. General:
 - 1. Comply with ANSI A14.3.
- B. Steel Ladders:
 - 1. Space siderails as indicated on Drawings.
 - 2. Siderails:
 - a. Size: As indicated on Drawings.
 - b. Provide continuous, steel flat bars, with eased edges.
 - 3. Rungs:

a.

Size: As indicated on Drawings.

- 4. Fit rungs in centerline of siderails; plug-weld and grind smooth on outer rail faces.
- 5. Provide nonslip surfaces on top of each rung by coating with abrasive material metallically bonded to rung.
- 6. Support each ladder at top and bottom and not more than 60 inches (1500 mm) o.c. with welded or bolted steel brackets as indicated on Structural Drawings.
- 7. Galvanize and shop prime exterior ladders, including brackets.

2.8 METAL DOWNSPOUT BOOTS

- A. Source Limitations: Obtain downspout boots from single source from single manufacturer.
- B. Provide downspout boots made from aluminum in heights indicated with inlets of size and shape to suit downspouts. Provide units with flanges and holes for countersunk anchor bolts.
 - 1. Outlet: Vertical, to discharge into existing pipe.
- C. Shop prime and field paint fabricated assemblies to match downspout color.

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2.9 GENERAL FINISH REQUIREMENTS

- A. Finish metal fabrications after assembly, unless otherwise noted.
- B. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.10 STEEL AND IRON FINISHES

- A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
 - 1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.
- B. Preparation for Shop Priming Galvanized Items: After galvanizing, thoroughly clean galvanized surfaces of grease, dirt, oil, flux, and other foreign matter, and treat with metallic phosphate process.
- C. Shop prime iron and steel items unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
- D. Preparation for Shop Priming: Prepare substrates to receive primer with specified primer requirements.
- E. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.
 - 1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.11 ALUMINUM FINISHES

- A. As-Fabricated Finish: AA-M12.
- B. Clear Anodic Finish: AAMA 611, Class I, AA-M12C22A41.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.
- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations.

Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide and install fasteners indicated on Structural Drawings.
- E. Provide temporary bracing or anchors as required to install fabricated items.
- F. Corrosion Protection: Coat concealed surfaces of aluminum that come into contact with grout, concrete, masonry, wood, or dissimilar metals.

3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Install framing and supports to comply with requirements indicated on Structural Drawings and of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.
- B. Anchor supports securely to, and rigidly brace from, building structure as indicated on Structural Drawings.

3.3 REPAIRS

A. Touchup Painting:

- 1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - a. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.
- B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION 055000

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SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Framing with dimension lumber.
 - 2. Rooftop equipment bases and support curbs.
 - 3. Wood blocking, cants, and nailers.
 - 4. Plywood backing panels.
- B. Related Requirements:
 - 1.
 - 2. Division 01, Section "Unit Prices" for framing replacement at existing areas of Work.
 - 3. Division 06, Section "Sheathing" for roof and wall sheathing.
 - 4. Division 07, Section "Preparation for Re-Roofing".

1.3 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2-inches nominal (38 mm actual) size in least dimension.
- B. Dimension Lumber: Lumber of 2-inches nominal (38 mm actual) size or greater but less than 5-inches nominal (114 mm actual) size in least dimension.
- C. Exposed Framing: Framing not concealed by other construction.
- D. Lumber grading agencies, and the abbreviations used to reference them, include the following:
 - 1. NLGA: National Lumber Grades Authority.
 - 2. WCLIB: West Coast Lumber Inspection Bureau.
 - 3. WWPA: Western Wood Products Association.
- E. OSB: Oriented strand board (Not Permitted).
- F. Timber: Lumber of 5-inches nominal (114 mm actual) size or greater in least dimension.

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1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.
 - 4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- B. Fastener Patterns: Full-size templates for fasteners in exposed framing.
 - 1. Submit only when fastener locations are critical to appearance and fastener patterns are not indicate on Drawings.

1.5 INFORMATIONAL SUBMITTALS

- A. Material Certificates: For dimension lumber specified to comply with minimum allowable unit stresses. Indicate species and grade selected for each use and design values approved by the ALSC Board of Review.
- B. Evaluation Reports: For the following, from ICC-ES, when applicable for this Project:
 - 1. Wood-preservative-treated wood.
 - 2. Fire-retardant-treated wood.
 - 3. Engineered wood products.
 - 4. Shear panels.
 - 5. Post-installed anchors.
 - 6. Metal framing anchors.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fireretardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece.
 - 3. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - 4. Dress lumber, S4S, unless otherwise indicated.
- B. Maximum Moisture Content of Lumber: Kiln dried, unless otherwise indicated. 15 percent for 2-inch nominal (38-mm actual) thickness or less; 19 percent for more than 2-inch nominal (38-mm actual) thickness unless otherwise indicated.
- C. Engineered Wood Products: Where noted on Structural Drawings, provide materials acceptable to Authorities Having Jurisdiction (AHJ) and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
 - 1. Allowable design stresses, as published by manufacturer, shall meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium. Do not use inorganic boron (SBX) for sill plates.
 - 2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
 - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
 - 3. Wood framing members that are less than 18-inches (460 mm) above the ground in crawlspaces or unexcavated areas.

2.3 FIRE-RETARDANT-TREATED MATERIALS (Where applicable for this Project)

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.
 - 1. Treatment shall not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fireretardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
 - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.
 - 4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D5664 and design value adjustment factors shall be calculated according to ASTM D6841.
- C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent. Kiln-dry plywood after treatment to maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.

- 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece.
- E. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.
- F. Application: Treat items indicated on Drawings, and the following:
 - 1. Roof construction.
 - 2. Plywood backing panels.

2.4 DIMENSION LUMBER FRAMING

- A. Roof Framing and Parapet Framing:
 - 1. Species: As indicated on Structural Drawings.

2.5 ENGINEERED WOOD PRODUCTS

- A. Source Limitations: Obtain each type of engineered wood product from single source from a single manufacturer.
- B. Laminated-Veneer Lumber: Structural composite lumber made from wood veneers with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559.
 - 1. Basis-of-Design: Subject to compliance with requirements, provide products from the following:
 - a. Manufacturer and Product: As indicated on Structural Drawings.
 - b. Extreme Fiber Stress in Bending, Edgewise: As indicated on Structural Drawings.
 - c. Modulus of Elasticity, Edgewise: As indicated on Structural Drawings.
 - d. Tolerances:
 - 1) Depth: As indicated on Structural Drawings.
 - 2) Width: As indicated on Structural Drawings.
 - e. Identification:
 - 1) Laminated Veneer Lumber (LVL) shall be identified by a stamp indicating the product type and grade, manufacturer's name, plant number and the independent inspection agency's logo.
- C. Parallel-Strand Lumber: Structural composite lumber made from wood strand elements with grain primarily parallel to member lengths, evaluated and monitored according to ASTM D5456 and manufactured with an exterior-type adhesive complying with ASTM D2559.
 - 1. Basis-of-Design: Subject to compliance with requirements, provide products from the following:

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- a. Manufacturer and Product: As indicated on Structural Drawings.
- b. Extreme Fiber Stress in Bending, Edgewise: As indicated on Structural Drawings.
- c. Modulus of Elasticity, Edgewise: As indicated on Structural Drawings.
- d. Tolerances:
 - 1) Depth: As indicated on Structural Drawings.
 - 2) Width: As indicated on Structural Drawings.
- e. Identification:
 - 1) Parallel Strand Lumber (PSL) shall be identified by a stamp indicating the product type and grade, manufacturer's name, plant number and the independent inspection agency's logo.
- D. Rim Boards: Product designed to be used as a load-bearing member and to brace roof trusses and/or joists at bearing ends, complying with research or evaluation reports.
 - 1. Basis-of-Design: Subject to compliance with requirements, provide products from the following:
 - a. Manufacturer and Product: As indicated on Structural Drawings.
 - b. Extreme Fiber Stress in Bending, Edgewise: As indicated on Structural Drawings.
 - c. Modulus of Elasticity, Edgewise: As indicated on Structural Drawings.
 - d. Tolerances:
 - 1) Depth: As indicated on Structural Drawings.
 - 2) Width: As indicated on Structural Drawings.

2.6 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Rooftop equipment bases and support curbs.
 - 4. Cants.
 - 5. Furring.
- B. Dimension Lumber Items: No. 2 grade lumber of species indicated on Structural Drawings.
- C. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- D. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

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

2.7 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated (where required), in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.

2.8 FASTENERS

- A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture and Structural Drawings, whichever may be more stringent.
 - 1. Where rough carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to Authorities Having Jurisdiction, as appropriate for the substrate.
- D. Wood Screws: ASME B18.6.1.
- E. Lag Bolts: ASME B18.2.1.
- F. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers. Install washers between all bolt heads and nuts in contact with wood.

2.9 METAL FRAMING ANCHORS

- A. Allowable design loads, as published by manufacturer, shall meet or exceed those indicated on Structural Drawings. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.
 - 1. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide products by the following, unless otherwise noted on Structural Drawings:
 - a. Simpson Strong-Tie Company, Inc.
- B. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A653/A653M; structural steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B

(HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.

- 1. Use for wood-preservative-treated lumber and where indicated.
- C. Joist Hangers: As indicated on Structural Drawings.
- D. Top Flange Hangers: As indicated on Structural Drawings.
- E. Bridging: As indicated on Structural Drawings.
- F. Joist Ties: As indicated on Structural Drawings.
- G. Wall Bracing: As indicated on Structural Drawings.

2.10 MISCELLANEOUS MATERIALS

A. Flexible Flashing: As indicated in Division 07, Section "Weather Barriers".

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
- B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
- C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.
- D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- E. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- F. Do not splice structural members between supports unless otherwise indicated.
- G. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- H. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:

- 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96 inches (2438 mm) o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
- 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96 inches (2438 mm) o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal (38-mm actual) thickness.
- 3. Fire block concealed spaces behind combustible cornices and exterior trim at not more than 20 feet (6 m) o.c.
- I. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- J. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
 - 1. Use inorganic boron for items that are continuously protected from liquid water.
 - 2. Use copper naphthenate for items not continuously protected from liquid water.
- K. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code (IBC).
 - 2. ICC-ES evaluation report for fastener.
- L. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
 - 1. Comply with approved fastener patterns where applicable.
 - 2. Use common nails unless otherwise indicated. Drive nails snug but do not countersink nail heads.

3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 INSTALLATION OF WOOD FURRING

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

3.4 INSTALLATION OF ROOF JOIST AND PARAPET WALL FRAMING

A. Provide special framing as indicated on Structural Drawings for eaves, overhangs, parapets, and similar conditions.

3.5 PROTECTION

- A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.
- B. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061000

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SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Roof sheathing Plywood.
- 2. Parapet sheathing Plywood.
- 3. Parapet and Vertical Sheathing (Glass Mat Style).
- 4. Sheathing joint and penetration treatment.

B. Related Requirements:

- 1. Division 01, Section "Unit Prices" for removal and replacement of unsatisfactory plywood roof and wall sheathing at existing areas.
- 2. Division 06, Section "Rough Carpentry" for plywood backing panels.
- 3. Division 07, Section "Preparation For Re-Roofing".
- 4. Division 07, Section "Weather Barriers" for water-resistive barrier applied over wall sheathing.
- 5. Division 07, Section "Thermoplastic Polyefin (TPO) Membrane Roofing".

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site with Installer present.
 - 1. When applicable for this Project, review air-barrier, fire retardant treated sheathing, and water-resistant glass-mat sheathing requirements and installation, special details, transitions, mockups, testing, protection, and work scheduling that covers sheathing types.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.

- 2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
- 3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5516.
- 4. For products receiving waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
- 5. For air-barrier and water-resistant glass-mat sheathing, include manufacturer's technical data and tested physical and performance properties of products.
- B. Shop Drawings: For air-barrier and water-resistant glass-mat sheathing assemblies.
 - 1. Show locations and extent of sheathing, accessories, and assemblies specific to Project conditions.
 - 2. Include details for sheathing joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 - 3. Include details of interfaces with other materials that form part of air barrier.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: From sheathing manufacturer(s), certifying compatibility of sheathing accessory materials with Project materials that connect to or that come in contact with the sheathing.
- C. Product Test Reports: For each type of sheathing assembly, indicating compliance with specified requirements, for tests performed by a qualified testing agency.
- D. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preservative-treated plywood.
 - 2. Fire-retardant-treated plywood.
 - 3. Water-resistant glass-mat gypsum sheathing.
- E. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer of air-barrier and water-resistant glass-mat gypsum sheathing.
 - 1. Installer shall be licensed by ABAA according to ABAA's Quality Assurance Program and shall employ ABAA-certified installers and supervisors on Project.
- B. Mockups: Build mockups to set quality standards for materials and execution.

- 1. Build integrated mockups of exterior roof conditions, proposed by Contractor and approved by Owner and Architect, incorporating roof and parapet framing conditions, transitions, penetrations, and flashing to demonstrate crack and joint treatment and sealing of gaps, terminations, and penetrations of sheathing assembly.
 - a. Coordinate construction of mockups to permit inspection and testing of sheathing before external insulation and cladding are installed.
 - b. Include junction with roofing membrane and parapet corner condition.
 - c. If Architect determines mockups do not comply with requirements, reconstruct mockups until mockups are approved.
- 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect and Owner specifically approves such deviations in writing.
- 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Testing Agency Qualifications:

- 1. For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.
- 2. When required, for testing and inspecting agency providing tests and inspections related to water-resistant glass-mat gypsum sheathing: an independent agency, qualified according to ASTM E329 for testing indicated.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Owner reserves the right to engage a qualified testing agency to perform preconstruction testing on field mockups.
- B. Mockup Testing: If testing is required by the Owner, Notify Owner and Architect, in writing, seven (7) days in advance of the dates and times when mockups will be tested.

1.8 DELIVERY, STORAGE, AND HANDLING

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

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance Ratings: As tested according to ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

- 1. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
- B. Water-Resistant Glass-Mat Gypsum Sheathing Performance: Water-resistant glass-mat gypsum sheathing assembly, and seals with adjacent construction, shall be capable of performing as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Installed assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tieins to installed waterproofing, and transitions at perimeter conditions without deterioration.

2.2 WOOD PANEL PRODUCTS

- A. Emissions: Products shall meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
- C. Factory mark panels to indicate compliance with applicable standard.

2.3 PRESERVATIVE-TREATED PLYWOOD

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
- B. Mark plywood with appropriate classification marking of an inspection agency acceptable to Authorities Having Jurisdiction (AHJ).
- C. Application: Treat items indicated on Drawings and plywood in contact with masonry or concrete or used with roofing, flashing, vapor barriers, and waterproofing.

2.4 FIRE-RETARDANT-TREATED PLYWOOD

- A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

- 1. Use treatment that does not promote corrosion of metal fasteners.
- 2. Exterior Type: Treated materials shall comply with requirements specified above for fireretardant-treated plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
- 3. Design Value Adjustment Factors: Treated lumber plywood shall be tested according to ASTM D5516 and design value adjustment factors shall be calculated according to ASTM D6305. Span ratings after treatment shall be not less than span ratings specified on Structural Drawings.
- C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.
- E. Application: Treat plywood indicated on Drawings, and the following:
 - 1. Roof and wall sheathing within 48 inches (1220 mm) of fire and party walls.
 - 2. Roof sheathing.

2.5 ROOF SHEATHING

- A. Plywood Sheathing: Match existing sheathing, unless otherwise noted on Structural Drawings.
 - 1. Span Rating: Match existing sheathing rating and structural performance characteristics, unless otherwise noted on Structural Drawings, but not less than 32/16 span rating.
 - 2. Nominal Thickness: As indicated on Drawings.
- B. Oriented-Strand-Board Sheathing (OSB): Not Allowed.

2.6 PARAPET SHEATHING

- A. Plywood Sheathing: Match existing sheathing, unless otherwise noted on Structural Drawings.
 - 1. Span Rating: Match existing sheathing rating and structural performance characteristics, unless otherwise noted on Structural Drawings, but not less than 32/16 span rating.
 - 2. Nominal Thickness: As indicated on Drawings.
- B. Oriented-Strand-Board Sheathing (OSB): Not Allowed.
- C. Water-Resistant Glass-Mat Sheathing: ASTM C1177/C1177M, coated fiberglass mat sheathing with integral weather-resistant barrier complying with ASTM E2178.
 - 1. Basis-of-Design: Subject to compliance with the requirements described herein, provide DensDeck® wall sheathing.
 - 2. Thickness: ½" minimum.
 - 3. Size: Verify in field, except that new panels shall not exceed 48- by 96-inches (1219 by 2438 mm) for vertical installation.
 - 4. Edges: Square.

- 5. Flashing and Transitions Strips: As acceptable to sheathing manufacturer.
- 6. Fire Propagation Characteristics: Complies with NFPA 285 testing as part of an approved assembly.
- 7. UV Resistance: Can be exposed to sunlight for thirty (30) days according to manufacturer's written instructions.
- 8. Provide primers, transition strips, termination strips, joint reinforcing fabric and strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by sheathing manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.

2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture, and as indicated on Structural Drawings, whichever may be more stringent.
 - 1. For roof, parapet, and wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M, unless otherwise noted on Structural Drawings.
- B. Nails, Brads, and Staples: ASTM F1667.
- C. Screws for Fastening Sheathing to Wood Framing: ASTM C1002.

2.8 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

- A. Sealant for Glass-Mat Sheathing: Elastomeric, medium-modulus, neutral-curing silicone joint sealant compatible with joint substrates formed by gypsum sheathing and other materials, recommended by sheathing manufacturer for application indicated and complying with requirements for elastomeric sealants specified in Division 07, Section "Joint Sealants."
 - 1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches (50 mm) wide, 10 by 10 or 10 by 20 threads/inch (390 by 390 or 390 by 780 threads/m), of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas of Work indicated to receive new sheathing, with Installer present, for compliance with requirements for sheathing, installation tolerances, and other conditions affecting performance of the Work. Notify Owner and Architect, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

- 1. Failure to call attention to defects or imperfections will be construed as acceptance and approval of substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of products indicates acceptance of surfaces and conditions.

3.2 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three (3) support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in the ICC's International Building Code.
 - 2. ICC-ES evaluation report for fastener.
- D. Use common wire nails unless otherwise indicated on Structural Drawings. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting substrate(s) and wood framing members.
- E. Coordinate wall, parapet, and roof sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- G. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.3 WOOD STRUCTURAL PANEL INSTALLATION

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 - 1. Parapet, and Roof Sheathing:
 - a. Nail to wood framing as indicated on Structural Drawings. Apply a continuous bead of glue to framing members at edges of wall sheathing panels.

b. Space panels 1/8 inch (3 mm) apart at edges and ends, unless otherwise noted on Structural Drawings.

3.4 GLASS-MAT SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
 - 1. Fasten sheathing to wood framing with nails or screws.
 - 2. Install panels with a 3/8-inch (9.5-mm) gap where non-load-bearing construction abuts structural elements, unless otherwise noted on Structural Drawings.
 - 3. Install panels with a 1/4-inch (6.4-mm) gap where they abut masonry or similar materials that might retain moisture, to prevent wicking, unless otherwise noted on Structural Drawings.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.
 - 1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of panels.
 - 2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.
 - 1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of panels.
 - 2. For sheathing under stucco cladding, panels may be initially tacked in place with screws if overlying self-furring metal lath is screw-attached through sheathing to studs immediately after sheathing is installed.
- E. Seal sheathing joints according to sheathing manufacturer's written instructions.
 - 1. Apply elastomeric sealant to joints and fasteners and trowel flat. Apply sufficient amount of sealant to completely cover joints and fasteners after troweling. Seal other penetrations and openings.
 - 2. Apply glass-fiber sheathing tape to glass-mat gypsum sheathing joints and apply and trowel sealant to embed entire face of tape in sealant. Apply sealant to exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.
- F. Water-Resistant Glass-Mat Sheathing:
 - 1. Install accessory materials according to sheathing manufacturer's written instructions and details to form a seal with adjacent construction, to seal fasteners, and ensure continuity of water barrier.

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Coordinate the installation of sheathing with installation of roofing membrane and a. base flashing to ensure continuity with roofing membrane.

- Install transition strip on roofing membrane or base flashing, so that a minimum of b. 3 inches (75 mm) of coverage is achieved over each substrate.
- 2. Connect and seal sheathing material continuously to substrate(s) and weather barriers specified under other Sections as well as to roofing-membrane air barrier, exterior louvers, and other construction used in exterior wall openings, using accessory materials.
- 3. Apply joint sealants forming part of sheathing assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- Fill gaps in perimeter frame surfaces of openings and miscellaneous penetrations of 4. sheathing material with foam sealant.
- Seal strips and transition strips around masonry reinforcing or ties and penetrations with 5. termination mastic.
- Seal top of through-wall flashings to sheathing with an additional 6-inch- (150-mm-) 6. wide, transition strip.
- 7. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- Repair punctures, voids, and deficient lapped seams in strips and transition strips 8. extending 6 inches (150 mm) beyond repaired areas in strip direction.

3.5 FIELD QUALITY CONTROL

- ABAA Quality Assurance Program: Perform examinations, preparation, installation, testing, A. and inspections under ABAA's Quality Assurance Program.
- B. Testing and Inspecting Agency: Owner reserves the right to engage a qualified testing agency to perform tests and inspections, when required by the Contract Documents.
- C. Air barriers will be considered defective if they do not pass tests and inspections.
- D. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- E. Prepare test and inspection reports.

END OF SECTION 061600

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SECTION 062013 - EXTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Exterior Trim (Standing and Running).
- B. Related Requirements:
 - 1. Division 06, Section "Rough Carpentry" for furring, blocking, and other carpentry work not exposed to view.
 - 2. Division 06, Section "Sheathing" for installation of damaged sheathing substrates.
 - 3. Division 07, Section "Sheet Metal Flashing and Trim".
 - 4. Division 07, Section "Joint Sealants".
 - 5. Division 09, Section "Exterior Painting".

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors and include construction and application details.
 - 1. Include data for wood-preservative treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained. Include chemical-treatment manufacturer's written instructions for finishing treated material.
 - 2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.
- B. Samples: For each type of product involving selection of colors, profiles, or textures.
 - 1. For each species and cut of lumber and panel products, with half of exposed surface finished; 12-inches in length by width of specified product.
 - 2. For exposed wood soffits, 12-inches in length by width of specified product.

1.4 INFORMATIONAL SUBMITTALS

A. Compliance Certificates:

- 1. For lumber that is not marked with grade stamp.
- 2. For preservative-treated wood that is not marked with treatment-quality mark.
- B. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preservative-treated wood.
- C. Sample Warranties: For manufacturer's warranties.

1.5 DELIVERY, STORAGE, AND HANDLING

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

1.6 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecast weather conditions permit work to be performed and at least one coat of specified finish can be applied without exposure to rain, snow, or dampness.
- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

1.7 WARRANTY

- A. Manufacturer's Warranty for Standing and Running Trim: Manufacturer agrees to repair or replace components that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, deformation or deterioration beyond normal weathering.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.

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- 1. Factory mark each piece of lumber with grade stamp of inspection agency, indicating grade, species, moisture content at time of surfacing, and mill.
- 2. For exposed lumber, mark grade stamp on end or back of each piece.

2.2 EXTERIOR TRIM (STANDING AND RUNNING)

A. Lumber Trim for Painted Finish:

- 1. Species and Grade: Western red cedar, vertical grain; NLGA, WCLIB, or WWPA Grade A.
- 2. Maximum Moisture Content: 15 percent with at least 85 percent of shipment at 12 percent or less.
- 3. Finger Jointing: Allowed if made with wet-use adhesive complying with ASTM D5572.
- 4. Face Surface: Rough sawn texture.
- 5. Factory Priming: Factory coated on both faces and all edges, with exterior primer compatible with topcoats specified.
- 6. Dimensions: As indicated on Drawings.

2.3 MISCELLANEOUS MATERIALS

- A. Fasteners for Exterior Finish Carpentry: Provide nails or screws, in sufficient length to penetrate not less than 1-1/2 inches (38 mm) into wood substrate.
 - 1. For pressure-preservative-treated wood, provide stainless steel fasteners.
 - 2. For applications not otherwise indicated, provide hot-dip galvanized-steel fasteners.
- B. Flashing: Comply with requirements in Division 07, Section "Sheet Metal Flashing and Trim" for flashing materials installed in exterior finish carpentry.
- C. Sealants: Comply with requirements in Division 07, Section "Joint Sealants".

2.4 FABRICATION

- A. Back out or kerf backs of standing and running trim wider than 5 inches (125 mm), except members with ends exposed in finished work.
- B. Ease edges of lumber less than 1 inch (25 mm) in nominal thickness to 1/16-inch (1.5-mm) radius and edges of lumber 1 inch (25 mm) or more in nominal thickness to 1/8-inch (3-mm) radius.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Notify Owner and

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Architect, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

- 1. Failure to call attention to defects or imperfections will be construed as acceptance and approval of substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Prime lumber and moldings to be painted, including both faces and edges, unless factory primed.
 - 1. Cut to required lengths and prime ends.
 - 2. Comply with requirements in Division 09, Section "Exterior Painting."

3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, or too small to fabricate with proper jointing arrangements.
 - 1. Do not use manufactured units with defective surfaces, sizes, or patterns.
- B. Install exterior finish carpentry level, plumb, true, and aligned with adjacent materials.
 - 1. Use concealed shims where necessary for alignment.
 - 2. Scribe and cut exterior finish carpentry to fit adjoining work.
 - 3. Refinish and seal cuts as recommended by manufacturer.
 - 4. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining exterior finish carpentry with 1/32-inch (0.8-mm) maximum offset for flush installation and 1/16-inch (1.5-mm) maximum offset for reveal installation.
 - 5. Coordinate exterior finish carpentry with materials and systems in or adjacent to it.
 - 6. Provide cutouts for mechanical and electrical items that penetrate exterior finish carpentry.

3.4 INSTALLATION OF STANDING AND RUNNING TRIM

A. Install flat-grain lumber with bark side exposed to weather.

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B. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available. Do not use pieces less than 24 inches (610 mm) long, except where necessary.

- 1. Use scarf joints for end-to-end joints.
- 2. Stagger end joints in adjacent and related members.
- C. Fit exterior joints to exclude water.
- D. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.

3.5 ADJUSTING

- A. Replace exterior finish carpentry that is damaged or does not comply with requirements prior to Substantial Completion.
 - 1. Exterior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.
- B. Adjust joinery for uniform appearance.

3.6 CLEANING

- A. Clean exterior finish carpentry on exposed and semi-exposed surfaces.
- B. Touch up factory-applied finishes to restore damaged or soiled areas.

3.7 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
 - 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062013

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SECTION 070150.19 - PREPARATION FOR RE-ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Full tear-off of roof system at areas indicated on Drawings.
- 2. Partial tear-off of roof system at areas indicated on Drawings.
- 3. Removal of flashings and counterflashings.
- 4. Temporary roofing.

B. Related Requirements:

- 1. Division 01, Section "Summary" for use of premises and for phasing requirements, as well as Occupied Structure requirements.
- 2. Division 01, Section "Unit Prices" for removal and replacement of unsatisfactory plywood roof sheathing at existing roof areas.
- 3. Division 01, Section "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for reroofing preparation.
- 4. Division 01, Section "Construction Waste Management and Disposal" for waste management and disposal procedures.
- 5. Division 02, Section "Asbestos Abatement Contractor Bid Documents and Specifications" prepared by Owner's Consultant for existing conditions information and remediation requirements.
- 6. Division 07, Section "Thermoplastic Polyefin (TPO) Membrane Roofing" for new finished roofing materials to be provided and installed.

1.3 UNIT PRICES

A. Work of this Section is affected by removal and replacement of unsatisfactory roof sheathing unit price.

1.4 DEFINITIONS

- A. Full Roof Tear-off: Removal of existing roofing system down to existing roof deck.
- B. OSB: Oriented strand board (use of this product is NOT permitted for this Project).

C. Partial Roof Tear-off: Removal of selected components and accessories from existing roofing system.

D. Roofing Terminology: Definitions in ASTM D1079 and glossary of NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

1.5 PREINSTALLATION MEETINGS

- A. Preliminary Roofing Conference: Before starting removal Work, conduct conference at Project Site, with Installer, roofing manufacturer, and General Contractor present.
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing tear-off, including, but not limited to, the following:
 - a. Reroofing preparation, including roofing system manufacturer's written instructions.
 - b. Temporary protection requirements for existing roofing system components that are to remain.
 - c. Existing roof drains and roof drainage during each stage of reroofing, and roof-drain plugging and plug removal.
 - d. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to avoid delays.
 - e. Existing roof deck conditions requiring Architect notification.
 - f. Existing roof deck removal procedures and Owner notifications.
 - g. Condition and acceptance of existing roof deck and base flashing substrate for reuse.
 - h. Structural loading limitations of roof deck during reroofing.
 - i. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that affect reroofing.
 - j. HVAC shutdown and sealing of air intakes.
 - k. Shutdown of fire-suppression, -protection, and -alarm and -detection systems.
 - 1. Asbestos removal and discovery of asbestos-containing materials.
 - m. Governing regulations and requirements for insurance and certificates if applicable.
 - n. Existing conditions that may require Architect notification before proceeding.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Moisture Mitigation Plan Submittal:
 - 1. Contractor shall prepare and submit a 3-part moisture mitigation plan to address potential inclement weather and for District and Architect approval prior to commencement of work. The moisture mitigation plan shall include the following:
 - 2. Part 1: Prevention

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a. Contractor's protocol for obtaining and reviewing weather forecast during construction and disseminating forecasted weather information and concerns to the Project Team. Include weather forecast source, intervals at which the forecast will be reviewed and the Contractor's method for disseminating forecasted weather-related impacts or concerns to the Project Team.

- b. Contractor's protocol for weatherizing building at end of each work day.
 - Include a roof plan showing areas where temporary weatherization are to be employed with detailed information of materials and techniques used to achieve temporary weatherization. Provide drawing details as needed to clarify intent and reference details on plan. If re-roof is to be phased, submit requested roof plan for each phase
 - 2) Provide a list of key members of the Construction team involved with endof-day weatherization and their associated roles and responsibilities (e.g., Those responsible for performing the work, those responsible for overseeing work being performed, those responsible for a quality control check after work is completed, etc)
- c. Provide list of equipment and where it is to be stored on-site for full project duration and for the sole purpose of deploying during a wet weather emergency to help minimize immediate wet weather affects to unprotected surfaces and affected interior areas.
- d. Contractor's Action Plan (<u>To be posted in job trailor or other District-approved location</u>): Provide an organized and cohesive Action Plan for addressing wet weather intrusion. A separate Action Plan shall be provided for each of two scenarios:
 - 1) <u>Scenario A:</u> Wet weather is encountered during the workday with appointed staff available to respond immediately.
 - 2) <u>Scenario B:</u> Wet weather is encountered during off-work hours with few or no appointed construction staff on site.
 - 3) For each of the above scenarios, include in the Action Plan (at a minimum) the following:
 - a) Response Team: Appoint a wet weather Response Team capable of adequately implementing contractor's Action Plan. This team shall consist of selected Contractor's staff and those of subcontractors as needed at Contractor's discretion. In addition, the District will provide a list of District and School staff to be included as part of the Response Team. Provide a list for each member of the Response Team and include emergency contact information for each, including name, role, phone number and e-mail address. Include in this list and identify at least one member of Contractor's appointed Response Team who can be reached on a 24-hour, seven days-per-week basis.
 - b) Stakeholder Contact List: The District will provide a list of District stakeholders to be contacted in the event of wet weather intrusion into the building for Contractor's integration with the Action Plan.
 - c) Location of dehumidifying equipment, drip buckets, absorbing blankets, moisture absorbing media, etc.to be employed if unprotected exterior surfaces are exposed to moisture and/or if moisture has penetrated the building envelope into the building's interior. Include

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- instructions for locating and operating equipment if required. Refer to Item Part 1.c above for Contractor's list of equipment and materials to be stored on-site.
- d) Sequence of Operations: Develop a Sequence of Operations for employing the Action Plan, including prioritizing the individuals to be notified upon implementation of the Action Plan and steps required to ensure moisture mitigation measures' effectiveness throughout the course of the wet weather event. As part of this sequence of operations identify the source and contact information for those responsible in supplying additional moisture mitigation equipment and materials if needed to address significant or prolonged wet weather event.
- e. Contractor's method for educating Contractor and Subcontractor staff of Moisture Mitigation Plan, including Action Plan, and gaging such staff's preparedness to execute the Contractor's Action Plan.

3. Part 2: Immediate Response

a. Provide written protocol for implementing Action Plan for both scenarios identified above.

4. Part 3: Moisture and Mold Mitigation

- a. Identify Contractor's protocol for quantifying wet weather related impact to exposed exterior surfaces and interior spaces and how Contractor intends to disseminate this information to The District and Architect. Include description of technologies to be employed for moisture detection in concealed and unconcealed locations. Initial verbal notification to the Owner and Architect shall take place within 24 hours of a water intrusion event.
- b. Identify measures to be taken after immediate wet weather event to ensure continued moisture and mold mitigation response. Include Contractor's protocol for drying and/or cleaning of school assets impacted by wet weather, including electronics, books, classroom and office furniture, etc.
- c. Describe the conditions under which Contractor-provided moisture and mold mitigation equipment and materials/supplies would be disengaged following a wet weather intrusion.
- d. Provide written confirmation that Contractor intends to work collaboratively with and support an Owner or Architect-contracted industrial hygienist or other moisture and mold mitigation expert. Such subcontractor may be hired at Owner's discretion to help quantify the locations and effects of wet weather related impacts for Contractor remediation.
- e. Outline Contractor's protocol for wet weather-related clean up.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Photographs: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by reroofing operations.

- 1. Submit before Work begins.
- C. Landfill Records: Indicate receipt and acceptance of demolished roofing materials and hazardous wastes, such as asbestos-containing materials, by a landfill facility licensed to accept them.
 - 1. Owner will engage a qualified third-party testing agency to test existing roofing components for hazardous materials prior to commencement of construction.

1.8 CLOSEOUT SUBMITTALS

- A. Maintenance and Product Data: Provide manufacturer's written recommended maintenance data and product data for each type of product installed, including methods for maintaining as well as precautions for use of cleaning materials and methods that could be detrimental to finishes and performance. Include in operation and maintenance manuals.
- B. Warranties: Include warranty in Project warranty manual.
- C. Upon completion of work of this Section, provide Owner with all maintenance materials from work of this Section that are packaged with protective covering for Owner's storage and identified with labels describing contents.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: An entity with not less than five (5) years of successful experience in installation of the specified roofing system(s) and accessories that employs installers and supervisors who are competent in techniques required and certified by manufacturer.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by manufacturer for installation techniques required.

B. Regulatory Requirements:

- 1. Comply with governing EPA notification regulations before beginning roofing removal.
- 2. Comply with hauling and disposal regulations of Authorities Having Jurisdiction (AHJ).

1.10 FIELD CONDITIONS

- A. Existing Roofing System: Built-up roofing system with ballasted overlay.
- B. Owner will occupy portions of building immediately below reroofing area.
 - 1. Conduct reroofing so Owner's operations are not disrupted.

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- 2. Provide Owner with not less than seventy-two (72) hours' written notice of activities that may affect Owner's operations.
- 3. Coordinate work activities daily with Owner so Owner has adequate advance notice to place protective dust and water-leakage covers over sensitive equipment and furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below work area.
- 4. Before working over structurally impaired areas of deck, notify Owner to evacuate occupants from below affected area.
 - a. Verify that occupants below work area have been evacuated before proceeding with work over impaired deck area.
- C. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.
- D. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.
- E. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.
- F. Limit construction loads on existing roof areas to remain, and existing roof areas scheduled to be reroofed to originally permitted, maximum loading design criteria for uniformly distributed loads.
 - 1. Originally permitted, maximum load: As indicated on Structural Drawings.
- G. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.
 - 1. Remove only as much roofing in one day as can be made watertight in the same day.
- H. Hazardous Materials: Division 02, Section "Asbestos Abatement Contractor Bid Documents and Specifications" prepared by Owner's Consultant TRC for existing conditions information and remediation requirements.

PART 2 - PRODUCTS

2.1 TEMPORARY PROTECTION MATERIALS

A. Design and selection of materials for temporary roofing are Contractor's responsibilities.

2.2 TEMPORARY ROOFING MATERIALS

A. Design and selection of materials for temporary roofing are Contractor's responsibilities.

J

INFILL AND REPLACEMENT MATERIALS

- A. Use infill materials matching existing roofing system materials unless otherwise indicated.
- B. Plywood roof sheathing is specified in Division 06, Section "Sheathing."
 - 1. Use of OSB sheathing products is NOT permitted for this Project.

2.4 AUXILIARY REROOFING MATERIALS

A. General: Use auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of existing and new roofing system.

PART 3 - EXECUTION

2.3

3.1 PREPARATION

- A. Protection of In-Place Conditions:
 - 1. Protect existing roofing system that is not to be reroofed.
 - 2. Limit traffic and material storage to areas of existing roofing that have been protected.
 - 3. Maintain temporary protection and leave in place until replacement roofing has been completed. Remove temporary protection on completion of reroofing.
 - 4. Comply with requirements of existing roof system manufacturer's warranty requirements.
- B. Temporarily seal or isolate windows, doors, and other openings, that may be exposed to airborne substances created in removal of existing materials.
- C. Shut off rooftop utilities and service piping before beginning the Work, as may be required.
- D. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work.
 - 1. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.
- E. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.
- F. Maintain roof drainage in functioning condition to ensure roof drainage at end of each workday.
 - 1. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new roofing system, provide alternative drainage method to remove water.
 - a. Do not permit water to enter into or under existing roofing system components that are to remain.

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3.2 **ROOF TEAR-OFF**

- Notify and coordinate with Owner each day of extent of roof tear-off proposed for that day and A. obtain authorization to proceed.
- B. Lower removed roofing materials to ground and onto lower roof levels, using dust-tight chutes or other acceptable means of removing materials from roof areas.
- C. Full Roof Tear-off: Where indicated on Drawings, remove existing roofing and other roofing system components down to the existing roof deck.
 - Remove damaged roof sheathing. 1.
 - Remove base flashings and counter flashings. 2.
 - Remove perimeter edge flashing. 3.
 - Remove flashings at pipes, curbs, mechanical equipment, and other penetrations. 4.
 - Remove roof gutters and downspouts, conductor heads, scuppers. 5.
 - Remove existing roof vents. 6.

3.3 **DECK PREPARATION**

- Inspect deck after tear-off of roofing system. A.
- If broken or loose fasteners that secure deck panels to one another or to structure are observed, В. or if deck appears or feels inadequately attached, immediately notify Architect, in writing.
 - 1. Do not proceed with installation until directed by Architect, in writing.
- C. If deck surface is unsuitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect and Structural Engineer, in writing.
 - 1. Do not proceed with installation until directed by Architect, in writing.
- Provide additional deck securement, as necessary, complying with building code for securing D. field and perimeter of roofing attachment, as indicated on Structural Drawings.
- E. Replace unsatisfactory roof sheathing as indicated on Structural Drawings.
 - 1. Roof sheathing replacement will be paid for by adjusting the Contract Sum according to unit prices included Division 01, Section "Unit Prices".

3.4 INFILL MATERIALS INSTALLATION

- Immediately after roof tear-off, and inspection and repair, if needed, of deck, fill in tear-off A. areas to match existing roofing system construction.
- Install new roofing patch over roof infill area. B.

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3.5 TEMPORARY ROOFING

- Install approved temporary roofing over area to be reroofed, as necessary to avoid weather A. elements from entering building interior.
- B. Remove temporary roofing before installing new finished roofing system.

3.6 BASE FLASHING REMOVAL

- A. Remove existing base flashings.
 - 1. Clean substrates of contaminants, such as asphalt, sheet materials, dirt, and debris.
- B. Do not damage metal counterflashings that are to remain.
 - 1. Replace metal counterflashings damaged during removal with counterflashings specified in Division 07, Section "Sheet Metal Flashing and Trim" and specified in Division 07, Section "Roof Specialties".

DISPOSAL 3.7

- Collect demolished materials and place in containers. A.
 - 1. Promptly dispose of demolished materials.
 - 2. Do not allow demolished materials to accumulate on-site.
 - Storage or sale of demolished items or materials on-site is not permitted. 3.
- B. Transport and legally dispose of demolished materials off Owner's property.

END OF SECTION 070150.19

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SECTION 072500 - WEATHER BARRIERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Weather resistant barrier and associated accessories.
- 2. Flexible flashing.

B. Related Requirements:

- 1. Division 01, Section "Unit Prices" for removal and replacement of unsatisfactory wall sheathing at exterior walls.
- 2. Division 01, Section "Quality Requirements" for additional mock-up requirements not noted within this Section.
- 3. Division 01, Section "Fenestration System Testing" for coordination with fenestration testing requirements.
- 4. Division 06, Section "Sheathing" for replacement of unsatisfactory wall sheathing at exterior walls.
- 5. Division 06, Section "Exterior Finish Carpentry" for exterior standing and running trim.
- 6. Division 07, Section "Sheet Metal Flashing and Trim" for metal flashings integrated into the building envelope.
- 7. Division 07, Section "Joint Sealants" for joint-sealant materials integrated into the building envelope.
- 8. Division 08, Section "Fixed Louvers" for fixed louver frame integration into the building envelope.
- 9. Division 09, Section Cement Plaster for exterior cladding system coordination.

1.3 DEFINITIONS

- A. AAMA: American Architectural Manufacturers Association
- B. AATCC: American Association of Textile Chemists and Colorists
- C. ASTM: American Society for Testing and Materials
- D. Back Dam: The rear upturned leg of a sill pan or subsill designed for the purpose of containing liquid water.

- E. End Dam: The side upturned legs of a sill pan or subsill designed for the purpose of containing liquid water. End dams must of a height equal to the height of the back dam or higher.
- F. Flexible Flashing: Refers to either Mechanically Attached Membrane flashing or Self Adhered Membrane flashing.
- G. Mechanically Attached Membrane ("MAM") flashing: A type of flashing with low or no permeance that is designed to prevent liquid water from passing through it. When mechanically attached flashing is used, a roll width dimension of not less than 9 inches (230 mm) shall be required. Mechanically attached flashing shall meet the performance requirements in ICC Acceptance Criteria 148.
- H. Self-Adhering Membrane ("SAM") flashing: Flexible facing materials coated completely, or partially, on at least one side with an adhesive material and which do not depend upon mechanical fasteners for permanent attachment. Self-adhering flashing shall meet the performance requirements of AAMA 711 or ICC Acceptance Criteria AC 148.
- I. Pan Flashing (sill pan or threshold pan): A type of flashing used at the base of a rough opening to divert incidental water to the exterior or to the exterior surface of a concealed weather resistive barrier. Pan flashings have upturned legs at the rear interior edge (back dam) and right and left sides (end dam) to form a three-sided pan that has the front open for drainage. At metal pans, all seams to be fully welded and watertight. Sill pans shall be sloped to the exterior.
- J. Weather Barrier Assembly: The collection of weather barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to provide vapor control, water resistance and wind resistance within the wall assembly.

1.4 REFERENCES

- A. AAMA 100-07 Standard Practice For Installation Of Windows With Flanges or Mounting Fins in Wood Frame Construction.
- B. AATCC Test Method 127 Water Resistance: Hydrostatic Pressure Test; 1998.
- C. American Society for Testing and Materials (ASTM)
 - 1. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E 96 Standard Test Methods for Water Vapor Transmission of Materials; Compliant with Procedure B (Water Method) for interior to exterior testing.
 - 3. ASTM D 779 Standard Test Method for Water Resistance of Paper, Paperboard, and Other Sheet Materials by the Dry Indicator Method
 - 4. ASTM D 882 Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
 - 5. ASTM 2112-07 Standard Practice for Installation of Exterior Windows, Doors and Skylights.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

- 1. For weather resistant barrier system and accessories, include data on air and water-vapor permeance based on testing according to referenced standards.
- B. Shop Drawings: Show details of weather resistant barrier system and accessories at terminations, openings, and penetrations. Show details of flexible flashing applications.
 - 1. Provide 1-1/2" scale drawings (or larger) showing relationship of membrane to:
 - a. Framing or blocking members
 - b. Thermal Insulation
 - c. Sheathing
 - d. All exterior cladding and corner conditions
 - e. Door and window frames
 - f. Pan flashing at doors
 - g. Sill flashing at windows
 - h. Through-wall metal flashing
 - i. Pipe, conduit and duct penetrations

1.6 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For weather-resistive barrier and flexible flashing, from ICC-ES.
- B. Samples:
 - 1. 8-1/2-x-11-inch square of weather-resistive barrier sheet.
 - 2. Tapes (Single & Double sided).
 - 3. 12" strip of Self Adhering Membrane Flashing
 - 4. Pre-fabricated Corner Sill Pan Flashing.
 - 5. Provide materials and fasteners for mock-up.

1.7 OUALITY ASSURANCE

- A. Applicator Qualifications: A firm experienced in applying Weather Barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Mockups: Before beginning installation of Weather Barrier, build mockups of exterior wall assembly, incorporating backup wall construction, external cladding, window, door frame and sill, and flashing to demonstrate surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of weather barrier membrane.
 - 1. Include junction with building corner condition and foundation wall intersection.
 - 2. If Owner and Architect determines mockups do not comply with requirements, reconstruct mockups and apply weather barrier until mockups are approved.
 - 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
 - 4. Mockup(s) shall be reviewed and approved by the Owner and Architect prior to proceeding with the balance of the installation.

- 5. At mock up review provide 8½"x11" images of weather barrier installation and all areas not visible at time of the inspection.
- C. Preinstallation Conference: Conduct conference at Project site.
 - 1. Include installers of other construction connecting to Weather Barrier, such as waterproofing, concrete, joint sealants, windows, and door frames.
 - 2. Review Weather Barrier requirements including surface preparation, substrate condition and pretreatment, minimum substrate curing period, forecasted weather conditions, special details and sheet flashings, mockups, installation procedures.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Store materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by Weather Resistant Barrier manufacturer.
- B. Store rolls according to manufacturer's written instructions.
- C. Protect stored materials from direct sunlight and excessive moisture.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Apply Weather Barrier within the range of ambient and substrate temperatures recommended by weather barrier manufacturer. Protect substrates from environmental conditions that affect performance of weather barrier. Do not apply weather barrier to a damp or wet substrate or during snow, rain, fog, or mist.

1.10 WARRANTY

- A. Special Warranty: Standard form in which manufacturer agrees to repair or replace weather resistant barrier system, including accessory components, that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Manufacturing defects.
 - b. Structural failures of system components.
 - 2. Material Warranty Period: Fifteen (15) years from date of Substantial Completion.
- B. Special Project Warranty: Installer's Warranty, signed by Installer, covering the Work of this Section, in which Installer agrees to repair or replace components of weather resistant barrier system that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two (2) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Weather Barrier shall be capable of performing as a continuous breathable weather and air barrier. Weather Barrier assemblies shall be capable of accommodating substrate movement, construction material changes, penetrations, and transitions at perimeter conditions without deterioration and air leakage.

2.2 WEATHER BARRIER (Exterior Cement Plaster Locations)

- A. Vapor Permeable Weather Barrier: Use vapor permeable weather resistive barrier.
 - 1. Manufacturer and Product: Subject to compliance with requirements, provide products by the following basis-of-design manufacturer:
 - a. Basis-of-Design: "Super Jumbo Tex 60 Minute" Weather Barrier by Fortifiber Building Systems Group.
 - 2. Layer(s): Two layers of asphalt saturated kraft Grade D breather type over wall sheathing, lapped per manufacturer instructions.
 - 3. Water Resistance (Boat Test): ASTM D779; not less than 60 minutes.
 - 4. Allowable UV Exposure Time: Per Manufacturer.
- B. Weather Barrier Tape: Pressure-sensitive plastic tape recommended by weather barrier manufacturer for sealing joints and penetrations in weather barrier.

2.3 FLEXIBLE FLASHING

- A. Butyl Rubber Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 20 mil, cold applied, self-adhering membrane.
 - 1. Manufacturer and Product: Subject to compliance with requirements, provide products by the following basis-of-design manufacturer:
 - a. Basis-of-Design: "FortiFlash Butyl" self-adhering membrane flashing by Fortifiber Building Systems Group.
 - b. High Temperature: Minimum 30 mil, cold applied, self-adhering flashing.
- B. Primer for Flexible Flashing: Product recommended in writing by flexible flashing manufacturer for substrate.

2.4 DRAINAGE MATERIAL (Exterior Cement Plaster Locations)

- A. Drainage Material: Provide product(s) that shall maintain a continuous open space between weather barrier and exterior cladding to create a drainage plane and shall be used under finish cladding.
 - a. General: Use ventilated rain screen with pre-installed mortar screen.
 - b. Basis-of-Design: "Delta-Dry Stucco & Stone" by Cosella Dorken.

2.5 ACCESSORIES

- A. General: Auxiliary materials detailed in Drawings and as recommended by Weather Resistive Barrier manufacturer for intended use and compatible with weather barrier.
- B. Sheathing Tape: Subject to compliance with requirements, provide products by the following basis-of-design manufacturer.
 - 1. Basis-of-Design: Fortifiber Building Systems "Sheathing Tape."
- C. Fasteners: 1-inch (25.4mm) plastic cap 0.019-inch-shank-diameter (2.11mm) galvanized steel or stainless steel nail. Fasteners shall be of sufficient length to penetrate through the sheathing.
- D. Sealant: Subject to compliance with requirements, provide products by the following basis-of-design manufacturer:
 - 1. Basis-of-Design: Fortifiber Building Systems "Moistop Sealant."
 - 2. Reference Standards: AAMA 808.3-92 (exterior perimeter sealing compound); ASTM C-920, Type S, Grade NS, Class 25.
 - 3. Primer for Sealant: Product recommended by manufacturer of sealant for substrate.
- E. Pre-Manufactured Flashing Panels: Subject to compliance with requirements, provide products by the following manufacturer:
 - 1. Basis-of-Design: Quickflash Weather Proofing Products, Inc.
 - 2. Panels: As indicated for plumbing and electrical items at exterior building envelope appurtenances.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance. Notify Owner and Architect, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.

- 1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
- 2. Failure to call attention to defects or imperfections will be construed as acceptance and approval of substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of products indicates acceptance of surfaces and conditions.

3.2 SURFACE PREPARATION

- A. Clean, prepare, and treat substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for weather barrier application.
- B. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks.
- C. Verify that substrate is adequately secured to framing and remove all loose nails, other sharp protrusions or other matter that will hinder the installation of weather barrier or adhesion of flexible flashing.
- D. Self-Adhering Membrane Flashing General: Verify substrate preparation and temperature tolerances with manufacture prior to installation of Self-Adhering Membrane Flashing(s). Self-Adhering Membrane Flashing installed at temperatures at or below 45 deg F (7.2 deg C) may require special preparation and use of butyl only.
- E. Windows, Doors and Louvers:
 - 1. Install in accordance with the recommendations of AAMA 100-07.
 - 2. Install flexible flashing following the shingle principle of overlapping materials. Weather-Resistive Barrier installed after window installation: in accordance with ASTM E.2112.
 - 3. Cover flexible flashing with finish material within the manufacturer's recommended time.

3.3 WEATHER BARRIER INSTALLATION

- A. General: Install all weather barrier products in accordance with manufacturer's written recommendations and installation instructions.
- B. Cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to framing immediately after sheathing is installed.
- C. Secure weather barrier and accessories so that the subsurface is protected from weather until finish materials can be installed.
- D. Apply weather barrier and accessories in a shingled manner to shed water.

- E. Install weather barrier laid smooth without folds or bunches of materials.
 - 1. First, wrap penetrations as indicated in Drawings.
 - 2. Start from the bottom, unroll the weather barrier, mechanically fastening top and bottom, 2'-0" o.c. (and in compliance with manufacturer's written installation instructions).
 - 3. Seal against jambs of openings with manufacturer recommended tape lapping weather barrier over flexible flashing at jambs and head. At sill, lap flexible flashing over weather barrier.
- F. Inspect and repair membrane prior to application of finish material over membrane. Tape tears, perforations and similar damage.

3.4 FLEXIBLE FLASHING INSTALLATION

- A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
 - 1. Prime substrates as recommended by flashing manufacturer.
 - 2. Lap seams and junctures with other materials as recommended by manufacturer.
 - 3. Lap flashing over water-resistive barrier at bottom and sides of openings.
 - 4. Lap water-resistive barrier over flashing at heads of openings.
 - 5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

3.5 DRAINAGE MATERIAL INSTALLATION

A. Install drainage material over building wrap and flashing to comply with manufacturer's written instructions.

3.6 FIELD QUALITY CONTROL

- A. Inspections: Weather barrier materials and installation are subject to inspection for compliance with requirements. Inspections may include the following:
 - 1. Continuity of weather barrier system has been achieved throughout the building envelope with no gaps or holes.
 - 2. Site conditions for application temperature and dryness of substrates have been maintained.
 - 3. Maximum exposure time of materials to UV deterioration has not been exceeded.
 - 4. Laps in sheet materials have complied with the minimum requirements and have been shingled in the correct direction.
 - 5. Compatible materials have been used.

3.7 CLEANING AND PROTECTION

A. Protect weather barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

B. Clean spills, stains, and soiling from adjacent construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 072500

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SECTION 074213.13 - FORMED METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Concealed-fastener, lap-seam metal wall panels.

B. Related Sections:

- 1. Division 07, Section "Weather Barriers".
- 2. Division 07, Section Joint Sealants".
- 3. Division 08, Section "Fixed Louvers".
- 4. Division 09, Section "Exterior Painting."

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at the Project Site with the Installer present.
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of doors, windows, and louvers.
 - 2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
 - 4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
 - 5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
 - 6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
 - 7. Review temporary protection requirements for metal panel assembly during and after installation.
 - 8. Review of procedures for repair of metal panels damaged after installation.
 - 9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

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1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings:

- 1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
- C. Samples: For each type of metal panel indicated with factory-applied finishes.
 - 1. Include Samples of trim and accessories involving color selection.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- C. Field quality-control reports.
- D. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. UL-Certified, Portable Roll-Forming Equipment: UL-certified, portable roll-forming equipment capable of producing metal panels warranted by manufacturer to be the same as factory-formed products. Maintain UL certification of portable roll-forming equipment for duration of work.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
- B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal panels during installation.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.10 COORDINATION

A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures including rupturing, cracking, or puncturing.
 - b. Deterioration of metals and other materials beyond normal weathering.
 - 2. Warranty Period: Ten years from date of Substantial Completion.
- B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested according to ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: Twenty-Five years from date of Substantial Completion.

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PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
 - 1. Wind Loads: As indicated on Structural Drawings.
- B. Water Penetration under Static Pressure: No water penetration when tested according to ASTM E331 at the following test-pressure difference:
 - 1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

- A. Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.
- B. Flush-Profile, Concealed-Fastener Metal Wall Panels: Formed with vertical panel edges and a flat pan between panel edges; with flush joint between panels.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide a product by one of the following:
 - a. Manufacturer: Flush Panel
 - b. Product: AEP Span division of ASC Profiles.
 - c. Gauge: 24 gauge minimum.
 - d. Profile and Pattern: Flat (no ribs)
 - e. Finish:
 - 1) Exterior Panel Finish (Exposed Face): Provide primer and finish coat on exposed faces.
 - 2) Exterior Panel Finish (Concealed Face): Provide backer coat on concealed faces of panels.
 - 2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653/A653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792/A792M, Class AZ50 (Class AZM150) coating

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designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755/A755M.

- a. Nominal Thickness: 0.034 inch (0.86 mm).
- b. Exterior Finish: Three-coat fluoropolymer.
- c. Color: As selected by Architect from manufacturer's full range.

2.3 MISCELLANEOUS MATERIALS

- A. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet, ASTM A653/A653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A792/A792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.
- B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
 - 1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
 - 2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
 - 3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
- C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.
- D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.
- E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.
 - 1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
 - 2. Joint Sealant: ASTM C920; elastomeric polyurethane sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
 - 3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

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2.4 FABRICATION

A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

- B. On-Site Fabrication: Subject to compliance with requirements of this Section, metal panels may be fabricated on-site using UL-certified, portable roll-forming equipment if panels are of same profile and warranted by manufacturer to be equal to factory-formed panels. Fabricate according to equipment manufacturer's written instructions and to comply with details shown.
- C. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.
- D. Fabricate metal panel joints with factory-installed captive gaskets or separator strips that provide a weathertight seal and prevent metal-to-metal contact, and that minimize noise from movements.
- E. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.
 - 1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
 - 2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
 - 3. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
 - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
 - 5. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
 - a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

- A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Steel Panels and Accessories:

- 1. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- 2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.
 - 1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
 - 2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.
 - a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
 - b. Failure to call attention to defects or imperfections will be construed as acceptance and approval of substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
- C. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.

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3.3 INSTALLATION

A. Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

- 1. Shim or otherwise plumb substrates receiving metal panels.
- 2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
- 3. Install screw fasteners in predrilled holes.
- 4. Locate and space fastenings in uniform vertical and horizontal alignment.
- 5. Install flashing and trim as metal panel work proceeds.
- 6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
- 7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
- 8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

- 1. Steel Panels: Use stainless steel fasteners for surfaces exposed to the exterior; use galvanized-steel fasteners for surfaces exposed to the interior.
- C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.
- D. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
 - 1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
 - 2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
 - 3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
 - 4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
 - 5. Flash and seal panels with weather closures at perimeter of all openings.

E. Watertight Installation:

- 1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.
- 2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
- 3. At panel splices, nest panels with minimum 6-inch (152-mm) end lap, sealed with sealant and fastened together by interlocking clamping plates.

F. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

- 1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.
- G. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.
 - 1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and achieve waterproof performance.
 - 2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect completed metal wall panel installation, including accessories.
- B. Remove and replace metal wall panels where inspections indicate that they do not comply with specified requirements.
- C. Additional inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.
- D. Prepare inspection reports and issue to Owner and Architect.

3.5 CLEANING AND PROTECTION

- A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
- B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074213.13

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SECTION 075423 – THERMOPLASTIC POLYOLEFIN (TPO) MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Induction welded mechanically attached TPO membrane roofing system.
- 2. Cover Board.
- 3. Sheet Metal Flashing and Trim:
 - a. Formed roof-drainage sheet metal fabrications.
 - b. Formed low-slope roof sheet metal flashings.
 - c. Formed wall sheet metal fabrications.
 - d. Formed equipment support flashings.
 - e. Sheet metal counter flashing.
- 4. Roof Insulation.
- 5. Vapor Retarder.
- 6. Miscellaneous materials.
- 7. Preparation of existing roofing system for new recover application.

B. Related Requirements

- 1. Division 01, Section "Unit Prices" for removal and replacement of unsatisfactory plywood roof and wall sheathing at existing areas.
- 2. Division 06, Section "Sheathing" for roof sheathing installation and replacement.
- 3. Division 07, Section "Preparation For Re-Roofing".
- 4. Division 07, Section "Metal Wall Panels".
- 5. Division 07, Section "Weather Barriers" for water-resistive barrier applied over wall sheathing.
- 6. Division 07, Section "Roof Accessories".
- 7. Division 23 for related heating, ventilating, and air conditioning and related accessory requirements.
- 8. Division 26 for related electrical and electrical accessory requirements.

1.3 REFERENCES

- A. Roofing Terminology: Refer to the following publications for definitions of roofing work related terms in this Section:
 - 1. ASTM D1079, Standard Terminology Relating to Roofing and Waterproofing.

- 2. Roofing Terminology: Definitions in ASTM D1079 and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to Work of this Section.
- 3. Roof Consultants Institute, Glossary of Building Envelope Terms.
- B. Sheet Metal Terminology and Techniques: SMACNA Architectural Sheet Metal Manual.

1.4 PREINSTALLATION MEETINGS

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

1.5 DESIGN CRITERIA

- A. General: Installed roofing membrane system to remain watertight and resist specified wind uplift pressures, thermally induced movement, and exposure to weather without failure.
- B. Material Compatibility: Roofing materials to be compatible with one another under conditions of service and application required and as demonstrated by roofing system manufacturer based on testing and field experience.
- C. Installer to comply with current code requirements as defined by governing Authorities Having Jurisdiction.
- D. Wind Uplift Performance: Roofing system to be identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressure calculated in accordance with ASCE 7 (2016).
 - 1. Refer to Structural Drawings for additional performance requirements.
- E. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL,

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FMG, or another testing and inspecting agency acceptable to Authorities Having Jurisdiction. Materials to be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E108, for application and roof slopes indicated.

1.6 SUBMITTALS

- A. Moisture Mitigation Plan Submittal:
 - 1. Prior to commencing any work, Contractor shall prepare and submit a 3-part moisture mitigation plan to address potential inclement weather and for District and Architect approval prior to commencement of work.
 - 2. The moisture mitigation plan shall successfully and completely at all items described in Division 07, Section "Preparation for Re-Roofing".
- B. Product Data: Manufacturer data sheets for each product to be provided.
- C. Roof Detail Drawings: Provide roofing system plans, elevations, sections, details, and details of attachment to other Work, including:
 - 1. Layout and thickness of insulation.
 - 2. Base flashings and membrane terminations.
 - 3. Flashing details at penetrations.
 - 4. Tapered insulation layout, thickness, and slopes.
 - 5. Roof plan showing orientation of roof sheathing, orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
 - 6. Crickets, saddles, and tapered edge strips, including slopes.
 - 7. Insulation fastening and adhesive patterns for corner, perimeter, and field-of-roof locations.
 - 8. Tie-in with adjoining building envelope systems.
- D. Tapered Insulation Shop Drawings: Contractor's delegated design professional shall provide, for the Owner and Architect to review, a comprehensive panel layout of roof plans and sections as required to identify slopes in regard to hips, valley's, ridges and to all drain locations. Identify thickness of insulation in relation to all applicable existing conditions to include curb mounted equipment, parapet heights, door and structure elevation impacts, potential obstructions and ponding issues.
 - 1. Basis-of-Design Service Provider Requirement: Tapered Design; www.tapereddesign.com
- E. Sheet Metal Detail Drawings:
 - 1. Include plans, elevations, sections and attachment details.
 - 2. Distinguish between shop and field assembly work.
 - 3. Include identification of finish for each item.
 - 4. Include pattern of seams and details of termination points, expansion joints and expansion joint covers, direction of expansion, roof penetration flashing, and connections to adjoining work.

- F. Verification Samples: Provide for each product specified.
- G. Qualification Data: For Installer and Manufacturer.
- H. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is approved, authorized, and licensed by manufacturer to install the specified roofing system and accessory components, resulting in a fully warranted roof assembly.
- I. Maintenance Data for all products installed.
- J. Warranty: Provide manufacturer's materials warranty.
- K. Prior to beginning the work of this section, provide a copy of the final System Assembly Letter issued by the manufacturer indicating that the products and system to be installed will be eligible to receive the specified manufacturer's warranty when installed by a certified contractor/installer in accordance with the manufacturer's application requirements and inspected and approved by a manufacturer's Technical Representative.
- L. Prior to roofing system installation, provide a copy of the Warranty Application Confirmation document issued by the manufacturer indicating that the project has been reviewed for eligibility to receive the specified warranty and is registered.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For all systems and components installed to be included in maintenance manuals.
- B. Materials warranties.
- C. Roofing Installer's warranty.

1.8 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Membrane Roofing: Coordinate with Owner regarding type of and amount of extra materials required by the Owner as part of this Project.

1.9 QUALITY ASSURANCE

- A. Installer Qualifications: Installer shall be licensed or otherwise authorized by all federal, state, and local authorities to install all products specified under this Section. Installer shall be approved and authorized by roofing system manufacturer to install manufacturer's product and that is eligible to receive the specified manufacturer's warranty.
 - 1. Installer shall have a minimum of five (5) years' experience for projects of this type and magnitude and shall be approved by manufacturer for installing manufacturer's product.

B. Manufacturer Qualifications: Qualified manufacturer that has a minimum of ten (10) years' of experience supplying roofing systems identical to that used for this Project.

- C. Testing Agency Qualifications: An independent testing agency with the experience and capability to conduct the testing indicated, as documented according to ASTM E329.
- D. Moisture Survey (Re-cover Roof Areas Only):
 - 1. Prior to installation, Contractor shall review the Moisture Survey performed by the Roofing Consultant. Contractor shall test areas where moisture damage was discovered or suspected, as well as at intervals required by the membrane roofing manufacturer to determine extent of damage and condition of roof assemblies. Submit prior to installation, results of the contractor's moisture survey test results as performed and completed by the Installer. Moisture Survey shall meet the requirements of the membrane roofing manufacturer, including location(s) of testing, quantity of testing, testing conditions, and types of testing, which shall, at a minimum utilize one of the following scanning processes:
 - a. Infrared Thermography Scanning.
 - b. Impedance Scanning.
- E. Pull-Test Requirements: Prior to commencement of Work, Installer shall perform and provide results demonstrating existing conditions will conform to basis-of-design manufacturer requirements (listed below) or building code requirements, whichever is more stringent.
 - 1. Minimum Pullout Resistance Requirements:
 - a. Mechanically Attached Membrane Systems: 400 lbs (181.4 kg)
- F. Source Limitations: Obtain all components from the single source roofing manufacturer guaranteeing the roofing system. All products used in the system to be labeled by the single source roofing manufacturer issuing the warranty.
- G. Fire-Test-Response Characteristics: Roofing materials to comply with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, or another testing and inspecting agency acceptable to Authorities Having Jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products and installation accessories to Project site in original manufacturer's unopened cartons and containers each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store roofing materials in a dry, well-ventilated location protected from weather, sunlight, and moisture in accordance with manufacturer's written instructions.
- C. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer.

D. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

E. Handle and store roofing materials and place equipment in a manner to prevent damage to and/or permanent deflection of roof deck and structural supporting members.

1.11 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when current and forecasted weather conditions permit roofing system to be installed in accordance with manufacturer's written instructions and warranty requirements.

1.12 WARRANTY

- A. Manufacturer Warranty: Provide manufacturer's 20-year total system warranty, No Dollar Limit System Warranty.
 - 1. Single-source special warranty to include roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, cover board, substrate board, vapor retarder, walkway products, manufacturer's expansion joints, manufacturer's edge metal products, and other single-source components of roofing system marketed by the manufacturer.
- B. Installer Warranty: Submit roofing Installer's warranty for the following period:
 - 1. Warranty Period: 2-years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Subject to compliance with requirements, provide products from the following manufacturer:
 - 1. Basis-of-Design: Johns Manville
 - 2. Or approved equal.

2.2 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING MEMBRANE

- A. Fabric-Reinforced Thermoplastic Polyolefin Sheet: ASTM D6878, uniform, flexible sheet formed from a thermoplastic polyolefin, internally fabric or scrim reinforced.
 - 1. Membrane Thickness: 60-mil (nominal)
 - 2. Exposed Face Color: White

2.3 AUXILIARY ROOFING MATERIALS – SINGLE PLY

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with membrane roofing.
 - 1. Liquid-type auxiliary materials to meet VOC limits of Authorities Having Jurisdiction.
- B. Sheet Flashing: Manufacturer's internally reinforced or scrim reinforced, smooth backed membrane with same thickness and color as sheet membrane.
- C. Sheet Flashing (Self-Adhered): 60 mil (1.5 mm) thick, manufacturer's internally reinforced or scrim reinforced with weldable selvage edges on each side of roll, one encapsulated edge and self-adhering capabilities in a wide installation temperature range.
 - 1. Serviceable Installation Substrate Temperature: 20°F (-7°C) and rising.
- D. Bonding Adhesive: Manufacturer's standard solvent-based bonding adhesive for membrane, and solvent-based bonding adhesive for base flashings.
 - 1. Serviceable Installation Ambient Air Temperature: 25°F and rising
- E. Self-Adhered Primer: One-part penetrating primer solution to enhance the adhesion of self-adhering membranes.
- F. Liquid Applied Flashing: Manufacturer's single ply liquid and fabric reinforced flashing system created with a fleece polyester scrim and a two-component polyurethane based liquid applied flashing material, consisting of a liquid resin and a curing agent.
- G. Liquid Applied Flashing Primer: Manufacturer's single ply liquid flashing primer.
- H. Metal Termination Bars: Manufacturer's standard predrilled stainless-steel or aluminum bars, with anchors.
- I. Membrane Fasteners and Plates: Factory-coated steel fasteners and galvalume coated steel plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening TPO membrane materials to substrate, and acceptable to membrane roofing system manufacturer. Note: Attachment of TPO membrane and insulation at field of roof areas to be done with TPO Induction Welding Plates, see below description.
 - 1. Induction Welding Plate: Round specially coated galvalume plate with a recessed center and raised flat bonding surface specifically designed for induction welding application.
- J. Miscellaneous Accessories: Provide pourable sealers, primers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, cover strips, and other accessories approved by roofing system manufacturer and required for full installation.

2.4 WALKWAY PADS

A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads sourced from membrane roofing system manufacturer.

1. Size: Manufacturer's standard width.

2. Color: Contrasting with roof membrane.

2.5 ROOF INSULATION

- A. General: Preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2 (20 psi), Basis of design: JM ENRGY 3 Polyiso Insulation.
 - 1. Provide insulation package with minimum R Value: R-49 where new insulation is indicated to be installed.
 - 2. Provide insulation package in multiple layers.
 - 3. Minimum Long-Term Thermal Resistance (LTTR): 5.7 per inch.
 - a. Determined in accordance with CAN/ULC S770 at 75°F (24°C)

2.6 COVER BOARD

- A. Substrate Board: ASTM C1177/C1177M, glass-mat, water-resistant gypsum board or ASTM C1278/C1278M, fiber-reinforced gypsum board.
 - 1. Basis-of-Design: DensDeck® by Georgia Pacific
 - 2. Thickness: 1/4 inch (6 mm) minimum thickness.
 - 3. Surface Finish: Factory primed.

2.7 TAPERED INSULATION AND/OR CRICKETING MATERIALS

A. Tapered Insulation and/or Cricketing Materials, Where Required: ASTM C1289, Type II, Class 1, Grade 2 (20 psi), provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48), unless otherwise indicated on Drawings.

2.8 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.
- B. Provide factory preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.
- C. Insulation Fasteners and Induction Welding Plates: Factory-coated steel fasteners and galvalume coated steel plates meeting corrosion-resistance provisions in FMG 4470, designed for fastening TPO membrane and insulation materials to substrate, and acceptable to membrane roofing system manufacturer. Note: Attachment of TPO membrane and insulation at field of roof areas to be done with TPO Induction Welding Plates.

1. TPO Induction Welding Plate: Round specially coated galvalume plate with a recessed center and raised flat bonding surface specifically designed for induction welding application.

- D. Urethane Adhesive: Manufacturer's two component polyurethane adhesive formulated to adhere insulation to substrate, where required.
- E. Wood Nailer Strips.

2.9 VAPOR RETARDER

- A. General: To be installed new roof assemblies (not roofing overlay applications), unless otherwise noted.
- B. Self-Adhered SBS Vapor Retarder: Tri-laminate woven polyethylene, nonslip UV protected top surface; suitable for application method specified.
 - 1. Subject to compliance with requirements, provide products from the following manufacturer:
 - a. Basis-of-design: JM Vapor Barrier SAR.
- C. Self-Adhered Primer: Low VOC aerosol penetrating primer solution to enhance the adhesion of self-adhering membranes.
 - 1. Subject to compliance with requirements, provide products from the following manufacturer:
 - a. Basis-of-design: Primer compatible with vapor retarder manufacturer requirements.

2.10 EDGE METAL COMPONENTS

- A. Coping Metal System at Parapet Wall Conditions: Provide manufacturer's factory fabricated metal coping consisting of anchor bar and a snap-on cap components. Provide product manufactured and marketed by single-source membrane supplier that is included in the No Dollar Limit warranty.
- B. All exposed sheet metal flashing to be minimum 24 gauge with Kynar 500 or Hylar 5000. Match existing colors, unless otherwise noted.
- C. Drip & Rake Edge Metal Components: Provide TPO membrane clad drip and rake edge components where required, including at gutter drip edge conditions. Drip and rake edge components to include a continuous cleat on the outside exterior edge.
- D. Refer to Drawings for additional information on locations, types of materials, and dimensions, where these materials are required.

2.10 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, clinch lock, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal unless otherwise indicated.

- B. Roof Drain Strainer Cover: Replace damaged roof drain strainer covers. Replacement covers to be cast iron only.
- C. Fasteners: Wood screws, annular threaded nails, self-tapping screws, bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal.
 - 1. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.
 - 2. Fasteners for Zinc Coated (galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.
- D. Solder For Stainless Steel: ASTM B32, Grade Sn96, with acid flux of type recommended by stainless steel sheet manufacturer.
- E. Butyl Sealant Tape: 100 percent solids, asbestos free, butyl sealant tape with release paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape ½ inch (13 mm) wide and 1/8 inch (3 mm) thick.
 - 1. Manufacturer: Schnee Morehead, Inc.; SM5227 Tacky Tape Sealant.

PART 3 - EXECUTION

3.1 EXAMINATION, GENERAL

- A. Examine areas of Work and associated substrates indicated to receive new membrane roofing, with Installer and roof membrane manufacturer representative present, for compliance with requirements for roofing membrane, installation tolerances, and other conditions affecting performance of the Work. Notify Owner and Architect, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
 - 1. Failure to call attention to defects or imperfections will be construed as acceptance and approval of substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of products indicates acceptance of surfaces and conditions.
- C. Verify that roof openings and penetrations are in place and set and braced and that roof drains are securely clamped in place.
- D. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses and elevation height of insulation and/or cover board materials.

E. Wood Decks:

- 1. Verify that wood decking is visibly dry and free of moisture according to manufacturer's approved method.
- 2. Verify that wood has ability to provide minimum fastener pull-out resistance.
 - a. Provide documentation of pull-out resistance values using manufacturer's approved procedures.

3.2 RECOVER PREPARATION

- A. Overall Roof Plan Pages and Key Plan: Refer to Drawings, including Key Plan and Overall Roof Plan, for identification of roof related work that falls under this specification.
- B. Existing BUR Roofing System to Remain in Place: Existing roofing system is to remain in place at locations noted in Contract Drawings.
 - 1. Existing Roof Core Results: Refer to "Appendix A: Roof Moisture Survey Report" for available information.
- C. Existing Roof Preparation: At all existing roof areas, power broom and remove any loose peagravel materials. Using a spud-bar remove any high-spots and make the existing roof substrate relatively smooth prior to the installation of the new cover board materials. Prepare existing roof according to roofing system manufacturer's written instructions, applicable recommendations of the roofing manufacturer, and requirements in this Section.
- D. Disable Existing Roofing System: Disable existing roof membrane system per manufacturer's written instructions and requirements.
- E. Existing Roof Base Flashings: Tear out, remove, and discard of all existing roof base flashings, counterflashings, pitch pans, pipe flashings, vents and like components necessary for application of the new cover board and roof membrane system.
- F. Existing Roof System Wet or Damaged Materials: Remove and replace with new any wet and/or compromised existing materials, including any materials identified with moisture per the roof moisture survey results. New infill materials to match the elevation height of the existing roofing system.
- G. Abandoned Equipment and/or Penetrations: Remove abandoned equipment curbs, skylights, smoke hatches, and penetrations. Where necessary, infill and install new plywood roof deck sheathing. New sheathing to match existing, unless otherwise noted by Structural Drawings.
- H. Existing Equipment Curbs: Raise, (disconnect by licensed craftsmen, if necessary) all HVAC units and other equipment supported by curbs to conform with the following:
 - 1. Modify curbs as required to provide a minimum 8-inch base flashing height measured from the surface of the new membrane to the top of the flashing membrane.
 - 2. Secure top of flashing and install new metal counterflashing prior to re-installation of unit.
- I. Remove Debris Prior to New Roof Installation: Clean and remove from substrate any sharp projections, dust, debris, moisture, and other substances detrimental to new roofing installation

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and in accordance with roofing system manufacturer's written instructions. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove all debris from roof surface prior to new roof installation. Demolished roof system materials may not be stored on the roof surface.

J. Unsatisfactory Conditions: Proceed with installation only after unsatisfactory conditions have been corrected.

INSTALLATION OF SHEATHING (WHERE NOTED ON DRAWIGNS) 3.3

- A. Install sheathing with long joints in continuous straight lines, with end joints staggered not less than 24 inches (610 mm) in adjacent rows.
 - 1. Tightly butt sheathing together.
 - Cut sheathing to fit tight around penetrations and projections, and to fit tight to intersecting 2. sloping roof decks.

VAPOR-RETARDER INSTALLATION (WHERE NOTED ON DRAWINGS) 3.4

- A. Prime substrate if required by manufacturer.
- B. Install self-adhering membrane, vapor retarder sheet per roofing manufacturer's written instructions, starting at low point of roofing system. Extend roofing membrane sheets over and terminate beyond cants, installing as follows:
 - Unroll roofing membrane sheets and allow them to relax for minimum time required by 1. manufacturer.
 - Self-adhere vapor retarder to substrate per roofing system manufacturer's instructions. 2.
- C. Extend vertically up parapet walls and projections to a minimum height equal to height of insulation and cover board, or as required by manufacturer, whichever is more stringent.
- D. Laps: Accurately align roofing membrane sheets, without stretching, and maintain uniform side and end laps. Stagger end laps. Completely bond and seal laps, leaving no voids.
 - 1. Repair tears and voids in laps and lapped seams not completely sealed.
- E. Completely seal vapor retarder at sides, end laps, terminations, obstructions, and penetrations to prevent air movement into membrane roofing system.

3.5 INSULATION INSTALLATION

- Coordinate installation of roof system components so insulation and cover board are not exposed A. to precipitation or left exposed at the end of the workday.
- B. Comply with roofing system manufacturer's written instructions for installation of roof insulation and cover board.
- Install tapered insulation under area of roofing to conform to slopes indicated. C.

- D. Install insulation boards with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer's written instructions. Fill gaps exceeding 1/4 inch (6 mm) with like material.
- E. Install 2 or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.
- F. Trim surface of insulation boards where necessary at roof drains so completed surface is flush and does not restrict flow of water.
- G. Install tapered edge strips at perimeter edges of roof that do not terminate at vertical surfaces.
- H. Fastened Insulation for Mechanically Fastened Membrane Systems: Install insulation with fasteners at rate required by roofing system manufacturer or applicable authority, whichever is more stringent.
 - 1. Fasten top layer to resist uplift pressure at corners, perimeter, and field of roof.
- I. Mechanically Fastened with Subsequent Layers Adhered Insulation: Secure first layer of insulation to deck using mechanical fasteners designed and sized for fastening specified board-type to deck type.
 - 1. Fasten first layer to resist uplift pressure at corners, perimeter, and field of roof.
 - 2. Install subsequent layers in a two-part urethane adhesive according to roofing system manufacturer's instruction.
 - 3. Install each layer to resist uplift pressure at corners, perimeter, and field of roof.
 - 4. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches (610 mm).
 - a. Trim insulation so that water flow is unrestricted.

3.6 TAPERED CRICKET INSULATION INSTALLATION

- A. Protection: Coordinate installing membrane roofing system components so cover board is not exposed to precipitation or left exposed at the end of the workday.
- B. Manufacturer Installation Instructions: Comply with membrane roofing system manufacturer's written instructions for installing roof cover board.
- C. Tapered Insulation and/or Tapered Cricketing Materials: Where defined on the Drawings, install tapered insulation and/or tapered cricketing materials under area of roofing to conform to slopes indicated. Materials are initially loose laid into position.

3.7 COVER BOARD INSTALLATION

- A. Protection: Coordinate installation of membrane roofing system components so cover board is not exposed to precipitation or left exposed at the end of the workday.
- B. Manufacturer Installation Instructions: Comply with membrane roofing system manufacturer's written instructions for installing roof cover board.

C. Cover Board, Mechanically Fastened: Mechanically attach cover board using manufacturer approved fasteners for application indicated and rhino plates. Fastening density of cover board to be 6/10/15 fasteners and rhino plates per 4' x 8' panel at field/perimeter/corner locations.

- D. Staggered Joints Cover Board: Install cover board with long joints in a continuous straight line. Joints should be staggered between rows, abutting edges and ends per manufacturer's written instructions. Fill gaps exceeding 1/4 inch with cover board.
 - 1. Cut and fit cover board within 1/4 inch of nailers, projections, and penetrations.
- E. Trim surface of cover board where necessary at roof drains so completed surface is flush and does not restrict flow of water.

3.8 ROOFING MEMBRANE INSTALLATION, GENERAL

- A. Install roofing membrane in accordance with roofing system manufacturer's written instructions, applicable recommendations of the roofing manufacturer and requirements in this Section.
- B. Coordinate installation of roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is imminent.
 - 1. Provide tie-offs at end of each day's work to cover exposed roofing membrane sheets and insulation.
 - 2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
 - 3. Remove and discard temporary seals before beginning work on adjoining roofing.

3.9 INDUCTION WELDED TPO ROOFING MEMBRANE INSTALLATION

- A. Install roofing membrane over area to receive roofing according to roofing system manufacturer's written instructions.
- B. Unroll roofing membrane and allow to relax before installing.
- C. Accurately align roofing membranes and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.
- D. Apply roofing membrane with side laps shingled with roof slope, where possible.
- E. Seams: Clean seam areas, overlap roofing membrane, and hot-air weld side and end laps of roofing membrane according to manufacturer's written instructions to ensure a watertight seam installation.
 - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roofing membrane.
 - 2. Verify field strength of seams a minimum of twice daily and repair seam sample areas. Remove and repair any unsatisfactory sections before proceeding with Work.
 - 3. Repair tears, voids, and lapped seams in roofing membrane that do not meet requirements.

F. Induction Welding Installation:

- 1. Perform calibration and set-up as detailed by the Induction Welder Owner's Manual
- 2. Center the Induction Welder over the first plate in pattern and activate the weld.
 - a. Induction Welder to be centered over the plate to create a 100% bond.
 - b. If an error occurs during activation, refer to the induction welder owner's manual for corrective action.
- 3. Prior to every use, clean face of Heat Sink Magnet.
- 4. Place Heat Sink Magnet over the welded plate.
 - a. Keep Heat Sink Magnet in place at least 45 seconds while the assembly cools.
- 5. Repeat process for each plate.
- G. Perimeter and Corner Membrane Enhancements: Perimeter and corner membrane enhancements are required at all exposed roof edge perimeters and corners.
 - 1. Formulas for determining dimensions of perimeters and corners are as follows: Use 10% of the lesser plan dimension, or 40% of the roof elevation height, whichever is the lesser.
 - 2. Use rhino plates and the induction welding process for creating perimeter and corner enhancements.
- H. At drains, spread sealant or mastic bed over deck drain flange and securely seal roofing membrane in place with clamping ring.

3.10 MEMBRANE BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates in accordance with membrane roofing system manufacturer's written instructions.
- B. Apply solvent-based bonding adhesive at required rate and allow to partially dry. Do not apply bonding adhesive to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas and overlap and firmly roll sheet flashings into the adhesive.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.11 DRIP AND RAKE EDGE FLASHINGS:

- A. Drip and Rake Edge Metal Flashings: At drip and rake edge conditions, including where gutter conditions exist, install new TPO membrane clad drip and rake edge metal flashings, where required.
- B. Drip and rake edge materials to incorporate a continuous cleat installed on the outside vertical face.

- C. Flash in and make watertight using 6-inch wide TPO Cover Strip.
- D. Refer to Drawings for additional information on locations, types of materials, and dimensions, where these materials are required.

3.12 COPING METAL AT PARAPET WALL CONDITIONS:

- A. At parapet wall conditions where coping metal is required, install new coping metal materials.
- B. Refer to Drawings for additional information on locations, types of materials, and dimensions, where these materials are required.

3.13 WALKWAY PAD INSTALLATION

- A. TPO Hot-Air Weldable Walkway Pads: Install walkway pads at locations indicated on the Contract Drawings, including:
 - 1. Perimeter of each rooftop unit.
 - 2. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
 - 3. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
 - 4. Top and bottom of each roof access ladder.
 - 5. Between each roof access ladder and each rooftop unit location or path connecting rooftop unit locations.
 - 6. Bottom of downspouts terminating at membrane roofing.
 - 7. Locations indicated on Drawings.
 - 8. As required by roof membrane manufacturer's warranty requirements.
- B. Install in accordance with manufacturer's written instructions.

3.14 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform roof tests and inspections and to prepare test reports.
- B. Final Roof Inspection: Arrange for roofing system manufacturer's Registered Roof Observer (RRO) to inspect roofing installation on completion and submit report to Consultant.
 - 1. Notify Consultant or Owner 48 hours in advance of date and time of inspection.
- C. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.
- D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.15 PROTECTION AND CLEANING

A. Protect roofing system from damage and wear during remainder of construction period.

B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION 075423

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SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Formed low-slope roof sheet metal fabrications.
- 2. Formed wall sheet metal fabrications.
- 3. Formed equipment support flashing.

B. Related Requirements:

- 1. Division 06, Section "Rough Carpentry" wood nailers, curbs, and blocking.
- 2. Division 06, Section "Sheathing".
- 3. Division 07, Section "Weather Barriers" for installation of manufactured sheet metal through-wall flashing and trim integral with weather barrier system.
- 4. Division 07, Section "Thermoplastic Polyefin (TPO) Membrane Roofing" for installation of manufactured sheet metal flashing and trim integral with membrane roofing system.
- 5. Division 07, Section "Joint Sealants".
- 6. Division 07, Section "Roof Accessories" for set-on-type curbs, equipment supports, vents, and other manufactured roof accessory units.

1.3 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project Site, with Installer Present.
 - 1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.

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- 3. Review requirements for insurance and certificates if applicable.
- 4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product specified.
- B. Shop Drawings: For sheet metal flashing and trim.
 - 1. Include plans, elevations, sections, and attachment details.
 - 2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled Work.
 - 3. Include identification of material, thickness, weight, and finish for each item and location in Project.
 - 4. Include details for forming, including profiles, shapes, seams, and dimensions.
 - 5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 - 6. Include details of termination points and assemblies.
 - 7. Include details of roof-penetration flashing.
 - 8. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, flashings, and counterflashings.
 - 9. Include details of special conditions.
 - 10. Include details of connections to adjoining work.
 - 11. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches (1:10).
- C. Samples: For each type of exposed finish.
 - 1. Sheet Metal Flashing: 12 inches (300 mm) long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
 - 2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches (300 mm) long and in required profile. Include fasteners and other exposed accessories.
 - 3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.
 - 4. Anodized Aluminum Samples: Samples to show full range to be expected for each color required.

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For fabricator and Installer.
- B. Product Certificates: For each type of coping and roof edge flashing that is ANSI/SPRI/FM 4435/ES-1 tested and FM Approvals approved.
- C. Product Test Reports: For each product, for tests performed by a qualified testing agency.
- D. Evaluation Reports: For copings and roof edge flashing, from an agency acceptable to authority having jurisdiction showing compliance with ANSI/SPRI/FM 4435/ES-1.

E. Sample Warranty: For special warranty.

1.7 CLOSEOUT SUBMITTALS

- A. Maintenance Data and Product Data: Provide manufacturer's written recommended maintenance data and product data for sheet metal flashing and trim, and its accessories, including methods for maintaining as well as precautions for use of cleaning materials and methods that could be detrimental to finishes and performance. Include in operation and maintenance manuals.
- B. Warranties: Include warranty(s) in Project warranty manual.
- C. Upon completion of work of this Section, provide Owner with all maintenance materials from work of this Section that are packaged with protective covering for Owner's storage and identified with labels describing contents.

1.8 QUALITY ASSURANCE

- A. Single-Source Responsibility: Obtain each type, color and pattern of sheet metal flashing and trim, and accessories, from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the work.
- B. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
 - 1. For copings and roof edge flashings that are ANSI/SPRI/FM 4435/ES-1 tested and FM Approvals approved, shop shall be listed as able to fabricate required details as tested and approved.
- C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
 - 1. Build mockup of typical roof edge, eave, including fascia trim, 10 feet (3.0 m) long, including supporting construction cleats, seams, attachments, underlayment, and accessories.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner and Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.
 - 1. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

2. Protect stored sheet metal flashing and trim from contact with water.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.10 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
 - b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: Ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Sheet metal flashing and trim assemblies, including cleats, anchors, and fasteners, shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual: Architectural Metal Flashing, Condensation and Air Leakage Control, and Reroofing" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. SPRI Wind Design Standard: Manufacture and install copings and roof edge flashings tested in accordance with ANSI/SPRI/FM 4435/ES-1 and capable of resisting the following design pressure:
 - 1. Design Pressure: As indicated on Structural Drawings.
- D. FM Approvals Listing: Manufacture and install copings and roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-90. Identify materials with name of fabricator and design approved by FM Approvals.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

- A. Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Aluminum Sheet: ASTM B209 (ASTM B209M), alloy as standard with manufacturer for finish required, with temper as required to suit forming operations and performance required; with smooth, flat surface.
 - 1. Factory Prime Coating: Where painting after installation is required, pretreat metal with white or light-colored, factory-applied, baked-on epoxy primer coat; minimum dry film thickness of 0.2 mil (0.005 mm).
 - 2. Exposed Coil-Coated Finish:
 - a. Three-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - b. All exposed sheet metal flashing to be minimum 24 gauge with Kynar 500 or Hylar 5000.
 - 3. Color: As selected by Architect from Manufacturers full range.
 - 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).
- C. Stainless Steel Sheet: ASTM A240/A240M, Type 304, dead soft, fully annealed; with smooth, flat surface.
 - 1. Finish: ASTM A480/A480M, No. 2D (dull, cold rolled).
 - a. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
- D. Metallic-Coated Steel Sheet: Provide zinc-coated (galvanized) steel sheet in accordance with ASTM A653/A653M, G90 (Z275) coating designation; pre-painted by coil-coating process to comply with ASTM A755/A755M.
 - 1. Surface: Smooth, flat and with manufacturer's standard clear acrylic coating on both sides.
 - 2. Exposed Coil-Coated Finish:

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- a. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
- 3. Color: Match existing, unless otherwise noted.
- 4. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with minimum total dry film thickness of 0.5 mil (0.013 mm).

2.3 UNDERLAYMENT MATERIALS

- A. Felt: ASTM D226/D226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.
 - 1. NOTE: This underlayment material is intended for use when sheet metal flashing and trim is applied directly over dissimilar metals or corrosive substrates.
- B. Refer to and coordinate with following specification sections for additional information regarding underlayment materials and systems:
 - 1. Division 07, Section "Weather Barriers".
 - 2. Division 07, Section "Thermoplastic Polyefin (TPO) Membrane Roofing".
 - 3. Division 07, Section "Metal Wall Panels".
- C. Self-Adhering, High-Temperature Sheet Underlayment: Minimum 30 mils (0.76 mm) thick, consisting of a slip-resistant polyethylene- or polypropylene-film top surface laminated to a layer of butyl- or SBS-modified asphalt adhesive, with release-paper backing; specifically designed to withstand high metal temperatures beneath metal roofing. Provide primer in accordance with underlayment manufacturer's written instructions.
 - 1. Source Limitations: Obtain underlayment from single source from single manufacturer.
 - 2. Low-Temperature Flexibility: ASTM D1970/D1970M; passes after testing at minus 20 deg F (29 deg C) or lower.

2.4 MISCELLANEOUS MATERIALS

- A. Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

- Exposed Fasteners: Heads matching color of sheet metal using plastic caps or a. factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
- Blind Fasteners: High-strength aluminum or stainless steel rivets suitable for metal b. being fastened.
- Spikes and Ferrules: Spikes and ferrules are not allowed for securing roof gutters. c.
- 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
- Fasteners for Stainless Steel Sheet: Series 300 stainless steel. 3.
- 4. Fasteners for Zinc-Coated (Galvanized) Steel Sheet: Series 300 stainless steel or hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329.

C. Solder:

- 1. For Stainless Steel: ASTM B32, Grade Sn60, with acid flux of type recommended by stainless steel sheet manufacturer.
- 2. For Zinc-Coated (Galvanized) Steel: ASTM B32, with maximum lead content of 0.2 percent.
- D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
- E. Gutter Sealant: Base polymer consisting of nitrile rubber.
 - 1. Basis-of-Design: The Ruscoe Company.
 - Ruscoe 12-1 Seam Sealer. a.
 - Ruscoe 12-3 Self-Leveling. b.
 - Ruscoe 12-4 Non-Sag. c.
- F. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- G. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- H. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.
- Cold-applied I. Bituminous Coating: asphalt emulsion in accordance with ASTM D1187/D1187M.
- Asphalt Roofing Cement: ASTM D4586, asbestos free, of consistency required for application. J.
- K. Reglets: Units of type, material, and profile required, formed to provide secure interlocking of separate reglet and counterflashing pieces, and compatible with flashing indicated with factory-

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mitered and -welded corners and junctions and with interlocking counterflashing on exterior face, of same metal as reglet.

- 1. Source Limitations: Obtain reglets from single source from single manufacturer.
- 2. Material: Stainless steel, 0.0188 inch (0.477 mm) thick.
- 3. Surface-Mounted Type: Provide with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
- 4. Accessories:
 - a. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where Drawings show reglet without metal counterflashing.
 - b. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing's lower edge.
- 5. Finish: Mill.

2.5 FABRICATION, GENERAL

- A. Custom fabricate sheet metal flashing and trim to comply with details indicated and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required.
 - 1. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 2. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 3. Verify shapes and dimensions of surfaces to be covered and obtain field measurements for accurate fit before shop fabrication.
 - 4. Form sheet metal flashing and trim to fit substrates without excessive oil-canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 5. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances:

- 1. Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.
- 2. Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.

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- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal in accordance with cited sheet metal standard to provide for proper installation of elastomeric sealant.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.

G. Seams:

- 1. Fabricate nonmoving seams with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- 2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints where necessary for strength.
- H. Do not use graphite pencils to mark metal surfaces.
- I. Fabricated flashing assemblies at all locations to be clinch locked and blind sealed at all locations, unless otherwise noted on Drawings and where fully soldered stainless steel flashing assemblies are specified.

2.6 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Hanging Gutters:

- 1. Fabricate to cross section required, complete with end pieces, outlet tubes, and other accessories as required.
- 2. Fabricate in minimum 96-inch- (2400-mm-) long sections.
- 3. Furnish flat-stock gutter brackets and flat-stock gutter spacers and straps fabricated from same metal as gutters, of size recommended by cited sheet metal standard, but with thickness not less than twice the gutter thickness.
- 4. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters. Shop fabricate interior and exterior corners.
- 5. Gutter Profile: 6-inch welded fascia-style gutters in accordance with cited sheet metal standard.
- 6. Expansion Joints: Butt type with cover plate.
- 7. Accessories: Use clean-out strainer above grade at downspout, as indicated on Drawings.
- B. Downspouts: Fabricate to match existing profile (round and rectangular) downspouts to dimensions indicated on Drawings, complete with mitered elbows. Furnish with metal hangers from same material as downspouts and anchors. Shop fabricate elbows.
 - 1. Fabricated Hanger Style: As detailed on Drawings and in accordance with SMACNA's "Architectural Sheet Metal Manual."
 - 2. Fabricate from the following materials:
 - a. Galvanized Steel: 0.022 inch (0.56 mm).

C. Parapet Scuppers: Fabricate scuppers to dimensions required, with closure flange trim to exterior, but not less than 4-inch- (100-mm-) wide wall flanges to interior, and base extending 4 inches (100 mm) beyond cant or tapered strip into field of roof. Fasten gravel guard angles to base of scupper. Fabricate from the following materials:

- 1. Galvanized Steel: 0.028 inch (0.71 mm).
 - a. Provide TPO membrane clad metal compatible with membrane roofing manufacturer, unless otherwise noted.
 - b. Coordinate coating requirements for through-wall drainage flashing members with Division 07, Section "Thermoplastic Polyefin (TPO) Membrane Roofing".
- D. Splash Pans: Provide pre-fabricated concrete splash plans at downspout terminations at grade where downspouts do not connect to existing below grade piping.

2.7 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof Edge Flashing: Provide TPO membrane clad drip and rake edge components where required, including at gutter drip edge conditions. Drip and rake edge components to include a continuous cleat on the outside exterior edge.
- B. Copings: Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Shop fabricate and miter interior and exterior corners to be watertight.
 - 1. Coping Profile: As indicated on Drawings and in accordance with SMACNA's "Architectural Sheet Metal Manual."
 - 2. Joint Style: Butted with expansion space and 6-inch- (150-mm-) wide, concealed backup plate,
 - 3. Fabricate from the following materials: Refer to Division 07, Section "Thermoplastic Polyefin (TPO) Membrane Roofing".

2.8 WALL SHEET METAL FABRICATIONS

- A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long, sections, under copings, and at shelf angles. Fabricate from the following materials:
 - 1. Galvanized Steel (Pre-primed), 26-gauge (0.022 inch (0.56 mm)) thick.
 - 2. Flashing to be shop fabricated, clinch locked with matching color sealant as detailed on Drawings.
- B. Opening Flashings in Frame Construction: Fabricate head, sill, pan flashing and similar flashings with end dams as detailed on Drawings. Fabricate from the following materials:
 - 1. Louver Sill Flashing: Galvanized Steel (Pre-primed), 24-gauge (0.022 inch (0.56 mm)) thick.
 - 2. Louver Head Flashing: Galvanized Steel (Pre-primed), 26-gauge (0.022 inch (0.56 mm)) thick.

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3. Flashing to be shop fabricated, clinch locked with matching color sealant as detailed on Drawings.

2.9 MISCELLANEOUS SHEET METAL FABRICATIONS

- A. Equipment Support Flashing: Fabricate from the following materials:
 - 1. Stainless Steel: 22-gauge (0.0299-inch).
- B. Fasteners: Same metal as sheet metal flashing or other noncorrosive metal as recommended by sheet metal manufacturer. Match finish of exposed heads with material being fastened.
- C. Metal Accessories: Provide sheet metal clips, straps, anchoring devices, and similar accessory units as required for installation of work, matching or compatible with material being installed; noncorrosive; size and thickness required for performance.
- D. Comply with details shown to fabricate sheet metal flashing and trim that fit substrates and result in waterproof and weather-resistant performance once installed. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
- E. Form exposed sheet metal work that is without excessive oil canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems.
- F. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of sheet metal exposed to public view.

2.10 FABRICATION - FLASHINGS

- A. Form sections square true, and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- B. Form sections in maximum lengths. Make allowances for expansion at joints.
- C. Seams are to be standing lock or batten type except corners. Fabricate corners minimum 18-inches mitered, soldered, or welded, and sealed as one piece.
- D. Wipe and wash clean, soldered joints, to remove traces of flux immediately after soldering.
- E. Hem exposed edges of flashings on underside 1/2 inch.
- F. Back paint flashings with bituminous paint where expected to be in contact with cementitious materials or dissimilar metals.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work. Notify Owner and Architect, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
 - 1. Failure to call attention to defects or imperfections will be construed as acceptance and approval of substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of products indicates acceptance of surfaces and conditions.

3.2 INSTALLATION OF UNDERLAYMENT

- A. Sheet Underlayment: Install sheet underlayment, wrinkle free, in accordance with manufacturers' written instructions, using adhesive to minimize use of mechanical fasteners under sheet metal flashing and trim.
 - 1. Install in shingle fashion to shed water.
 - 2. Lap joints per underlayment manufacturer recommendations or as noted on Drawings, whichever is more stringent.
- B. Self-Adhering, High-Temperature Sheet Underlayment:
 - 1. Install self-adhering, high-temperature sheet underlayment; wrinkle free.
 - 2. Prime substrate if recommended by underlayment manufacturer.
 - 3. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures.
 - 4. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses, or self-adhering sheet underlayment manufacturer requirements, whichever is more stringent.
 - 5. Overlap side edges not less than 3-1/2 inches (90 mm), or self-adhering underlayment manufacturer requirements, whichever is more stringent. Roll laps and edges with roller.
 - 6. Roll laps and edges with roller.
 - 7. Cover underlayment within (14) days of installation.
- C. Install slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and

1. Install in shingle fashion to shed water.

2. Lapp joints not less than 4-inches (100 mm).

3.3 INSTALLATION, GENERAL

- A. Install sheet metal flashing and trim to comply with details indicated and recommendations of cited sheet metal standard that apply to installation characteristics required unless otherwise indicated on Drawings.
 - 1. Install fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 2. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, sealant.
 - 3. Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement.
 - 4. Install sheet metal flashing and trim to fit substrates and to result in watertight performance.
 - 5. Install continuous cleats with fasteners spaced not more than 12 inches (300 mm) o.c.
 - 6. Space individual cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 - 7. Install exposed sheet metal flashing and trim with limited oil-canning, and free of buckling and tool marks.
 - 8. Do not field cut sheet metal flashing and trim by torch.
 - 9. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressuretreated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
 - 1. Coat concealed side of uncoated-aluminum and stainless steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim.
 - 1. Space movement joints at maximum of 10-feet (3 m) with no joints within 24-inches (600 mm) of corner or intersection.
 - 2. Form expansion joints of intermeshing hooked flanges, not less than 1-inch (25 mm) deep, filled with sealant concealed within joints.
 - 3. Use lapped expansion joints only where indicated on Drawings.
- D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

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- F. Seal joints as required for watertight construction.
 - 1. Use sealant-filled joints unless otherwise indicated.
 - a. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant.
 - b. Form joints to completely conceal sealant.
 - c. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way.
 - d. Adjust setting proportionately for installation at higher ambient temperatures.
 - 1) Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
 - 2. Prepare joints and apply sealants to comply with requirements in Division 07, Section "Joint Sealants."
- G. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter.
 - 1. Pre-tin edges of sheets with solder to width of 1-1/2 inches (38 mm); however, reduce pre-tinning where pre-tinned surface would show in completed Work.
 - 2. Do not solder metallic-coated steel and aluminum sheet.
 - 3. Do not pre-tin zinc-tin alloy-coated copper.
 - 4. Do not use torches for soldering.
 - 5. Heat surfaces to receive solder, and flow solder into joint.
 - a. Fill joint completely.
 - b. Completely remove flux and spatter from exposed surfaces.
 - 6. Stainless Steel Soldering:
 - a. Tin edges of uncoated sheets, using solder for stainless steel and acid flux.
 - b. Promptly remove acid-flux residue from metal after tinning and soldering.
 - c. Comply with solder manufacturer's recommended methods for cleaning and neutralization.
- H. Rivets: Rivet joints where necessary for strength.

3.4 INSTALLATION OF ROOF-DRAINAGE SYSTEM

- A. Install sheet metal roof-drainage items to produce complete roof-drainage system in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.
- B. Hanging Gutters:
 - 1. Join sections with riveted and soldered joints.
 - 2. Provide for thermal expansion.
 - 3. Attach gutters at eave or fascia to firmly anchor them in position.
 - 4. Provide end closures and seal watertight with sealant.
 - 5. Slope to downspouts.
 - 6. Fasten gutter spacers to front and back of gutter.

- 7. Anchor gutter with straps spaced not more than 24 inches (600 mm) apart to roof deck unless otherwise indicated, and loosely lock to front gutter bead.
- 8. Install gutter with expansion joints at locations indicated on Drawings, but not exceeding, 50 feet (15.2 m) apart. Install expansion-joint caps.
 - a. Spikes and Ferrules: Not Allowed.

C. Downspouts:

- 1. Join sections with 1-1/2-inch (38-mm) telescoping joints.
- 2. Provide hangers with fasteners designed to hold downspouts securely to walls.
- 3. Locate hangers at top and bottom and at approximately 60 inches (1500 mm) o.c.
- 4. Provide elbows at base of downspout to direct water away from building.
- 5. Connect downspouts to underground drainage system.

D. Parapet Scuppers:

- 1. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
- 2. Anchor scupper closure trim flange to exterior wall and seal with elastomeric sealant to scupper.
- 3. Loosely lock front edge of scupper with conductor head.
- 4. Seal with elastomeric sealant exterior wall scupper flanges into back of conductor head.
- E. Conductor Heads: Anchor securely to wall, with elevation of conductor head rim at minimum of 1 inch (25 mm) below scupper discharge.

3.5 INSTALLATION OF ROOF FLASHINGS

- A. Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard.
 - 1. Provide concealed fasteners where possible, and set units true to line, levels, and slopes.
 - 2. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing:

- 1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
- 2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch (75-mm) centers.
- 3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

C. Copings:

- 1. Install roof edge flashings in accordance with ANSI/SPRI/FM 4435/ES-1.
- 2. Anchor to resist uplift and outward forces in accordance with recommendations in cited sheet metal standard unless otherwise indicated.

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- a. Interlock exterior bottom edge of coping with continuous cleat anchored to substrate at 24-inch (600-mm) centers.
- b. Anchor interior leg of coping with washers and screw fasteners through slotted holes at 24-inch (600-mm) centers.
- 3. Anchor to resist uplift and outward forces in accordance with recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.
- D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless steel draw band and tighten.
- E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing.
 - 1. Insert counterflashing in reglets or receivers and fit tightly to base flashing.
 - 2. Extend counterflashing 4 inches (100 mm) over base flashing.
 - 3. Lap counterflashing joints minimum of 4 inches (100 mm).
 - 4. Secure in waterproof manner by means of snap-in installation and sealant or lead wedges and sealant unless otherwise indicated.
- F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

3.6 INSTALLATION OF WALL FLASHINGS

- A. Install sheet metal wall flashing to intercept and exclude penetrating moisture in accordance with cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.
- B. Opening Flashings in Frame Construction: Install continuous head, sill, and similar flashings to extend 4 inches (100 mm) beyond wall openings.

3.7 INSTALLATION OF MISCELLANEOUS FLASHING

- A. Equipment Support Flashing:
 - 1. Coordinate installation of equipment support flashing with installation of roofing and equipment.
 - 2. Weld or seal flashing with elastomeric sealant to equipment support member.

3.8 INSTALLATION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing".

3.9 CLEANING

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.

3.10 PROTECTION

- A. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended in writing by sheet metal flashing and trim manufacturer.
- C. Maintain sheet metal flashing and trim in clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures, as determined by Architect.
- E. Provide final protection and maintain conditions that ensure sheet metal flashing and trim work during construction is without damage or deterioration other than natural weathering at the time of Substantial Completion.

END OF SECTION 076200

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SECTION 077200 - ROOF ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

- 1. Roof curbs.
- 2. Equipment supports.
- 3. Duct supports.
- 4. Preformed flashing sleeves.
- 5. Rooftop pipe supports.

B. Related Requirements:

- 1. Division 05, Section "Metal Fabrications" for metal vertical ladders.
- 2. Division 06, Section "Rough Framing".
- 3. Division 06, Section "Sheathing".
- 4. Division 07, Section "Thermoplastic Polyefin (TPO) Membrane Roofing".
- 5. Section 076200 "Sheet Metal Flashing and Trim" for shop- and field-formed metal flashing, roof-drainage systems, and miscellaneous sheet metal trim and accessories.
- 6. Division 23 for related heating, ventilating, and air conditioning and related accessory requirements.
- 7. Division 26 for related electrical and electrical accessory requirements.

1.3 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
- B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of roof accessory.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

- B. Shop Drawings: For roof accessories.
 - 1. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
 - 1. Size and location of roof accessories specified in this Section.
 - 2. Method of attaching roof accessories to roof or building structure.
 - 3. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
 - 4. Required clearances.
- B. Sample Warranties: For manufacturer's special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Wind-Restraint Performance: As indicated on Structural Drawings.

2.2 ROOF CURBS

- A. Roof Curbs: Internally reinforced roof-curb units capable of supporting superimposed live and dead loads, including equipment loads and other construction indicated on Structural and Mechanical Drawings, bearing continuously on roof structure, and capable of meeting performance requirements; with welded or mechanically fastened and sealed corner joints, straight sides, and integrally formed deck-mounting flange at perimeter bottom.
- B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported.
- C. Supported Load Capacity: Coordinate load capacity with information on Shop Drawings of equipment to be supported, Structural Drawings, and Mechanical Drawings.

- D. Material: Zinc-coated (galvanized) steel sheet.
 - 1. Thickness: As indicated on Mechanical Drawings.
 - 2. Finish: Mill phosphatized, unless otherwise noted.
 - 3. Color: As selected by Architect from manufacturer's full range.

E. Construction:

- 1. Curb Profile: Manufacturer's standard, unless otherwise noted, compatible with roofing system.
- 2. Fabricate curbs to minimum height of 12 inches (305 mm) above roofing surface unless otherwise indicated or required by membrane roofing manufacturer.
- 3. Top Surface: Level top of curb, with roof slope accommodated by use of leveler frame.
- 4. Sloping Roofs: Where roof slope exceeds 1:48, fabricate curb with perimeter curb height tapered to accommodate roof slope so that top surface of perimeter curb is level. Equip unit with water diverter or cricket on side that obstructs water flow.
- 5. Insulation: Factory insulated with 1-1/2-inch- (38-mm-) thick glass-fiber board insulation.
- 6. Liner: Same material as curb, of manufacturer's standard thickness and finish.
- 7. Nailer: Factory-installed wood nailer continuous around curb perimeter.
- 8. Wind Restraint Straps and Base Flange Attachment: Provide wind restraint straps, welded strap connectors, and base flange attachment to roof structure at perimeter of curb, of size and spacing required to meet wind uplift requirements as indicated on Structural Drawings.
- 9. Platform Cap: Where portion of roof curb is not covered by equipment, provide weathertight platform cap formed from 3/4-inch- (19-mm-) thick plywood covered with metal sheet of same type, thickness, and finish as required for curb.
- 10. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as curb.
- 11. Damper Tray: Provide damper tray or shelf with opening as indicated on Mechanical Drawings.

2.3 EQUIPMENT SUPPORTS

- A. Equipment Supports: Provide metal equipment supports capable of supporting superimposed live and dead loads between structural supports, including equipment loads and other construction indicated on Drawings, spanning between structural supports; capable of meeting performance requirements indicated on Structural Drawings; with welded or mechanically fastened and sealed corner joints as indicated on Structural Drawings, and integrally formed structure-mounting flange at bottom.
- B. Size: Coordinate dimensions with roughing-in information or Shop Drawings of equipment to be supported and Mechanical Drawings.
- C. Supported Load Capacity: Coordinate load capacity with information on Shop Drawings of equipment to be supported, Structural Drawings, and Mechanical Drawings.
- D. Material: As noted on Structural drawings or Zinc-coated (galvanized) steel sheet, most restrictive shall govern. Confirm equipment support requirement(s) with Structural Engineer of Record.

- 1. Finish: Mill phosphatized
- 2. Color: As selected by Architect from manufacturer's full range.

E. Construction:

- 1. Curb Profile: Manufacturer's standard, unless otherwise noted, compatible with roofing system.
- 2. Insulation: Factory insulated with 1-1/2-inch- (38-mm-) thick glass-fiber board insulation.
- 3. Liner: Same material as equipment support, of manufacturer's standard thickness and finish.
- 4. Nailer: Wood nailers, continuous around support perimeter.
- 5. Wind Restraint Straps and Base Flange Attachment: Provide wind restraint straps, welded strap connectors, and base flange attachment to roof structure at perimeter of curb of size and spacing required to meet wind uplift requirements and as indicated on Structural Drawings.
- 6. Platform Cap: Where portion of equipment support is not covered by equipment, provide weathertight platform cap formed from 3/4-inch- (19-mm-) thick plywood covered with metal sheet of same type, thickness, and finish as required for curb.
- 7. Metal Counterflashing: Manufacturer's standard, removable, fabricated of same metal and finish as equipment support.
- 8. Fabricate curbs to minimum height of 12 inches (305 mm) above roofing surface unless otherwise indicated or required by membrane roofing manufacturer.
- 9. Sloping Roofs: Where roof slope exceeds 1:48, fabricate each support with height to accommodate roof slope so that tops of supports are level with each other. Equip supports with water diverters or crickets on sides that obstruct water flow.

2.4 DUCT SUPPORTS

- A. Duct Supports: Extruded-aluminum, urethane-insulated supports, sizes as indicated on mechanical and structural drawings; with manufacturer's recommended hardware for mounting to structure or structural roof deck.
 - 1. Finish: Manufacturer's standard, unless otherwise noted.

2.5 PIPE PORTALS

- A. Curb-Mounted Pipe Portal: Insulated roof-curb units with welded or mechanically fastened and sealed corner joints, straight sides, and integrally formed deck-mounting flange at perimeter bottom; with weathertight curb cover with single or multiple collared openings and pressure-sealed conically shaped EPDM protective rubber caps sized for piping indicated, with stainless steel snaplock swivel clamps.
- B. Flashing Pipe Portal: Formed aluminum membrane-mounting flashing flange and sleeve with collared opening and pressure-sealed conically shaped EPDM protective rubber cap sized for piping indicated, with stainless steel snaplock swivel clamps.

2.6 PREFORMED FLASHING SLEEVES

- A. Exhaust Vent Flashing: As indicated on Mechanical Drawings.
- B. Vent Stack Flashing: Metal flashing sleeve, uninsulated, with integral deck flange.
 - 1. Location and Type: As indicated on Mechanical Drawings.

2.7 METAL MATERIALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, G90 (Z275) coating designation and mill phosphatized for field painting where indicated.
 - 1. Mill-Phosphatized Finish: Manufacturer's standard for field painting.
 - 2. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil (0.005 mm).
 - 3. Exposed Coil-Coated Finish: Prepainted by the coil-coating process to comply with ASTM A755/A755M. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer Finish: AAMA 621. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride (PVDF) resin by weight.
 - 4. Baked-Enamel or Powder-Coat Finish: After cleaning and pretreating, apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat to a minimum dry film thickness of 2 mils (0.05 mm).
 - 5. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil (0.013 mm).
- B. Stainless Steel Sheet and Shapes: ASTM A240/A240M or ASTM A666, Type 304.
- C. Steel Shapes: ASTM A36/A36M, hot-dip galvanized according to ASTM A123/A123M unless otherwise indicated.
- D. Steel Tube: ASTM A500/A500M, round tube.
- E. Galvanized-Steel Tube: ASTM A500/A500M, round tube, hot-dip galvanized according to ASTM A123/A123M.
- F. Steel Pipe: ASTM A53/A53M, galvanized.

2.8 MISCELLANEOUS MATERIALS

A. Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.

- B. Cellulosic-Fiber Board Insulation: ASTM C208, Type II, Grade 1, thickness as indicated.
- C. Glass-Fiber Board Insulation: ASTM C726, nominal density of 3 lb/cu. ft. (48 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C), thickness as indicated.
- D. Polyisocyanurate Board Insulation: ASTM C1289, thickness and thermal resistivity as indicated.
- E. Wood Nailers: Softwood lumber, pressure treated with waterborne preservatives for aboveground use, acceptable to authorities having jurisdiction, containing no arsenic or chromium, and complying with AWPA C2; not less than 1-1/2 inches (38 mm) thick.
- F. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:
 - 1. Fasteners for Zinc-Coated or Aluminum-Zinc Alloy-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A153/A153M or ASTM F2329.
 - 2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
 - 3. Fasteners for Stainless Steel Sheet: Series 300 stainless steel.
- G. Solder For Stainless Steel: ASTM B32, Grade Sn96, with acid flux of type recommended by stainless steel sheet manufacturer.
- H. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.
- I. Roof Drain Strainer Cover: Replace damaged roof drain strainer covers. Replacement covers to be cast iron only.
- J. Elastomeric Sealant: ASTM C920, elastomeric polyurethane polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.
- K. Butyl Sealant: ASTM C1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.
- L. Butyl Sealant Tape: 100 percent solids, asbestos free, butyl sealant tape with release paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape ½ inch (13 mm) wide and 1/8 inch (3 mm) thick.
 - 1. Manufacturer: Schnee Morehead, Inc.; SM5227 Tacky Tape Sealant
- M. Rooftop Pipe Supports: Prefabricated pipe supports capable of supporting small rooftop piping and conduit.
 - 1. Basis-of-Design: "PipeGuard" by OMG Roofing Products, or approved equal.
 - a. Installs without roof penetrations and sits freely on roof.

- b. Material: Smooth, flexible, black EPDM rubber.
- c. Pipe Support Height: To be selected by Contractor from manufacturer's standard sizes based on existing conditions and proposed routing modifications.
- d. Maximum Load Capacity per Support: As defined by manufacturer.
- 2. Basis-of-Design: "Height Adjustable Strut" by OMG Roofing Products, or approved equal.
 - a. Installs without roof penetrations and sits freely on roof.
 - b. Material: Smooth, flexible, black EPDM rubber.
 - c. Pipe Support Height: To be selected by Contractor from manufacturer's standard sizes based on existing conditions and proposed routing modifications.
 - d. Maximum Load Capacity per Support: As defined by manufacturer.

2.9 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, for compliance with requirements for roofing accessories, installation tolerances, and other conditions affecting performance of the Work. Notify Owner and Architect, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
 - 1. Failure to call attention to defects or imperfections will be construed as acceptance and approval of substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of products indicates acceptance of surfaces and conditions.

3.2 INSTALLATION

- A. Install roof accessories according to manufacturer's written instructions.
 - 1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
 - 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.
 - 3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
 - 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
 - 1. Coat concealed side of roof accessories with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
 - 2. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.
 - 3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof accessories for waterproof performance.
- C. Roof Curb Installation: Install each roof curb so top surface is level.
- D. Equipment Support Installation: Install equipment supports so top surfaces are level with each other.
- E. Gravity Ventilator Installation:
 - 1. Remove and safely store existing gravity ventilators.
 - 2. Install new curb, where required to meet roof membrane vertical clearance requirements.
 - 3. Securely re-attach existing equipment to new curbs after new membrane roofing, flashing, and accessory system components have been installed in accordance with manufacturer requirements.
 - 4. Verify that gravity ventilators operate properly and have unrestricted airflow. Clean, lubricate, and adjust operating mechanisms.
- F. Preformed Flashing-Sleeve and Flashing Pipe Portal Installation: Secure flashing sleeve to roof membrane according to flashing-sleeve manufacturer's written instructions; flash sleeve flange to surrounding roof membrane according to roof membrane manufacturer's instructions.
- G. Seal joints with elastomeric or butyl sealant as required by roof accessory manufacturer.
- H. Rooftop Pipe Supports:
 - 1. Provide additional layer of membrane roofing under all supports. Adhere pipe support to additional membrane roofing layer. Do not adhere the secondary membrane to the primary field membrane roofing.
 - 2. Adhesives: Use adhesives compatible with pipe support and membrane roofing manufacturers.

- 3. Spacing of Pipe Supports:
 - a. Pipe diameters 2-inches to 5-inches in diameter: Maximum 10 feet apart.
 - b. Pipe diameter 1 ½-inches: Maximum 8 feet apart.
 - c. Pipe diameters less than 1 ½-inches: Maximum 6 feet apart.
 - d. Place one additional support at every union and source along with one at side of junctions.

3.3 REPAIR AND CLEANING

- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A780/A780M.
- B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Division 09, Section "Exterior Painting".
- C. Clean exposed surfaces according to manufacturer's written instructions.
- D. Clean off excess sealants.
- E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 077200

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SECTION 078413 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:
 - 1. Penetration firestopping systems for the following applications:
 - a. Penetrations in fire-resistance-rated walls.
 - b. Penetrations in horizontal assemblies.
 - c. Penetrations in smoke barriers.

B. Related Requirements:

1. Division 07, Section "Joint Firestopping" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers as indicated on Drawings.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project Site with Installer present.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.
 - 1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

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1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.6 CLOSEOUT SUBMITTALS

- A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.
- B. Maintenance and Product Data: Provide manufacturer's written recommended maintenance data and product data for each type of firestopping product and accessory, including methods for maintaining as well as precautions for use of cleaning materials and methods that could be detrimental to finishes and performance. Include in operation and maintenance manuals.
- C. Warranties: Include warranty in Project warranty manual.
- D. Upon completion of work of this Section, provide Owner with all maintenance materials from work of this Section that are packaged with protective covering for Owner's storage and identified with labels describing contents.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Approval according to FM Approval 4991, "Approval Standard for Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

1.9 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
- B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

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1.10 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics:
 - 1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
 - 2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
 - a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
 - 1) UL in its "Fire Resistance Directory."
 - 2) FM Approval in its "Approval Guide."

2.2 PENETRATION FIRESTOPPING SYSTEMS

- A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. 3M Fire Protection Products.
 - b. A/D Fire Protection Systems, Inc.
 - c. Grabber Construction Products.
 - d. Tremco, Inc.
- B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
 - 1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

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- C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).
 - 1. F-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated.
 - 2. T-Rating: At least one hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
 - 3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
- D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg (74.7 Pa).
 - 1. L-Rating: Not exceeding 5.0 cfm/sq. ft. (0.025 cu. m/s per sq. m) of penetration opening at and no more than 50-cfm (0.024-cu. m/s) cumulative total for any 100 sq. ft. (9.3 sq. m) at both ambient and elevated temperatures.
- E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.
- F. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content:
 - 1. Sealants: 250 g/L.
 - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
 - 3. Sealant Primers for Porous Substrates: 775 g/L.
- G. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
 - 1. Permanent forming/damming/backing materials.
 - 2. Substrate primers.
 - 3. Collars.
 - 4. Steel sleeves.
- 2.3 FILL MATERIALS (Where applicable for this Project)
 - A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
 - B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.
 - C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

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- D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.
- E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.
- F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.
- H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
- I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.
- J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

2.4 MIXING

A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work. Notify Owner and Architect, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
 - 1. Failure to call attention to defects or imperfections will be construed as acceptance and approval of substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

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1. Installation of products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
 - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
 - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
 - 3. Remove laitance and form-release agents from concrete.
- B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

- A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications.
- B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
 - 1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.
- C. Install fill materials by proven techniques to produce the following results:
 - 1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
 - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
 - 3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Wall Identification: Permanently label walls containing penetration firestopping systems with the words "FIRE AND/OR SMOKE BARRIER - PROTECT ALL OPENINGS," using lettering not less than 3-inches (76 mm) high and with minimum 0.375-inch (9.5-mm) strokes.

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- 1. Locate in accessible concealed floor, floor-ceiling, or attic space at 15-feet (4.57 m) from end of wall and at intervals not exceeding 30-feet (9.14 m).
- B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
 - 1. The words "Warning Penetration Firestopping Do Not Disturb. Notify Building Management of Any Damage."
 - 2. Contractor's name, address, and phone number.
 - 3. Designation of applicable testing and inspecting agency.
 - 4. Date of installation.
 - 5. Manufacturer's name.
 - 6. Installer's name.

3.5 FIELD QUALITY CONTROL

- A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E2174.
- B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
- C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

- A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION 078413

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SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes joint sealants for the applications shown or indicated and as required to provide a positive barrier against the passage of moisture and air:
 - 1. Silyl-terminated polyether joint sealants.
- B. Related Requirements:
 - 1. Division 07, Section "Metal Wall Panels" for sealants in contact with metal wall panels.
 - 2. Division 07, Section "Sheet metal Flashing and Trim" for sealants in contact with flashing materials.
 - 3. Division 08, Section "Fixed Louvers" for sealants around fixed louver assemblies.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project Site with Installer present.

1.4 ACTION SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Samples: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- C. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant color.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified testing agency.

- B. Sealant, Waterproofing, and Restoration Institute (SWRI) Validation Certificate: For each sealant specified to be validated by SWRI's Sealant Validation Program.
- C. Product Test Reports: For each kind of joint sealant, for tests performed by a qualified testing agency.
- D. Preconstruction Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:
 - 1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2. Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.
- E. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
- F. Field-Adhesion-Test Reports: For each sealant application tested.
- G. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
- B. Product Testing: Test joint sealants using a qualified testing agency.
 - 1. Testing Agency Qualifications: Qualified according to ASTM C1021 to conduct the testing indicated.
 - 2. Test according to SWRI's Sealant Validation Program for compliance with requirements specified by reference to ASTM C 920 for adhesion and cohesion under cyclic movement, adhesion-in-peel, and indentation hardness.
- C. Single-Source Responsibility: Obtain each type and color of sealant from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the work.
- D. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
 - 1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.

- 2. Conduct field tests for each kind of sealant and joint substrate.
- 3. Notify Architect seven (7) days in advance of dates and times when test joints will be erected.
- 4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
 - a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
 - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
- 5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
- 6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sealant products to Project site in original manufacturer's unopened cartons and containers each bearing names of product and manufacturer, Project identification, and shipping and handling instructions.
- B. Store products in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer.

1.9 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 - 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
 - 2. When joint substrates are wet.
 - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.10 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

- 1. Warranty Period: Five (5) years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 - 1. Warranty Period: Five (5) for all sealants from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 - 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 - 2. Disintegration of joint substrates from causes exceeding design specifications.
 - 3. Mechanical damage caused by individuals, tools, or other outside agents.
 - 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

1.11 CLOSEOUT SUBMITTALS

- A. Maintenance and Product Data: Provide manufacturer's written recommended maintenance data and product data for each type of sealant including methods for maintaining as well as precautions for use of cleaning materials and methods that could be detrimental to finishes and performance. Include in operation and maintenance manuals.
- B. Warranties: Include warranty in Project warranty manual.
- C. Upon completion of work of this Section, provide Owner with all maintenance materials from work of this Section that are packaged with protective covering for Owner's storage and identified with labels describing contents.

1.12 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. Stain-Test-Response Characteristics: Where sealants are specified to be non-staining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 URETHANE JOINT SEALANTS

- A. Urethane, S, NS, 25, NT: Single-component, nonsag, nontraffic-use, plus 25 percent and minus 25 percent movement capability, urethane joint sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT.
 - 1. Basis-of Design Products: Subject to compliance with requirements, provide one of the following:
 - a. Sikaflex 1A.
 - b. MasterSeal NP1.
 - 2. Color: As selected by Architect from manufacturer's full range.

2.3 SILYL-TERMINATED POLYETHER (STPE) JOINT SEALANTS

- A. STPE, S, NS, 50, NT: Single-component, non-sag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, silyl-terminated polyether joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.
 - 1. Basis-of-Design Manufacturer: Master Builders Solutions by BASF, The Chemical Company; Web-site: www.buildingsystems.basf.com
 - 2. Basis-of-Design Product: "MasterSeal NP 150" (Formerly Sonolastic 150 VLM), low modulus, non-sag, elastomeric, based on hybrid polymer joint sealant.
 - 3. Manufacturer's Product is rated for: Non-traffic-use for vertical or horizontal, interior or exterior use above grade.

2.4 FOAM AIR-INFILTRATION SEALANT

- A. Acceptable manufacturers:
 - 1. Grace Polycel One.
 - 2. Kwik Foam by DAP.

2.5 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Provide sealant backings that are non-staining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C1330, Type B (bicellular material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape as indicated on Drawings and where applicable. Tape to be 3/4-inch in width minimum. Clear tape not allowed.

2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
 - 1. Liquid primer applied to appropriate surfaces as recommended by manufacturer to promote adhesion of specified sealants.
 - a. Color: Clear.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Cleaning cloths: Clean, soft, absorbent, lint-free cloths.
- D. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work. Notify Owner and Architect, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
 - 1. Failure to call attention to defects or imperfections will be construed as acceptance and approval of substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
 - 1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 - 2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Fiber cement materials.
 - 3. Remove laitance and form-release agents from concrete.
 - 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
 - c. Vinyl.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

- 1. Do not leave gaps between ends of sealant backings.
- 2. Do not stretch, twist, puncture, or tear sealant backings.
- 3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.
- 4. Braiding sealant backings to produce a larger backing is strictly prohibited.
- 5. Dissimilar sealant backings used in single applications are strictly prohibited.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile per Figure 8A in ASTM C1193 unless otherwise indicated.
 - 4. Provide flush joint profile where indicated according to Figure 8B in ASTM C1193.
 - 5. Provide recessed joint configuration of recess depth and at locations indicated on Drawings according to Figure 8C in ASTM C1193.
 - a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

3.4 FIELD QUALITY CONTROL

- A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 - 1. Extent of Testing: Test completed and cured sealant joints as follows:
 - a. Perform ten (10) tests for the first 1000 feet (300 m) of joint length for each kind of sealant and joint substrate.
 - b. Perform one (1) test for each 1000 feet (300 m) of joint length thereafter or one test per each floor per elevation.
 - 2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.

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- a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
- 3. Inspect tested joints and report on the following:
 - a. Whether sealants filled joint cavities and are free of voids.
 - b. Whether sealant dimensions and configurations comply with specified requirements.
 - c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
- 4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
- 5. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
- B. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 079200

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SECTION 089119 - FIXED LOUVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Fixed extruded-aluminum louvers.

B. Related Requirements:

- 1. Division 07, Section "Weather Barriers" for louvers incorporated in the building enclosure system.
- 2. Division 07, Section "Sheet Metal Flashing and Trim" for louvers incorporated into the building envelope.
- 3. Division 09, Section "Exterior Painting" for field painting exterior louvers.

1.3 DEFINITIONS

- A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.
- B. Horizontal Louver: Louver with horizontal blades (i.e., the axis of the blades are horizontal).
- C. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.
- D. Wind-Driven-Rain-Resistant Louver: Louver that provides specified wind-driven-rain performance, as determined by testing according to AMCA 500-L.
- E. Windborne-Debris-Impact-Resistant Louver: Louver that provides specified windborne-debris-impact resistance, as determined by testing according to AMCA 540.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

- B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.
 - 1. Show weep paths, gaskets, flashings, sealants, and other means of preventing water intrusion.
 - 2. Show mullion profiles and locations.
- C. Samples: For each type of metal finish required.

1.5 INFORMATIONAL SUBMITTALS

- A. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.
- B. Sample Warranties: For manufacturer's special warranties.

1.6 QUALITY ASSURANCE

- A. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.2/D1.2M, "Structural Welding Code Aluminum."

1.7 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain louvers from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

2.2 PERFORMANCE REQUIREMENTS

- A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver-blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.
 - 1. Wind Loads: Determine loads based on pressures as indicated on Structural Drawings.

- B. Seismic Performance: Louvers, including attachments to other construction, shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
 - 1. Design earthquake spectral response acceleration, short period (Sds) for Project as indicated on Structural Drawings.
 - 2. Component Importance Factor: As indicated on Structural Drawings.
- C. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.
- D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.
- E. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

2.3 FIXED EXTRUDED-ALUMINUM LOUVERS

- A. Horizontal, Wind-Driven-Rain-Resistant Louver:
 - 1. Basis-of-Design: Subject to compliance with requirements, provide the below listed manufacturer and model number or approved equal:
 - a. Manufacturer: Greenheck Fan Corporation.
 - b. Model Number: EHH-201
 - 2. Louver Size: As indicated on Architectural Drawings. Dimensions of existing opening shall be field verified.
 - 3. Louver Depth: 2-inches.
 - 4. Frame and Blade Nominal Thickness: Not less than 0.060-inch for blades and 0.080- inch for frames.
 - 5. Louver Performance Ratings:
 - a. Free Area: Refer to Mechanical Drawings.
 - b. Air Performance: Refer to Mechanical Drawings.
 - c. Wind-Driven Rain Performance: Not less than 99 percent effectiveness when subjected to a rainfall rate of 3 inches (75 mm) per hour and a wind speed of 29 mph at a core-area intake velocity of 500 fpm (2.5 m/s).
 - d. Point of Beginning Water Penetration: Not less than 914 fpm.
 - 6. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.4 LOUVER SCREENS

A. General: Provide screen at each exterior louver.

- 1. Screen Location for Fixed Louvers: Interior face.
- 2. Screening Type: Insect screening.
- B. Secure screen frames to louver frames with stainless-steel machine screws spaced a maximum of 6-inches from each corner and at 12-inches o.c.
- C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.
 - 1. Metal: Same type and form of metal as indicated for louver to which screens are attached.
 - 2. Finish: Same finish as louver frames to which louver screens are attached.
 - 3. Type: Rewirable frames with a driven spline or insert.
- D. Louver Screening for Aluminum Louvers:
 - 1. Insect Screening: Stainless steel, 18-by-18 (1.4-by-1.4-mm) mesh, 0.009-inch (0.23-mm) wire.

2.5 MATERIALS

- A. Aluminum Extrusions: ASTM B221 (ASTM B221M), Alloy 6063-T5, T-52, or T6.
- B. Aluminum Sheet: ASTM B209 (ASTM B209M), Alloy 3003 or 5005, with temper as required for forming, or as otherwise recommended by metal producer for required finish.
- C. Fasteners: Use types and sizes to suit unit installation conditions.
 - 1. Use hex-head or Phillips pan-head screws for exposed fasteners unless otherwise indicated.
 - 2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
 - 3. For color-finished louvers, use fasteners with heads that match color of louvers.
- D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

2.6 FABRICATION

- A. Factory assemble louvers to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.
- B. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.
- C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.
 - 1. Frame Type: Exterior flange unless otherwise indicated.

- D. Include supports, anchorages, and accessories required for complete assembly.
- E. Provide subsills made of same material as louvers for recessed louvers.
- F. Join frame members to each other and to fixed louver blades with fillet welds concealed from view, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.7 ALUMINUM FINISHES

- A. Finish louvers after assembly.
- B. High-Performance Organic Finish: Two-coat fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Notify Owner and Architect, in writing, of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
 - 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with installation of specified equipment.
 - 2. Failure to call attention to defects or imperfections will be construed as acceptance and approval of substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

- A. Locate and place louvers level, plumb, and at indicated alignment with adjacent work.
- B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.
- C. Form closely fitted joints with exposed connections accurately located and secured.
- D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.
- E. Protect unpainted galvanized- and nonferrous-metal surfaces that are in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.
- F. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Division 07, Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

- A. Clean exposed louver surfaces that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.
- B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.
- C. Restore louvers damaged during installation and construction, so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.
 - 1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 089119

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SECTION 092400 - CEMENT PLASTERING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Exterior portland cement plasterwork (stucco) on metal lath.

B. Related Sections:

- Division 06, Section "Rough Carpentry", for wood framing at exterior wall assemblies.
- 2. Division 06, Section "Sheathing"a, for sheathing at exterior wall assemblies.
- 3. Division 07, Section "Thermal Insulation", for thermal insulation at exterior wall assemblies.
- 4. Division 07, Section "Weather Barriers" (WRB), for weather barriers, self-adhering membrane flashing and accessories at exterior wall assemblies.
- 5. Division 07, Section "Sheet Metal Flashing and Trim", for exterior flashing at exterior wall assemblies.
- 6. Division 07, Section "Joint Sealants", for joint-sealant installation.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at the Project Site, with the Installer present.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated, including the following:
 - 1. Manufacturer's certification of compliance of materials and product literature.
 - 2. Manufacturer's product literature for all additives and proprietary components.
- B. Shop Drawings: Show locations and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other work.
- C. Samples for Initial Selection: For each type of factory-prepared finish coat indicated.
- D. Samples for Verification: For each type of factory-prepared, colored and textured finish coat indicated; 12 by 12 inches (305 by 305 mm), and prepared on rigid backing.

E. Stucco Trim Accessories: Submit samples of each trim accessory (3 each, not less than 6" long).

F. Metal lath and backing: 12" x 12" (3 each).

1.5 QUALITY ASSURANCE

- A. Fire-Resistance Ratings: Where indicated for this Project, provide portland cement plaster assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 - 1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
- B. Sound-Transmission Characteristics: Where indicated, provide portland cement plaster assemblies identical to those of assemblies tested for STC ratings per ASTM E 90 and classified according to ASTM E 413 by a qualified testing agency.
- C. Mockups: Before plastering, install mockups of at least 100 sq. ft. (9.3 sq. m) in surface area to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Install mockups for each type of finish indicated.
 - 2. Build mockups at locations recommended by Contractor with approval of locations by Architect prior to building mockups.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Installer qualifications: The Installer shall meet the following requirements:
 - 1. Specialize in this scope of work, with at least (10) years of experience installing the specified system successfully.
 - 2. Have qualified and properly trained people to perform work.
 - 3. Be licensed, bonded and insured.
 - 4. Be in good financial standing and capable of meeting the financial obligations associated with the stucco scope of work on the Project.
 - 5. Have documented experience in quality work of comparable scope.
 - 6. Be recommended as a qualified installer by NWCB or national or regional Wall and Ceiling Association (Plastering Association) prior to Bid.
 - 7. Contractor shall be able to meet schedule requirements set at time of Bid.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store materials inside under cover and keep them dry and protected against damage from weather, moisture, direct sunlight, surface contamination, corrosion, construction traffic, and other causes.
- B. Materials at job site to be in original containers with labels intact and legible.

C. All trim accessories and lath and/or other specified products to be shipped to job site in original containers. Any damaged or bent materials shall be removed from site and replaced.

D. All sack materials to be stored above ground, dry and protected.

1.7 FIELD CONDITIONS

- A. Comply with ASTM C 926 requirements, application of Portland Cement-Based Plaster (latest edition).
- B. Comply with ASTM C 1063 requirements, installation of Lathing and Furring to Received Exterior Portland Cement-Based Plaster (latest edition).
- C. All work to be performed per Northwest Wall and Ceiling Bureau and/or regional wall and ceiling association recommendations.

D. Exterior Plasterwork:

- 1. Apply and cure plaster to prevent plaster drying out during curing period. Use procedures required by climatic conditions, including moist curing, providing coverings, and providing barriers to deflect sunlight and wind.
- 2. Apply plaster when ambient temperature is greater than 40 deg F (4.4 deg C).
- 3. Protect plaster coats from freezing for not less than 48 hours after set of plaster coat has occurred
- 4. Do not apply cement plaster to any frozen surfaces or surfaces containing frost.
- 5. Do not use frozen materials.
- 6. Hoarding (tenting), heat and ventilation must be provided if cement plastering is done in a temperature below 35 deg F.
- 7. Protect the basecoats and finish coat of cement plaster from uneven and excessive evaporation in warm, windy weather.
- E. Factory-Prepared Finishes: Comply with manufacturer's written recommendations for environmental conditions for applying finishes.

PART 2 - PRODUCTS

2.1 METAL LATH

- A. Expanded-Metal Lath: ASTM C 847 with ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized zinc coating.
 - 1. 3/8-Inch (9.5-mm) Rib Lath (for use on horizontal exterior ceilings and/or soffits for this Project): 3.4 lb/sq. yd. (1.8 kg/sq. m).

B. Wire-Fabric Lath:

1. Woven-Wire Lath (for use on vertical exterior walls surfaces for this Project): ASTM C 1032; self-furring, with stiffener wire backing, 1.4 lb/sq. yd. (0.8 kg/sq. m).

C. Paper Backing: As indicated in Division 07, Section "Weather Barriers".

2.2 ACCESSORIES

A. General: Comply with ASTM C 1063 and coordinate depth of trim and accessories with thicknesses and number of plaster coats required.

B. Metal Accessories:

- 1. Foundation Weep Screed: Fabricated from hot-dip galvanized-steel sheet, ASTM A 653/A 653M, G60 (Z180) zinc coating.
- 2. Cornerite: Fabricated from metal lath with ASTM A 653/A 653M, G60 (Z180), hot-dip galvanized zinc coating.
- 3. Cornerbeads: Fabricated from zinc.
 - a. Small nose cornerbead with expanded flanges; use unless otherwise indicated.
- 4. Casing Beads: Fabricated from zinc; square-edged style; with expanded flanges.
- 5. Control Joints: Fabricated from zinc; one-piece-type, folded pair of unperforated screeds in M-shaped configuration; with perforated flanges and removable protective tape on plaster face of control joint.
- 6. Expansion Joints: Fabricated from zinc; folded pair of unperforated screeds in M-shaped configuration; with expanded flanges.
- 7. Two-Piece Expansion Joints: Fabricated from zinc; formed to produce slip-joint and square-edged reveal that is adjustable from 1/4 to 5/8 inch (6.34 to 16 mm) wide; with perforated flanges.

2.3 MISCELLANEOUS MATERIALS

- A. Water for Mixing: Potable and free of substances capable of affecting plaster set or of damaging plaster, lath, or accessories.
- B. Fiber for Base Coat: Alkaline-resistant glass or polypropylene fibers, 1/2 inch (13 mm) long, free of contaminants, manufactured for use in portland cement plaster.
- C. Fasteners for Attaching Metal Lath to Substrates: Complying with ASTM C 1063.
- D. Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, not less than 0.0475-inch (1.21-mm) diameter, unless otherwise indicated.

2.4 PLASTER MATERIALS

- A. Portland Cement: ASTM C 150, Type II.
 - 1. Color for Finish Coats: Gray.
- B. Lime: ASTM C 206, Type S; or ASTM C 207, Type S.
- C. Sand Aggregate: ASTM C 897.

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- 1. Color for Job-Mixed Finish Coats: White.
- D. Ready-Mixed Finish-Coat Plaster: Mill-mixed portland cement, aggregates, coloring agents, and proprietary ingredients.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Bonsal American, an Oldcastle Company; Marblesil Stucco Mix.
 - b. California Stucco Products Corp.; Conventional Portland Cement Stucco.
 - c. El Rey Stucco Company, Inc., a brand of ParexLaHabra, Inc.; Premium Stucco Finish.
 - d. Florida Stucco: Florida Stucco.
 - e. LaHabra, a brand of ParexLaHabra, Inc.; Exterior Stucco Color Coat.
 - f. Omega Products International, Inc.; ColorTek Exterior Stucco.
 - g. QUIKCRETE; QUIKCRETE Finish Coat Stucco, No. 1201.
 - h. Shamrock Stucco LLC; Exterior Stucco.
 - i. SonoWall, BASF Wall Systems, Inc.; Thoro Stucco.
 - j. USG Corporation; Oriental Exterior Finish Stucco.
 - 2. Color: Match Architect's sample and approved submittal.

2.5 PLASTER MIXES

- A. General: Comply with ASTM C 926 for applications indicated.
 - 1. Fiber Content: Add fiber only to base-coat mixes after ingredients have mixed at least two minutes. Comply with fiber manufacturer's written instructions for fiber quantities in mixes, but do not exceed 1 lb of fiber/cu. yd. (0.6 kg of fiber/cu. m) of cementitious materials.
 - a. Fibers: Polypropylene, nylon or alkali-resistant glass fibers.
 - b. Use only types specifically manufactured for a stucco basecoat and per manufacturer's recommendations.
- B. Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork as follows:
 - 1. Portland Cement Mixes:
 - a. Scratch Coat: For cementitious material, mix 1 part portland cement and 3/4 to 1 parts lime. Use 2-1/2 to 4 parts aggregate per part of cementitious material.
 - b. Brown Coat: For cementitious material, mix 1 part portland cement and 3/4 to 1 parts lime. Use 3 to 5 parts aggregate per part of cementitious material, but not less than volume of aggregate used in scratch coat.
- C. Factory-Prepared Finish-Coat Mixes: For ready-mixed finish-coat plasters, comply with manufacturer's written instructions.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas of Work and associated substrates indicated to receive new finish plastering, with Installer present, for compliance with requirements for finish plaster installation, installation tolerances, and other conditions affecting performance of the Work. Notify Owner and Architect, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
 - 1. Failure to call attention to defects or imperfections will be construed as acceptance and approval of substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Installation of products indicates acceptance of surfaces and conditions.
- C. Ensure that Weather Resistive Barrier (WRB), flashings around all openings and Rainscreen assemblies are secure and properly installed prior to installing Portland Cement Plastering (stucco) assembly and stucco trims accessory components. Do not proceed until unsatisfactory conditions have been resolved. Notify Architect of unsatisfactory conditions.

3.2 PREPARATION

- A. Protect adjacent work from soiling, spattering, moisture deterioration, and other harmful effects caused by plastering.
- B. Prepare solid substrates for plaster that are smooth or that do not have the suction capability required to bond with plaster according to ASTM C 926.
- C. Flashings shall be installed prior to start of lathing or may be required to be integrated at the time of lathing.

3.3 INSTALLATION, GENERAL

- A. Fire-Resistance-Rated Assemblies (where indicated for Project): Install components according to requirements for design designations from listing organization and publication (where indicated on Drawings).
- B. Acoustical Sealant: Where required, seal joints between edges of plasterwork and abutting construction with acoustical sealant.

3.4 INSTALLING METAL LATH

A. Expanded-Metal Lath: Install according to ASTM C 1063.

- 1. Partition Framing and Vertical Furring: Install woven-wire lath.
- 2. Flat-Ceiling and Horizontal Framing: Install 3/8-inch (9.5-mm) rib lath lath.

3.5 INSTALLING ACCESSORIES

- A. Install according to ASTM C 1063 and at locations indicated on Drawings.
- B. Reinforcement for External Corners:
 - 1. Install cornerbead at interior and exterior locations.
- C. Control Joints: Install control joints as indicated on Drawings. When not indicated on Drawings, coordinate locations with Architect for approval prior to installation for visual effect as follows:
 - 1. As required to delineate plasterwork into areas (panels) of the following maximum sizes:
 - a. Vertical Surfaces: 144 sq. ft. (13.4 sq. m).
 - b. Horizontal and other Nonvertical Surfaces: 100 sq. ft. (9.3 sq. m).
 - 2. At distances between control joints of not greater than 18 feet (5.5 m) o.c.
 - 3. As required to delineate plasterwork into areas (panels) with length-to-width ratios of not greater than 2-1/2:1.
 - 4. Where control joints occur in surface of construction directly behind plaster.
 - 5. Where plasterwork areas change dimensions, to delineate rectangular-shaped areas (panels) and to relieve the stress that occurs at the corner formed by the dimension change.
- D. Verify that substrate and work by other trades are complete to the point at which installation of trim accessories may properly commence.
- E. Attachments shall be firm enough to hold trim accessories in place without misalignment during plastering.
 - 1. Flanges or attachment points of trim accessories shall be secured to substrate in accordance with requirements of manufacturer's approved fasteners and written recommendations and installation instructions.
- F. Install individual trim-accessory sections to each other at end joints for accurate alignment.
- G. Install trim accessories in a manner that ensures a true, level and plumb stucco surface, and moisture resistant.
- H. Install the trim accessories in accordance with the required thickness of stucco basecoat and finish coat requirements.
- I. Install the longest possible length of trim accessory sections.
- J. The Weather Resistive Barrier (WRB) must continue unbroken behind trim accessory joints in vertical or horizontal direction.

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3.6 PLASTER APPLICATION

- A. General: Comply with ASTM C 926.
 - 1. Do not deviate more than plus or minus 1/4 inch in 10 feet (6.4 mm in 3 m) from a true plane in finished plaster surfaces, as measured by a 10-foot (3-m) straightedge placed on surface.
 - 2. Finish plaster flush with casing beads acting as grounds at window and door frames and other built-in items or accessories.
 - 3. Provide plaster surfaces that are ready to receive field-applied finishes indicated.
- B. Walls; Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork; 3/4-inch (19-mm) thickness total.
 - 1. Portland cement mixes.
- C. Ceilings; Base-Coat Mixes for Use over Metal Lath: Scratch and brown coats for three-coat plasterwork; 3/4 inch (19 mm) thick.
 - 1. Portland cement mixes.
- D. Apply stucco first ("scratch") coat in a nominal thickness of 3/8-inch. First coat to completely embed the lath.
 - 1. Scoring of the first coat should be uniform and shallow, approximately 1/8-inch.
 - 2. Moist cure the first ("scratch") coat for a minimum of 48 hours before application of the second ("brown") coat. First coat to be hard and rigid before receiving the second coat.
- E. Apply stucco second ("brown") coat in a in a nominal thickness of 3/8-inch over stucco first coat. Second coat thickness to bring the combined basecoats (fist and second) thickness to a nominal thickness of 3/4 inch (19 mm) total thickness.
 - 1. Apply second coat over a damp fist coat. If required, apply a fine spray of clean water, so as to dampen only. Do not saturate. Allow water sheen to disappear before applying the second coat.
 - 2. Apply the second coat with sufficient material and pressure to ensure a tight uniform bond to the first coat. Apply second coat so as not to deform or crack the first coat.
 - 3. Rod the second coat to a true, even plane, filling surface defects with cement plaster.
 - 4. Trowel-float the second coat surface uniformly. Float the basecoat after it has set and when moisture is still present in it.
- F. Plaster Finish Coats: Apply to provide sand float texture finish to match Architect's sample and approved submittal.

3.7 PLASTER REPAIRS

A. Repair or replace work to eliminate cracks, dents, blisters, buckles, crazing and check cracking, dry outs, efflorescence, sweat outs, and similar defects and where bond to substrate has failed.

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B. Replace damaged products that cannot be repaired in a manner approved by Architect prior to Substantial Completion.

3.8 PROTECTION

- A. Remove temporary protection and enclosure of other work. Promptly remove plaster from door frames, windows, and other surfaces not indicated to be plastered. Repair floors, walls, and other surfaces stained, marred, or otherwise damaged during plastering.
- B. Replace damaged products that cannot be repaired in a manner approved by Architect before time of Substantial Completion.
- C. Provide protection and maintain conditions in a manner acceptable to manufacturer and Installer that ensures that products are without damage or deterioration prior to Substantial Completion.
- D. Remove all debris by work of this Section off-site in an approved manner and leave area in a clean an orderly manner.

END OF SECTION 092400

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SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. General: All labor, surface preparation, application, materials, tools and other equipment, services and supervision required to complete all work as indicated on and to the full extent of the Drawings, specifications, and "Exterior Finish Legend".
- B. Section includes surface preparation and the application of paint systems on the following exterior substrates:
 - 1. Steel and iron.
 - 2. Galvanized metal.
 - 3. Wood.
- C. Work under this Section shall also include, but not necessarily be limited to, the following:
 - 1. Surface preparation of substrates as required for acceptance of painting, including cleaning, small crack repair, patching, caulking, and making good surfaces and areas to the limits defined under *MPI* preparation requirements.
 - 2. Specific pre-treatments noted herein or specified in the *MPI* Architectural Painting Specification Manual.
 - 3. Priming and painting of structural steel, miscellaneous metal, ornamental metal and primed steel equipment (except where pre-primed with an approved primer under other Sections of work).
 - 4. Priming and back-priming of wood materials as noted herein or specified in the *MPI* Architectural Painting Specification Manual.
 - 5. Painting of all semi-concealed areas (e.g. inside of light troughs and valances, behind grilles, and projecting edges above and below sight lines).
 - 6. Refer to Mechanical, Plumbing, Electrical, and Fire Suppression Design-Build Drawings and Specifications (by others and under separate cover) for painting requirements, if any, for exposed plumbing, heating, fire protection, and electrical elements.
 - a. All louvers and grilles to be painted to match adjacent surfaces.
 - b. Labels: Do not paint over Underwriter's Laboratories, FMG or other code-required labels, or equipment name, identification, performance rating, or nomenclature plates.

- 7. Provision of safe and adequate ventilation as required over and above temporary ventilation supplied by others, where toxic and/or volatile / flammable materials are being used.
- 8. Refer to and coordinate with Drawings, specifications and "Interior Finish Legend" for location of finishes required, and include all touch-ups and field painting necessary to complete work shown, scheduled or specified.
- D. NOTE: This specification Section is intended as a generic performance specification. Refer to Drawings and the approved submittal (which shall take precedence) for the following:
 - 1. Areas to receive product(s) specified in this specification Section.
 - 2. Product materials.
 - 3. Manufacturer.
 - 4. Color selections.
 - 5. Gloss levels.

E. Related Requirements:

- 1. Division 05, Section "Metal Fabrications" for shop priming metal fabrications.
- 2. Division 06, Section "Exterior Finish Carpentry" for standing and running wood trim surface preparation, priming, and coating(s).
- 3. Division 07, Section "Fiber-Cement Siding" for exterior cladding surface preparation, priming, and coating(s).
- 4. Division 07, Section "Sheet Metal Flashing and Trim" for specialty finishes.
- 5. Division 07, Section "Joint Sealants".
- 6. Division 08, Section "Hollow Metal Doors and Frames" for surface preparation, priming, and coating(s).
- 7. Division 09, Section "Staining and Transparent Finishing" for surface preparation and the application of wood stains and transparent finishes on exterior wood substrates.

1.3 REFERENCES

- A. The latest edition of the following reference standards shall govern all painting work:
 - 1. Architectural Painting Specification Manual by the Master Painters Institute (MPI), including Identifiers, Evaluation, Systems, Preparation and Approved Product List (hereafter referred to as the MPI Painting Manual) as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
 - 2. Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).

1.4 DEFINITIONS

- A. "Paint" includes coating systems materials, primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
- B. Master Painters Institute (MPI): Definitions of MPI Gloss Levels below are from "MPI Architectural Painting Specification Manual" (hereafter, "MPI Manual").

- C. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523. MPI Gloss Standard Description: A traditional "matte" finish flat.
- D. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523. MPI Gloss Standard Description: A traditional "egg-shell" finish.
- E. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523. MPI Gloss Standard Description: A "satin-like" finish.
- F. MPI Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D523. MPI Gloss Standard Description: A traditional "semi-gloss" finish.
- G. MPI Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D523. MPI Gloss Standard Description: A traditional "gloss" finish.
- H. MPI Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D523. MPI Gloss Standard Description: A traditional "high gloss" finish.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site with Installer present.

1.6 SUBMITTALS, GENERAL

- A. All submittals shall be in accordance with the requirements of Division 01, Section "Submittal Procedures".
 - 1. Do not proceed with final painting until samples and mock-ups, when required, are approved.

1.7 ACTION SUBMITTALS

- A. Product Data: For each specific type of product being provided and installed for this Project. Include preparation requirements and application instructions.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 2. Indicate VOC content.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8-inches (200 mm) square.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.

- D. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.
 - 1. Printout of current "MPI Approved Products List" for each product category being provided, with the proposed product highlighted.
 - 2. VOC content of each schedule product.
- E. Painting Schedule: In a form similar to the schedule indicated outlining the type of paint to be used for each category, application, and color. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.

1.8 INFORMATIONAL SUBMITTALS

- A. Certifications: Manufacturer's statement that paint materials conform to current regulations relating to lead content and air pollution emission requirements.
- B. Submit Material Safety Data Sheets (MSDS) prior to commencement of work and for posting at job site as required.
- C. When or if requested by the General Contractor, Architect or Owner, submit work schedule for various stages of work when painting occupied areas for the Architect's review and Owner's approval.
- D. Sample Warranty: For Painting Contractor (Installer) warranty. Upon final completion of the work, a signed and dated warranty shall be included in the Project's warranty manual.

1.9 WARRANTY

- A. The Painting Contractor (Installer) shall provide a signed and dated written warranty that will guarantee to the Owner to appropriately repaint work provided due to product and/or workmanship failure, at no added cost to the Owner, for a period of:
 - 1. Two (2) years from date of Substantial Completion.

1.10 CLOSEOUT SUBMITTALS

- A. Maintenance and Product Data: Provide manufacturer's written recommended maintenance data and product data for each type of paint or stain indicated, including methods for maintaining as well as precautions for use of cleaning materials and methods that could be detrimental to finishes and performance. Include in operation and maintenance manuals.
- B. Warranties: Include warranty in Project warranty manual.
- C. Upon completion of work of this Section, provide Owner with all maintenance materials from work of this Section that are packaged with protective covering for Owner's storage and identified with labels describing contents.

1.11 MAINTENANCE MATERIAL SUBMITTALS

- A. At project completion, furnish extra materials (including full unopened cans of surplus paint), from the same product run (batch mix), that match products installed and that are packaged with protective covering for storage and identified for Owner's later us in maintenance that are properly labeled describing contents. Store where indicated by Owner.
 - 1. Paint: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.12 OUALITY ASSURANCE

- A. Installer Qualifications: An entity with not less than five (5) years of successful experience in installation of specified product(s) that employs installers and supervisors who are competent in techniques required by manufacturer.
 - 1. Engage an installer who employs workers for this Project who are trained or certified by specified paint or stain manufacturer for installation techniques required.
- B. Single-Source Responsibility: Obtain each type, color and finish of specified products and accessories from a single source with resources to provide products of consistent quality in appearance and physical properties without delaying progress of the work.
- C. Coordination of Work: Review Sections in which primers are provided to ensure compatibility of the total systems for various substrates.
- D. Material Quality: Provide the manufacturer's best quality trade sale type paint material of the various types specified. Paint material containers not displaying manufacturer's product identification will not be acceptable. Proprietary names used to designate colors or materials are not intended to imply that products named are required or to exclude of equal products of other manufacturers.
- E. All materials, preparation and workmanship shall conform to requirements of the latest edition of the Architectural Painting Specification Manual by the Master Painters Institute (*MPI*) (hereafter referred to as the *MPI* Painting Manual) as issued by the local MPI Accredited Quality Assurance Association having jurisdiction.
 - 1. Unless otherwise specified herein, all painting work shall be in accordance with *MPI* premium Grade finish requirements.
- F. All paint manufacturers and products used shall be as listed under the Approved Product List section of the *MPI* Painting Manual, unless otherwise indicated or approved.
 - 1. All such material shall be from a single manufacturer for each system used.
 - 2. Other materials such as linseed oil, shellac, thinners, solvents, etc. shall be the highest quality product and shall be compatible with paint materials being used as required.
 - 3. All materials used shall be lead and mercury free and shall have low VOC content where possible.
 - 4. Where required, use only materials having a minimum *MPI* "Environmentally Friendly" rating based on VOC (EPA Method 24) content levels.

- G. Where "special" painting, coating or decorating system applications (i.e. non-MPI listed products or systems) are to be used, the paint or coating manufacturer shall provide as part of this work, certification of all surfaces and conditions for specific paint or coating system application as well as on site supervision, inspection and approval of their paint or coating system application as required at no additional cost to the Owner.
- H. The Painting Contractor (Installer) shall receive written confirmation of the specific surface preparation procedures and primers used for all fabricated steel items from the fabricator / supplier to ascertain appropriate and manufacturer compatible finish coat materials to be used before painting any such work.
- I. All paint materials shall have good flowing and brushing properties and shall dry or cure free of blemishes, sags, air entrapment, etc.
- J. Unless otherwise specified herein or pre-approved, all paint shall be ready-mixed and pre-tinted. Re-mix all paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and color and gloss uniformity.
- K. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
 - 1. Architect and Owner will select surfaces to represent surfaces and conditions for application of each paint system.
 - a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft. (9 sq. m).
 - b. Other Items: Architect and Owner will designate items or areas required.
 - 2. Final approval of color selections will be based on mockups.
 - a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect and Owner at no added cost to Owner.
 - 3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect and Owner specifically approves such deviations in writing.
 - 4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.13 DELIVERY, STORAGE, AND HANDLING

- A. Deliver all painting materials in sealed, original labeled containers bearing manufacturer's name, brand name, type of paint or coating and color designation, standard compliance, materials content as well as mixing and/or reducing and manufacturer's instructions and application requirements.
 - 1. Product Name or Title of Material.
 - 2. Product Description (Generic Classification or Binder Type).
 - 3. Manufacturer's Stock Number and Date of Manufacture.
 - 4. Contents by Volume, for Pigment and Vehicle Constituents.

- 5. Thinning Instructions.
- 6. Application Instructions.
- 7. Color Name and Number.
- 8. VOC Content.
- B. Approved materials without the above information will NOT be allowed on the Project Site.
- C. Store all paint materials in original labeled containers in a secure (lockable), dry, heated and well ventilated single designated area meeting the minimum requirements of both paint manufacturer and authorities having jurisdiction and at a minimum ambient temperature of 45 deg F (7 deg C). Only material used on this project to be stored on site.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.
 - 3. Take all necessary precautionary and safety measures to prevent fire hazards and spontaneous combustion and to protect the environment from hazard spills. Materials that constitute a fire hazard (paints, solvents, drop clothes, etc.) shall be stored in suitable closed and rated containers and removed from the site on a daily basis.
- D. Where toxic and/or volatile / explosive / flammable materials are being used, provide adequate fireproof storage lockers and take all necessary precautions and post adequate warnings (e.g. no smoking) as required.
- E. Comply with requirements of Authorities Having Jurisdiction (AHJ), in regard to the use, handling, storage and disposal of hazardous materials.

1.14 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
- C. Conduct all moisture tests using a properly calibrated electronic Moisture Meter.

1.15 WASTE MANAGEMENT AND DISPOSAL

- A. Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Obtain information on these controls from applicable State and Local government Authorities Having Jurisdiction (AHJ).
- B. All waste materials shall be separated and recycled. Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility. Materials that cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- C. Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

- D. To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:
 - 1. Retain cleaning water for water-based materials to allow sediments to be filtered out. In no case shall equipment be cleaned using free draining water.
 - 2. Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
 - 3. Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
 - 4. Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
 - 5. Empty paint cans are to be dry prior to disposal or recycling (where available).
 - 6. Close and seal tightly partly used cans of materials including sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.
- E. Set aside and protect surplus and uncontaminated finish materials not required by the Owner and deliver or arrange collection for verifiable re-use or re-manufacturing.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, the available manufacturers' offering products that may be incorporated into the Work, except where noted otherwise, all finishing materials, thinners, etc., shall be the best quality, first line materials as manufactured by one of the following manufacturers:
 - 1. Sherwin-Williams Company (The).
 - 2. Benjamin Moore & Co.
 - 3. Glidden Professional.
 - 4. Miller Paint.
 - 5. Rodda Paint. Co.
- B. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in the Exterior Painting Schedule for the paint category indicated.
 - 1. Basis-of-Design:
 - a. Manufacturer: Sherwin-Williams Company (The).
 - b. Product: Sherwin Williams Exterior Latex Primer at all surfaces to receive paint.
 - c. Product: Sherwin Williams SuperPaint, Exterior Latex Satin at all exterior locations, except exterior doors.
 - d. Product: Sherwin Williams Pro Industrial DTM Acrylic, Semi-Gloss paint at all exterior metal door and door frame surfaces.
 - 2. Acceptable manufacturers with an equal or better product from one of the following:
 - a. Benjamin Moore & Co.

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- b. Glidden Professional.
- c. Miller Paint.
- d. Rodda Paint. Co.

2.2 PAINT, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
- B. VOC Content: When the Project uses the following materials, those materials shall comply with the field applications, paints and coatings, and shall not exceed the VOC content limits of Authorities Having Jurisdiction (AHJ) and the following maximum VOC content limits:
 - 1. Flat Paints and Coatings: 50 g/L.
 - 2. Nonflat Paints and Coatings: 100 g/L.
 - 3. Dry-Fog Coatings: 150 g/L.
 - 4. Industrial Maintenance Coatings: 250 g/L.
 - 5. Pretreatment Wash Primers: 420 g/L.
 - 6. Primers, Sealers, and Undercoaters: 100 g/L.
 - 7. Recycled Coatings: 250 g/L.
 - 8. Rust-Preventive Coatings: 250 g/L.

C. Material Compatibility:

- 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
- 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- D. Colors: As indicated on "Exterior Finish Legend" on Drawings.

2.3 SOURCE QUALITY CONTROL

- A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
 - 1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
 - 2. Testing agency will perform tests for compliance with product requirements.
 - 3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

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PART 3 - EXECUTION

3.1 EXAMINATION

- A. DO NOT commence the Work of this Section until the exterior paint submittal and mock-ups, specific locations, and colors have been reviewed and approved by the Architect.
- B. Prior to commencement of the Work of this Section, thoroughly examine (and test as required) all substrates and conditions scheduled to be painted or receive coatings, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Notify Owner and Architect, in writing, of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
 - 1. Failure to call attention to defects or imperfections will be construed as acceptance and approval of substrate. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.
- C. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Wood: 15 percent.
 - 2. Portland Cement Plaster: 12 percent.
 - 3. Gypsum Board: 12 percent.
- D. Portland Cement Plaster Substrates: Verify that plaster is fully cured.
- E. Exterior Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- F. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- G. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations for preparation and workmanship in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove and securely store all hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, carefully clean and replace all hardware, covers, plates, and similar items, using workers skilled in the trades involved to reinstall items

that were removed. Remove surface-applied protection if any. Do not use solvent or reactive cleaning agents on items that will mar or remove finishes.

- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and re-prime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Steel and Iron Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
 - 1. SSPC-SP 3: Power Tool Cleaning.
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- G. Aluminum Substrates: Remove loose surface oxidation.
- H. Wood Substrates:
 - 1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
- I. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 APPLICATION

- A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
 - 3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
 - 4. Paint entire exposed surface of window frames and sashes.
 - 5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

- 6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
- B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.
- D. Do not paint unless substrates are acceptable and/or until all environmental conditions (heating, ventilation, lighting and completion of other sub-trade work) are acceptable for applications of products.
- E. Apply paint and coatings within an appropriate time frame after cleaning when environmental conditions encourage flash-rusting, rusting, contamination or the manufacturer's paint specifications require earlier applications.
- F. Apply paint only to dry, clean, properly cured and adequately prepared surfaces in areas where dust is no longer generated by construction activities such that airborne particles will not affect the quality of finished surfaces.
- G. Painting coats specified are intended to cover surfaces satisfactorily when applied at proper consistency and in accordance with manufacturer's recommendations.
- H. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- I. Apply one (1) coat of specified primer at all exterior wall surfaces to receive paint.
- J. Apply two (2) coats of specified top coat paint at all exterior wall surfaces to receive paint.
- K. Apply two (2) coats of specified top coat paint at all exterior metal and metal frames.
- L. Protect all adjacent surfaces and areas, including rating and instruction labels on doors, frames, equipment, piping, etc., from painting operations and damage with drop cloths, shields, masking, templates, or other suitable protective means and make good any damage caused by fail to provide protection.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Contractor shall touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

- A. Steel and Iron Substrates:
 - 1. Water-Based Light Industrial Coating System MPI EXT 5.1C:
 - a. Prime Coat: Shop primer specified in Section where substrate is specified.
 - b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
 - c. Topcoat: Light industrial coating, exterior, water based, gloss (MPI Gloss Level 6), MPI #164.
- B. Galvanized-Metal Substrates:
 - 1. Alkyd System MPI EXT 5.3B:
 - a. Prime Coat: Primer, galvanized, cementitious, MPI #26.
 - b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
 - c. Topcoat: Alkyd, exterior, gloss (MPI Gloss Level 6), MPI #9.
- C. Wood Substrates: (Location(s): Wood siding, trim, architectural woodwork.)
 - 1. Water-Based Light Industrial Coating System MPI EXT 6.3J:
 - a. Prime Coat: Primer, alkyd for exterior wood, MPI #5.
 - b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
 - c. Topcoat: Light industrial coating, exterior, water based, semi-gloss (MPI Gloss Level 5), MPI #163.

END OF SECTION 099113

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1 GENERAL

1.01 GENERAL REQUIREMENTS

A. Drawings and general provisions of the Contract, including General and other conditions and Division 1 - General requirements Sections apply for the work specified in this Section.

1.02 SCOPE OF WORK

A. The work covered by this Specification shall include furnishing all labor, materials, equipment, and services to construct and install the complete mechanical system as shown on the Drawings and specified herein. Verify all conditions on the job site and lay out work accordingly.

1.03 RELATED WORK

- A. The General Provisions apply to this Division, including but not limited to:
 - 1. Drawings and Specifications.
 - 2. Contract Modifications, addendums and change orders.
- B. Division 1, General Requirements, applies to this Division, including but not limited to:
 - 1. Summary of Work.
 - 2. Coordination. In addition, it shall be the responsibility of each trade performing work specified under Division 23 to coordinate with all others for proper and adequate installation clearance.
 - 3. Cutting and Patching. The cost of cutting and patching required work of Division 23 and not shown in other Divisions of Work shall be included in the cost of Division 23.
 - 4. Shop Drawings, Product Data and Samples.
 - 5. Temporary Facilities and Controls.
 - 6. Material and Equipment.
 - 7. Substitutions and Product Options.
 - 8. Contract Closeout:
 - a. Project Record Documents. Keep up to date marked up Drawings on site.
 - b. Operations and Maintenance Data.

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- c. Start-up.
- C. Related work provided in Divisions 2 through 14:
 - 1. Pipe chases and formed concrete work except as specified hereunder.
 - 2. Framed openings in masonry, concrete, wood, and other architectural and structural elements.
 - 3. Wood grounds and nailing strips in masonry and concrete.
 - 4. Installation only of access panels in ceilings, walls, etc. Provide access panels as part of mechanical work.
 - 5. Painting except as specified hereunder.
 - 6. Curbs and roof flashings for openings through roofs, except for roof drain and vent pipe flashing.
- D. Related Work provided in Division 26 and 28:
 - 1. Motor disconnects switches and installation except as specified herein.
 - 2. Motor starters and installation except as herein specified.
 - 3. Power wiring except as specified herein.

1.04 QUALITY ASSURANCE

- A. Regulatory Requirements:
 - 1. All work, installations, materials, and equipment shall comply with the provision of the following codes, standards, and regulations, except where more stringent requirements are shown or specified:
 - a. State of Oregon International Mechanical Code. (IMC)
 - b. State of Oregon Plumbing Specialty Code. (UPC)
 - c. State of Oregon Structural Specialty Code. (IBC)
 - d. National Electrical Code. (NEC)
 - e. National Fire Protection Agency. (NFPA)
 - f. All City, County, State and Federal applicable laws and regulations.
 - g. Regulations and standards set forth by ASME, ASHRAE, SMACNA, AGA and ARI.

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- 2. Should there be any direct conflict between Codes and the Drawings and Specifications, the Codes, rules and regulations shall govern.
- 3. Where two or more codes or regulations apply, the more stringent of the two shall be exercised.
- 4. Should the Documents indicate a condition, which will conflict with the Codes, the Contractor shall inform the Owner's Representative and refrain from installing that portion until resolved. Any work installed in violation of the Codes will be removed and correctly installed as part of the Contract work.
- 5. If the Drawings and Specifications indicate a higher quality than code, the Drawings and Specifications shall govern.
- 6. Electrical products shall bear the U.L. label.
- B. The entire mechanical system shall operate correctly at full capacity without objectionable noise, vibration or decrease of efficiency.

C. Materials and Equipments:

- 1. Equipment furnished shall meet all requirements of the Drawings and Specifications and be suitable for the installation. Equipment not meeting all requirements will not be acceptable.
- 2. Where two or more units of the same class of equipment are furnished, use products of the same manufacturer.
- 3. Furnish all materials and equipment, new and of size, type and quality herein specified.

D. Workmanship:

1. Follow manufacturers' instructions. If they are in conflict with the Drawings and Specifications, obtain clarification from the Architect prior to beginning the work.

E. Cutting and Patching:

1. Provide for cutting, patching, and repairing for the installation of the work specified, including masonry work, concrete work, carpentry work and painting. Work shall be performed by skilled craftsmen of the respective trade.

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1.05 DRAWINGS

A. The Drawings and Specifications are complementary and what is called for by one shall be as if called for by both. All items shown on the Drawings are not necessarily included in the Specifications. All directives and instructions to furnish, provide, install, complete and test described in the design documents shall be interpreted as directives unless clearly specified otherwise.

- B. Bring obscure or questionable items to the attention of the Owner's Representative prior to bid date. Necessary directions and explanations will be given by the Owner's Representative in Addendum Form.
- C. Should the Documents indicate a condition which will conflict with the Governing Codes and Regulations, the Contractor shall refrain from installing that portion of the work until receiving verification from the Owner's Representative. Should rearrangement or rerouting of duct or piping be necessary, provide for approval the simplest layout possible for that particular potion of the work. Any work installed in violation of the Governing Codes will be removed and correctly installed by the Contractor as part of the Contract work.
- D. Drawings are diagrammatic. They do not show every offset, bend, tee, or elbow which may be required to install work in the space provided. Do not scale drawings for roughing-in measurements, nor use as shop drawings. Make field measurements and prepare shop drawings as required. Coordinate work with shop drawings of other trades. Provide any bends. Offsets and elbows where required by local conditions from measurements taken at the Building (subject to approval) and without additional cost to the Project. The right is reserved to make any reasonable changes in outlet location prior to rough-in.
- E. It is the intent of these specifications that the field wiring of all systems provided and modified under this contract shall be complete and operable. Refer to all drawings and specifications, especially the electrical drawings, to determine voltage, phase, circuit ampacity and number of connections indicated. Bring to the attention of the Engineer all conflicts, incompatibilities and discrepancies prior to bid.
- F. Where equipment is shown, dimensions have been taken from typical equipment of the class indicated. Carefully check the Drawings to see that the equipment under consideration for installation will fit the space provided and that all connections may be made thereto without impairment of space and height requirements and of Code required clearances. Contractor is responsible for all changes required by equipment dimensions different than those shown.
- G. Where equipment manufacturer and model number are listed it is the most recent and/or desired to describe function and quality of equipment to be supplied and installed. Since manufacturers may change model numbers without notification, should the model specified be unavailable, furnish and install the model number that is equal to or better than the one listed.

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H. The location of all utilities, wires, conduits, pipes, duct, or other service facilities are shown in a general way only on the Drawings and are taken from existing public records. Ascertain whether any additional facilities other than those shown on the plans may be present and determine the exact location and elevations of all utilities prior to commencing installation.

- I. Prior to bid, contact the local utility companies to verify requirements. Provide all material and labor by utilities.
- J. The Contractor, before submitting a Bid on the work, must visit the site to become familiar with all visible existing conditions. As a result of having visited the premises, the Contractor shall be responsible for the installation of the work as it relates to such visible existing conditions. The submission of the bid will be considered an acknowledgement of the part of the Bidder of visitation to the site.
- K. The Contractor is responsible to apply for and obtain all necessary permits, fees and inspections required by any public authority having jurisdiction. Refer to General Conditions for additional information.

1.06 SUBSTITUTION AND PRODUCT OPTIONS

- A. See Division 1.
- B. The use of manufacturer's names, models and numbers in the Drawings and Specifications is intended to establish style, quality, appearance, and usefulness. The model numbers listed are the last available to the designer, if no longer current, substitute equipment equal to or better than that represented by the model number listed. Items noted "or equivalent" will require prior acceptance.
- C. Submit for the Owner's Representative's review, manufacturer's detailed specifications and data sheets for all proposed substitutions. Submittals shall consist of a single sheet, or specific data need for consideration of approval. All pertinent data listed in the Specifications and on the Drawings shall be furnished, including all special features. See that all submittals are in proper order, and that all equipment will fit the space provided.
- D. All requests for approval of substitutions for materials other than those specified must be submitted in accordance with Instruction to Bidder.
- E. Substitution products from approved manufacturers do not need prior approval. Ensure substitutions meet all requirements of the Specifications.
- F. All changes required due to product substitutions are the responsibility of the Contractor.

1.07 PROJECT RECORD DRAWINGS

- A. Obtain drawings from Architect.
- B. Keep Drawings clean, undamaged, and up to date.

- C. Record and accurately indicate the following:
 - 1. Depths, sizes, and locations of all buried and concealed piping.

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- 2. Locations of all clean-outs.
- 3. Changes, additions, and revisions due to contract modifications.
- 4. Locations of tracer wire terminal points.
- D. Drawings to be available for Architect review.
- E. Submit as a part of Project Closeout Documents

1.08 PROJECT CONDITIONS

- A. Existing Conditions: Prior to bidding, verify and become familiar with all existing conditions by visiting the site and include all factors which may affect the execution of this work. Include all related costs in the initial bid proposal.
- B. Coordinate exact requirements governed by actual job conditions. Check all information and report all discrepancies before fabrication work. Report changes in the time to avoid unnecessary work. Make changes as directed by Owner's Representative.

1.09 CONTRACT MODIFICATIONS

A. In addition to the requirements of the General provisions, all supplemental cost proposals for this Division of work shall be accompanied by a complete itemized breakdown of labor and materials for each item. No exceptions will be made. Contract's estimating sheets for supplemental cost proposals shall be made available upon request. Labor must be separated and allocated to each item of work. Changes or additions subject to additional compensation made without written authorization based on agreed price shall be at Contractor's own risk and expense.

1.10 STORAGE AND HANDLING

- A. Delivery: Deliver to project site with manufacturer's labels intact and legible.
- B. Handling: Avoid damage.
- C. Storage: Store material inside, protected from weather, dirt and construction dust. Where necessary to store outside, elevate well above grade and enclose with durable, waterproof wrapping.

1.11 WARRANTY

A. Provide a written guarantee covering the work of this Division for a period of one calendar year form the data of acceptance of the entire project as required by the General Provisions.

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B. Provide manufacturer's written warranties for material and equipment furnished under this Division insuring parts and labor for a period of one year from the date of acceptance of the entire project.

C. Correct warranty items promptly upon notification.

1.12 OPERATIONS AND MAINTENANCE DATA

A. Prior to final inspection, provide digital manufacturer's maintenance manuals for each piece of equipment or items requiring service. Manual shall include manufacturer's operation and maintenance instruction manuals and parts list for each piece of equipment or item requiring servicing. Include in the manual manufacturer's service data, wiring diagrams and parts lists for all major items of equipment, valve charts, balancing data, final control diagrams showing final set points and any additional equipment added by contract modification. Comply with provisions of Section 01700 where applicable.

1.13 SUBMITTALS

- A. Electronic Submission Requirements:
 - 1. Shop Drawings and Product Data:
 - a. Submit all equipment and product data for Work of Division 15 together in a group in a single PDF format file, with each item filed behind a cover sheet, and labeled with its respective speciation section number, article and paragraph, and mark if applicable.
 - b. Include a complete index in the original submittal. Indicate both original items submitted and note stragglers that will be submitted at a later date to avoid delay in submitting.
 - c. Additional product data submitted after return of the original file shall include a cover sheet similar to that originally submitted. Upon receipt of the return submittal, insert them in the previously submitted electronic file.
 - d. Submission of overall line or general catalog data will not be accepted, submittals must be tailored to specific model being submitted on.
 - e. Indication of unit, model, features, etc being submitted must be marked by bold arrow, bold circle or other clear means that will reproduce in black and white. Use of highlights, colored text or other colored indicators cannot be used.
 - f. Electronic submissions review and comment will be in electronic PDF format only. Submission in an electronic format will be considered acceptance of this review process and format.

g. Refer to Division 1 for number of shop drawing copies to be submitted.

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1.14 START-UP

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Owner's Representative seven days prior to start-up of each item.
- C. Verify that each piece of equipment of system has been checked prior to start-up for proper lubrication, drive rotation, belt tension, control sequence, or other conditions, which may cause damage.
- D. Verify that 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 completed and tested.
- F. Execute start-up under supervision of responsible manufacturer's representative or Contractor's personnel in accordance with manufacturer's instructions.

1.15 FEES, PERMITS AND INSPECTIONS

A. The Contractor is responsible to apply for and obtain all necessary permits, fees and inspections required by any public authority having jurisdiction. Refer to General Conditions for additional information.

1.16 DEFINITIONS

- A. "Furnish: Means to supply and deliver to the project site, ready for unloading, unpacking, assembly, installation and similar operations.
- B. "Install": Describes operations at project site including actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations.
- C. "Provide": Means to furnish and Install, complete and ready for intended use.

2 PRODUCTS

2.01 MATERIAL

- A. All materials and products used for construction shall be new, of the best grade, and latest products as listed in printed catalog data. All articles of a kind shall be the standard product of a single manufacturer. Trade names and manufacturers names denote a character and quality of equipment desired and shall no be construed as limiting competition.
- B. Asbestos: Do not use products made of or containing asbestos.

2.02 QUALITY ASSURANCE

- A. Refer to Section 01640 Material and Equipment for information regarding available alternatives to materials and equipment specified herein. Product listings are for informational purposes only and establish a general standard of quality.
- B. Provide products which are compatible with other portions of the work and provide products with the proper and correct power and fuel burner characteristics and similar adaptations for the project.

2.03 INSPECTION

- A. All work and materials are subject to field observation at any and all times by the Owner's Representative.
- B. The Contractor shall notify the Owner's Representative a minimum of two days prior to testing any piping system which must be witnessed and accepted before it is covered up or enclosed.
- C. If an observer finds any material or work not conforming to these Specifications, within three days after being notified, remove the materials from the premises and replace with approved materials. If the material has been installed, the entire expense of removing and replacing shall be borne of the Contractor.

3 EXECUTION

3.01 EQUIPMENT PROTECTION

- A. Keep pipe, ductwork and conduit openings closed by means of plugs or caps to prevent the entrance of foreign matter. Protect piping, conduit, ductwork, fixtures, equipment, and apparatus against dirty water, chemical or mechanical damage both before and after installation. Restore damaged or contaminated fixtures, equipment or apparatus to original conditions or replace at no cost to the Owner.
- B. Mechanical equipment run during construction for any purpose must be protected from contaminating the duct work.
- C. Protect bright finished shafts, bearing housings, and similar items until in service. No rust will be permitted.
- D. Cover or otherwise suitably protect equipment and materials stored on the job site.

3.02 CLEANING

- A. General: Clean mechanical and plumbing equipment, fixtures, piping and ductwork of stampings and markings (except those required by codes), iron cuttings, and other refuse.
- B. Painted Surfaces: Clean scratched or marred painted surfaces of rust or other foreign mater and paint with matching color industrial enamel, except as otherwise noted.

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C. Before operating any equipment or systems, make thorough check to determine that systems have been flushed and cleaned as required and equipment has been properly installed, lubricated, and serviced. Check factory instructions to see that installations have been made accordingly and that recommended lubricants have been used.

D. Use particular care in lubricating bearings to avoid damage by over-lubrication and blowing out seals. Check equipment for damage that may have occurred during shipment, after delivery or during installation. Repair damaged equipment as approved or replace with new equipment.

3.03 LAYOUT AND COORDINATION

- A. Site Examination: Before starting work, carefully examine site and all contract Drawings so as to become thoroughly familiar with conditions governing work on this project. Verify all indicated elevations, building measurements, roughing-in dimensions, and equipment locations before proceeding with any of the work.
- B. The existence of any wires, conduits, pipes, ducts or other service facilities are shown in a general way only. It will be the duty of the Contractor to visit the site and make exact determination of the existence of any such facilities prior to submitting a bid. It is understood that the Contractor will be responsible for making the exact determination of the location and condition of these facilities.
- C. The location of all utilities indicated on the plans is taken from existing public records. The exact location and elevation of all public utilities must be determined by the Contractor It shall be the duty of the Contractor to ascertain whether any additional facilities other than those shown may be present.
- D. Sleeves, Insets, Cast-in-Place Work: provide sleeves, inserts, anchoring devices, cast-in-place work, etc. which must be set in concrete sequenced at the proper time for the project schedule.

E. Coordination:

- 1. Where the work must be sequenced and positioned with precision in order to fit into the available space, prepare accurate scale shop drawings showing the actual physical dimensions required for the installation and submit prior to purchase-fabrication-installation of any of the elements involved in the coordination.
- 2. Cooperate with other trades in furnishing material and information for sleeves, bucks, chases, mountings, backing, foundations, and wiring required for installation of mechanical items.
- Coordinate all work with other trades and determine in advance where interfacing of the mechanical work and other work are required to be connected together. Provide all materials and equipment to make those connections. Submit shop drawings showing required connections where special conditions exist.

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F. Discrepancies: Report immediately any error, conflict or discrepancy in Plans, Specifications and/or existing conditions. Do not proceed with any questionable items of work until clarification of same has been made. Should rearrangement or re-routing of ducts or piping be necessary, provide for approval the simplest layout possible for that particular portion of the work.

3.04 TEMPORARY FACILITIES AND CONTROLS

- A. Comply with Division 1 requirements.
- B. Permanent mechanical systems' equipment utilized for temporary heating, ventilating, and cooling shall be started with all controls and safeties installed and operational. Start-up shall be done by a factory approved mechanic only.
- C. Owner's warranties shall not be abridged by Contractor's use of the permanent systems' equipment prior to final acceptance. Warranty period shall begin at final completion.

3.05 MECHANICAL WORK CLOSEOUT

- General: Refer to the Division 1 sections for general closeout requirements. A. Calibrate all equipment requiring same.
- В. Record Drawings: Submit record set of drawings required in Division 1, Submittals and as previously specified in this Section.
- C. Closeout Equipment/Systems Operations: Sequence operations properly so that work of project will not be damaged or endangered. Coordinate with seasonal requirements. Operate each item of equipment and each system in a test run of appropriate duration with the Architect present, and with the Owner's operating personnel present, to demonstrate sustained, satisfactory performance. Adjust and correct operations as required for proper performance. Clean and lubricate each system, and replace dirty filters, excessively worn parts and similar expendable items of the work.
- D. Operation and Instruction: Provide four (4) hours of on-site training to Owner's personnel on all mechanical systems and equipment. Training shall include maintenance, lubrication, troubleshooting and repair. Contractor shall provide necessary digital manuals and training aides explaining operational diagrams, emergency and alarm provisions, sequencing requirements, seasonal provisions, security, safety, and similar features of the installed system. Manuals shall be left with Owner at end of training.

END OF SECTION

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1 GENERAL

1.01 SECTION INCLUDES

A. Items common to more than one section of Division 15 and general construction procedures and products. Work described in this Section applies to all Sections of Division 23.

1.02 STORAGE AND HANDLING

A. Deliver materials to the project site with manufacturer's labels intact and legible. Handle materials with care to avoid damage. Store materials inside protected from weather, dirt, and construction dust. Where necessary to store outside, elevate well above grade and enclose with durable, waterproof wrapping. Label equipment as soon as it arrives at job site.

1.03 SUBMITTALS

- A. Submit product data under provisions of Section 23 0000 and Division 1.
- B. Provide submittals for:
 - 1. Motors.
 - 2. Starters.
 - 3. Alarm Panels.
 - 4. Pipe sleeves
 - 5. Escutcheons.
 - 6. Piping and Equipment Identification.
 - 7. Valve Schedule.
 - 8. Variable Frequency Drives

2 PRODUCTS

2.01 QUALITY ASSURANCE

- A. Refer to Division 1 Material and Equipment for information regarding available alternatives to materials and equipment specified herein. Product listings are for informational purposes only and establish a general standard of quality.
- B. Provide products which are compatible with other portions of the work and provide products with the proper and correct power and fuel burner characteristics and similar adaptations for the project.

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2.02 MATERIALS

A. All materials and products used for construction shall be new, of the best grade, and the latest products as listed in printed catalog data.

- B. All articles of a kind shall be the standard product of a single manufacturer.
- C. Provide products which are compatible with other portions of the work and products which have the proper electrical power and fuel-burning characteristics for this project.
- D. Trade names and manufacturers names denote the character and quality of equipment desired and shall not be construed as limiting competition.

2.03 ELECTRIC MOTORS

- A. Enclosure Type: Open drip-proof for normal concealed indoor use, guarded were exposed to employees or occupants. Type II for outdoor use, except weather-protected Type I where adequately housed.
- B. Bearings: Ball or roller bearings, and design for thrust where applicable; permanent or pressure lubricated anti-friction. Sleeve-type bearings permitted only were indicated for light-duty fractional horsepower motors.
- C. Construction: General purpose, continuous duty; NEMA design "B", except "C" for high starting torque applications.
- D. Frames: For single phase motor sizes NEMA No. 48, except 56 for heavy-duty applications. NEMA "T" frames for 1 horsepower and larger polyphase motors.
- E. Phases and Current: 1/3 horsepower and smaller capacitor-start single-phase; ½ horsepower and larger, squirrel-cage induction polyphase. Coordinate with actual current characteristics; specified in Division 16 and do not use 230/460 voltage motors on 208 voltage power or vise versa.
- F. Service Factor: 1.35 for single-phase; 1.15 for polyphase.
- G. Overload Protection: Built-in thermal with internal sensing device for stopping motor, and for signaling where indicated on single phase motors.
- H. Speed: Not faster than synchronous speeds of 1800 RPM except where otherwise indicated.
- I. Temperature Rating: Class B insulation, except where otherwise indicated or required for service indicated.
- J. Starting Capability: As required for service indicated, but not less than 5 starts per hour.

K. Efficiency: The manufacturer's highest efficiency motors tested under procedures recommended by NEMA Premium (IEEE Standard 112, Test Method B). Minimum 84% efficiency at 3 HP increasing to 90% above 15 HP. Submit manufacturer's data if motor nameplate does not indicate minimum efficiency.

- L. Manufacturers: Century, General Electric, Lincoln, Louis Allis, Baldor, Wagner, Westinghouse, or accepted substitute. Where selection of motor manufacturer is within Contractor's control (independent of mechanical equipment selection), provide motors produced by a single manufacturer.
- M. VFD duty: Provide inverter type with shaft grounding rings.

2.04 STARTERS AND SWITCHES

- A. General: Provide each motor with starter or switch as approved and recommended by manufacturer of motor or equipment of which motor is a part.
- B. Magnetic Starters: Provide for ½ horsepower and larger motors, and for smaller motors on automatic control or with interlock switch. Include pilot lights, reset, trip-free relay on each phase, Hand-Off-Auto switch in cover, and devices for coordination with control system (including transformer for control circuit, verify holding coil voltage requirements with control system design). Provide automatic ambient temperature compensation for starter heaters.
- C. Manual Switches: Provide on motors 1/3 horsepower and smaller except where automatic control or interlock is indicated. Include pilot light. Provide overload protection where not protected by panel board circuit breaker or fused disconnect switch.
- D. Starter Characteristics: Type I general purpose enclosure with padlock ears and mounting supports. Starter type and size as recommended by motor manufacturer.
- E. Manufacturers: General Electric, ITE, Allen Bradley, Cutler-Hammer, Square D or accepted substitute.

2.05 ELECTRICAL EQUIPMENT

- A. Equipment Wiring: Interconnecting wiring within or on a piece of mechanical equipment shall be provided with the equipment unless required otherwise. Provide all necessary field wiring and devices from the point of connection indicated on the electrical drawings to each equipment item.
- B. Control Wiring: All control wiring for mechanical equipment shall be provided under Section 23 0923 or 23 0933, Controls, and Instrumentation.
- C. Codes: All electrical equipment and products shall bear the U.L. and/or C.S.A. label as required by governing codes and ordinances. Refer to paragraph 1.3, Quality Assurance for definition of testing agency certification requirements.

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2.06 DRIVES

A. General: "V" section belt drives, multiple as required, sized on 1.5 times installed motor horsepower. Provide variable pitch motor sheaves on all one or two belt drives and standard slide rails or approved means of adjustment for each motor with belt drive. Use standard section belts and no sheave smaller than cataloged industry standard; provide countersunk center on shaft ends to receive speed counter tip.

B. Manufacturers: Dayton, Gates, Browning, or accepted substitute.

2.07 MACHINERY GUARDS

- A. Furnish guards for protection on all rotating and moving parts of equipment. Provide guards for all metal fan drives and motor pulleys, regardless of being enclosed in a metal cabinet.
- B. Design guards so as not to restrict air flow at fan inlets resulting in reduced capacity.
- C. Provide 2-1/2 inches diameter access opening holes in guards for easy use of tachometers at pulley centers. Guards shall be easily removable for pulley adjustment or removal and changing of belts.
- D. All guards shall meet OSHA requirements including back plates.

2.08 ACCESS PANELS

- A. Access panels shall have same fire rating as surface where mounted.
- B. Provide flush key cylinder locks on all access panels less than 8 feet above the floor in public spaces. Turn keys over to Owner at project completion. Screwdriver latches on all others.
- C. Steel, 24" x 24" or as required. Complete with steel frame, hinged locating door, and prime coat finish. Type to match building construction.
- D. Manufacturers: INRYCO/MILCOR Style DW, K or M panels as required by construction. Bilco, Potter-Roemer or accepted substitute.

2.09 PIPE SLEEVES

- A. Interior Wall Sleeves: 12 gage galvanized steel, flush with wall on both sides.
- B. Interior Floor Sleeves: 12 gage galvanized steel and extend 2-inches above finished floor.
- C. Exterior Wall Sleeves: Cast iron, flush with wall on both sides.
- D. On Grade Floor Sleeves: Same as exterior wall sleeves.

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2.10 ESCUTCHEONS

A. Brass material, chrome plated finish. Size sufficient to cover all pipe openings through wall, floor, or ceiling. Set screw or spring to secure to pipe.

2.11 UNIONS

- A. Steel pipe union shall be 150-pound malleable iron, brass to iron seat, ground joint, black, or galvanized to match pipe.
- B. Copper pipe union shall be 200 psig working pressure. Bronze body. Solder ends.
- C. Insulating unions shall be 250 psig working pressure. Pipe ends and material to match piping. Electric current below 1% of galvanic current. Gasket material as recommended by manufacturer. Epco or approved.

2.12 ROOF FLASHING

A. Use flashing products specifically designed for and compatible with metal roofing system used.

2.13 MISCELLANEOUS STEEL

A. Provide steel as required for adequate support of all mechanical equipment, angle or channel, I or H sections as required by application. Provide suitable base plates for stands and anchors for hanging equipment. Drill support holes only in flanges of structural center of length as possible. Apply on coat of black rust inhibitive enamel primer to shop fabricated items before delivery to job; other painting as specified herein. Provide shop drawings of supports especially constructed for this project. Burning of holes is not permitted.

2.14 PAINTING

A. Apply one coat of black rustoleum primer to shop fabricated items before delivery to job. Other painting as specified herein.

2.15 IDENTIFICATION MARKERS

A. Pipe Markers:

- 1. Adhesive pipe markers of width, letter size and background color conforming to ANSI A13.1.
- 2. Acceptable Manufacturers: Brady B350 with banding tape. Seaton, Zeston, Porter or accepted substitute.

B. Nameplates:

- 1. Engraved nameplates, 1/16 inches thick, laminated 3-ply plastic, center ply white, outer ply black, letters formed by exposing center ply.
- 2. Size: 3 inches by 5 inches nameplates with 1/4-inch high letters.

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3. Manufacturers: Lamicoid. Seaton, Brady, Zeston or accepted substitute.

C. Valve Tags:

- 1. 1-1/2 inches diameter, 18-gauge polished brass tags with 3/16-inch chain hole and 1/4 inch high stamped, black-filled service designation.
- 2. Manufacturers: Seaton Style 250-BL, Brady, Zeston or accepted substitute.

D. Lettering and Graphics:

- 1. Coordinate names, abbreviations and other designations used in mechanical identification work with designations shown or scheduled. Provide numbers, lettering and wording as indicated for identification of mechanical systems and equipment.
- Multiple Systems: Where multiple systems of same name are shown 2. provide identification which indicates individual equipment number as well as service (examples: Chiller (CH) No. 1, Chiller (CH) No. 2, Air Conditioning Unit No. 1 (AC) No. 1, Air Conditioning Unit (AC) No. 2.)

2.16 VALVE SCHEDULES

Schedules: Valve schedule for each piping system, typewritten and reproduced on 8-A. 1/2 by 11-inch paper. Indicate valve number, piping system, location of valve (room or space) and normal setting (open, closed, etc.). Mark valves which are intended for emergency shutoff and similar uses by special notation. In addition to mounted copies, furnish five (5) extra copies for maintenance manuals.

2.17 CONCRETE FOR MECHANICAL WORK

Provide strength classes per Building Code. A.

2.18 VARIABLE-FREQUENCY MOTOR CONTROLLERS

- A. All field installed drives should be ABB ACH drives or approved equal.
- B. Acceptable Manufacturers: Allen Bradley, Robicon, ABB, Trane, Yasakawa, Siemens, Emerson Industrial Automation, or approved equal.

C. General Description:

- 1. AC motor variable frequency controller (VFC) shall be of pulse width modulated (PWM) inverter type. The VFC shall be designed to convert 60 Hz input power to adjustable frequency output power to provide positive speed control to standard induction motors. The VFC shall be dedicated variable torque design for specific use with centrifugal loads.
- 2. Provide complete solid state variable frequency power and logic unit.

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- 3. Frequency control shall be stepless throughout the range under variable torque load on a continuous basis. Frequency controlled by remote building energy management systems providing 4-20MA input signal to drive and remote start/stop signal. Coordinate with other work of Division 23.
- 4. Provide adjustable frequency control with diode bridge/capacity input designed to provide high, constant power factor of 0.95 regardless of load or speed and eliminate SCR line noise.
- 5. Each VFD shall contribute no more than 5 percent total harmonic voltage distortion at the VFD input terminals while operating under full-load conditions. If proposed VFD equipment is anticipated to exceed these limits, multi-pulse converters and/or harmonic filtering devices shall be provided.
- 6. Equipment shall be designed and manufactured in accordance with applicable NEMA and IEEE recommendations and be designed for installation in accordance with NEC. Equipment shall have UL and/or CSA approval.
- 7. Control shall be suitable for operation in ambient temperature of 0 to 40°C.
- 8. Every VFD shall be factory tested with an AC induction motor 100 percent loaded and temperature cycles within an environmental chamber at 104°F.
- D. Self-Protection and Reliability Features:
 - 1. Adjustable current limit from 60 to 110 percent of drive rating
 - 2. Adjustable instantaneous over current trip.
 - 3. Under voltage trip.
 - 4. Over temperature trip.
 - 5. Short circuit protection phase to phase and phase to ground faults phase rotation insensitive.
 - 6. Momentary power loss, more than 17 milliseconds.
 - 7. Transient protection against all normal transients and surges in incoming power line.
 - 8. Orderly shutdown in event of any above conditions, drive shall be designed to shut down safely without component failure.
 - 9. Provide visual indication and manual reset.
- E. Standard Features:

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1. Drive logic shall be microprocessor based. Control logic shall be isolated from power circuitry.

- 2. Standalone operation to facilitate startup and troubleshooting procedures.
- 3. VFD shall have a lockable circuit breaker disconnect and be UL 508c listed for use on distribution systems with 22,000 AIC.
- 4. Door interlock protection which shall be defeatable by qualified personnel to troubleshoot during operation as required.
- 5. Input power 460V 60Hz, 3-phase output voltages shall be equal to applied input voltage.
- 6. Isolated signal inputs.
- 7. Frequency Stability: Output frequency shall be held to +0.1 percent of maximum frequency regardless of load, +10 percent input voltage change or temperature changes within ambient specification.
- 8. Built-in digital display located in panel face shall indicate output frequency, voltage and current and shall provide indication of over current, over voltage, current limit, ground fault, over temperature, input power on, minimum or maximum speed adjustment, power on, and fault condition.
- 9. Start/Stop Control: Controlled decelerated stop.
- 10. Primary and secondary fused for a control circuit transformer.
- 11. Minimum and maximum speed control.
- 12. Adjustable Accel/Decel: Independently adjustable 10-100 second.
- 13. Hands-off auto switches.
- 14. Programmable auto restart after power outage.
- 15. Fused disconnects shall include auxiliary contacts to isolate control circuit when disconnect is in "off" position.
- 16. Remote contacts for fault, and on/off status.
- 17. Adjustable motor output voltage.
- 18. Analog output voltage of 0-10 VDC, 4-20MA proportional to control output frequency.
- 19. RS232 communications port, and programming software capability.
- 20. Bacnet MSTP
- F. Additional Features:

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- 1. NEMA 1 enclosure shall isolate each motor starter and control section with its associated disconnect switch.
- 2. Manual speed control for each motor.
- 3. Manual bypass shall provide ability to service control while motor is operational.
- 4. Provide radio frequency and electromagnetic interference noise suppression network to limit radio frequency and electromagnetic interference.
- 5. Provide isolated analog output signals for volts, amps, and frequency, from each VFD for connection to the building energy management system.
- 6. Provide line (input) reactors.
- 7. Provide output filters for all VFD's located more than 150 conductor feet from the motor they serve.
- 8. VFD shall be designed to catch a spinning load in forward and reverse direction.
- 9. Harmonic calculations shall be performed on a manufacturer-supplied harmonic analysis program for conformance with IEEE 519.

3 EXECUTION

3.01 ACCESS PANELS

A. Furnish and install access panels required for mechanical work. Access panels shall have same fire ratings as surface where mounted. Furnish panels of adequate size for valves and equipment requiring service and installed above ceilings, behind walls or in furring, complete with correct frame for type of building construction involved. Exact size, number and location of access panels are not necessarily shown. Use no panel smaller than 12 inches by 12 inches for simple manual access or smaller than 16 inches by 20 inches where personnel must pass through. Paint with color and finish to match surrounding architectural features, where exposed.

3.02 PIPE SLEEVES

- A. Sleeves: Large enough in diameter to provide ¼-inch clearance around pipes or insulation. Caulk with watertight rated, UL listed foam-in-place barrier.
- B. Layout: Lay out work in advance of pouring of slabs or construction of wall, and furnish and set inserts and sleeves necessary to complete the work.
- C. Coordination: Cutting or patching required as a result of lack of coordination of this operation shall be at no change in contract amount.

3.03 FLOOR, WALL, AND CEILING ESCUTCHEONS

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A. Install on piping passing through finished walls, floors, ceilings, partitions, and plaster furrings. Escutcheons shall completely cover opening around pipe.

- B. Secure wall and ceiling escutcheons to pipe or structure.
- C. Escutcheons shall not penetrate insulation vapor barriers.
- D. Escutcheons not required in mechanical rooms or unfinished spaces.

3.04 MECHANICAL EQUIPMENT WIRING

- A. Provide all mechanical equipment motors, automatic temperature, limit, float and similar control devices required, with wiring complete from power source indicated on Electrical Drawings.
- B. Provide properly rated motor overload and under voltage protection and all manual or automatic motor operating devices for all mechanical equipment.
- C. Equipment and systems shown on the Drawings and/or specified, are based upon requirements of specific manufacturers which are intended as somewhat typical of several makes which may be approved. Provide all field wiring and/or devices necessary for a complete and operable system including controls for the actual selected equipment/system.
- D. Provide all starters for mechanical motors. Review Electrical Specifications and Drawings to determine which mechanical motor starters will be provided under the Electrical Specification Sections and provide all others.

3.05 PAINTING

- A. General: Coordinate painting of mechanical equipment and items with products and methods specified under Section 09900, Painting.
- B. Painting Materials: material shall comply with Section 09900, Painting.
- C. Uninsulated Piping: Paint black or galvanized uninsulated piping located buried in ground, in concrete or masonry one (1) coat acid-resisting black paint. Paint black or galvanized uninsulated piping in moist equipment rooms, crawl spaces without vapor barriers or exposed to weather one (1) coat black asphaltum varnish.
- D. Iron Work: Paint hangers, rods, anchors, guides, threads of galvanized pipe, bases, supports, uncoated sheet metal and other iron work without factory finish, exposed to weather, located in moist concealed spaces and moist equipment rooms one coat acid-resisting black paint. Apply one (1) coat Dixon's Aluminum Graphite No. 209 paint over the (1) coat primer as recommended by paint manufacturer to all hot metal surfaces.
- E. Sheet Metal: Apply one coat of zinc chromate to mechanical sheet metal exposed to weather, except no painting required on aluminum or stainless steel. Apply one coat of flat black paint to the inside of unlined ducts behind all grilles and registers.

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F. Insulated Piping and Other Insulated Surfaces: Paint insulated piping in half-round, split tile, or other inaccessible locations, one (1) coat asphalt emulsion.

3.06 MECHANICAL SYSTEM IDENTIFICATION

- A. Piping System: Indicate each pipe system by its generic name (abbreviated) as shown; except vent and drainage piping. Comply with ANSI A13.1 for marker locations, letter sizes, and colors. Include arrows to show direction of flow and "Electric Traced" signs to identify heat cable wrapped piping.
- B. Valve Identification: Tag all valves with brass disc and chain. Prepare valve charts indicating valve number, size, location, function and normal position. Use no duplicate numbers in Plumbing and Heating systems. Mount glazed frames containing one set of valve charts in the building as directed.
- C. Each new piece of equipment shall bear a permanently attached identification plate, listing the manufacturer's name, capacities, sizes and characteristics. In addition to the manufacturer's identification plate, provide nameplates of black phenolic resin laminate and identify new equipment by name and number ½" high letters.
- D. Mount valve schedule(s) as directed by Architect or Owner.

3.07 ACCESSIBILITY

- A. Locate valves, thermometers, cleanout fittings and other indicating equipment or specialties requiring frequent reading, adjustments, inspection, repairs and removal or replacement conveniently and accessibly with reference to the finished building.
- B. Thermometers and Gages: Install thermometers and gages so as to be easily read from the floors, platforms and walkways.

3.08 INSTALLATION

- A. Locating and Positioning Equipment: Comply with all Codes, Regulations and observe good common practice in locating and installing mechanical equipment and material so that completed installation presents the least possible hazard. Maintain adequate clearances for repair, service and operation to all equipment and comply with Code requirements. Set all equipment level or as recommended by manufacturer.
- B. Arrangement: Arrange ductwork and piping parallel with primary lines of the building construction, and with a minimum of 7' overhead clearance in all areas where possible. Conceal all piping and ductwork. Locate operating and control equipment properly to provide easy access. Give right-of-way to piping which must slope for drainage. Set all equipment level as recommended by manufacturer. Under no conditions shall beams, girders, footings or columns be cut for mechanical items. Casting of pipes into concrete is prohibited unless so shown on Drawings.
- C. Anchorage: Anchor and/or brace all mechanical equipment, piping and ductwork to resist displacement due to seismic action, include snubbers on equipment mounted on spring isolators.

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D. Drip Pans: Provide drip pans under all above ceiling in-line pumps and cooling coils. Locate pan immediately below piping and equipment and extend a minimum of 6 inches on each side and lengthwise 18 inches beyond equipment being protected. Fabricate pans 2 inches deep, or reinforced sheet metal (20 gauge copper, or 16 gauge steel with 2 ounces zinc finish hot dipped after fabrication) with rolled edges and soldered or welded seams. Provide 3/4 inch copper drainage piping, properly discharged to over floor drain or as shown on the Drawings. Comply with Mechanical Code overflow protection and pipe sizing.

- E. Adjusting: Adjust and calibrate all automatic mechanical equipment, mixing valves, flush valves, float devices, etc. Adjust flow rates at each piece of equipment or fixture.
- F. Building Vapor Barrier: Wherever the building insulation vapor barrier is penetrated by mechanical piping, hangers, conduits, ductwork, etc., provide clear self-adhesive tape recommended by the insulation manufacturer around the penetrations.

3.09 SYSTEM ADJUSTMENT

Adjust and calibrate all automatic mechanical equipment, mixing valves, float A. devices, etc. Adjust flow rates at each piece of equipment or fixture. Open and close all shutoff and control valves several times to insure tight glands.

3.10 CUTTING AND PATCHING

General: Comply with the requirements of Division 1 for the cutting and patching of A. other work to accommodate the installation of mechanical work. Do all necessary cutting and patching of existing yard surfaces required for completion of the mechanical work. Patch to match finish and color of adjacent surfaces.

END OF SECTION

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1 GENERAL

1.01 WORK INCLUDED

A. Provide all pipe, piping fittings and all related components required for complete piping system. Refer to each specification section for each system for pipe application.

1.02 REFERENCES

- A. ANSI/ASME Sec. 9 Welding and Brazing Qualifications.
- B. ANSI/ASTM B32 Solder Metal.
- C. ANSI/AWS D1.1 Structural Welding Code.
- D. ASME Boiler and Pressure Vessel Code.
- E. ASTM A53 Pipe, Steel, Black and Hot-Dipped Zinc Coated, Welded and Seamless.
- F. ASTM A120 Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized), Welded and Seamless, for Ordinary Uses.
- G. ASTM F477 Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
- H. AWS A5.8 Brazing Filler Metal.
- I. AWWA C601 Standard Methods for the Examination of Water and Wastewater.

1.03 QUALITY ASSURANCE

- A. Conform to ANSI/ASME B31.9 for pressurized system as well as all applicable codes.
- B. Welding Materials and Procedures: Conform to ASME Code and applicable state labor regulations.
- C. Welders Certification: In accordance with ANSI/ASME Sec 9. and ANSI/AWS D1.1.

1.04 SUBMITTALS

- A. Submit product data under provisions of Section 23 0000 and Division 1.
- B. Include data on pipe materials, pipe fittings and accessories.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site under provisions of Section 23 0000.

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B. Store and protect products under provisions of Section 23 0000 and provide factory applied end caps each length of pipe and tubes to prevent damage to pipe-ends and eliminate dirt and moisture from inside of pipes and tubes.

2 PRODUCTS

2.01 NATURAL GAS PIPING AND COMPRESSED AIR PIPING, ABOVE GRADE

A. Above Grade:

1. Steel Pipe: ASTM A53 or A120, Schedule 40 black. Fittings: ANSI/ASME B16.3, malleable iron, or ASTM A234, forged steel welding type. Joints: Screwed for pipe two inches and under; ANSI/AWS D1.1, welded, for pipe over two inches.

B. Below Grade (Natural Gas Only):

- 1. Polyethylene Pipe: PE pipe, supplied under this specification shall conform to the current edition of the specification for <u>Thermoplastic Gas Pressure Pipe, Tubing and Fittings (ASTM D2513)</u>. The PE plastic compound shall be either Phillips TR-418 or Plexco P24BC and shall meet the requirements of Type II, Class B, Category 3, Grade P24, in ASTM D-1248 <u>"Standard Specification for Polyethylene Plastics Molding and Extrusion Materials:</u>
- 2. Marking: Pipe and tubing furnished under this specification shall be marked in accordance with the current edition of the Specification for Thermoplastic Gas Pressure Pipe, Tubing and Fittings (ASTM D2513).
- 3. The following information shall be included:
 - a. Manufacturer
 - b. Type of Pipe or Type of Tubing
 - c. Nominal Size (e.g. 1-1/4", 2" etc.) or OD
 - d. Wall Thickness or SDR
 - e. Code No. Identifying Month of Production and Resin
 - f. The words "Gas Pipe or "Gas Tubing"
 - g. A code system which can be used to identify the above information in the records may be used.
- C. Coiling: PE Pipe and tubing shall be furnished in coils. The amount of footage per coil shall be as specified below unless otherwise specified on the purchase order. Each coil shall consist of a single length of pipe. Joints shall not be permitted. 4" IPS, and 6" IPS PE pipe shall be furnished in straight lengths 40 feet long. A straight length shall consist of a single length of pipe. Joints will not be permitted.

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D. Fittings: ASTM D2513 socket type. Joints: fusion welded. Provide minimum 14 gauge single strand, copper wire with orange color insulating coating.

2.02 HEATING WATER AND CHILLED WATER PIPING, ABOVE GROUND

- Steel Pipe: ASTM A53 or A120, Schedule 40, black. Fittings: ANSI/ASTM B16.3, A. malleable iron or ASTM A234, forged steel welding type fittings. Joints: Screwed for pipe 2 inches and under, or ANSI/AWS D1.1, welded for pipe over 2 inches.
- B. Copper Tubing: ASTM B88, Type L, hard drawn. Fittings: ANSI/ASTM B16.22 cast brass or ANSI/ASME B16.29 solder wrought copper. Joints: ASTM B32, Grade 95TA or ANSI/AWS A5.8, BCuP silver braze. Brazed for pipe 2 inches and over, soldered for pipe under 2 inches.
- C. At contractor's option with no additional cost to owner: for sizes larger than 3 inch, cut grooved black steel pipe with Victaulic style 77 couplings with grade "E" gaskets and appropriate fittings. Type "L" copper Victaulic approved as optional material.

EQUIPMENT AND COOLING COIL DRAINS AND OVERFLOWS 2.03

A. Copper Tubing: ASTM B88, Type L, hard drawn. Fittings: ANSI/ASTM B16.22, cast brass, or ANSI/ASME B16.29 solder wrought copper. Joints: ASTM B32, solder, Grade 95TA or ANSI/AWS A5.8, BCuP silver braze.

2.04 MISCELLANEOUS PIPING MATERIAL

- Welding Materials: Provide welding materials as determined by the installer to A. comply with installation requirements. Comply with Section 2-C, ASME Boiler Code for welding materials.
- Soldering and Brazing Materials: Provide soldering materials as determined by the B. installer to comply with installation requirements.
 - 1. Tin-Antimony Solder: ASTM B32, Grade 95TA.
 - 2. Lead-Free Solder: ASTM B32, Grade HB. Harris "Bridgit" approved.
 - 3. Silver Solder: ASTM B32, Grade 96.5TS.
- C. Gaskets for Flanged Joints: ANSI B16.21; full-faced for cast-iron flanges; raisedface for steel flanges. Pressure and temperature rating required for the service indicated.
- D. Sleeve Seal: Rubber-link pipe wall and casing closure. Thunderline Link-Seal. For fire rated wall, floor or ceiling penetrations, 3-M "CP-25" caulk, "No. 303" putty and/or "PSS 7904" sealing system.
- E. Tracer Wire: 14 gauge, single strand, copper wire with blue insulation for water, green for sanitary and storm sewers, and orange for gas. 3M "DBY" direct bury splice kit required at all splices.

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2.05 FLANGES, UNIONS, AND COUPLINGS

- A. Pipe Size 2 Inches and Under: 150 psig malleable iron unions for threaded ferrous piping; bronze unions for copper pipe, soldered joints.
- B. Pipe Size Over 2 Inches: 150 psig forged steel slip-on flanges for ferrous piping; bronze flanges for copper piping; neoprene gaskets for gas service; 1/16 inch thick performed neoprene bonded to asbestos.
- C. Grooved and Shouldered Pipe End Couplings: Malleable iron housing clamps to engage and lock, designed to permit some angular deflection, contraction, and expansion; "C" shape composition sealing gasket; steel bolts, nuts, and washers; galvanized couplings for galvanized pipe.
- D. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier. Victaulic "Clear Flow", Epco or accepted substitute.

2.06 PIPE SLEEVES

A. Minimum 20 gauge galvanized steel in concrete, 18 gauge in all other construction. Provide ½-inch clearance around pipe or insulation. Provide UL approved fire-rated assemblies/caulking. 3M or accepted substitute.

2.07 ESCUTCHEONS

A. Brass material, chrome plated finish. Size to cover all pipe openings through wall, floor, or ceiling. Set screw or spring to secure pipe. Coordinate all opening sizes.

2.08 GLYCOL

A. Inhibited propylene glycol.

2.09 HEAT TRACE

- A. Provide UL or CSA certified, self regulating, pipe heat trace heating cable on all outside pipe exposed to outside air temperature. Provide outside air thermostat control of heat trace that turns heat trace on, only when outside temperature is below 40°F. Submit schedule for each pipe indicating pipe size, insulation thickness, heat trace watt per foot and wrapping pitch (inches of lineal pipe for complete wrap of heat trace), based on 50°F pipe temperature and 0°F outside air temperature.
- B. Acceptable Manufacturers: Raychem, Chromalox, or accepted substitute.

2.10 GENERATOR EXHAUST PIPING

A. Steel Pipe: ASTM A53 or A120, Schedule 40, black. Fittings: ANSI/ASTM B16.3, malleable iron, or ASTM A234, forged steel welding type fittings. Joints: welded.

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3 EXECUTION

3.01 PREPARATION

- A. Ream pipe and tube ends. Remove burrs or bevel plain end ferrous pipe.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.02 INSTALLATION

- A. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
- B. Route piping in orderly manner, maintain gradient and conceal all piping unless otherwise indicated.
- C. Install piping to conserve building space, not to interfere with use of space or access panels and parallel with walls.
- D. Group piping whenever practical at common elevations.
- E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Provide loops, swing joints, pinchers, runouts and spring pieces to prevent damage to piping or equipment.
- F. Provide clearance for installation of insulation and access to valves and fittings.
- G. Where piping is installed in the exterior building envelope or in any component of the exterior building envelope it shall be located on the warm building interior side of the building envelope insulation.
- H. Slope water piping and arrange to drain at low points and provide drain valve.
- I. Establish elevations of buried water piping outside the building to ensure not less than 3 feet of cover.
- J. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- K. Prepare pipe, fittings, supports, and accessories not prefinished, ready for finish painting. Refer to Section 23 0500.
- L. Establish invert elevations, slopes for drainage to 1/4 inch per foot minimum. Maintain gradients.
- M. Pitch vent piping at 1/4 inch per 10 feet minimum.
- N. Establish elevations of all heating and cooling piping to ensure minimum of 1 inch pitch for every 40 feet to low point drip or drains.

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O. Unions and Flanges: At all equipment to permit dismantling and elsewhere as consistent with good installation practice.

- P. Tracer Wire: Provide tracer wire as close to underground non-metallic water, sanitary and storm sewers, and gas pipe in the trench as possible. Tracer wire shall be accessible at grade via all services, valve and meter boxes, curb cocks, cleanouts at the building, manholes (inside the cover near the top), etc. Locate all points on the record as-installed drawings. Splice into utility tracer system where available. Comply with code requirements.
- Q. Corrosion Control Underground Steel Piping Corrosion Protection: Factory wrap all uninsulated underground steel piping systems with protective coating composed of a coal-tar saturated wrapping tape over a 20 mil thick coal-tar epoxy coating. Wrap joints with a minimum of ½ width of wrap. Extend wrap not less than 4-inches above grade.
- R. Pipe Sleeves: Lay out work in advance of pouring concrete and furnish and set sleeves necessary to complete work.
 - 1. Floor Sleeves: Provide sleeves on pipes passing through concrete construction. Extend sleeve 2-inches above finished floor. Caulk all pipes passing through floor with nonshrinking grout or approved caulking compound. Provide Link-Seal sleeve sealing system for slab on grade. Caulk/seal all piping passing through fire rated building assemblies with UL rated assemblies. Provide fire-rated assemblies per local code requirements.
 - 2. Wall Sleeves: Provide sleeves on pipes passing through concrete or masonry construction. Provide sleeve flush with finished face of wall. Caulk all pipes passing through walls with nonshrinking caulking compound. Caulk/seal all piping passing through fire rated building assemblies with UL rated assemblies. Provide fire-rated assemblies per local code requirements.
- S. Expansion and Flexibility: Install all work with due regard for expansion and contraction to prevent damage to piping, ductwork, equipment, building and its contents. Provide piping offsets, loops, approved type expansion joints, anchors, or other means to control piping movement and to minimize pipe forces.
- T. Escutcheons: Install on all exposed pipes passing through wall or floors and on fixture stops and waste connections to wall.

3.03 EXCAVATION

- A. General: Do not excavate for mechanical work until the work is ready to proceed without delay, to minimize the total time lapse from excavation to completion of backfilling. Comply with all applicable Federal and state safety regulations.
- B. Width: Excavate for piping with 6 inches to 9 inches clearance on both sides of pipe, except where otherwise shown or required for proper installation of pipe joints, fittings, valves, and other work. Excavate for other mechanical work to provide minimum practical but adequate working clearances.

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- C. Depth for Direct Support: For work to be supported directly on undisturbed soil, do not excavate beyond indicated depths, and hand-excavate the bottom cut to accurate elevations. Support the following work on undisturbed soil at the bottom of the excavations:
 - 1. Piping of 5 inches and less pipe/tube size.
 - 2. Cast-in-place concrete.
- D. Depth for Subbase Support: For large piping (6 inches pipe size and larger), tanks and were indicated for other mechanical work, excavate for installation of subbase material in the depth indicated, or, if not otherwise indicated, 6 inches below bottom of work to be supported.
- E. Depth for Unsatisfactory Soil Conditions: Where unsatisfactory soil condition at the bottom of excavation exists, excavate additional depth as directed to reach satisfactory soil-bearing condition. Backfill with subbase material, compacted as directed, to indicated excavation depth.
- F. Excavated Materials: Store excavated material (temporarily) near the excavation, in a manner which will not interfere with or damage the excavation or other work. Do not store under trees (within the drip line). Retain excavated material which complies with the requirements for backfill material. Dispose of excavated material which is either in excess of quantity needed for backfilling or does not comply with requirements for backfill material.

3.04 BASE PREPARATION

A. Subbase Installation: Where indicated, install subbase material to receive mechanical work, and compact by tamping to form a firm base for the work. For 4 inches and larger piping, horizontal cylindrical tanks and similar work, shape and subbase to fit the shape of the bottom 90 degrees of the cylinder, for uniform continuous support. Provide finely-graded subbase material for wrapped, coated and plastic pipe and tank. Shape subbases and bottoms of excavation with recesses to receive pipe bells, flanges connections, valves and similar enlargements in the piping systems and set bottom of trench at proper pitch and correct elevations with subbase material.

3.05 BACKFILLING

A. Do not backfill until installed mechanical work has been tested and accepted wherever testing is indicated. Install drainage fill where indicated and tamp to a uniform firm density. Backfill with finely-graded subbase material to 6 inches above wrapped, coated and plastic piping and tanks, and to center line of other tanks (where recommended by tank manufacturer, use "pea gravel" backfill). Condition backfill material by either drying or adding water uniformly, to whatever extent may be necessary to facilitate compaction to the required densities. Do not backfill with frozen materials.

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3.06 CLEANING

A. General: Clean all dirt and construction dust and debris from all mechanical piping systems and leave in a new condition. Touch up paint where necessary.

- B. Gas Piping: Blow clear of debris with nitrogen or oil free air. Clean all low point strainers and pockets.
- C. Heating and Chilled Water Systems:
 - 1. Use one pound of trisodium phosphate per 50 gallons in the system, or one pound of sodium carbonate for each 30 gallons in the system or one pound of sodium hydroxide (lye) for each 50 gallons in the system.
 - 2. Fill, vent and circulate the system with this solution at design operating temperature. After circulating for four hours, drain and fill with fresh water including glycol.
 - 3. Test for pH and add sufficient amount of the cleaning chemical to obtain a pH between 7 and 8.
 - 4. Clean all strainers and remove start-up strainers (from suction diffusers) after the system has operated for one week.

3.07 TEST

- A. Natural Gas Piping: One half hour minimum air at 60 psig for 2 psig gas, and 15 minutes at 10 psig for 7 inch water gauge natural gas or as approved and certified by serving utility.
- B. Compressed Air Piping: Twenty-four hour, 125 psi with no pressure loss.
- C. Heating and Chilled Water Piping: 75 psig hydrostatic for 30 psig systems without loss for four hours.

END OF SECTION

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1 GENERAL

1.01 WORK INCLUDED

A. Provide pipe and equipment hanger, support, anchors, and all related items for complete systems.

1.02 QUALITY ASSURANCE

- A. Provide pre-manufactured horizontal piping and ductwork hangers, clamps, hanger rod, shields, supports, etc.
- B. Seismic requirements: Provide seismic restraints in accord with the latest edition of "Seismic Restraint Manual Guidelines" as published by SMACNA. Seismic Hazard Level (SHL) of "A". A lower SHL will be allowed provided the contractor provides calculations stamped by a registered professional structural engineering in the state the project is located indicating a lower SHL is acceptable.

1.03 SUBMITTALS

- A. Submit product data under provisions of Section 23 0500.
- B. Submit construction details, and performance characteristics for each type and size of anchor, hanger, and support.

2 PRODUCTS

2.01 HANGERS AND SUPPORTS

- A. Listed Types: The Manufacturers Standardization Society (MSS) Piping Types listed with Grinnell figure numbers in parentheses where applicable (or other manufacturers as noted). ITT Grinnell, Elcen, Michigan, Super Strut, Kindorf, Unistrut or accepted substitute.
- B. Horizontal Piping Hangers and Supports:
 - 1. Adjustable Clevis Hanger: MSS Type 1 (Fig. 260).
 - 2. Adjustable Band Hanger: MSS Type 7 (Fig. 97), fabricated from steel.
 - 3. Adjustable Swivel-Band Hanger: MSS Type 10 (Fig. 70).
 - 4. Clamp: MSS Type 4 (Fig. 212, 216).
 - 5. Double-Bolt Clamp: MSS Type 3 (Fig. 295A, 295H), including pipe spacers.
 - 6. Pipe Anchors: (Carpenter & Peterson Fig. 145CI) Steel weld type to pipe for sizes up to 20 inches in diameter.

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- 7. Single-Roll Support: MSS Type 42 (Fig. 174), including axle-roller and threaded sockets.
- 8. Adjustable Roller Hanger: MSS Type 43 (Fig. 181), including axle-roller and clevis.
- 9. Adjustable Roll/Base: MSS Type 46 Fig. 274), including roller, adjustable base and stand.
- 10. Rollers for Channel Support Systems: Grinnell Fig. 1901, 1902, 1911, 815, or 816 for pipe sizes up to 18 inches in diameter.
- 11. Sliding Support Base: MSS Type 35 (Grinnell 600 series). Base and guide.
- 12. Adjustable Saddle-Support: MSS Type 36 (Fig. 258) and MSS Type 37 (Fig. 259), including saddle, pipe, and reducer. Fabricate base-support from steel pipe and include cast-iron flange or welded-steel plate.

C. Equipment and Piping Supports:

- 1. Channel Support System: Galvanized, 12 gauge channel and bracket support systems, single or double channel as indicated on the Drawings or as required by piping and equipment weights. Grinnell "Power "Strut" channel.
- 2. Steel Brackets: Welded structural steel shapes complying with one of the following:
 - a. Light Duty: MSS Type 31 (Fig. 194).
 - b. Medium Duty: MSS Type 32 (Fig. 195).
 - c. Heavy Duty: MSS Type 33 (Fig. 199).

D. Vertical Pipe Clamps:

- 1. Two-Bolt Riser Clamp: MSS Type 8 (Fig. 261).
- 2. Four-Bolt Riser Clamp: MSS Type 42 include pipe spacers at inner boltholes.

E. Hanger Rod Attachment:

- 1. Hanger Rod: Right hand threaded, (Grinnell Fig. 140 or 146 for all sizes).
- 2. Turnbuckles: MSS Type 13 (Fig. 230).
- 3. Weldless Eye-Nut: MSS Type 17 (Fig. 290).
- 4. Malleable Eye-Socket: MSS Type 16 (Fig. 110R).
- 5. Clevises: MSS Type 14 (Fig. 299).

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F. Building Attachments:

- 1. Concrete Inserts: MSS Type 18 (Fig. 282), steel or Grinnell Power-Strut PS349 continuous channel.
- 2. Clamps: MSS Type 19 (Fig. 285, 281), Type 20, 21 (Fig. 225, 226, 131), Type 23 (Fig. 86, 87,88), Type 25 (Fig. 227), Type 27 through 30 where applicable.

2.02 SADDLES AND SHIELDS

- A. Listed Types: The Manufacturers Standardization Society (MSS) Piping Types listed with Grinnell figure numbers in parentheses where applicable (or other manufacturers as noted).
- B. Protection Saddles: MSS Type 39 (Fig. 160).
- C. Protection Shields: MSS Type 40 (Fig. 167).
- D. Pre-insulated Pipe Supports: Pipe Shields Inc. or accepted substitute.
 - 1. Pipe supported on rods Model A1000, through A4000 and A9000.
 - 2. Pipe supported on flat surfaces Model A1000, A2000, A5000 through A7000.
 - 3. Pipe supported on pipe rolls Model A3000 through A6000 and A8000.

2.03 MISCELLANEOUS HANGER MATERIALS

- A. Metal Framing: Provide products complying with NEMA STD ML 1.
- B. Steel Plates, Shapes and Bars: ASTM A-36.
- C. Cement Grout: Portland Cement (ASTM C-150, Type I or Type III) and clean uniformly graded, natural sand (ASTM C-404, Size No. 2). Mix at a ratio of 1.0 part cement to 3.0 parts sand, by volume with only the minimum amount of water required for placement and hydration.
- D. Heavy Duty Steel Trapezes: Fabricate from steel shapes selected for the loads required; weld steel in accordance with AWS Standards.
- E. Pipe Guides: Provide factory-fabricated guides, of cast semi-steel or heavy fabricated steel, consisting of a bolted two-section outer cylinder and base with a two-section guiding spider bolted tight to the pipe. Size guide and spiders to clear pipe and insulation (if any), and cylinder. Provide guides of the length recommended by the manufacturer to allow indicated travel.
- F. Standard Bolts and Nuts: ASTM A 307, Grade A.
- G. Concrete Anchors: Rawl Lok/Bolt, Hilti "HSL," ITT Phillips, Red Head Wedge Anchors, Ramset Trubolt or Dynabolt or accepted substitute.

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H. Shop Primer: Manufacturer's standard rust inhibitive primer.

2.04 ROOF EQUIPMENT SUPPORTS

- A. General: Coordinate the location and type of each roof equipment support with the roofing system supplier. Systems to maintain roof warranty. Minimum 18 gauge galvanized steel with fully mitered and welded corners, internal bulkhead reinforcing, integral base plates, pressure-treated wood nailer and 18 gauge galvanized steel counterflashing. Compensate for roof slope so top of support is level. Construct curb to meet or exceed all seismic forces.
- B. Manufacturers: Thycurb, Custom Curb, Vibrex or accepted substitute.

3 EXECUTION

3.01 INSTALLATION OF HANGERS AND SUPPORTS

- A. General: Proceed with the installation of hangers, supports and anchors only after the required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) the proper placement of inserts, anchors, and other building structural attachments.
 - 1. Install hangers, supports, clamps, and attachments to support piping and equipment properly from the building structure. Use no wire or perforated metal to support piping, and no supports from other piping or equipment. For exposed continuous pipe runs, install hangers, and supports of the same type and style as installed for adjacent similar piping.
 - 2. Prevent electrolysis in the support of copper tubing by the use of hangers and supports which are copper plated, or by other recognized industry methods.
 - 3. Arrange supports to prevent eccentric loading of joists and joist girders. Locate supports at panel points only.
 - 4. Install hangers and supports to provide the indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 are not exceeded. Comply with the following installation requirements:
 - a. Clamps: Attach clamps, including spacers (if any), to piping outside the insulated piping support. Do not exceed pipe stresses allowed by ANSI B31.
 - b. Insulated Pipe Supports: Insulated pipe supports shall be supplied and installed on all insulated pipe and tubing.
 - c. Load Rating: All insulated pipe supports shall be load rated by the manufacturer based upon testing and analysis in conformance with ASME B31.1, MSS SP-58, MSS SP-69 and MSS SP-89.

- d. Support Type: Manufacturer's recommendations, hanger style and load shall determine support type.
- e. Insulated Piping Supports: Where insulated piping with continuous vapor barrier or where exposed to view in finished areas is specified, install hard maple wood insulation shields (Elcen Fig. 216) or steel pipe covering protection shields (MSS type 39) at each hanger.

B. Provisions for Movement:

- 1. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate the action of expansion joints, expansion loops, expansion bends and similar units.
- 2. Install hangers and supports so that equipment and piping live and dead loading and stresses from movement will not be transmitted to connected equipment.

C. Pipe Hangers and Supports:

- 1. Vertical Spacing: Support at base, every floor height not exceeding 10 feet and required by Code and just below roofs line.
- 2. Screwed or Welded Steel or Copper Piping: Maximum hanger spacing shall be as follows:

	Steel	Copper
1-1/4 inches and smaller	6 foot span	5 foot span
1-1/2 inch pipe	9 foot span	6 foot span
2 inch pipe	10 foot span	10 foot span
2-1/2 inch	11 foot span	10 foot span
4 inches and larger	12 foot span	10 foot span

3. Cast Iron Soil Pipe:

- a. Hubless and Compression Joint: At every other joint except when developed length exceeds 4 feet, then at each joint.
- b. Additional Support: Provide at each horizontal branch and/or at concentrated loads to maintain alignment and prevent sagging.
- 4. Install additional hangers or supports at concentrated loads such as pumps, valves, etc. to maintain alignment and prevent sagging.
- 5. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
- 6. Place a hanger within 12 inches of each horizontal elbow.

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7. Support Rod: Hanger support rods sized as follows:

Pipe Size	Rod Diameter	Max. Load
2 inches and smaller	3/8 inch	610 lb.
2-1/2 to 3 inches	1/2 inch	1130 lb.
4 inches	5/8 inch	1810 lb.
6 inches	3/4 inch	2710 lb.
8 through 12 inches	7/8 inch	3770 lb.

- D. Adjust hangers and supports to bring piping to proper levels and elevations.
- E. Provide all necessary structural attachments such as anchors, beam clamps, hanger flanges and brackets in accordance with MSS SP-69. Attachments to beams wherever possible. Supports suspended from other piping, equipment, metal decking, etc., are not acceptable.
- F. Horizontal banks of piping may be supported on common steel channel member spaced not more than the shortest allowable span required on the individual pipe. Maintain piping at its relative lateral position using clamps or clips. Allow lines subject to thermal expansion to roll axially or slide. Size channel struts for piping weights.

3.02 INSTALLATION OF ANCHORS

- A. Install anchors at the proper locations to prevent stresses from exceeding those permitted by ANSI B31, where recommended in SMACNA "Seismic Restraint Manual" or exceeding manufacturer's recommended loading, and to prevent the transfer of loading and stresses to connected equipment.
- B. Welding: Provide anchor by welding steel shapes, plates and bars to the piping and/or equipment and to the structure. Comply with ANSI B31 and AWS standards and SMACNA "Seismic Restraint Manual."
- C. Bolting: Provide standard plate washers under heads and nuts of bolts bearing on wood. Soap threads of lag bolts prior to installing.
- D. Structural Blocking: Locate as indicated and as required to support mechanical piping and equipment.
- E. Where expansion compensators are indicated, install anchors in accordance with the expansion unit manufacturer's written instructions, to limit movement of piping and forces to the maximums recommended by the manufacturer of each unit.
- F. Anchor Spacings: Install anchors at the ends of principal pipe runs, at intermediate points in pipe runs between expansion loops and bends. Make provisions for presetting of anchors as required to accommodate both expansion and contraction of piping.
- G. Painting: Refer to Section 23 0500.

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3.03 ROOF EQUIPMENT SUPPORTS, EQUIPMENT CURBS AND PIPE CURB ASSEMBLIES

- A. Provide prefabricated units for all roof penetrations for mechanical equipment. Set supports on the structural deck. Do not set supports on insulation or roofing. Provide level supports by prefabricated slope built into curb.
- B. Equipment supports: Provide for roof mounted equipment which does not require a structural roof deck penetration.
- C. Equipment Curbs: Provide for equipment which requires a structural roof deck penetration other than piping or conduit.
- D. Pipe Curb Assemblies: Provide for piping and electrical conduit which penetrates the roof deck to service equipment above the roof.

END OF SECTION

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1 GENERAL

1.01 WORK INCLUDED

- A. After completion of the work of installation, test and regulate all components of the heating, air conditioning and ventilating systems to verify air and water flow rates shown.
- B. Testing, adjustment, and balancing of air and water systems.
- C. Measurement of final operating condition of mechanical systems.

1.02 REFERENCES

- A. AABC National Standards for Field Measurement and Instrumentation, Total System Balance.
- B. ASHRAE Measurements, Instruments and Testing, Adjusting and Balancing.
- C. NEBB Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.

1.03 QUALITY ASSURANCE

- A. Agency shall be company specializing in the adjusting and balancing of systems specified in this Section with minimum five years documented experience.
- B. Testing, adjusting, and balancing shall be performed by a firm with 10 years of experience and certified for direct digital control systems.

1.04 SUBMITTALS

- A. Submit name of adjusting and balancing agency for approval within 30 days after award of Contract.
- B. Submit test reports as a submittal under provisions of Section 15010.
- C. Prior to commencing work, submit draft reports indicating adjusting, balancing, and equipment data required.
- D. Submit draft copies of report for review prior to final acceptance of Project. Provide final copies for Architect and for inclusion in operating and maintenance manuals.

2 PRODUCTS

2.01 EQUIPMENT

A. Provide all necessary personnel, equipment, and services.

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2.02 REPORT FORMS

- A. Submit reports on forms.
- B. Forms shall include the following information:
 - 1. Title Page:
 - a. Company name.
 - b. Company address.
 - c. Company telephone number.
 - d. Project name.
 - e. Project location.
 - f. Project Architect.
 - g. Project Engineer.
 - h. Project Contractor.
 - i. Project altitude.
 - j. Outdoor conditions.
 - 2. Instrument List:
 - a. Instrument.
 - b. Manufacturer.
 - c. Model.
 - d. Serial number.
 - e. Range.
 - f. Calibration date.
 - 3. Air Handling Units, Make-up Air Unit, Exhaust Fans and Fan Coil Units:
 - a. Location.
 - b. Manufacturer.
 - c. Model.
 - d. Supply air flow specified and actual.

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- e. Return and/or outside air flows, specified and actual.
- f. Total and external static pressure specified and actual.
- g. Inlet pressure.
- h. Discharge pressure.
- i. Fan RPM.
- j. Cooling and heating coils inlet/outlet water and air temperature including flow rates.

4. VAV Terminal:

- a. Location.
- b. Manufacturer.
- c. Model.
- d. Air flow specified and actual (maximum and minimum).
- e. Total static pressure (total external), specified and actual.
- f. Inlet pressure.
- g. Discharge pressure.
- h. Reheat coil flow rates including inlet/outlet water temperature.
- i. Inlet and outlet temperatures with heating on.
- j. Electric heater Kw, voltage, phase, stages.

5. Air Flow:

- a. Identification/ location.
- b. Design air flow.
- c. Actual air flow.
- d. Supply air temperature.
- e. Return air temperature.
- 6. Chilled Water and Heating Water (all coils):
 - a. Identification/location.
 - b. Design water flow rate.

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- c. Actual water flow rate.
- d. Entering temperature, specified and actual.
- e. Leaving temperature, specified and actual.
- f. Design and actual air flow rate.

7. Electric Motors and VFD's:

- a. Manufacturer.
- b. HP/BHP.
- c. Phase, voltage, amperage; nameplate, and actual.
- d. RPM.
- e. Service factor.
- f. Starter size, rating, heater elements.

8. V-Belt Drive:

- a. Identification/location.
- b. Required driven RPM.
- c. Driven sheave, diameter, and RPM.
- d. Belt, size, and quantity.
- e. Motor sheave, diameter, and RPM.
- f. Center to center distance, maximum, minimum, and actual.

9. Pumps:

- a. Identification/number.
- b. Manufacturer.
- c. Size/model.
- d. Impeller.
- e. Type of service system.
- f. Design flow rate, pressure drop, BHP.
- g. Actual flow rate, pressure drop, BHP.

- h. Shut off, discharge and suction pressures.
- 10. Heat Exchangers:
 - a. Identification/location.
 - b. Type of service.
 - c. Manufacturer.
 - d. Water flow, design and actual.
 - e. Water pressures drop, design and actual.
 - f. Entering water temperature, design and actual.
 - g. Leaving water temperature, design and actual.

11. Boilers:

- a. Manufacturer.
- b. Model.
- c. Input firing rate, MBH.
- d. Rated output, MBH.
- e. Water flow, design and actual.
- f. Water pressures drop.
- g. Water temperature, supply, and return.

12. Cooling Towers:

- a. Tower identification/location.
- b. Manufacturer.
- c. Model.
- d. Rated capacity.
- e. Entering air WB temperature, specified and actual.
- f. Leaving air WB, specified and actual.
- g. Ambient air DB temperature.
- h. Water temperature, entering and leaving.

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- i. Water flow rate.
- 13. Chiller:
 - a. Ambient temperature.
 - b. Water flow.
 - c. Entering water temperature.
 - d. Leaving water temperature.
 - e. Head pressure.
 - f. Suction pressure.
 - g. Electrical data.

3 EXECUTION

3.01 EXAMINATION

- A. Before commencing work, verify that systems are complete and operable. Ensure the following:
 - 1. Equipment is operable and in a safe and normal condition.
 - 2. Temperature control systems are installed complete and operable.
 - 3. Proper thermal overload protection is in place for electrical equipment.
 - 4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
 - 5. Duct systems are clean of debris.
 - 6. Correct fan rotation.
 - 7. Fire and volume dampers are in place and open.
 - 8. Coil fins have been cleaned and combed.
 - 9. Access doors are closed, and duct end caps are in place.
 - 10. Air outlets are installed and connected.
 - 11. Duct system leakage has been minimized.
- B. Report any defects or deficiencies noted during performance of services to Architect.

- C. Promptly report abnormal conditions in mechanical systems or conditions which prevent system balance.
- D. If, for design reasons, system cannot be properly balanced, report as soon as observed.
- E. Beginning of work means acceptance of existing conditions.

3.02 **PREPARATION**

- Provide instruments required for testing, adjusting, and balancing operations. Make A. instruments available to Architect to facilitate spot checks during testing.
- B. Provide additional balancing devices as required.

3.03 **INSTALLATION TOLERANCES**

- Adjust air handling systems to plus or minus 5 percent for supply, return and A. exhaust systems from figures indicated.
- Permanently mark settings of valves, dampers, and other adjustment devices В. allowing settings to be restored. Set and lock memory stops.
- C. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by the Owner.

3.04 **ADJUSTING**

- Permanently mark settings of valves, dampers, and other adjustment devices A. allowing settings to be restored. Set and lock memory stops.
- B. After adjustment, take measurements to verify balance has not been disrupted or that such disruption has been rectified.
- C. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.

3.05 AIR SYSTEM PROCEDURE

- Adjust air handling and distribution systems to provide required or design supply, A. return, and exhaust air quantities.
- Make air quantity measurements in ducts by Pitot tube traverse of entire cross B. sectional area of duct.
- C. Measure air quantities at air inlets and outlets.
- D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts and noise.

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- E. Use volume control devices to regulate air quantities only to extent that adjustments do not create objectionable air motion or sound levels. Effect volume control by duct internal devices such as dampers and splitters.
- F. Vary total system air quantities by adjustment of fan speeds. Provide drive changes required. Vary branch air quantities by damper regulation.
- G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
- H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across the fan.
- I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
- J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
- K. Where modulating dampers are provided, take measurements and balance at extreme conditions.
- L. Measure building static pressure and adjust supply, return, and exhaust air systems to provide required relationship between each to maintain approximately 0.05 inches positive static pressure near the building entries.
- M. Test and record entering and leaving air dry-bulb temperature for both heating and cooling cycles of each fan system.

3.06 WATER SYSTEM PROCEDURES

- A. Adjust water systems to provide required or design quantities. Use calibrated orifices or other metered fittings and pressure gauges to determine flow rates for system balance.
- B. Adjust systems to provide specified pressure drops and flows through heat transfer elements. Perform balancing by measurement of temperature differential.
- C. Effect system balance with automatic control valves fully open.
- D. Effect adjustment of water distribution systems by means of balancing valves, valves, and fittings. Do not use service or shutoff valves for balancing.

3.07 DOMESTIC WATER

A. Test and adjust domestic water recirculation system to ensure hot water circulation in all mains.

3.08 VERIFICATION OF CONTRACTOR'S PERFORMANCE

A. Balancing data may be spot checked with instruments similar to that used by the balancing firm.

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B. If there are discrepancies between balancing data and spot check data, readjust and rebalance the systems at no additional project cost.

END OF SECTION

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1 GENERAL

1.01 WORK INCLUDED:

- A. Furnish a complete and fully operating Microsoft Windows based Johnson Controls Direct Digital Control system (DDCS) in accordance with Beaverton School District standards and this specification section. All components of system shall conform to most recent open protocol requirements of BACnet by ASHRAE. Any component or part of system that does not comply with BACnet shall have an intermediate communication device or gateway supplied under this scope of work that makes that component, subsystem, or system compliant with BACnet, for open protocol purpose, with higher level control components or systems that may be added in future. Items of work included are as follows.
 - 1. Provide all necessary hardware and software to meet the specified functional requirements.
 - 2. Prepare individual hardware layouts, interconnection drawings and control loop configuration data from project design data.
 - 3. Implement the detailed design for all system input/output points, distributed control and system data bases, graphic displays, logs, and management reports based on control descriptions, logic drawings, configuration data, and bid documents.
 - 4. Design all equipment cabinets, panels, and the data communication network cables including all associated hardware.
 - 5. Provide and install all cabinets, panels, and data communication network cables including all associated hardware.
 - 6. Provide and install all interconnecting cables between supplied cabinets, controllers, and output devices.
 - 7. Provide and install all interconnecting cables between all operator terminals and peripheral devices (such as printers, etc.) supplied under this section.
 - 8. Provide complete specifications for all items supplied by the Vendor from others (such as printers, instruments, etc.).
 - 9. Provide supervisory specialists and technicians at the job site to assist in all phases of system installation, start-up and commissioning.
 - 10. HVAC and controls will be commissioned by an authorized commissioning agent. Control and mechanical contractor will support the commissioning process.
 - 11. Provide a comprehensive operator and technician training program as described herein.
 - 12. Provide as-built documentation, software, and all DDC control logic and all associated support documentation on approved media which accurately represents the final system.

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- 13. Provide an electronic copy of all programming.
- 14. Provide all license agreements, with MRIPA being the owner of the license, from DDC software and hardware to owner.
- 15. Provide twenty-four (24) hours of owner training. Training to be provided at owner's direction but in not less than four (4) hour blocks of time.
- 16. Wireless controls will be considered by BSD on a case-by-case basis for this project.

1.02 RELATED WORK:

- A. Related work in other sections of the specifications:
 - 1. Section 23 0500, Basic Materials and Methods
 - 2. Divisions 26 and 28, Basic Electrical Requirements

1.03 SYSTEM DESCRIPTION:

A. General Requirements:

- 1. Provide a Distributed Processing System complete with Direct Digital Control (DDC) software. This system is to control all VAV boxes, RTU's, fans, coils, dampers, and other specified equipment directly, without intervening conventional controls.
- 2. All DDC Controllers for terminal units, air handlers, Central mechanical equipment, and central server shall communicate with each other and share information.
- 3. The controls contractor shall assume complete responsibility for the entire controls system as a single source and shall certify that he has on staff under his direct employ on a day to day basis, factory trained technical personnel, qualified to engineer, program, debug, and service all portions of the DDC control system, including central server, global controllers, terminal unit controllers, and all other portions of the DDC control system. Controls contractor shall be a JCI Metasys authorized contractor.
- 4. All control work, including demo of controls is to be done by a JCI Metasys authorized contractor.
- 5. System to be completely based on ANSI/ASHRAE STANDARD 135-2001, BACnet.
- 6. All control work is to match existing naming conventions, graphics, alarm management, and relationships.
- B. Basic System Features:

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1. Zone by zone DDC control of space temperature, usage scheduling, optimum starting, equipment failure reporting, and override timers for off-hours usage. A zone is the area served by one HVAC terminal unit (VAV box, heat pump, unit ventilator, fan coil, etc.)

Operator's workstation software shall be latest version of Microsoft Windows as the computer operating system. The energy Management and Control System (EMCS) application program shall be written to communicate specifically utilizing BACnet protocols. Software functions delivered on this project shall include password protection, scheduling, (including optimum start) alarming, logging of historical data, full graphics including animation, demand limiting, full suite of field engineering tools including graphical programming and applications. Systems using operating systems other than that described above are strictly prohibited. All software required to program application specific controllers and all field level devices and controllers will be left with the owner. All software passwords required to program and make future changes to the system will also become the property of the owner.

All software required to make any program changes anywhere in the system along with scheduling, and trending applications will be left with the owner. All software passwords required to program and make future changes to schedules, trends and related program changes will also become the property of the owner. All software required for all field engineering tools including graphical programming and applications will be left with the owner. All software passwords required to program and make future changes to field engineering tools including graphical programming and applications will be left with the owner.

- 3. Building controllers shall include complete energy management software, including scheduling building control strategies with optimum start and logging routines. All energy management software and firmware shall be resident in field hardware and shall not be dependent on the operator's terminal. Operator's terminal software is to be used for access to field-based energy management functions. Provide zone-by-zone direct digital logic control of space temperature, scheduling, runtime accumulation, equipment alarm reporting, and override timers for afterhours usage.
- 4. System to have the ability to interface with and record electrical meter data and interact with metering software from other vendors. System to be compatible with and interface with Dashboard systems.
- 5. All application controllers for every terminal unit (VAV, HP, UV, etc.) air handler, all central plant equipment, and any other piece of controlled equipment shall be fully programmable. Application controllers shall be mounted next to controlled equipment and communicate with building controller via BACnet LAN. Programming shall be specific for this project.

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6. The complete system including but not limited to terminal unit controllers, Global controllers and Operator terminals shall Auto-restart, without operator intervention, on resumption of power after a power failure. Database stored in Global Controller memory shall be battery backed up for a minimum of 30 days. Unitary controllers shall utilize EEPROM for all variable data storage. Battery backed up Unitary controllers shall not be allowed.

- 7. Priority password security systems to prevent unauthorized use. Each user shall have an individual password. Each user shall be assigned which control functions they have access to.
- 8. Equipment monitoring and alarm function including information for diagnosing equipment problems.
- 9. The complete system including but not limited to terminal unit controllers, Global controllers and Operator terminals shall Auto-restart, without operator intervention, on resumption of power after a power failure. Database stored in Global Controller memory shall be battery backed up for a minimum of 30 days. Unitary controllers shall utilize EEPROM for all variable data storage. Battery backed up Unitary controllers shall not be allowed.
- 10. Modular system design of proven reliability.
- 11. Each field panel capable of independent control.
- 12. All software and/or firmware interface equipment for connection to remote monitoring station from field hardware or central server.
- 13. Equipment runtime totalization of fans, heaters, boilers, etc., capable of alarm generation and alarm dial out to remote sites.
- 14. Room sensors with unoccupied schedule override
- 15. Field control devices such as terminal unit controllers shall have optically isolated communication lines. Controllers not optically isolated and utilizing a ground referenced communication technique are specifically prohibited.
- 16. Communication wiring for field control devices shall not be dependent on daisy chaining of communication wiring. Communication wire to be run in daisy chained fashion, allowing units to be added to a communication line easily in the future.
- 17. All DDC hardware and software shall be designed and manufactured by U.S. corporations. All hardware shall be U.L. listed with integral labels showing rating.

1.04 QUALITY ASSURANCE:

A. Responsibility: The supplier of the DDCS shall be responsible for inspection and Quality Assurance (QA) for all materials and workmanship furnished by him.

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B. Component Testing: Maximum reliability shall be achieved through extensive use of high-quality, pre-tested components. Each and every controller, sensor, and all other DDC components shall be individually tested by the manufacturer prior to shipment.

C. Tools, Testing and Calibration Equipment: Provide all tools, testing and calibration equipment necessary to ensure reliability and accuracy of the DDCS.

1.05 REFERENCE STANDARDS:

- A. The latest edition of the following standards and codes in effect and amended as of date of Supplier's Proposal, and any subsections thereof as applicable, shall govern design and selection of equipment and material supplied:
 - 1. ASHRAE: American Society of Heating, Refrigerating and Air Conditioning Engineers
 - 2. UBC: Uniform Building Code, including local amendments.
 - 3. UL 916 Underwriters Laboratories Standard for Energy Management Equipment
 - 4. NEC: National Electrical Code
- B. City, county, state, and federal regulations, and codes in effect as of date of purchase.
- C. Except as otherwise indicated, vendor shall secure and pay for all permits, inspections, and certifications required for his work and arrange for necessary approvals by the governing authorities.

1.06 SUBMITTALS:

A. Drawings:

- 1. Within four weeks after award of contract, the Supplier shall submit review drawings, installation and operation instruction and a recommended spare parts list.
- 2. Drawings shall be standard sizes (24 inches x 36 inches) or (11 inches x 17 inches).
- 3. Provide digital copy of submittal drawings.
- B. System documentation by the Vendor shall include the following as a minimum:
 - 1. System configuration diagrams in simplified block format.
 - 2. Input/output point and alarm point summary listing.
 - 3. Electrical drawings showing all system internal and external connection points, terminal block layouts and terminal identification.
 - 4. Complete written description of system sequence of operation.

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- 5. Manufacturer's instructions and drawings for installation, maintenance and operation of all purchased items.
- 6. Overall system operation and maintenance instructions, including preventive maintenance and troubleshooting instructions.
- 7. Complete recommended spare parts list.

1.07 SCHEDULING AND COORDINATION:

- A. The Vendor shall provide a detailed project design and installation schedule with time markings and details for hardware items and software development phases.
- B. The schedule shall show all the target dates for transmission of project information and documents and will indicate system installation, debug, and commissioning timing dates.

1.08 WARRANTY:

- A. Warranty shall cover all costs for parts, labor, and associated travel, and expenses for a period of three (3) years from completion of system demonstration and training.
- B. Hardware and software personnel supporting this warranty agreement shall provide on-site or off-site service in a timely manner after failure notification to the Vendor. The maximum acceptable response time to provide this service at the site shall be 24 hours.
- C. This warranty shall apply equally to both hardware and software.

2 PRODUCTS

2.01 SYSTEM MANUFACTURER:

A. DDC temperature control system shall be a Johnson Control system furnished by Johnson Control Inc, Northwest Control Contractors, or Automated Controls, no substitutions. Network Automation Engine shall be Johnson Controls NAE55 series or as approved by owner.

2.02 SYSTEM TERMINAL:

A. Displays:

 All operator interfaces will be web based requiring no special programming to access. All server level software must be approved by BSD IT department. General Specification for BSD International School of Beaverton Re-Roof

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Operator interface shall display all data associated with project as called out on drawings and/or point list supplied. Terminal software shall accept either PCX or Windows BITMAP format graphic files for display purposes. Graphic files shall be created utilizing scanned full color photographs of system installation, AutoCAD drawing files of field installation drawings and wiring diagrams from as-built drawings. System shall be capable of displaying graphic file, text and dynamic point data together on each display. Information shall be labeled with descriptors and shall be shown with the appropriate engineering units. Terminal shall allow user to change all field resident EMS functions associated with the project such as set points, time schedules, holiday schedules, etc. This shall be done without any reference to point addresses or other numeric/mnemonic indications.

- 3. All displays shall be generated and customized in such a manner by the local DDCS supplier that they fit the project as specified. Displays shall use standard English (or specified language) for labeling and readout. Systems requiring factory programming for graphics or DDC logic are specifically prohibited. All graphics and DDC programming shall be supported locally by the installing contractor without factory dependency or assistance.
- 4. Digital points shall be displayed as on/Off or with customized text. Text shall be justified Left, Right or Center. Also allow digital points to be displayed as individual bitmap objects on the display screen as an overlay to the system graphic. Each digital point displayed in this manner shall be assigned up to three bitmap files for display when the point is On, Off or in Alarm. For Digital Output points, toggle the points commanded status when the bitmap is selected with the system digitizer (mouse) by the operator (i.e. selecting a picture of a switch or light with the mouse shall toggle the points status and display a different picture). Also allow digital points to be displayed as an animated graphic. Animated graphic points shall be displayed as a sequence of multiple bitmaps to simulate motion (i.e. when a pump is in the OFF condition. display a stationary picture of the pump. When the operator selects the picture with the mouse, the points status is toggled, and the picture of the pump rotates the vanes in a time-based animation). Allow operator to change bitmap file assignment and also create new and original bitmaps online. System shall be supplied with a library of standard bitmaps which may be used unaltered or be modified by the operator. Systems that do not allow customization or creation of new bitmap objects by the operator shall not be allowed.
- 5. Analog points shall be displayed with operator modifiable units. Analog Input points may also be displayed as individual bitmap objects on the display screen as an overlay to the system graphic. Each analog input point may be assigned to a minimum of five bitmap files each with High/Low limits for automatic selection and display of the bitmaps. As an example, a graphic representation of a thermometer would rise and fall in response to either the room temperature or its deviation from the controlling setpoint. Analog Output points, when selected with the mouse, shall be displayed as a prompted dialog box, adjustable knob or slide bar. Selection for display type shall be individual for each point.

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6. Analog points may also be assigned to an area of a system graphic, where the color of the defined area would change based on the analog points value. As an example, an area of a floor plan graphic served by a single control zone would change color respective to the temperature of the zone or its deviation from setpoint. Selection of the graphic area to be done using a "Roller Brush Flood Fill" tool similar to ones used in painting programs. All editing and area assignment shall be created or modified on-line, using simple icon tools.

- 7. A Customized Menu Label shall be used for display selection. Menu items on a display shall allow penetration to lower level displays or additional menus. Dynamic point information and menu items may be mixed on the same display to allow sub displays to exist for each item. Each display may be protected from viewing unless operator has appropriate security level. A separate display security level may be assigned to each display and system point.
- 8. All dynamic point information shall be updated on the central server once every 1 second. Any changes by the operator shall be acted on by devices in the field within 2 seconds maximum.
- 9. A Mouse or other form of digitizer shall be used to move pointer arrow to desired item for selection of new display or to allow the operator to make changes to point data.
- 10. Displays may be modified on site or via remote communications.
- 11. Display resolution shall be limited by the physical monitor properties and software driver. A minimum resolution of 1024x768 @16bit (65,536 colors). Entire system shall operate without dependency on the Operator's terminal.
- 12. Entire system shall operate without dependency on the Operator's terminal.

2.03 SECURITY SYSTEM:

- A. Provide security system that prevents unauthorized use unless operator is logged on. Access shall be limited to operator terminal's functions unless user is logged on. This includes displays as outlined above.
- B. System shall maintain a log of all user activities while logged onto the system. Provide for easy viewing of all items in user log, including time and date of login, logoff and all activities in between.

2.04 DISPLAY OF SCHEDULING INFORMATION:

A. Display of Weekly schedules shall show all information in easy to read 7-day (week) format for each schedule. This includes all on/off times for each day along with all optimum start information.

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B. Holiday schedules shall show all dates that are to be holidays. Holidays shall be shown on the terminal in a graphical calendar format showing all scheduled days for a given month. User shall be able to easily scroll through the months for each year for up to 20 years into the future as a minimum. Each day assigned as a holiday shall display as "All Off" or show the times scheduled for that day

- C. Event schedules shall be shown in the same graphical calendar format and manner as Holiday schedules. Event schedules allow for scheduling of special events up to 20 years into the future. After event has elapsed, control returns to normal schedule.
- D. Operator shall be able to change all information for a given Weekly, Holiday or Event schedule if logged on with the appropriate security access. This includes all information that has to do with optimum start assignments such as sensors to use and heating/cooling factors.

2.05 ALARM INDICATION:

- A. System Terminal shall provide audible, visual and printed means of alarm indication. The Alarm Dialog box shall always become the Top Dialog box regardless of the application(s) being run at the time (such as a word processor). Printout of alarms shall be sent to the assigned terminal and port.
- B. Provide log of alarm messages. Alarm log shall be archived to the hard disk of the system terminal. Each entry shall include point descriptor and address, time and date of alarm occurrence, point value at time of alarm, time and date of point return to normal condition, time and date of alarm acknowledge.
- C. Alarm messages shall be in plain English (or specified language) and shall be user definable on site or via remote communication. System shall provide a minimum of 20 user definable messages for each zone controlled.

2.06 TREND LOG INFORMATION:

- A. System shall periodically gather samples of point data stored in the field equipment (see section 2.2.D) and archive the information on the Operator terminals hard disk. Archive files shall be appended with new sample data, allowing samples to be accumulated over several years. Systems that write over archived data shall not be allowed. Samples may be viewed at the operator's terminal in a Trend Log. Trend log displays shall be in spreadsheet format. Provide a minimum of 100 Trend Log displays at each terminal. Each trend log display shall be capable of a minimum of 100 trended points, with a minimum of 10,000 samples for each trended point. Provide capability for operator to scroll through all trend log data vertically (time axis) and horizontally (point sample columns). System shall automatically open archive files as needed to display archived data when operator scrolls through the data vertically. Display all trend log information in standard engineering units.
- B. System software shall be capable of graphing the trend log point data. Software shall be capable of creating graphs in the following forms as a minimum:
 - 1. Bar charts, Log/Linear graphs, Bubble graphs,
 - 2. x-y graphs, Log/Log graphs, Area graphs (2D or 3D),

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- 3. Pie charts, Scatter graphs, Polar graphs,
- 4. High-Low-Close graphs
- C. Operator shall be able to change trend log setup information as well. This includes information to be trend logged as well as interval at which information is to be logged. All points in the system may be logged. All operations shall be password protected.

2.07 ENERGY LOG INFORMATION:

- A. System shall periodically gather energy log data stored in the field equipment (see section 2.2.H) and archive the information on the Operator terminals hard disk. Archive files shall be appended with the new data, allowing data to be accumulated over several years. Systems that write over archived data shall not be allowed. Log data may be viewed at the operator's terminal in a spreadsheet format. Provide a minimum of 100 Energy Log displays at each terminal. Provide capability for operator to scroll through all Energy log data vertically (time axis) and horizontally (point sample columns). System shall automatically open archive files as needed to display archived data when operator scrolls through the data vertically. Display all Energy log information in standard engineering units.
- B. System software shall be capable of graphing the Energy log data. Software shall be capable of creating graphs in the following forms as a minimum:
 - 1. Bar charts, Log/Linear graphs, Bubble graphs,
 - 2. x-y graphs, Log/Log graphs, Area graphs (2D or 3D),
 - 3. Pie charts, Scatter graphs, Polar graphs,
 - 4. High-Low-Close graphs
- C. Operator shall be able to change the Energy log setup information as well. This includes which meters to be logged and meter pulse value. All meters monitored in the system may be logged. All operations shall be password protected.

2.08 CONTROLLER STATUS:

- A. Provide means for operator to view communication status of all controllers connected to the system. Display shall include controller, status and error count. Status will show if controller is communicating or not. Error count shall show actual count of communication errors between system and controllers in the field.
- B. Provide means for operator to reset error count for all controllers to zero.
- C. Provide capability to select alarm indication for each controller.

2.09 CONFIGURATION/SETUP:

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A. Provide means for operator to display and change system configuration. This shall include but not be limited to system time, day of the week, date of day light savings set forward setback, printer type and port addresses, modem port and speed, etc. Items shall be modified utilizing easy to understand terminology using simple mouse/cursor key movements.

2.10 CUSTOM REPORT GENERATOR:

- A. Custom report generator shall allow the operator to create multiple custom reports utilizing system point information, text and outputs of other software modules such as trend logging, controller status, point values, etc. Operation shall be similar to a word processing program allowing easy manipulation of report text, content, font and initiation parameters. Reports may be manually or automatically printed to system printer. Automatic printing initiation may be by assignment to a schedule (Weekly, Holiday or Event schedules), point Change of State (COS), point alarm condition, or point value.
- B. Reports shall fully support Windows DDE and OLE allowing information from other software programs (such as spreadsheet programs) to be part of the report.

2.11 OCCUPANT OVERRIDE LOGGING AND BILLING:

A. Night cycle override of zone temperature control, etc., shall be automatically logged by field devices (Global Controllers) on a zone-by-zone basis. See section 2.2.G for description. Operator Terminal software shall allow zones to be grouped for totalization of all zones within the area over an adjustable time period. System shall include a billing program for creation of charges based on the billing rate and the totaled override usage from specified begin and end dates.

2.12 CAMPUS LOCAL AREA NETWORK:

- A. In addition to the LAN communication between the Operator Terminals and the Global Controllers (hereafter called a LOCAL system), the local system shall also be capable of connecting to other local systems or central server via a Campus LAN. The Campus LAN shall be any of the ETHERNET type LANs available. Provide all ETHERNET hardware and Windows Network software necessary for a complete and operational system.
- B. Any point in the interconnected system, comprised of all local systems connected together with the Campus LAN, shall be available for any and all functions of any one of the local systems. As an example, an electric meter input to one of the local systems shall be capable of being utilized in any of the other local systems demand limiting program(s).

2.13 GLOBAL CONTROLLER:

A. General:

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> 1. Global controller shall provide battery backed real time clock functions. It shall also provide system communications to programmable and application specific controllers as noted in section 2.3 in the field. Global controller shall interface with Operator terminal(s) for information display. Global controllers shall share information in a Peer-to-Peer manner utilizing a high-speed LAN communication network. Global Controller shall be capable of 1 Meg baud LAN communication rates.

- 2. Global controller shall decide global strategies for system based on information from any points in the system regardless if the point is directly monitored by the controller. Program that implements these strategies shall be completely flexible and user definable. Any system utilizing factory pre-programmed global strategies that cannot be modified by field personnel on site or downloaded via remote communications are not acceptable. Changing global strategies via firmware changes is also unacceptable. Program executed speed shall be once per second as a minimum.
- 3. Programming shall be object oriented using control program blocks. Provide documentation in flow chart form for all programming as part of the final system As-Built documentation. Include samples of flow chart documentation in submittals. All flow charts shall be generated with CAD system and automatically downloaded to controller. No reentry of data base shall be necessary.
- 4. Provide means to view inputs and outputs to each program block in real time as program is executing. This function may be done via the central server, field computer, or via modem.
- Controller shall have a minimum of 128mb RAM (SDRAM). Provide 5. JACE-3 if project requires 10-15 controllers; JACE-6 if project requires up to 50 controllers; and JACE-7, with 1Gb DDR-2 RAM if project has 50 or more controllers.
- 6. Communication to field devices shall be via four individual two wire communication trunks. Communication baud rate shall be at 76,800 BAUD. All field devices shall automatically search and detect the communication rate to match the Global controller. All field devices on the communication trunk shall be optically isolated. Ground referenced communications to field devices is prohibited. Routing of communication trunk to be daisy chained.
- 7. Controller shall have at a minimum, four (4) additional communication ports in addition to the LAN port. Two of the ports shall be RS-232, one for communication to portable field computer and one for a modem for remote communications. The other two ports shall be RS-485 for connection to a permanent panel mounted display device (see 2.2.I for description), and for future connection to other devices.

Remote Communications: B.

1. Provide all functions that will allow remote communications via modem to off-site locations. Include modem along with all cabling necessary for installation.

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 Provide Windows 7 Ultimate compatible software for off-site computer which allows operator to view and change all information associated with system on color graphic displays if desired. Operator shall be able to change all parameters in this section from off-site location including all programming of global controllers and programmable terminal unit controllers.

- 3. Global Controller shall have capability to call out alarm conditions automatically if desired. Alarm message and site description may be sent to offsite computer or serial printer. If desired, controller may also send encoded message to digital pager. All Global controllers connected to the local LAN shall be capable of calling out alarm messages through one shared modem connected to one of the Global controllers on the local LAN.
- 4. Controller shall have capability to call 10 different phone numbers each as a minimum. Numbers called may be controlled by time schedule or other selectable program parameters.
- 5. Owner shall provide standard voice grade phone line for remote communication function.
- 6. Global controller and supplied modem shall be capable of modem-to-modem baud rates of 9600 baud minimum over standard voice grade phone lines. Lower baud rates shall be selectable for areas where local phone company conditions require lower baud rates.

2.14 SCHEDULES:

- A. Schedules shall be arranged in a three-tiered hierarchy as follows:
 - 1. Highest level: Event Schedules
 - 2. Middle level: Holiday Schedules
 - 3. Lowest level: Weekly Schedules
- B. Each Global Controller shall have at a minimum:
 - 1. 100 Weekly time schedules (7 day)
 - 2. 100 Holiday schedules (400 programmable days each)
 - 3. 20 Event schedules (400 programmable days each) With 8 schedule entries per day.
- C. Each schedule may be assigned to any point, controller, or program in the system.
- D. Each schedule (Weekly, Holiday and Event) shall be capable of performing an optimum start. Optimum start calculation shall be based on outside air temperature, zone air temperature deviation from zones daytime heating and cooling setpoints, and individual zone adaptive heating and cooling coefficients that are adjusted each day based on performance parameters of the individual zone. Each schedule may use identical or individual sensors in its calculations.

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E. Holiday schedule shall be provided to allow operation of system based on different schedule on specified holidays. Display of Holiday schedule shall be via a monthly calendar format. Operator shall be able to scroll through months and years. Operator shall be capable of scheduling dates a minimum of 20 years into the future.

- F. Event schedules shall be identical to Holiday schedule format and requirements.
- G. Operator may define and setup all schedule information from system terminal, via portable computer on site or via remote communications. This includes all times, dates and optimum start parameters. These functions shall be password protected.

2.15 Logging Capabilities:

- A. Each Global Controller shall log as a minimum 256 user selectable points with a minimum of 1440 samples per point. Sample time interval shall be from 1 to 1000 seconds. Sample initiation may be by any of the following conditions:
 - 1. Selectable begin and end date and time
 - 2. Point COS (Any system point)
 - 3. Point Alarm Status (Any system point)
 - 4. Schedule ON status (Weekly, Holiday or Event schedules)
 - 5. Any point in the system whether it is real or calculated may be logged.
 - 6. Logs may be viewed both onsite and off-site via remote communication.
 - 7. Global controller shall periodically upload trended data to Operator terminal for long term archiving if desired.
 - 8. Trend Logs Definition
 - The operator interface shall allow a user with the appropriate security permissions to define a trend log for any data in the system.
 - b. The operator interface shall allow a user to define any trend log options as described in the Application and Control Software section.
 - 9. Trend Log Viewer
 - a. The operator interface shall allow Trend Log data to be viewed and printed.
 - b. The operator interface shall allow a user to view trend log data in text-based (time –stamp/value).
 - c. The operator shall be able to view the data collected by a trend log in a graphical chart in the operator interface.

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- d. Trend log viewing capabilities shall include the ability to show a minimum of 5 points on a chart.
- e. Each data point trend line shall be displayed as a unique color.
- f. The operator shall be able to specify the duration of historical data to view by scrolling and zooming.
- g. The system shall provide a graphical trace display of the associated time stamp and value for any selected point along the x-axis.

10. Export Trend Logs.

 The operator interface shall allow a user to export trend log data in CSV or PDF format for use by other industry standard word processing and spreadsheet packages.

2.16 ALARM GENERATION:

- A. Alarms may be generated for any condition of the system. This includes things such as analog point high/low alarm limits, digital point COS, communication failure to terminal unit controllers, etc. Controller shall have a minimum of 6 alarm types with 7 categories for each type.
- B. Each alarm may be dialed out as noted in paragraph B. above.
- C. Provide alarm log for viewing of alarms. Log may be viewed on site at the system terminal or off-site via remote communications.

2.17 DEMAND LIMITING:

- A. System shall monitor energy demand. Energy demand may be from any type of energy source such as electrical or gas. Provide a Demand Limiting routine which shall shed assigned points or zones in the system to prevent the demand from exceeding preset limits. Demand limiting routine shall be a priority shed type allowing automatic override of zone or point shed when assigned temperature sensor exceeds operator set limits. Routine shall be able to change between 4 sets of demand limit and restore setpoints based on time of day or operator command.
- B. Zone shed method shall be by either preventing operation of heating and cooling, or by shifting the zones heating and cooling setpoints.
- C. All parameters of the Demand Limiting routine shall be modifiable from the central server or via remote communications.

2.18 OCCUPANT OVERRIDE LOGGING AND BILLING:

A. Night cycle override of zone temperature control, etc., shall be automatically logged on a zone by zone basis. Zones may be grouped into areas for totalization of all zones within the area over an adjustable time period. System shall include a billing program for creation of charges based on the billing rate and the totaled override usage from specified begin and end dates.

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B. Provide Global Controller capacity to total override usage for a minimum of 100 areas with up to 256 zones per area and 30 overrides per zone. Global controller shall periodically upload the override information to the System terminal for long term archiving and billing generation.

2.19 **ENERGY LOGGING:**

- A. Each global controller shall have ability to provide for a minimum of 10 Energy Logs. When required by specified sequence of operation, each log shall monitor an energy meter and record or calculate the following information for each Day. Month and Year:
 - 1. Energy consumption
 - 2. Demand peak value and time of peak
 - 3. Outside air temperature minimum, maximum and average value
 - 4. Heating and Cooling degree day calculation
- B. Energy meter input may be from any type of energy source such as electric or gas. Input type shall be dry contact pulse.

TERMINAL UNIT CONTROLLERS: 2.20

Α. General:

- 1. Provide programmable and application specific Terminal Unit Controller as needed to comply with sequence of operation, point list and drawings. All Terminal Unit Controller units shall be completely stand-alone with no loss of control if communication with global controller is interrupted. All control parameters, DDC programs and local variables such as setpoint information shall be stored in EEPROM on board each Terminal Unit Controller allowing the operator to change information as desired. Controllers that utilize a battery to backup control parameters, etc. Shall not be allowed.
- All points on drawings, in sequence of operation and on point list shall be 2. connected to and controlled by DDC units. No control shall be done by external devices such as thermostats or analog controls that are not part of the DDC system.
- 3. Programmable Terminal Unit Controllers shall be used in custom applications such as central plant, built up air handlers, fume hoods or when application specific controllers' sequence of operation is not applicable.
- 4. Communication from Global controller to Terminal Unit Controllers shall be via two wire communication trunks as specified for Global Controllers above. Any type of Terminal Unit Controller shall communicate on the same communication trunk. System shall communicate to one Terminal Unit Controller regardless of whether other Terminal Unit Controllers on the same communication line are powered and connected. Ground referenced communications is prohibited.

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B. Programmable Terminal Unit Controllers:

- Each programmable Terminal Unit Controller shall be completely programmable from the system terminal, via field computer or via remote communications. Program execution rate shall be ten times per second minimum (once every 100 milliseconds).
- 2. This controller shall be programmed to perform custom strategies for system based on information from all points in the field. Program that implements these strategies shall be completely flexible and user definable. Any controllers utilizing factory programmed strategies that cannot be modified by field personnel on site, require factory assistance, or cannot be downloaded via remote communications are not acceptable. Changing strategies via firmware changes is also unacceptable.
- 3. Programming shall be object oriented using program blocks familiar to control specialists for all program strategies. Provide documentation in flow chart form for all programming. Include samples of flow chart documentation in submittals. All flow charts shall be generated with CAD system and automatically downloaded to controller. No re-entry of data base shall be necessary. As-Built documentation of all software shall be provided to end user in flow chart form at completion of project.
- 4. Program and program parameters such as set points shall be stored in EEPROM. Battery backed RAM shall not be accepted for this level of controller.
- 5. All inputs shall be universal in that they accept analog and digital information. Inputs shall be capable of detecting a 0.1 second momentary closure. Analog inputs shall be capable of accepting thermistor inputs, 0 to 5 VDC, 0 to 10 VDC, or 4 to 20 mA inputs. No external hardware shall need to be added for Terminal Unit Controller to accept these different types of inputs. All inputs shall utilize a minimum of 10 bit analog to digital conversion.
- 6. Each of the analog outputs shall be independently switch selectable to output 0 to 10 VDC or 4 to 20 mA. Unit shall be programmable to output a sub range of voltage or current to match the device controlled. Analog outputs shall use 8 bit digital to analog conversion.
- 7. Terminal Unit Controller may be programmed to control what is displayed on zone sensor display. See section 2.4. Terminal Unit Controller may be programmed to show alpha numeric values on zone sensor display in response to program changes or button presses on the zone sensor.
- 8. Each Terminal Unit Controller shall provide 24 VDC at 250 mA as a source of power for current transducer sensors in the field.
- C. Application Specific Terminal Unit Controllers:
 - Application Specific Terminal Unit Controllers shall be completely standalone controllers for unitary type controls such as VAV terminal boxes, heat pumps, AC units, unit ventilators, etc. All programs shall be resident in controller for complete stand-alone operation.

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2. EEPROM technology shall be used for storage of program parameters such as set points, limits, etc., controllers utilizing a battery for backup of program parameters shall not be allowed.

3. All application specific Terminal Unit Controller units shall have capability to use Digital display zone sensor, or thermistor type zone sensor as listed in section 2.4.

2.21 TEMPERATURE SENSORS:

A. General: All temperature sensors to be solid state electronic, factory calibrated to within one-half degree F, totally interchangeable. Wall sensors to be housed in enclosure appropriate for application. Duct and well sensors to be electronically identical with housing appropriate for application. Provide appropriate wells for installation by others.

B. Zone Temperature Sensor:

- 1. Sensor shall contain push-button bypass switch, electronic sensor, setpoint bias lever, setting adjustable wheel and jack for connection to Digital Display zone sensor for troubleshooting. The operator shall program the time of on after hours override operation from 0.0, no override, to 9.9 hours in 0. hour increments. Push buttons are to remain inactive until zone is in the afterhours mode.
- 2. Setpoint bias shall be via labeled bias lever. Maximum bias shall be plus or minus 3 degrees F.

2.22 OTHER CONTROL DEVICES:

- A. Dampers: shall be factory sizes nearest to duct size being used and shall have factory filler panels so damper assembly matches duct size. Bearings oil impregnated bronze. Provide parallel blades for positive or modulating mixing service and opposed blade for throttling service, or as specified in sequence. Maximum blade dimension 10 inches. Damper blades and damper frames galvanized. Provide blade edging and side seals for tight shutoff. Dampers shall be equal to Johnson D1200, D1300, or Ruskin CD35. Scribe end of damper drive shaft to indicate blade position.
- B. Damper actuators: Actuators to be pressure independent and have 0-10 volt fully proportional operation. VAV box controllers to have position feedback capability to keep the damper position accurate. Damper actuators shall be sized for 80% of their published load rating including those with pilot positioners. Damper actuators shall be located to distribute operating force equally over full area of damper for uniform positioning of all blades. Quantity and size of actuators for each damper shall be listed on the shop drawings. Where damper operation and fan operation are interlocked, provide control to open damper sufficiently to prevent duct or equipment damage before fan is started. Outside air and relief damper actuators shall also have spring return to closed position.

2.23 SMOKE DETECTORS:

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A. Dual chamber ionization type with duct sampling tubes. UL approved with adjustable sensitivity. Arrange to stop associated fan on presence of smoke. Provide in return duct upstream of outside air connection and filters for all fan systems above 2000 CFM. Smoke detectors to meet BSD standards and be on an annunciator system.

2.24 CARBON DIOXIDE SENSORS:

- A. General: Wall-mounted carbon dioxide sensor. Infrared type.
- B. Range and Accuracy: 0 to 2,000 ppm plus or minus 100 ppm. Maximum drift plus or minus 100 ppm per year.
- C. Output Signal: 4 to 20 milliamps linearized.
- D. Calibration Interval: One year.
- E. Ambient Operating Conditions: 32°F to 122°F.

3 EXECUTION

3.01 EXAMINATION:

- A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence.
- B. Notify the Owners Representative in writing of conditions detrimental to the proper and timely completion of the work.
- C. Do not begin work until all unsatisfactory conditions are resolved.

3.02 GENERAL INSTALLATION:

- A. Install in accordance with manufacturer's instructions.
- B. Provide all miscellaneous devices, hardware, software, interconnections installation and programming required to insure a complete operating system in accordance with the sequences of operation and point schedules.

3.03 LOCATION AND INSTALLATION OF COMPONENTS:

- A. Locate and install components for easy accessibility; in general, mount 60 inches above floor with minimum 3'-0" clear access space in front of units. Obtain Owner Representative's approval on locations prior to installation.
- B. All instruments, switches, transmitters, etc., shall be suitably wired and mounted to protect them from vibration and high temperatures.
- C. Identify all equipment and panels. Provide permanently mounted tags to all panels.

3.04 INTERLOCKING AND CONTROL WIRING:

- A. Provide all interlock and control wiring. All wiring shall be installed in a neat and professional manner in accordance with Division 16 and all state and local electrical codes.
- B. Provide wiring as required by functions as specified and as recommended by equipment manufacturers, to serve specified control functions.
- C. Control wiring shall not be installed in power circuit raceways. Magnetic starters and disconnect switches shall not be used as junction boxes. Provide auxiliary iunction boxes as required. Coordinate location and arrangement of all control equipment with the Owner's Representative prior to rough-in.
- D. Provide auxiliary pilot duty relays on motor starters as required for control function.
- E. Provide power for all control components from nearest electrical control panel or as indicated on the electrical drawings; coordinate with electrical contractor.
- F. All control wiring in the mechanical, electrical, telephone and boiler rooms to be installed in raceways. All other wiring to be installed in a neat and inconspicuous manner per local code requirements.

3.05 DDC POINT SUMMARY:

- A. Provide all Data-base generation.
- B. Displays: System displays shall show all points in the system. They shall be logically laid out for ease of use by the owner. Provide outside air temperature indication on all system displays associated with economizer cycles.
- C. Run time Totalization: At a minimum, run time totalization shall be incorporated for each monitored supply fan, return fan, exhaust fan, hot water and chilled water pumps. Warning limits for each point shall be entered for alarm and or maintenance purposes.
- D. Trend Log: All binary and analog points shall have the capability to be trended.
- E. Alarm Points: All analog inputs (High/Low Limits) and selected digital input alarm points shall be prioritized and routed/auto-dial with alarm message per owner's requirements.
- F. Database Save: Provide back-up database for all stand-alone DDC panels on floppy disk.
- G. Provide all points required in above specification and in point schedule, included in this specification.

3.06 FIELD SERVICES:

- A. Prepare and start DDCS under provisions of this section.
- Start-up and commission systems. Allow sufficient time for start-up and В. commissioning prior to placing control systems in permanent operation.

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C. Provide the capability for off-site monitoring at Control Contractor's local or main office. At a minimum, off-site facility shall be capable of system diagnostics and software download. Owner shall provide Ethernet port and network address setup.

D. Provide Owner's Representative with spare parts list. Identify equipment critical to maintaining the integrity of the operating system.

3.07 TRAINING:

- Provide application engineer to instruct owner in operation of systems and Α. equipment.
- B. Provide basic operator training for a minimum of 3 persons on data display, alarm and status descriptors, requesting data, execution of commands and request of logs.
- C. Provide training above as required up to twenty-four (24) hours in four (4) six (6) hour blocks as part of this contract. And provide an additional eight (8) hours of training for VRF controls.

DEMONSTRATION: 3.08

- Provide systems demonstration under provisions of Section 23 0000. A.
- B. Demonstrate complete and operating system to Owner's Representative.
- C. Provide certificate stating that control system has been tested and adjusted for proper operation.

3.09 COMMISSIONING

HVAC controls will be commissioned by an authorized commissioning agent. A. Controls and mechanical contractors will support the commissioning process.

SEQUENCE OF OPERATION 4

4.01 CONSTANT VOLUME ROOFTOP UNITS (All):

- A. Operate during occupied hours set by owner's schedule.
- B. Modulate heating, cooling and economizer to maintain set point. Coordinate initial setpoints with BSD staff.
- C. Ventilation: Demand control ventilation based on CO2 in space.
- Night set back and morning warm up. Close outside air dampers and operate D. heating or cooling as required to reach set point.
- E. Alarms: At a minimum provide alarms for high space temperature, low space temperature, and all unit generated alarms.
- F. Install HVAC shut-off button to shut down building HVAC system. Locate button in the main office. Provide an openable, clear plastic cover to prevent accidental activation, as well as a visual indicator to alert office staff if activation occurs.

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4.02 GYMNASUM SYSTEM (EF-10 & 11, UH-1 & 2, DF-1 thru 4):

A. Exhaust Fans/OSA Intake.

- 1. Turn on fans on low speed and open OSA damper for cooling when temperature is at or above set point. Increase fan speed if temperature remains above set point.
- 2. CO2 will override both off and cooling mode to operate fans and fans speed and open OSA dampers to maintain CO2 set point.
- 3. Modulate fan speed to lowest setting required to maintain set point.
- 4. Night Low Limit and Morning Warm Up: Fans off and dampers closed during NLL and Morning Warm Up.
- 5. Install HVAC shut-off button to shut down building HVAC system. Locate button in the main office. Provide an openable, clear plastic cover to prevent accidental activation, as well as a visual indicator to alert office staff if activation occurs.

B. Unit Heaters:

- 1. Operate during occupied hours.
- 2. Modulate heating to maintain set point.
- 3. Night Low Limit: Operate as needed during unoccupied hours to maintain NLL set point.
- 4. Morning Warm Up: Operate prior to occupied hours for space temperature to reach set point by occupied time.
- 5. Install HVAC shut-off button to shut down building HVAC system. Locate button in the main office. Provide an openable, clear plastic cover to prevent accidental activation, as well as a visual indicator to alert office staff if activation occurs.

C. Destratification Fans:

- 1. Operate only during occupied hours
- 2. Operate when temperature difference between near the ceiling and at 5 feet above the floor is more than 5°F at the highest reading sensors (adjustable).
- 3. Provide manual on/off override switch in the space to operate all fans.
- 4. Install HVAC shut-off button to shut down building HVAC system. Locate button in the main office. Provide an openable, clear plastic cover to prevent accidental activation, as well as a visual indicator to alert office staff if activation occurs.
- 4.03 VARIABLE REFRIGERANT FLOW SYSTEMS (All):

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- A. These systems will operate on factory provided controls, see VRF specifications for sequence, with the following interconnections to the DDC system and graphic interface.
 - 1. Set point control.
 - 2. Scheduling control.
 - 3. Space temperature viewing.
 - 4. Status viewing.
 - 5. Alarms.
 - 6. Install HVAC shut-off button to shut down building HVAC system. Locate button in the main office. Provide an openable, clear plastic cover to prevent accidental activation, as well as a visual indicator to alert office staff if activation occurs.
- 4.04 DEDICATED OUTSIDE AIR SYSTEM (AHU-1):
 - A. Operate during occupied hours.
 - B. Modulate heating to maintain discharge air set point.
 - C. Modulate fan speed to maintain space CO2 set point. Airflow to be as shown on schedules.
 - D. Operate heat recovery when leaving air temperature and entering air temperature are adequate to provide necessary heating or cooling.
 - E. Install HVAC shut-off button to shut down building HVAC system. Locate button in the main office. Provide an openable, clear plastic cover to prevent accidental activation, as well as a visual indicator to alert office staff if activation occurs.
- 4.05 ELECTRIC WALL HEATERS (All local control only):
 - A. Modulate to maintain set point temperature.
- 4.06 EXHAUST FAN EF-20:
 - A. Operate during occupied hours.
 - B. Install HVAC shut-off button to shut down building HVAC system. Locate button in the main office. Provide an openable, clear plastic cover to prevent accidental activation, as well as a visual indicator to alert office staff if activation occurs.
- 5 POINTS LIST
 - 5.01 This points list is intended to convey design intent only and is the minimum points required. Additional points will be required and determined by system designer to accomplish a complete and operating system in compliance with this specification and the sequence of operation.
 - 5.02 GENERAL:

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- A. Outside air temperature
- 5.03 CONSTANT VOLUME ROOFTOP UNITS:
 - A. Status (on/off)
 - B. Status (heating/cooling/economizing)
 - C. Supply air temperature
 - D. Return air temperature
 - E. Space temperature
 - F. CO2
 - G. Alarms.
- 5.04 GYMNASIUM SYSTEM:
 - A. Unit Heaters
 - 1. Status (on/off)
 - 2. Temperature
 - B. Exhaust Fans
 - 1. Fan and Damper Status (on/off)
 - C. OSA Intake
 - 1. Damper Status
 - D. Destratification Fans
 - 1. Status (on/off/override)
 - 2. Temperature at ceiling.
 - 3. Temperature at floor.
 - 4. Status (on/off)
- 5.05 VARIABLE REFRIGERANT FLOW SYSTEMS:
 - A. Status (on/off)
 - B. Status (heating/cooling)
 - C. Space temperature
 - D. Alarms.
- 5.06 EXHAUST FANS:

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Status (on/off). A.

END OF SECTION

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1 GENERAL

1.01 WORK INCLUDED

- A. Provide equipment as specified herein and shown on the Drawings.
- B. Equipment capacity and size as indicated in the equipment lists on the Drawings.

1.02 QUALITY ASSURANCE

- A. Air Handling Equipment: Rated in accordance with AMCA certified rating procedures and AMCA labeled.
- B. Air Conditioning and Refrigeration Equipment Rating: Rated in accordance with ARI certified rating procedures and AMCA labeled.
- C. Codes: Refer to Section 23 0000.

1.03 SUBMITTALS

- A. Submit product data under provisions of Section 23 0000.
- B. Submit product data for manufactured products and assemblies required for this project.
- C. Indicate electrical service and duct connections on product data.
- D. Submit manufacturer's installation instructions under provisions of Section 23 0000.
- E. Provide Submittals for the following:
 - 1. Air Handling Units.

1.04 DELIVERY, STORAGE AND HANDLING

- A. Deliver product to site under provisions of Section 23 0000.
- B. Store and protect product under provisions of Section 23 0000.
- C. Store insulation in original shipping container with labeling in place. Do not install damaged insulation.

1.05 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data under provisions of Section 23 0500.
- B. Include manufacturer's descriptive literature, operating instructions, installation instructions, maintenance and repair data, and parts listing.

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2 PRODUCTS

2.01 PACKAGED ROOFTOP AIR CONDITIONING UNITS (20-130 TONS)

- A. Manufacturers: Trane IntelliPak, McQuay RPS, Mammoth or approved substitute.
- B. Performance: Unit shall be selected within +/-5% of cooling and heating capacity scheduled. Unit shall be provide EER, IPLV, fan BHP efficiencies at or better than scheduled values.
- C. General: Single piece packaged rooftop combination heating and cooling unit. Unit factory assembled, piped, wired, and tested. Factory run tested to include the operation of all fans, compressors, heat exchangers, and control sequences. Factory adhere labels, decals, and/or tags to aid in the service of the unit and indicate caution areas. Unit manufacturer to provide galvanized steel roof curb.
- D. Casing: Zinc coated galvanized steel to be finished with weather-resistant enamel finish. Unit surface shall withstand 1000 hours in a salt spray test in compliance with ASTM B117. Unit to have downflow supply and return with duct connections made fully inside roof curb. The unit base shall have provisions for crane lifting lugs. Unit to include outside air intake louvers. Roof panels shall be sloped to provide positive drainage of rainwater / melting snow away from the cabinet.
- E. Service Access: Access panels shall be hinged, double wall access doors with quick release latches, and provide a water and airtight seal. Hinged access doors for fan sections, filter section and control section. Removable access panels for refrigeration and coils.
- F. Electrical: Units shall be UL, CSA or ETL listed and labeled. Provide single point electrical connection with hinged weatherproof control panel, suitable overload protection for each branch circuit and contactors for each motor. Provide fused control power transformer.
- G. Supply Fan: Belt driven, forward curved supply fan, centrifugal type with fixed pitch sheaves. Provide one set of replacement sheaves if needed by air balancer. Fans to be internally isolated with two inch deflection spring isolation. Provide thermal overload protection on motors. Motors to be high efficiency.
- H. Economizer: Outside, return and exhaust dampers to be factory installed, ultra low leak damper with leakage rate not to exceed 1.0% of nominal airflow at one inch W.G. static pressure, rated in accordance with AMCA 575. Include polyvinyl gasketing on leading edges.
- I. 100% Return/Exhaust Fans: Same as supply fan.
- J. 50% Fixed Exhaust Fan: Provide 50% non-modulating exhaust air capabilities integral to unit. Utilize barometric dampers at fan outlet to prevent backdraft conditions. Operation of exhaust fan is on/off based on economizer outdoor air damper position.

K. Dx Cooling And Refrigeration System: Semi-hermetic reciprocating compressors or hermetic scroll compressors allowed. Semi-hermetic reciprocating with crankcase heater, discuss suction & discharge valves, and max. 1750 RPM. Hermetic scroll compressor with integral oil separation, no suction & discharge valves and maximum 3600 RPM. All compressors to include internal temperature and current-sensitive motor overloads. Units to include compressor isolation, thermal expansion devices, service pressure ports and liquid line dryers. Direct drive propeller condenser fans to include permanently lubricated bearings and three phase motors with built-in thermal overload protection. Aluminum fin DX cooling coil with moisture carryover management system and drain pan. Condenser coils shall be copper tube with aluminum fin, maximum 14 fins per inch for cleanability. Refrigeration system suitable for ambient operation down to 50 degrees F. Provide hot gas bypass on systems with semi-hermetic compressors for low load conditions and frost control. Provide refrigerant circuit suction temperature compressor cycle control for coil frost protection on units with scroll compressors. Evaporator and condenser coils leak tested to 600 psi.

- L. Provide architectural condenser coil covers constructed of stamped steel, painted to match unit casing. Louvers shall have maximum opening size of ½ inch tall and 4 inches wide for appearance and to prevent debris from blocking condenser coil.
- M. Unit Options:
 - 1. Non-Fused Disconnect Switch.
 - 2. Standard Roof Curb.
 - 3. Gas Heating Section.
 - 4. VAV applications to include variable frequency drives, one per motor, for airflow / duct static pressure modulation. Completely factory installed inside unit.
 - 5. Corrosion Protection.
 - 6. Filters: Filter rack with MERV 13 filters required, see schedule. Two sets of filters required.
 - 7. Microprocessor Control: Factory controls to include devices and wiring necessary for unit operation on a standalone basis for service checkout and operation during construction and startup yet before control installation is complete. Each unit shall be provided with a factory installed and run tested, stand alone, microprocessor control system suitable for CV or VAV control as required. This system shall consist of temperature and pressure sensors, printed circuit boards, and a unit mounted user interface. The microprocessor shall be equipped with on-board diagnostics to indicate that all hardware, software, and all interconnected wiring and sensors are in proper operating condition. The microprocessor's memory shall be non-volatile EEPROM type, thus requiring no battery backup to maintain all data during a power loss.

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- 8. Minimum control devices shall include:
 - a. Refrigeration safety controls including high pressure, low pressure and overcurrent protection with manual reset upon tripout
 - b. Gas heat units shall have continuous flame supervision, shutting off gas if flame fails. High temperature limit controls must shut off gas flow in the event of excessive temperatures resulting from restricted indoor airflow or loss of indoor airflow.
 - c. Provide 100 percent fully integrated and modulating enthalpy economizer control. Shall include outside air enthalpy sensor to enable economizer when free cooling is feasible, supply temperature sensor to limit discharge temperature, adjustable minimum position potentiometer to provide ventilation in occupied mode, outside/return dampers, spring return actuator, and adjustable exhaust fan control.
 - d. VAV units shall include duct static pressure control to modulate VFD.
 - e. VAV units shall include building static pressure control.

2.02 PACKAGED ROOFTOP AIR CONDITIONING UNITS (3-20 TONS)

- A. Manufacturers: Trane Precedent/Voyager, Carrier, McQuay, Luxaire, Lennox or approved substitution.
- B. Performance: Unit shall be selected within +/-5% of cooling and heating capacity scheduled. Unit shall be provide EER, IPLV, fan BHP efficiencies at or better than scheduled values.
- C. Unit: Single piece packaged rooftop combination heating and cooling unit. Unit factory assembled, piped, charged with refrigerant, wired, and tested. Factory run tested to include the operation of all fans, compressors, heat exchangers, and control sequences. Factory adhere labels, decals, and/or tags to aid in the service of the unit and indicate caution areas.
- D. Cabinet: Zinc coated galvanized steel to be finished with weather-resistant enamel finish. Unit surface shall withstand 600 hours in a salt spray test in compliance with ASTM B117. Unit to have downflow supply and return with duct connections made fully inside roof curb. The unit base shall have provisions for crane lifting lugs. Unit to include outside air intake hood. Roof panels shall be sloped to provide positive drainage of rainwater / melting snow away from the cabinet.
- E. Service Access: Access panels shall be hinged or quick lift out with no more than two screws and provide a water and airtight seal.

- F. Supply Fan: Forward curved, double width, double inlet, centrifugal type supply fan with self-aligning, grease lubricated ball or sleeve bearings with permanent lubrication fittings. Belt drive with fixed pitch sheaves on units 3 tons and larger, direct drive allowed only on units 2.5 tons and smaller. Provide one set of replacement sheaves if needed by air balancer. Provide thermal overload protection on motor.
- G. Exhaust Fan: Units 6 tons and larger shall be provided with exhaust fan to assist in controlling building static pressure. Exhaust fan is for duct installation on horizontal discharge units. Exhaust fan shall be mounted and integrally wired on downflow units. Exhaust fan shall be on whenever outside air damper is greater that 25 percent. Units below 6 tons, which have economizers, shall have barometric relief hood.
- H. Gas Heating Section: Completely assembled and wired gas fired heating system with aluminized steel heat exchanger, electronic ignition, centrifugal combustion blower, continuous flame safety, automatic gas valve and manual gas shut-off valve. Designed and tested for use constant airflow with entering air down to 45 degrees. Two-stage natural gas heating when heating output is greater than 140 MBH.
- I. Refrigeration System: Direct drive hermetic scroll compressors with centrifugal type oil pumps. All compressors to include internal temperature and current-sensitive motor overloads. Crankcase heaters to be included on units 6-tons and above. Compressors shall be isolated from casing with suitable vibration isolation. Direct drive propeller condenser fans to include permanently lubricated bearings and built-in thermal overload protection. Aluminum fin DX cooling coil with moisture carryover management system. Condensate pan shall be sloped & pitched with not standing water. Condenser coil with plate type aluminum fin, maximum 16 fins per inch for cleanability. Refrigeration system suitable for ambient operation down to 0 degrees F in case of economizer failure. Refrigeration system suitable for ambient operation up to 125 deg F. Evaporator and condenser coils leak tested to 600psi.
- J. Economizer: Provide an outside air economizer with return and outside air dampers modulated directly by the unit level DDC controller. Damper operator shall be spring return and close outside air damper on power loss. Economizer controls shall utilize outdoor dry bulb temperature to enable economizer operation. Outside air shall be locked out during unoccupied and morning warmup conditions. Provide adjustable minimum position control.
- K. Electrical: Units shall be UL listed and label as a complete assembly. Provide single control panel with weatherproof control panel, single point electrical connection, suitable overload protection for each branch circuit, contactors for each motor & compressor, fused control power transformer. Provide wiring diagrams, affixed to access door.

L. Controls: Factory controls to include devices and wiring necessary for unit operation on a standalone basis for service checkout and operation before control installation is complete. This system shall consist of contactors, transformers, two minute supply fan anticycle timer, compressor min ON and OFF anticycle timers, condenser fan anticycle timers, heat anticycle timers, and refrigeration safeties factory wired and tested. Controls shall provide fully integrated, dry bulb initiated, economizer control that allows compressor operation to supplement free cooling. Unit control shall interface with thermostat or controller specified under division 23 0923 or 23 0933.

M. Unit Options:

- 1. Roof Curb: 14 inch high galvanized steel curb with gaskets and nailer strip, manufactured in accordance with the National Roofing Contractors Association guidelines for rooftop equipment support.
- 2. Filters: Filter rack with MERV 13 filters required, see schedule. Two sets of filters required.

3 EXECUTION

3.01 EXAMINATION

- A. Verify that building is ready to receive work and opening dimensions are as illustrated by the manufacturer.
- B. Verify that proper power supply is available.

3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions and applicable code.
- B. Lubricate all moving and rotating parts in accordance with manufacturer's recommendation prior to start-up.
- C. All roof mounted mechanical equipment shall be supported and seismically anchored on leveled, flashed and counterflashed curbs anchored to resist seismic forces and suitable for the roof construction. Minimum curb height shall be 12 inches above the roof unless otherwise noted. Flashing into the roof is specified in another Section.
- D. Make all electrical and duct penetrations for each equipment within the curb unless shown otherwise on the Drawings. Piping and electrical conduit routed above and across the roof shall be supported on flashed and counterflashed curbs with pipe guides anchored to the curbs in "pitch pockets." Submit shop drawings on other arrangements for approval.
- E. On makeup air unit evaporative cooling pump discharge pipe to media, install tee and 3/8" manual bleed valve and piping to nearest floor drain. Set bleed rate per manufacturer's instructions.

3.03 FILTERS

A. New filters shall be installed in units prior to air balancing and project acceptance.

3.04 MOISTURE DETECTION SYSTEM

- A. The solid state control module panel will be wall mounted in a control enclosure within the rooms shown. Circuit the control unit from the security panel ring circuit via hard wiring. Coordinate capacity with Division 16.
- B. Provide and install the moisture detection cable. Secure the cable to the floor via the clips via adhesive to the floor. Provide a 750mm diameter cable loop at each modular cable connector and at the termination point at the end of the cable run. This loop to be clipped down. The actual layout of the cable will be confirmed and coordinated with the telecommunications cable and computer room cable installers.

3.05 COMMISSIONING

A. Installed HVAC will be commissioned by an authorized commissioning agent. Controls and mechanical contractor will support the commissioning process.

END OF SECTION

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1 GENERAL

1.01 SUMMARY

A. Section Includes:

- 1. Electrical systems required for this work includes labor, materials, equipment, and services necessary to complete installation of electrical work for building shell, core and one Tenant build out as shown on Drawings, specified herein or required for a complete operable facility and not specifically described in other Sections of these Specifications. Among the items required are:
 - a. Service and distribution equipment shown on Drawings.
 - b. Distribution level transient voltage suppression equipment.
 - c. Feeders to switchboards, distribution panels, HVAC equipment, Owner provided equipment and other equipment as detailed.
 - d. Branch circuit wiring from the distribution panels for lighting, receptacles, motors, signal systems and other detailed circuit wiring.
 - e. Wiring and power connections for motors installed for heating, cooling and ventilation.

International Electrotechnical Commission.

1.02 DEFINITIONS

A. Following is a list of abbreviations generally used in Divisions 26, 27, 28, and 33:

1.	AHJ	Authority Having Jurisdiction.
2.	ADA	Americans With Disabilities Act.
3.	ANSI	American National Standards Institute.
4.	APWA	American Public Works Association.
5.	ASTM	American Society for Testing and Materials.
6.	FCC	Federal Communications Commission.
7.	HVAC	Heating-Ventilating and Air Conditioning.
8.	IBC	International Building Code.
9.	IEEE	Institute of Electrical and Electronic Engineers.

10.

IEC

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	11.	IETA	International Electrical Testing Association.
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- 12. IFC International Fire Code.
- 13. FM Factory Mutual.
- 14. NEMA National Electrical Manufacturer's Association
- 15. NFPA National Fire Protection Association.
- 16. NEC National Electric Code.
- 17. OSHA Occupational Safety and Health Administration.
- 18. UL Underwriters' Laboratories, Inc.
- B. Provide: To furnish and install, complete and ready for the intended use.
- C. Furnish: Supply and deliver to the project site, ready for unpacking, assembly, and installation.
- D. Install: Includes unloading, unpacking, assembling, erecting, installation, applying, finishing, protecting, cleaning and similar operations at the project site as required to complete items of work furnished by others.

1.03 ADDITIONAL REQUIREMENTS TO DIVISION 01

- A. Operation and Maintenance Documentation: Provide copies of certificates of code authority acceptance, test data, product data, guarantees, warranties, and the like. These are to be provided electronically through eBuilder, refer to Division 1 for more information.
- B. Shop Drawings: When requested by individual Sections provide shop drawings, which include physical characteristics, electrical characteristics, device layout plans, wiring diagrams, and the like. Refer to individual Specification Sections for additional requirements for the shop drawings. All shop drawings are to be provided electronically through eBuilder, refer to Division 1 for more information.
- C. Closeout Documentation: Provide all closeout documentation electronically through eBuilder, refer to Division 1 for more information.

D. Record Drawings:

- 1. Show changes and deviations from the Drawings. Include written Addendum and change order items.
- 2. Show exact routes of feeders 60 amp and larger, conduits for signal systems 2-inches in diameter and larger, and service entrance conduits.
- 3. Show exact location of switchboards, distribution panelboards, safety disconnects, motor controllers, and the like.

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- 4. Make changes to Drawings in a neat, clean, and legible manner.
- 5. Provide an 11 x 17 size Record Drawing of the one-line power diagram sealed in a plastic coating. Mount on the wall of the electric room.

1.04 QUALITY ASSURANCE

- A. Conform to requirements of the NEC, latest adopted version with amendments by local AHJs.
- B. Conform to latest adopted version of the IBC with Oregon amendments.
- C. Obtain and pay for electrical permits, plan review, and inspections.
- D. Furnish products listed by UL or another testing firm acceptable to AHJ.
- E. Conform to requirements of the serving electric, and telephone utilities.

1.05 SEQUENCING AND SCHEDULING

- A. For the proper execution of the work cooperate with other crafts and contracts as needed.
- B. To avoid installation conflicts, thoroughly examine the complete set of Contract Documents. Resolve conflicts with Architect prior to installation.
- C. Prior to installation of feeders to equipment requiring electrical connections, examine the manufacturer's shop drawings, wiring diagrams, product data, and installation instructions. Verify that the electrical characteristics detailed in the Contract Documents are consistent with the electrical characteristics of the actual equipment being installed. When inconsistencies occur request clarification from Architect.

2 PRODUCTS

2.01 MANUFACTURERS

A. Provide like items from one manufacturer, such as, luminaire types, switches, receptacles, breakers, panels, and the like.

2.02 MATERIALS

- A. Provide new electrical materials of the type and quality detailed, listed by UL, bearing their label wherever standards have been established. Indicated brand names and catalog numbers are used to establish standards of performance and quality. The description of materials listed herein governs in the event that catalog numbers do not correspond to materials described herein.
- B. Provide material and equipment that is acceptable to AHJ as suitable for the use indicated. For example, provide wet labeled equipment in locations that are wet.

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C. Include special features, finishes, accessories, and other requirements as described in the Contract Documents regardless of the item's listed catalog number.

Provide incidentals not specifically mentioned herein or noted on Drawings, but D. needed to complete the system or systems, in a safe and satisfactory working condition.

FIRESTOPPING 2.03

- For additional requirements see Division 07, Firestopping section A.
- B. Foam Sealant: Foam sealant for use around conduit penetrations to prevent passage of smoke, fire, toxic gas or water. Maintain seal before, during and after fire. In and around conduit for thermal break at penetration of barrier between heated and unheated spaces. Chase Technology Corporation, Fire Foam, Thomas & Betts, or approved.

3 **EXECUTION**

3.01 **EXAMINATION**

A. **Construction Documents:**

- Drawings are diagrammatic with symbols representing electrical 1. equipment, outlets, luminaires, and wiring.
- Electrical symbols indicating wiring and equipment shown in the 2. Contract Documents are included in the Contract unless specifically noted otherwise.
- 3. Examine the entire set of Drawings to avoid conflicts with other systems. Determine exact route and installation of electrical wiring and equipment with conditions of construction.

Clarification: B.

- The Drawings govern in matters of quantity, the Specification in matters 1. of quality. In event of conflict on Drawings or in the Specifications, the greater quantity and the higher quality apply.
- 2. Should the Electrical Documents indicate a condition conflicting with the governing codes and regulations, refrain from installing that portion of the work until clarified by Architect.

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3.02 INSTALLATION

A. Install electrical equipment complete as directed by manufacturer's installation instructions. Obtain installation instructions from manufacturer prior to rough-in of the electrical equipment, examine the instructions thoroughly. When requirements of the installation instructions conflict with the Contract Documents, request clarification from Architect prior to proceeding with the installation.

B. Do not install electrical equipment in obvious passages, doorways, scuttles, or crawl spaces which would impede or block the area passage's intended usage.

C. Earthwork:

- 1. Refer to Division 31, Earthwork.
- 2. Perform excavation and backfill for the installation of electrical work.

D. Noise Control:

- 1. Do not install outlet boxes back to back. Do not use straight through boxes.
- 2. Do not place contactors, transformers, starters, and similar noise producing devices on walls, which are common to occupied spaces, unless specifically called for on Drawings. Where such devices must be mounted on walls common to occupied spaces, mount or isolate in such a manner as to effectively prevent the transmission of their inherent noise to the occupied space.

E. Firestopping:

- 1. Coordinate with the Drawings the location of fire rated walls, ceilings, floors, and the like. When these assemblies are penetrated by electrical equipment, seal around the equipment with approved firestopping material. Maintain integrity of rated assemblies.
- 2. Install firestopping material complete as directed the manufacturer's installation instructions.

3.03 FIELD QUALITY CONTROL

A. Tests:

1. Conduct tests of equipment and systems to demonstrate compliance with requirements specified in Divisions 26, 27, 28, and 33. Refer to individual Specification Sections for required tests. Document tests and include in Closeout Documents.

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2. During site evaluations, by Architect or Engineer, provide an electrician with tools to remove and replace trims, covers, devices, and the like, so that a proper evaluation of the installation can be performed.

3.04 CLEANING

- A. Remove dirt and debris caused by the execution of the electrical work.
- B. Leave the entire electrical system installed under this Contract in clean, dust-free, and proper working order.
- C. Vacuum clean interiors of electrical equipment enclosures.

END OF SECTION

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1 GENERAL

1.01 SUMMARY

- A. Wires and cables.
- B. Connectors.
- C. Lugs and pads.
- D. MC cable.

1.02 SYSTEM DESCRIPTION

A. Provide wires, cables, connectors, lugs, and the like for a complete and operational electrical system.

1.03 SUBMITTALS

- A. Provide product data for the following equipment:
 - 1. Wires.
 - 2. Cables.
 - 3. Connectors.
 - 4. Lugs.
- B. Provide the insulation cable testing report in the project closeout documentation, see Project Closeout Requirements in Division 01.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of the NEC, latest adopted version with amendments by local AHJs.
- B. Furnish products listed by UL or another testing firm acceptable to AHJ.

2 PRODUCTS

2.01 MANUFACTURERS

- A. Wires and Cables: Carol, General Cable, Okonite, Rome, Southwire, or approved.
- B. Connectors: Stranded conductors by Anderson, Burndy, Ilsco, Thomas & Betts, or approved.

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C. Splices:

- 1. Branch Circuit Splices: Ideal, Scotch-Lock, 3M, or approved.
- 2. Feeder Splices: Compression barrel splice with two layers Scotch 23 and four layers of Scotch 33+ as vapor barrier.
- D. MC Cable: Alflex, AFC, Carol, or approved.

2.02 WIRES AND CABLES

- A. Copper, 600 volts rated throughout. Conductors 14AWG to 10AWG, solid or stranded. Conductors 8AWG and larger, stranded.
- B. Phase color to be consistent at all feeder terminations; A-B-C, top to bottom, left to right, front to back.
- C. Color Code Conductors as Follows:

PHASE	208 VOLT WYE	240 VOLT DELTA	480 VOLT
A	Black	Black	Brown
В	Red	Orange (High Leg)	Orange
C	Blue	Blue	Yellow
Neutral	White	White	[Gray] [White w/colored strip]
Ground	Green	Green	Green
Isolated Ground	Green w/yellow trace	N/A	N/A

- D. Conductors 3AWG and larger, minimum insulation rating of 75C.
- E. Insulation types THWN, THHN or XHHW. Minimum insulation rating, 90C, for branch circuits.
- F. MC Cable: High strength galvanized steel or aluminum flexible armor. Full length minimum size No. 12 copper ground wire, THHN 90C conductors, full length tape marker. Overall PVC or nylon cable tape. Short circuit throat insulators, mechanical compression termination. Manufacturers: Alflex, AFC, or Carol.
- G. Refer to communications, Division 27, for cable requirements.

2.03 CONNECTORS

- A. Copper Pads: Drilled and tapped for multiple conductor terminals.
- B. Lugs: Indent/compression type for use with stranded branch circuit or control conductors.
- C. Solid Conductor Branch Circuits: Spring connectors, wire nuts, for conductors 18 through 8AWG.

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2.04 LUGS AND PADS

A. Ampacity: Cross-sectional area of pad for multiple conductor terminations to match ampere rating of panelboard bus or equipment line terminals.

3 EXECUTION

3.01 INSTALLATION

- A. Wires and Cables:
 - 1. Conductor Installation:
 - a. Install conductors in raceways having adequate, code size cross-sectional area for wires indicated.
 - b. Install conductors with care to avoid damage to insulation.
 - c. Do not apply greater tension on conductors than recommended by manufacturer during installation.
 - d. Use of pulling compounds is permitted. Clean residue from exposed conductors and raceway entrances after conductor installation. Do not use pulling compounds for installation of conductors connected to GFI circuit breakers or GFI receptacles.
 - 2. Conductor Size and Quantity:
 - a. Install no conductors smaller than 12AWG unless otherwise shown.
 - b. Provide all required conductors for a fully operable system.
 - 3. Provide dedicated neutrals (one neutral conductor for each phase conductor) in the following single-phase circuits:
 - a. Dimmer controlled circuits.
 - b. Isolated ground circuits.
 - c. Ground fault protected circuits where a GFI breaker is used in a panelboard.
 - d. Other electronic equipment which produces a high level of harmonic distortion including but not limited to computers, printers, plotters, copy machines, fax machines, and the like.
 - 4. MC cable allowed in the following locations only: In areas where there is an accessible ceiling. Do not use in areas where there is no accessible ceiling.

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- 5. Conductors in Cabinets:
 - a. Cable and tree all wires in panels and cabinets for power and control. Use plastic ties in panels and cabinets.
 - b. Tie and bundle feeder conductors in wireways of panelboards.
 - c. Hold conductors away from sharp metal edges.
- 6. Connectors: Retighten mechanical type lugs and connectors for conductors to equipment prior to Substantial Completion.

3.02 FIELD QUALITY CONTROL

A. Tests:

- 1. Test conductor insulation on feeders of 100 amp and greater for conformity with 1000-volt megohmmeter. Use Insulated Cable Engineers Association testing procedures. Minimum insulation resistance acceptable is 1 megohm for systems 600 volts and below. In the condition that the insulation resistance is less than 1 megohm notify Architect.
- 2. Test Report: Prepare a typed tabular report indicating the testing instrument, the feeder tested, amperage rating of the feeder, insulation type, voltage, the approximate length of the feeder, conduit type, and the measured resistance of the megohmmeter test. Submit report with operating and maintenance manual.

END OF SECTION

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1 GENERAL

1.01 SUMMARY

- A. Grounding materials.
- B. Electric service grounding electrode.
- C. Feeder and branch circuit grounding.
- D. Raceway and enclosure grounding.
- E. Equipment grounding.
- F. Receptacle grounding.
- G. Related Sections:
 - 1. Section 26 0519, Low-Voltage Electrical Power Conductors and Cables.
 - 2. Section 26 0533, Raceway and Boxes for Electrical Systems.

1.02 SYSTEM DESCRIPTION

- A. Provide grounding and bonding of electrical service, circuits, equipment, signal, and communications systems.
- B. Performance Requirements: Supplement the grounded neutral of the secondary distribution system with an equipment grounding system to properly safeguard the equipment and personnel. Install equipment grounding such that all metallic structures, enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, portable equipment, and other conductive items in close proximity with electrical circuits operate continuously at ground potential and provide a low impedance path for possible ground fault currents.

1.03 SUBMITTALS

- A. Provide Shop drawings and product data for the grounding material.
- B. Provide the following test reports for information:
 - 1. Grounding system test.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of the NEC, latest adopted version with amendments by local AHJs.
- B. Furnish products listed by UL or other testing firm acceptable to AHJ.

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1.05 SEQUENCING AND SCHEDULING

A. Building Ground Electrode: Coordinate placement of ground rods and grounding electrode conductor in base of building footing prior to placement of concrete. Coordinate bonding of rebar with rebar installer prior to rough-in.

2 PRODUCTS

2.01 MATERIALS

- A. Ground Rods: Copperclad steel, 3/4-inch diameter, 10-feet long, tapered point, chamfered top. Manufacturers: Weaver, Thomas & Betts, Talley, or approved.
- B. Grounding Connectors: Hydraulic compression tool applied connectors or exothermic welding process connectors or powder actuated compression tool applied connectors. Mechanical connectors are not acceptable. Manufacturers: Burndy Hyground Compression System, Erico/Cadweld, Amp Ampact Grounding System or approved.
- C. Pipe Grounding Clamp: Mechanical ground connector with cable parallel or perpendicular to pipe. Burndy GAR Series, O-Z Gedney, Thomas & Betts or approved.
- D. Telecommunications Grounding Bar: 1/4-inch thick by 4-inch high by 20-inch long copper ground bar with insulators. Manufacturers: Erico/Cadweld or approved.
 - 1. Grounding Electrode Conductor: Bare copper stranded conductor.

3 EXECUTION

3.01 INSTALLATION

- A. Concrete Encased Ground Electrode:
 - 1. From the service equipment ground bus install grounding electrode conductor to footing foundation rebar.
 - 2. Bond the grounding electrode conductor to two independent steel rebars. Minimum re-bar length, 20-feet.
 - 3. Protect grounding electrode conductor extension from footing/foundation to service equipment with rigid PVC conduit. Do not use metal conduit for grounding electrode conductor protection.

B. Ground Rod Electrode:

1. Install 40-feet of No. 3/0 stranded bare copper grounding electrode conductor in base of perimeter footing.

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2. Arrange conductor to provide maximum exposure to earth in the perimeter footing. Do not fold conductor.

- 3. Bond grounding electrode conductor to driven ground rods at 10-foot intervals.
- 4. Tap at center ground rod and extend ground electrode conductor to service ground bus. Install ground electrode conductor extension in rigid PVC conduit for physical protection.
- C. Water Service Grounding: Bond building ground electrode and water service pipe to service ground bus. Connect to water pipe on utility side of isolating fittings or meters, bond across water meters.

D. Raceways:

- 1. Ground all metallic raceway systems. Bond to ground terminal with code size jumper except where code size or larger grounding conductor is included with circuit, use grounding bushing with lay-in lug.
- 2. Connect all metal raceways, which terminate within an enclosure but without mechanical connection to the enclosure, by grounding bushings and ground wire to the grounding bus.
- 3. Where equipment supply conductors are in flexible metallic conduit, install stranded copper equipment grounding conductor from outlet box to equipment frame.
- 4. Install equipment grounding conductor, code size minimum unless noted on Drawings, in all nonmetallic and metallic raceway systems.

E. Feeders and Branch Conduits:

- 1. Install continuous insulated equipment copper ground conductors within the following circuits: feeders, circuits for computer systems and other circuits as indicated on Drawings.
- 2. Where installed in a continuous solid metallic raceway system and larger sizes are not detailed, provide insulated equipment ground conductors for feeders and branch circuits sized in accordance with NEC Table 250.122.
- F. Boxes, Cabinets, Enclosures and Panelboards:
 - 1. Bond grounding conductors to enclosure with specified conductors and lugs. Install lugs only on thoroughly cleaned contact surfaces.
 - 2. Bond all sections of service equipment enclosure to service ground bus.
- G. Motors, Equipment and Appliances: Install code size equipment grounding conductor from outlet box to (motor) equipment frame or manufacturer's designated ground terminal.

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H. Receptacles: Connect ground terminal of receptacle to equipment ground system by No. 14 conductor bolted to outlet box except isolated grounds where noted.
 Self-grounding nature of receptacle devices does not eliminate the requirement for ground conductor bolted to outlet box.

- I. Telecommunications Backboard: Provide telecommunications ground bar at each telecommunications backboard. Bond the grounding bar to service grounding bar in the main service equipment with a 6AWG copper equipment ground conductor.
- J. Separately Derived Systems: Ground each separately derived system per NEC 250.30.

END OF SECTION

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1 GENERAL

1.01 SYSTEM DESCRIPTION

A. Safety factor of 4 required for every fastening device or support for electrical equipment installed. Support to withstand four times weight of equipment it supports.

1.02 SUPPORTING DEVICES

A. Safety factor of 4 required for every fastening device or support for electrical equipment installed. Support to withstand four times weight of equipment it supports. Bracing to comply with Seismic Zone 3 requirements.

2 PRODUCTS

2.01 MATERIALS

- A. Hangers: Kindorf B-905-2A channel, H-119-D washer, C105 strap, 3/8-inch rod with ceiling flange.
- B. Concrete Inserts: Kindorf D-255, cast in concrete for support fasteners for loads up to 800 lbs.
- C. Pipe Straps: Two-hole galvanized or malleable iron.
- D. Luminaire Chain: Campbell Chain 75031, 90-lb. test with steel hooks.

3 EXECUTION

3.01 INSTALLATION

- A. Provide all electrical equipment supports.
- B. Verify mounting height of all luminaires or items prior to installation when heights are not detailed.
- C. Install vertical support members for equipment and luminaires, straight and parallel to building walls.
- D. Provide independent supports to structural member for electrical luminaires, materials, or equipment installed in or on ceiling, walls or in void spaces or over furred or suspended ceilings.
- E. Do not use other trade's fastening devices as supporting means for electrical equipment materials or fixtures.
- F. Do not use supports or fastening devices to support other than one particular item.

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G. Support conduits within 18-inches of outlets, boxes, panels, cabinets, and deflections.

- H. Maximum distance between supports not to exceed 8-foot spacing.
- I. Securely suspend all junction boxes, pull boxes or other conduit terminating housings located above suspended ceiling from the floor above or roof structure to prevent sagging and swaying.
- J. Provide seismic bracing per UBC requirements.

END OF SECTION

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1 GENERAL

1.01 SUMMARY

A. Section Includes:

- 1. Raceways.
- 2. Conduit fittings.
- 3. Sleeves and chases.
- 4. Surface metal raceways.
- 5. Outlet boxes.
- 6. Weatherproof outlet boxes.
- 7. Junction and pull boxes.
- 8. Floor boxes.

1.02 SYSTEM DESCRIPTION

A. Raceways:

- 1. Provide raceways, wires, cables, connector, boxes, devices, finish plates and the like for a complete and operational electrical system.
- 2. Electrical Connections: Connect equipment, whether furnished by Owner or other Divisions of the Contract, electrically complete.
- 3. Supporting Devices: Safety factor of 4 required for every fastening device or support for electrical equipment installed. Support to withstand four times weight of equipment it supports. Bracing to comply with Seismic Zone 3 requirements.

B. Boxes:

- 1. Outlet System: Provide electrical boxes and fittings as required for a complete installation. Include but not limited to outlet boxes, junction boxes, pull boxes, bushings, locknuts, and all other necessary components.
- 2. Code Compliance: Comply with NEC as applicable to construction and installation of electrical boxes and fittings and size boxes according to NEC 370, except as noted otherwise.
- 3. Flush Outlets in Insulated Spaces: Maintain integrity of insulation and vapor barrier.

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1.03 SUBMITTALS

- A. Provide Shop Drawings and Product Data for the Following Equipment:
 - 1. Raceways.
 - 2. Conduit fittings.
 - 3. Surface metal raceways.
 - 4. Outlet boxes.
 - 5. Weatherproof outlet boxes.
 - 6. Junction and pull boxes.
 - 7. Floor boxes.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of the NEC, latest adopted version with amendments by local AHJs.
- B. Furnish products listed by UL or another testing firm acceptable to AHJ.

1.05 SEQUENCING AND SCHEDULING

- A. Raceway System is Defined as Consisting of: Conduit, tubing or duct and fittings including but not limited to connectors, couplings, offsets, elbows, bushings, expansion and deflection fittings and other components and accessories.

 Complete electrical raceway installation before starting the installation of conductors and cables.
- B. Finished Surfaces: Prevent cutting in connection with finished work. Make repairs in a manner approved by Architect.

2 PRODUCTS

2.01 MANUFACTURERS

- A. Raceways: Allied Steel, Certainteed, Jones & Laughlin, Carlon, Kraloy, or approved.
- B. Conduit Fittings: 0-Z Gedney, Thomas & Betts, Crouse & Hinds, or approved.
- C. Surface Metal Raceway System: Square D, Wiremold, or approved, unless specifically noted on Drawings.
- D. Outlet Boxes: Bowers, Raco, or approved.
- E. Weatherproof Outlet Boxes: Bell, Red Dot, Carlon, or approved.

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- F. Junction and Pull Boxes: Circle AW, Hoffman, or approved.
- G. Box Extension Adapter: Bell, Red Dot, Carlon, or approved.
- H. Conduit Fittings: O-Z Gedney, Thomas & Betts, or approved.
- I. Floor Boxes: Wiremold/Walker, Hubbell, Steel City, or approved.

2.02 CONDUITS

- A. Galvanized Rigid Steel Conduit (GRC):
 - 1. Hot-dip galvanized after thread cutting.
 - 2. Manufacture in conformance with Federal Specification WWC-581 and ANSI C80.1.
 - 3. Uniform finish coat with chromate for added protection.
- B. Rigid Aluminum Conduit: Alloy 6063, threaded at each connection.
- C. Intermediate Metal Conduit (IMC):
 - 1. Hot-dip galvanized after thread cutting.
 - 2. Manufacture in conformance with Federal Specification WWC-581.
 - 3. Uniform finish coat with chromate for added protection.
- D. Electrical Metallic Tubing (EMT):
 - 1. Hot-dip galvanized and chromate coated.
 - 2. Manufacture in conformance with Federal Specification WWC-563 and ANSI C80.3.
- E. Flexible Conduit:
 - 1. Reduced wall flexible steel conduit.
 - 2. Hot-dip galvanize steel strip prior to forming and joining.
 - 3. Manufacture in conformance with Federal Specification WWC-566.
- F. Flexible Conduit, PVC Coated:
 - 1. Hot-dip galvanize steel strip prior to forming and joining.
 - 2. PVC chemical resistant jacket extruded to core, up to 1-inch trade size.
 - 3. PVC chemical resistant jacket tubed over core, up to 4-inch trade size.

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- G. PVC:
 - 1. Class 40 heavy wall rigid PVC.
 - 2. Rated for use with 90C conductors.
 - 3. Manufacture in conformance with Federal Specification WC1094A and NEMA TC-2.

2.03 CONDUIT FITTINGS

A. Bushings:

- 1. Insulated Type for Threaded Rigid, IMC Conduit or Raceway Connectors without Factory Installed Plastic Throat Conductor Protection: Thomas & Betts 1222 Series or O-Z Gedney B Series.
- 2. Insulated Grounding Type for Threaded Rigid, IMC Conduit and Conduit Connectors: O-Z Gedney BLG Series.
- B. Raceway Connectors and EMT Couplings
- C. Steel conductor and coupling bodies, with zinc electroplate or hot-dip galvanizing.
- D. Connector locknuts are steel, with threading meeting ASTM tolerances. Locknuts are zinc electroplated or hot-dip galvanized.
- E. Connector throats (EMT, flexible conduit, metal clad cable and cordset connectors) have factory installed plastic inserts permanently installed. For normal cable or conductor exiting angles from the raceway (NEC bending radius), the cable jacket or conductor insulation bears only on the plastic throat insert.
- F. Steel gland, Tomic or Breagle connectors and couplings are recognized for this Contract as having acceptable raceway to fitting electrical conductance.
- G. Set screw connectors and couplings, without integral compression glands, are recognized for this Contract as not having acceptable raceway to fitting electrical conductance. A ground conductor sized per this Specification must be included and bonded within a raceway assembly utilizing this type of connector or coupling.
- H. Expansion/Deflection Fittings
- I. EMT, O-Z Gedney Type TX.
- J. RMC, O-Z Gedney Type AX, DX and AXDX, Crouse & Hinds XD.

2.04 BOXES

A. Outlet Boxes

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B. Luminaire Outlet: 4-inch octagonal box, 1-1/2-inches deep with 3/8-inch luminaire stud if required. Provide raised covers on bracket outlets and on ceiling outlets.

- C. Device Outlet: Installation of one or two devices at common location, minimum 4-inch square, minimum 1-1/2-inches deep. Single or 2-gang flush device raised covers. Raco Series 681 and 686.
- D. Multiple Devices: Three or more devices at common location. Install 1-piece gang boxes with 1-piece device cover. Install one device per gang.
- E. Masonry Boxes: Outlets in concrete, Raco Series 690.
- F. Construction: Provide galvanized steel interior outlet wiring boxes, of the type, shape, and size, including depth of box, to suit each respective location and installation; constructed with stamped knockouts in back and sides, and with threaded holes with screws for securing box covers or wiring devices.
- G. Accessories: Provide outlet box accessories as required for each installation, including mounting brackets, wallboard hangers, extension rings, luminaire studs, cable clamps and metal straps for supporting outlet boxes, compatible with outlet boxes being used and meeting requirements of individual wiring situations.
- H. Weatherproof Outlet Boxes
- I. Construction: 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, blank plugs and corrosion proof fasteners. Weatherproof boxes to be constructed to have smooth sides, gray finish.

2.05 Junction and Pull Boxes

A. Construction: Provide galvanized sheet steel junction and pull boxes, with screwon covers; of the type of shape and size, to suit each respective location and installation; with welded seams and equipped with steel nuts, bolts, screws and washers.

B. Location:

- 1. Install junction boxes above accessible ceilings for drops into walls for receptacle outlets from overhead.
- 2. Install junction boxes and pull boxes as required to facilitate the installation of conductors and limiting the accumulated angular sum of bends between boxes, cabinets, and appliances to 270 degrees.

2.06 BOX EXTENSION ADAPTER

A. Construction: Diecast aluminum.

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B. Location: Install over flush wall outlet boxes to permit flexible raceway extension from flush outlet to fixed or movable equipment. Bell 940 Series, Red Dot IHE4 Series.

2.07 **CONDUIT FITTINGS**

A. Requirements: Provide corrosion-resistant punched-steel box knockout closures, conduit locknuts and plastic conduit bushings of the type and size to suit each respective use and installation.

2.08 FLOOR BOXES - SINGLE GANG

A. Construction: Deep recessed or cast steel fully adjustable before and after concrete pour with all required components for complete activation. Verify required components for application of service fittings, covers, monuments, and the like, attached to floor boxes.

В. Activations:

- 1. Flush: Provide brass duplex or single signal cover, hinged with set screw lock. Carpet or tile finish ring.
- 2. Monuments: Provide stainless steel monuments with power receptacle or data grommet as noted.
- 3. Coordinate specific application of systems as noted on Drawings.
- C. Plastic floor boxes which glue together will not be considered. Plastic mechanically assembled floor boxes may be considered with prior approval.
- Location: Concrete floor. Use poke-thru of same construction in non-concrete D. structure. Verify exact locations. Ensure flush with finish surface.

2.09 FLOOR BOXES - MULTIPLE GANG

Construction: Deep steel, fully adjustable before and after pour. Equal to A. Walkerboy Omnibox multi-service floor box with carpet plates, device covers. Verify color. Partition for different power or signal applications. Provide required power receptacle devices and signal grommets or receptacles as noted.

3 **EXECUTION**

3.01 **PREPARATION**

- A. Inserts, Anchors and Sleeves:
- Coordinate location of inserts and anchor bolts for electrical systems prior to B. pouring concrete.
- Coordinate location of sleeves for electrical systems prior to pouring concrete, C. with consideration for all other building systems.

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3.02 INSTALLATION

- A. Conduits
- B. Conduit Joints: Assemble conduits continuous and secure to boxes, panels, luminaires, and equipment with fittings to maintain continuity. Provide watertight joints where embedded in concrete, below grade or in damp locations. Seal PVC conduit joints with solvent cement and metal conduit with metal thread primer. All rigid conduit connections to be threaded, clean and tight (metal to metal). Threadless connections are not permitted for GRC and IMC.
 - 1. Conduit Placement
 - 2. Install continuous conduit and raceways for electrical power wiring [and signal systems wiring].
 - 3. Conceal all conduits. Exposed conduits are permitted only in the following areas:
 - a. Mechanical rooms, electrical rooms, or spaces where walls, ceilings and floors will not be covered with finished materials.
 - b. Existing walls that are concrete or block construction.
 - c. Where specifically noted on the Drawings.
 - d. Where exposed conduits are permitted install parallel or at right angles to building lines, tight to finished surfaces and neatly offset into boxes.
 - e. Do not install conduits or other electrical equipment in obvious passages, doorways, scuttles, or crawl spaces which would impede or block the area passage's intended usage.
 - f. Do not install conduits on surface of building exterior, across roof, on top of parapet walls, or across floors.
 - 4. Below Grade Conduit and Cables: Place a minimum 3-inch cover of sand or clean earth fill around the cable or conduit on a leveled trench bottom. Lay conduit on a smooth level trench bottom, so that contact is made for its entire length. Remove water from trench before electrical conduit is installed.
 - 5. Maximum Bends: Install code sized pull boxes to restrict maximum bends in a run of conduit to 270 degrees.
 - 6. Conduit Terminations: Provide conduits shown on Drawings which terminate without box, panel, cabinet, or conduit fitting with not less than five full threads. Bushings and metal washer type sealer between bushing and conduit end.

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7. Flexible Conduit: Install 12-inch minimum slack loop on flexible metallic conduit and PVC coated flexible metallic conduit.

- 8. Conduit Size: Size as indicated on Drawings. Where size is not indicated, provide conduit in minimum code permitted size for THW conductors of quantity shown. Minimum trade size 1/2-inch.
- C. Conduit Use Locations
 - 1. Underground: PVC.
 - 2. Cast-in-Place Concrete, Masonry, Damp Locations and Subject to Mechanical Damage: GRC or IMC.
 - 3. Dry, Protected: GRC, IMC, EMT.
 - 4. Sharp Bends and Elbows: GRC, EMT use factory elbows.
- D. Install pull wire or nylon cord in empty raceways provided for other systems. Secure wire or cord at each end.
- E. Elbows for Signal Cables: Use long radius factory ells were linking sections of raceway for installation of signal cable.
- F. Motors, recessed luminaires, and equipment connections subject to movement or vibration, use flexible metallic conduit.
- G. Motors and equipment connections subject to movement or vibration and subjected to any of the following conditions: exterior location, moist or humid atmosphere, water spray, oil or grease use PVC coated liquid tight flexible metallic conduit.
- H. Branch Circuits: Do not change the intent of the branch circuit or controls without approval. Homeruns for 20-amp branch circuits may be combined to a maximum of six conductors in a homerun. Apply derating factors as required by NEC 310. Increase conductor size as needed.
- I. Feeders: Do not combine or change feeder runs.
- J. Unless otherwise indicated, provide raceway systems for lighting, power, and Class 1 remote-control and signaling circuits and Class 2 and 3 remote-control signaling and communication circuits.
- K. Condulets and Conduit Bodies: Condulets and conduit bodies are not allowed.
- L. Sleeves and Chases Floor, Ceiling and Wall Penetrations: Provide necessary rigid conduit sleeves, openings, and chases where conduits or cables are required to pass through floors, ceiling, or walls.

Project Number: 20Y105.01 Release Phase: Bid Set

M. Boxes:

- 1. Location: Locate boxes and conduit bodies so as to ensure accessibility of electrical wiring.
- 2. Round Boxes: Avoid using round boxes where conduit must enter through side of box, which would result in a difficult and insecure connection with a locknut or bushing on the rounded surface.
- 3. Anchoring: Secure boxes rigidly to the substrate upon which they are being mounted, or solidly embed boxes in concrete or masonry.
- 4. Special Application: Provide weatherproof outlets for locations exposed to weather or moisture.
- 5. Knockout Closures: Provide knockout closures to cap unused knockout holes where blanks have been removed.
- 6. Mount Center of Outlet Boxes, unless Otherwise Required by ADA, or Noted on Drawings, the Following Distances above the Floor:
 - a. Control Switches: 48-inches.
- 7. Receptacles: 18-inches.
- 8. Telecom Outlets: 18-inches.
- 9. Other Outlets: As indicated in other Sections of Specifications or as detailed on Drawings.
- 10. Coordinate all electrical device locations (switches, receptacles, and the like) with Drawings to prevent mounting devices in mirrors, back splashes, behind cabinets, and the like.

END OF SECTION

Project Number: 20Y105.01 Release Phase: Bid Set

1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Equipment identification labels.
 - 2. Conductor identification numbers.
 - 3. Branch circuit identification.

1.02 SYSTEM DESCRIPTION

- A. Design Requirements
- B. Coordinate names, abbreviations and other designations with equipment specified in this or other Divisions of the Specification or identified on Drawings.
- C. Fasten labels to equipment in a secure and permanent manner.
- D. Mark underground utilities in conformance with APWA.

1.03 REGULATORY REQUIREMENTS

- A. Conform to requirements of the NEC, latest adopted version with amendments by local AHJs.
- B. Furnish products listed by UL or another testing firm acceptable to AHJ.

2 PRODUCTS

2.01 MANUFACTURERS

- A. Engraved Labels: Lamicoid or approved.
- B. Conductor Numbers: Brady or approved.

2.02 ENGRAVED LABELS

- A. Melamine plastic laminate, white with black core, 1/16-inch thick.
- B. Letter and number font: Engravers standard letter style, minimum 3/16-inch high letters, all capitals.
- C. Drill or punch labels for mechanical fastening except where adhesive mounting is necessary because of substrate. Use self-tapping stainless steel screws.
- D. Dymo tape labels are not acceptable.

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2.03 CONDUCTOR NUMBERS

A. Cable and conductor markers: Standard vinyl-cloth self-adhesive backing, wraparound type. Pre-printed black numbers on a yellow field.

2.04 BRANCH CIRCUIT SCHEDULES

- A. Provide branch circuit identification schedules, typewritten, clearly filled out, to identify load connected to each circuit and location of load. Numbers to correspond to numbers assigned to each circuit breaker pole position.
- B. Provide two columns, odd numbers in left column, even numbers in right column, with 3-inch wide line for typing connected load information.

2.05 CIRCUIT BREAKER IDENTIFICATION

- A. Provide permanent identification number in or on panelboard dead-front adjacent to each circuit breaker pole position. Square D adhesive approved, other adhesives by specific prior approval only.
- B. Horizontal centerline of engraved numbers to correspond with centerline of circuit breaker pole position.

3 EXECUTION

3.01 GRAPHICS

A. Coordinate names, abbreviations and designations used on Drawings with equipment labels.

3.02 CONDUCTOR IDENTIFICATION

- A. Apply markers on each conductor for power, control, signaling and communications circuits where wires of more than one circuit are present.
- B. Match conductor identification used in panelboards, shop drawings, Contract Documents and similar previously established identification for work included in Divisions 26, 27, and 33.

3.03 EQUIPMENT/SYSTEM IDENTIFICATION

- A. Install an engraved label on each major unit of electrical equipment, including but not limited to the following items:
 - 1. Disconnect switches, identify item of equipment controlled.
 - 2. Relays.
 - 3. Contactors.
 - 4. Time switches.

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- 5. Override switches.
- 6. Service disconnects and distribution switches, identify connected load.
- 7. Branch circuit panelboards.
- 8. Central or master unit of each electrical system, including communication/signal systems, unless the unit incorporates its own self-explanatory identification.

3.04 APPLICATION

- A. Install engraved labels on the inside of flush panels, visible when door is opened. Install label on outside of surface panel.
- B. Install signs at locations detailed or, where not otherwise indicated, at location for best convenience of viewing without interference with operation and maintenance of equipment.
- C. Where signs are to be applied to surfaces, which require finish, install identification after completion of painting.

END OF SECTION

Project Number: 20Y105.01 Release Phase: Bid Set

1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Switchboards.
 - 2. Distribution panelboards.
- B. Related Sections:
 - 1. Section 26 0553, Identification for Electrical Systems.
 - 2. Section 26 0526, Grounding and Bonding for Electrical Systems.
 - 3. Section 26 2800, Low-Voltage Circuit Protective Devices.

1.02 SYSTEM DESCRIPTION

A. Electrical Service System: 208Y/120 volts, 3-phase, 4 wire, wye connected system.

1.03 SUBMITTALS

- A. Provide Shop Drawings and Product Data for the Following Equipment:
 - 1. Switchboards.
 - 2. Distribution panelboards.
- B. Provide the following operating, maintenance and installation instructions from the manufacturer for project closeout, see Project Closeout Requirements in Division 01:
 - 1. Switchboards.
 - 2. Distribution panelboards.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of the NEC, latest adopted version with amendments by local AHJs.
- B. Furnish products listed by UL or another testing firm acceptable to AHJ.
- C. Conform to requirement of the serving electric utility.

Project Number: 20Y105.01 Release Phase: Bid Set

2 PRODUCTS

2.01 MANUFACTURERS

- A. Switchboards: Cutler-Hammer/Westinghouse, General Electric, Siemens, Square D, or approved.
- B. Distribution Panelboards: Cutler-Hammer/Westinghouse, General Electric, Siemens, Square D, or approved.

2.02 MATERIALS

A. Standards: Comply with requirements of UL 67, NEMA PB1 and NEC 384 in construction of switchboards.

B. Switchboards:

1. Enclosures:

- a. Free standing, dead front with front accessibility.
- b. Framework constructed of formed, code gauge steel, rigidly welded and bolted together to support all cover plates, bussing and component devices during shipment and installation bolt steel base channels to the frame to rigidly support the entire shipping section for moving on rollers and floor mounting.
- c. Provide each section with individually removable top plate and open bottom to permit installation and termination of service and feeder raceways.
- d. Removable Front Covers: Screw attached.
- e. Provide removable hinge pins on all hinged doors.
- f. Paint interior and exterior surfaces. Medium light gray finish applied by electro-deposition process over an iron phosphate pretreatment.

2. Bussing:

- a. Material: Extruded aluminum plated by ALTAN 70 or 80 process.
- b. Bus supports, connections and joints bolted together with hexhead bolts and Belleville washers.
- c. Ground Bus: Full length of switchboard, 50 percent of phase bus capacity.
- d. Neutral Bus: 100 percent rated, full length of switchboard.

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3. Provide fully rated integrated equipment rating greater than the available fault current. Series rated switchboards are not acceptable. See Drawings for available fault current.

- 4. Lugs: Compression type rated for both aluminum and copper conductors.
- 5. Circuit Breakers
- a. Provide electronic, adjustable trip, circuit breakers rated 600A and larger:
 - a. Provide molded case thermal magnetic circuit breakers, less than 600A.
 - b. Provide the units with provisions for padlocking in the "OFF" position.
 - c. Operating handle position to clearly indicate device contact position, "ON" or "OFF".
 - d. Provide circuit breakers rated for the available fault current and suitable for use as service equipment.

C. Distribution Panelboards:

- 1. Enclosures:
 - a. Flush Panelboards Rated 600 Amp or Less: Maximum enclosure depth, 5-3/4-inches.
 - b. Wiring Gutter Size: 5-inches at sides, 6-inch top and bottom.
 - c. Finish: Galvanized metal.

2. Bussing:

- a. Aluminum bar with suitable electroplating (tin) for corrosion control at connection.
- b. Provide ground bar to accommodate specified terminal lugs.
- c. Pre-drill bus for bolt-on type circuit breakers.
- d. Provide feed through lugs for field inter-connection of multisection flush panel sections.
- e. When distribution panel is feeding isolated ground circuits, provide isolated ground bar, insulated from panelboard enclosure, to accommodate specified terminal lugs.
- 3. Provide fully rated integrated equipment rating greater than the available fault current. See Drawings for available fault current. Minimum rating is 10,000 amps.

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4. Lugs: Compression type rated for both aluminum and copper conductors.

- 5. Breakers: Bolt-on type.
- 6. Covers:
 - a. Hinged door with flush lift latch and lock, two keys per panel. Key all distribution panelboards alike.
 - b. Paint all surfaces with medium light gray finish suitable for field painting to match wall finish.
 - c. Surface panels to have metal trim covers with no sharp edges or corners. Surface panel enclosure finish to match trim cover.
 - d. Where two or more panels are installed side-by-side, provide covers of same height with each trim independently removable without disturbing the other sections.
 - e. Where panels are mounted in finished interior areas in normal view of the building occupants, paint covers to match adjacent wall surface.

3 EXECUTION

3.01 INSTALLATION

A. General: Equipment arrangement in electrical room is based on one manufacturer. Coordinate space requirements with equipment supplier. Maintain Code required clearances and manufacturer's recommended clearances.

B. Switchboards:

- 1. Install switchboards as directed by manufacturer's installation instructions.
- 2. Install equipment in conformance with workspace requirements of NEC 110.26.
- 3. Locate equipment in rooms or spaces dedicated to such equipment, NEC 110.26(F). Coordinate with other Divisions of work.

C. Distribution Panelboards:

- 1. Install distribution panelboards as directed by manufacturer's installation instructions.
- 2. Install distribution panelboards surface or flush mounted in accessible locations as indicated on Drawings. Maintain or exceed minimum clearances required by code.

Project Number: 20Y105.01 Release Phase: Bid Set

- 3. Where flush panels are installed, verify available recessing depth and coordinate wall framing with other Divisions.
- 4. Feeder conductors to enter directly in line with lug terminals wherever practicable. Feeder conductors, except ground and neutral, not to exceed 45 degree deflection from raceway entry to feeder phase lugs.
- 5. Paint panel cover and surface mounted enclosure (if surface allowed) to match finished wall color where panels are located in finished spaces.
- 6. Where panels are installed flush, provide two spare conduits from panel to accessible space above the panel.
- 7. Where panels are installed flush in fire rated walls, maintain fire rating of wall assembly.

3.02 CLEANING

- A. Thoroughly clean the exterior and the interior of each switchboard and distribution panelboard in accordance with manufacturer's installation instructions.
- B. Vacuum construction dust, dirt and debris out of each switchboard and distribution panelboard.
- C. Where enclosure finish is damaged, touch up finish with matching paint in accordance with manufacturer's specifications and installation instructions.

END OF SECTION

Project Number: 20Y105.01 Release Phase: Bid Set

1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Wall switches.
 - 2. Receptacles.
 - 3. Device plates.
 - 4. Surface covers.

1.02 SYSTEM DESCRIPTION

A. Provide devices and finish plates for a complete and operational electrical system.

1.03 SUBMITTALS

- A. Provide Product Data for the Following Equipment:
 - 1. Wall switches.
 - 2. Receptacles.
 - 3. Finish plates.
- B. Provide Product Data for Project Closeout for the Following Equipment, see Project Close-out Requirements in Division 1:
 - 1. Wall switches
 - 2. Receptacles.
 - 3. Finish plates.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of the NEC, latest adopted version with amendments by local AHJs.
- B. Furnish products listed by UL or another testing firm acceptable to AHJ.
- C. Federal Specification Compliance: Comply with Federal Specification WS896 and WC596 for switches and receptacles, respectively.
- D. NEMA Configuration: Comply with NEMA configurations and standards for general and special purpose wiring devices.

WIRING DEVICES 262726 - 1

General Specification for BSD International School of Beaverton Re-Roof
Project Number: 20Y105.01

Date: February 9, 2021
Release Phase: Bid Set

2 PRODUCTS

2.01 WALL SWITCHES

- A. Characteristics: Toggle type, quiet acting, 20-amp, 120/277 volt, UL listed for motor loads up to 80 percent of rated amperage. Arrow-Hart 1221, Leviton 1221, Pass & Seymour 20AC1, Bryant 4901, Hubbell 1221, Eagle 1201.
- B. Pilot Light Switches: Lighted handle, toggle type, red unless noted otherwise, neon pilot lamp. Pilot lamp energized when load is energized. Arrow-Hart 1991-PL, Leviton 1221-PL, Pass & Seymour 20ACI-PL, Bryant 4901-PL, Hubbell 1221-PL, Eagle 1201PL.
- C. Key Switches: 20 amp/120-277-volt, black key guide. Arrow-Hart 1991-L, Pass & Seymour 20ACI-L, Bryant 4901-L, Hubbell 1221-L, Eagle 1201L.
- D. Finish: Gray finish unless selected otherwise by Architect. Provide Architect with optional colors for selection prior to ordering.
- E. Appearance: Provide lighting switches and receptacles of common manufacturer and appearance.

2.02 RECEPTACLES

- A. Finish: Same exposed finish as switches. Receptacles connected to emergency circuits, red finish.
- B. Characteristics: Straight parallel blade 15 amp, 125 volts, 2-pole, 3-wire grounding. Arrow-Hart 5352, Leviton 5352, Pass & Seymour 5352, Bryant 5352, Hubbell 5352, Eagle 5362.
- C. Isolated Ground Receptacle: Orange urea finish with isolated ground. Hubbell IG-5362, Arrow-Hart IG-5362, Leviton, Pass & Seymour, Bryant, Eagle IG5362.
- D. Isolated Grounding Surge Suppressor Duplex Receptacles: 15-amp, 120 volt, specification grade, three level MOV protection for phase to neutral, phase to ground, and neutral to ground. Indicator light on continuously when protection is active. Indicator light flashes when protection circuit has failed. Leviton 5280-IGI.
- E. Ground Fault Interrupter: Feed through type, 20 amp, 125VAC, specification grade. Hubbell GF-5362GY, Arrow-Hart GF-5342.
- F. Wet Locations: Weatherproof receptacles installed in wet locations, approved for location and use.
 - 1. Single Receptacle Cover: Crouse & Hinds WLRS-5-20. Arrow-Hart non-continuous use approved.
 - 2. Duplex Receptacle Covers: Crouse & Hinds WLRD-5-20 Noncontinuous use approved.

WIRING DEVICES 262726 - 2

Project Number: 20Y105.01 Release Phase: Bid Set

3. Cord Caps: Equip utilization equipment connected to wet location receptacles with barrel type plug similar to Hubbell 5266-C.

- 4. Provide continuous use cover with cover capable of closing over energized cord cap with bottom aperture for cord exit.
- G. Special Purpose Receptacles: Refer to Drawings for NEMA Standard Specification.

2.03 FINISH PLATES

- A. Material: 18 percent chrome, 8 percent nickel, Type 302 stainless steel, smooth satin finish metal. Hubbell S Series, Arrow-Hart, Leviton, Pass & Seymour, Bryant.
- B. Telephone/Signal System Device Plates: Activated outlets to have coverplate to match modular jack. Hubbell S Series.

2.04 WALL DIMMERS

A. Lutron NT Series compatible with type or load controlled (i.e., electronic ballast, low voltage luminaire, and the like). Finish to match wall switches. Size dimmers to accept connected load. Do not cut fins. Where dimmers are ganged together, provide a single multi-gang coverplate.

2.05 SURFACE COVERS

- A. Material: Galvanized or cadmium plated steel, 1/2-inch raised industrial type with openings appropriate for devices installed on surface outlets.
- B. Cast Box and Extension Adaptors: Aluminum, with gasket, blank. Single gang, Bell 240-ALF, Carlon, 2-gang, Bell 236-ALF, Carlon, or approved.

3 EXECUTION

3.01 PREPARATION

A. Protection:

- 1. Devices: Upon installation of wall plates and receptacles, advise Contractor regarding proper and cautious use of convenience outlets. At time of substantial completion, replace those items which have been damaged, including those burned and scored by faulty receptacles or cord caps.
- 2. Finish Plates and Devices: Do not install items until finish painting is complete. Scratched or splattered finish plates and devices not acceptable.

WIRING DEVICES 262726 - 3

3.02 INSTALLATION

A. Plumb: Install devices and finish plates plumb with building lines and equipment cabinets.

B. Orientation:

- 1. Wall Mounted Receptacles: Install with long dimensions oriented vertically at centerline height shown on Drawings or specified herein.
- 2. Vertical Alignment: When more than one outlet is shown on Drawings in close proximity to each other, but at different elevations, align the outlets on a common vertical centerline for best appearance. Verify with Architect.

3.03 FIELD QUALITY CONTROL

A. Wiring Device Tests: Test wiring devices to ensure electrical continuity of grounding connections, and after energizing circuitry, to demonstrate compliance with requirements. Test receptacles for line to neutral, line to ground and neutral to ground faults. Correct any defective wiring.

END OF SECTION

WIRING DEVICES 262726 - 4

General Specification for BSD International School of Beaverton Re-Roof Date: February 9, 2021

Project Number: 20Y105.01 Release Phase: Bid Set

1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Toggle types disconnect switches.
 - 2. Manual motor starters.
 - 3. Safety switches.
 - 4. Fuses.
 - 5. Circuit breakers.
 - 6. Fuse cabinet.
- B. Related Sections:
 - 1. Section 26 2400, Switchboards and Panelboards.

1.02 SYSTEM DESCRIPTION

A. Provide disconnect switches as required by NEC for a complete and operational electrical system.

1.03 SUBMITTALS

- A. Provide product data for toggle type disconnect switches, manual motor starters, and safety disconnect switches.
- B. Provide product data for project closeout, see Project Closeout Requirements in Division 1.
- C. Product Data:
 - 1. Provide instantaneous let-through current curves and average melting time current curves for fuses supplied to project.
 - 2. Provide product data and time/current trip curves for circuit breakers supplied to project.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of the NEC, latest adopted version with amendments by local AHJs.
- B. Furnish products listed by UL or another testing firm acceptable to AHJ.

General Specification for BSD International School of Beaverton Re-Roof Date: February 9, 2021

Project Number: 20Y105.01 Release Phase: Bid Set

2 PRODUCTS

2.01 MANUFACTURERS

- A. Toggle Type Disconnect Switches: Arrow-Hart, Bryant, Hubbell, Leviton, Pass & Seymour, Slater, or approved.
- B. Manual Motor Starters: Cutler-Hammer/Westinghouse, Siemens, Square D, or approved.
- C. Safety Switches: Cutler-Hammer/Westinghouse, General Electric, Siemens, Square D, or approved.
- D. Fuses: Bussmann Division, McGraw-Edison; Shawmut Division, Gould Electronic, Littelfuse, or approved.
- E. Circuit Breakers: Cutler-Hammer/Westinghouse, General Electric, Siemens, Square D, or approved.
- F. Fuse Cabinet: Bussmann, Circle AW, Gould-Shawmut, Littelfuse, Siemens, Square D, or approved.

2.02 TOGGLE TYPE DISCONNECT SWITCHES

- A. Rating: 120 volts, 1-pole, 20 amp, 1 HP maximum.
- B. Enclosure: NEMA 1 indoors, NEMA 3R raintight outdoors.

2.03 MANUAL MOTOR STARTERS

- A. Characteristics:
 - 1. Quick-make, quick-break.
 - 2. Thermal overload protection.
 - 3. Clearly label device for maximum voltage, current and horsepower.
 - 4. Square D, Class 2510.
- B. Enclosure: NEMA 1 indoors, NEMA 3R raintight outdoors.

2.04 SAFETY SWITCHES

- A. Heavy duty, fused type, dual rated, quick-make, quick-break with fuse rejection feature for use with Class R fuses only, unless another fuse type is specifically noted.
- B. Enclosures NEMA 1 indoors, NEMA 3R raintight outdoors.
- C. Switches clearly marked for maximum voltage, current and horsepower.

General Specification for BSD International School of Beaverton Re-Roof Date: February 9, 2021 Release Phase: Bid Set

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- D. Equip enclosure with defeatable cover interlock.
- E. Switches rated for maximum available fault current.

2.05 **COMBINATION STARTERS**

- A. Heavy duty, fused type, dual rated, quick-make, quick-break with fuse rejection feature for use with Class R fuses only, unless another fuse type is specifically noted.
- B. Enclosures NEMA 1 indoors, NEMA 3R raintight outdoors.
- C. Clearly mark switches for maximum voltage, current and horsepower.
- D. Provide coil voltage coordinated with control requirements.
- E. Provide thermal overload units sized to equipment nameplate rating.
- F. Provide one N.C. and one N.O. auxiliary contacts.
- G. Provide pre-wired hand/off/auto switch and start button.

2.06 **FUSES**

- Characteristics: Dual element, time delay, current limiting, nonrenewable type, A. rejection feature.
- B. Combination Loads: Class RK1, 1/10 to 600 amp, UL Class L, above 600 amps.
- C. Motor Loads: UL Class RK5, 1/10 to 600 amp.
- D. Fuse pullers for complete range of fuses.

2.07 MOLDED CASE CIRCUIT BREAKERS

- One, two or three-pole bolt on, single handle common trip, rated 15 to 800 amp, A. 250VAC as indicated on Drawings.
- В. Over center toggle-type mechanism, quick-make, quick-break action. Trip indication is by handle position.
- C. Calibrate for operation in 40C ambient temperature.
- 15 to 100 Amp Breakers: Permanent trip unit containing individual thermal and D. magnetic trip elements in each pole.
- E. Greater than 100 Amp Breakers: Variable magnetic trip elements set by a single adjustment. Provide push-to-trip button on cover on breaker for mechanical tripping.
- F. Provide removable load lugs, UL listed for compression type lugs, copper conductors only.

Project Number: 20Y105.01 Release Phase: Bid Set

G. Provide all circuit breakers series rated and when series combination ratings are applied, identify all equipment enclosures as required by NEC 110-22.

3 EXECUTION

3.01 INSTALLATION

- A. Provide disconnect switch at each motor location within 5-feet unless otherwise noted
- B. Motors within sight of and not more than 20-feet from motor branch circuit device do not require a disconnect switch at the motor. Provide locking device on circuit protective device.
- C. Recessed fractional horsepower exhaust ceiling or wall fan units; no disconnect switch required at motor if unit is recessed, unless shown otherwise on Drawings.
- D. Switches disconnect all phase legs.
- E. Coordinate fuse ampere rating with installed equipment. Fuse ampere rating variance between original design information and installed equipment, size in accordance with Bussmann Fusetron 40C recommendations. Do not provide fuses of lower ampere rating than motor starter thermal units.
- F. Fuses: For each class and ampere rating of fuse installed, provide the following quantities of spares for quantity of fuses installed:
 - 1. 0 to 24: Provide 6 spare.
 - 2. 25 to 48: Provide 9 spare.
 - 3. 49 and Above: Provide 12 spare.

G. Circuit Breakers:

- 1. Provide circuit breakers, specified herein and on Drawings, for installation in panelboards, individual enclosures, or combination motor starters.
- 2. Provide ground fault interrupter circuit breakers for equipment in damp or wet locations.
- 3. Provide device on handle to lock breaker in "ON" position for breakers feeding time switches, night lights and similar circuits required to be continuously energized.

END OF SECTION





December 18th, 2020

Portland OR 97239

RDH Building Science Inc.
5331 S Macadam Avenue #314

Making Buildings Better™

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Portland, OR 97224

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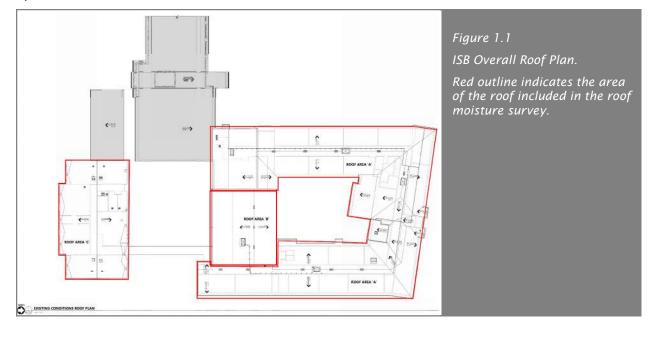
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Appendix C IR Scan Results

1 Project Background

RDH Building Science Inc. (RDH) was retained by CIDA on behalf of Beaverton School District (BSD) to perform a roof moisture survey on built-up roof systems of school campuses included in the BSD portfolio. BSD is planning re-roofing efforts for the 2022 summer season. The purpose of the work described in this report is a) to provide verification that existing built-up roof systems are acceptable for re-cover applications and that manufacturers' warranties can be provided, and b) that there are no hidden or unforeseen conditions associated with the existing roof system. This report documents our findings at built-up roof areas of the International School of Beaverton (ISB), located at 17770 SW Blanton St, Beaverton, OR 97078. Refer to Figure 1.1 for the extent of roof area surveyed.

This report documents data collection and observations from the roof moisture survey. This report has been undertaken for CIDA on behalf of the BSD and is not to be relied on by others.



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2 Data Collection

2.1 Document Review

The documents provided to and reviewed by RDH are listed in Table 2.1.

TABLE 2.1 DOCUMENTS REVIEWED	
DOCUMENT DESCRIPTION	DOCUMENT PAGES
Document Type: Architectural Drawings Title: BSD International School of Beaverton – Existing Conditions Roof Plan Author: CIDA Issuance: Schematic Design Progress Set: 2020	AD0.2
Document Type: Scope of Work Title: Preliminary Roofing Scope of Work Author: Roofing Solutions Group LLC Issuance: 10/01/2020	1-4
Document Type: Request for Proposal Title: International School of Beaverton Design Services for Roof and HVAC Upgrades Author: Beaverton School District 48 Issuance: 04/20/2020	1-24

We note the following relevant information that is related from review of the documents provided:

- → Per the Scope of Work document, the planned re-roofing project scope includes re-covering over the existing roof system within the roof moisture survey area (Roof Areas 'A' and 'C') and replacing the entire roof assembly at the gym roof (Roof Area 'B'), as identified in Figure 1.1.
- → Per the Scope of Work document, the existing gym roof (Roof Area 'B') consists of two built-up roof systems over the roof deck substrate.
- → Per the Scope of Work document and information provided by CIDA, the roof deck type at Roof Areas 'A' and 'B' is 1"x6" wood ship lap board.

2.2 Historic Information

A history of activities and events including past leakage and repairs relating to the existing roof assembly as reported to us or described in reviewed documents are listed in Table 2.2.

TABLE 2.2 HISTORIC EVENTS RELATING TO EXISTING ROOF PERFORMANCE		
DATE	EVENT	
1911	Original structure construction	
1944 - 1953	Additions made to original structure	
1987	Modular building construction (Roof Area 'C')	
1995	Roofs replacement on Roof Areas 'A', 'B', and 'C'	
October 26, 2020	Current leakage reported at Roof Area 'C'.	

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2.3 Field Work

Relevant information pertaining to the field work performed during the roof moisture survey are included in Table 2.3 and Table 2.4.

TABLE 2.3 DETAILS OF FIELD WORK (ROOF AREA 'A' AND 'C')		
Dates of Roof Assessment: 2020/10/26		
Impedance Testing	Yes	
Infrared Scanning	Yes, Partial	
Test Cuts	Yes	
Method of Roof Access	Access Hatch, Ladder	
RDH Staff in Attendance	Cameron Chorney Scott Mecalis	
Other Parties in Attendance	Juan Cardoso - Carlson Roofing	

TABLE 2.4 DETAILS OF FIELD WORK (ROOF AREA 'B')		
Dates of Roof Assessment: 2020/12/04		
Impedance Testing Yes		
Infrared Scanning	Yes, Partial	
Test Cuts	Yes	
Method of Roof Access	Access Hatch, Ladder	
RDH Staff in Attendance	Cameron Chorney	
	Scott Mecalis	
Other Parties in Attendance	Juan Cardoso - Carlson Roofing	

2.4 Existing Roof System

General information and specific components of the existing roof systems, as identified by core sampling and information provided by CIDA, are listed in Table 2.5 to Table 2.7.

TABLE 2.5 ROOF AREA 'A' EXISTING ROOF SYSTEM		
Roof Age	Approximately 25 years	
General Roof Assembly		
Deck Type	1"x6" wood ship lap board (per CIDA)	
Vapor Barrier	None observed	
Insulation	None observed	
Cover Board	1/2" Fiberboard	
Roof Membrane	Hot-mopped asphalt built-up roofing	
Ballast	Pea Gravel	
Means of Drainage	Gutter and Downspout	
Approximate Roof Area	37,100 Sq. Ft.	
Warranty Available (Y/N)	No	

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TABLE 2.6 ROOF AREA 'B' EXISTING ROOF SYSTEM		
Roof Age	Approximately 25 years	
General Roof Assembly		
Deck Type	1"x6" wood ship lap board (per CIDA)	
Vapor Barrier	Partial - None observed, or Asphalt-impregnated felt	
Insulation	None observed	
Cover Board	1/2" Fiberboard	
Roof Membrane	Hot-mopped asphalt built-up roofing layer	
Ballast	Pea Gravel	
Means of Drainage	Gutter and Downspout	
Approximate Roof Area	7,025 Sq. Ft.	
Warranty Available (Y/N)	No	

TABLE 2.7 ROOF AREA 'C' EXISTING ROOF SYSTEM		
Roof Age	Approximately 25 years	
General Roof Assembly		
Deck Type	Plywood	
Vapor Barrier	Varies - none observed, asphalt impregnated roofing felt, or 1/4" concrete topping	
Insulation	4" Expanded polystyrene (EPS)	
Cover Board	Two layers of 3/4" perlite board	
Roof Membrane	Hot-mopped asphalt built-up roofing	
Ballast	Pea Gravel	
Means of Drainage	Internal Drain, Overflow Scupper	
Approximate Roof Area	11,250 Sq. Ft	
Warranty Available (Y/N)	No	

3 Observations and Field Testing

3.1 Visual Observations

We made the following visual observations during our time on site. Refer to Appendix A for photographic examples of the conditions listed below.

- → Embedded flashings are located at penetrations, drains, and perimeters and can result in inconsistent impedance readings.
- → At all roofs, the membrane is generally in fair condition. We observe several areas where the asphaltic component of the membrane is not covered with ballast and experiencing degradation due to UV exposure.
- → We did not identify any areas of standing water at the time of our roof moisture survey.

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- → There is a high amount of organic growth (moss) at almost all areas of the modular building roof (Roof Area 'C'). Localized patches of organic growth observed at the main roof (Roof Area 'A'). Organic growth could indicate poor drainage of water from the roof surface and/or limited sun exposure. Figures A.2 to A.14 in Appendix A include photos taken before organic growth was removed ahead of this roof moisture survey.
- → At Roof Areas 'A' and 'B', roofs are sloped to gutters along each edge. Higher roof areas drain onto adjacent lower roof areas through downspouts.
- → Roof Area 'C' is drained via internal drains and overflow scuppers. Overflow scuppers do not have a collector box and downspout assembly.
- → Several trapped air bubbles/blisters are present in the roof membrane. The location of these areas is marked in Appendix B.
- → At Roof Areas 'A' and 'B', roof edge flashings are equipped with a low-profile gravel stop. We observe that ballast has fallen into the gutter at many locations.
- → At Roof Areas 'A' and 'B', roofs are ventilated using eave and roof vents. Roof Area 'C' is not ventilated.
- → There are many penetrations through the roof membrane including rooftop mechanical units, vents, and drains. In general, they appear to be detailed properly to provide a watertight interface. We observe failed membrane flashing coating in some places.
- → Test openings at Roof Area 'B' revealed a bituminous felt vapor barrier in use only at the south half of the roof. The north half of the 'B' roof does not have a vapor barrier.

3.2 Impedance Scanning

We performed impedance testing in general accordance with ASTM D7954-15a. Refer to Table 2.3 for general information related to field work. Refer to Table 3.1 and Table 3.2 for information specifically pertaining to impedance testing.

TABLE 3.1 IMPEDANCE TESTING DETAILS (ROOF AREA 'A' AND 'C')		
Date of Impedance Testing	2020/10/26	
Time of Impedance Testing	0900h to 1030h	
Ambient Temperature, Relative	Humidity, and Dew Point Temperature	
Pre-Testing	38.6 °F, 55.3 %RH, 25.1 °F	
Mid-Testing	44.4 °F, 44.4 %RH, 25.0 °F	
Post-Testing	52.0 °F, 39.0 %RH, 27.0 °F	
Date and Amount of Last Precipitation Event	0.01 inches on 2020/10/22	
Impedance Scanner Operator and Data Analyst	Cameron Chorney	
Scanner Make, Model and Serial Number	Tramex DEC DSAL rolling scanner (Serial Number: DS2 0720292) and Tramex DEC RWS handheld scanner (Serial Number RWS 07203562)	

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TABLE 3.2 IMPEDANCE TESTING DETAILS (ROOF AREA 'B')		
Date of Impedance Testing	2020/12/04	
Time of Impedance Testing	0900h to 1000h	
Ambient Temperature, Relative Humidity, and Dew Point Temperature		
Pre-Testing	40.6 °F, 82.6 %RH, 37.5 °F	
Mid-Testing	44.8 °F, 69.7 %RH, 37.9 °F	
Post-Testing	54.3 °F, 36.1 %RH, 34.6 °F	
Date and Amount of Last Precipitation Event	0.22 inches on 2020/12/01	
Impedance Scanner Operator and Data Analyst	Cameron Chorney	
Scanner Make, Model and Serial Number	Tramex DEC DSAL rolling scanner (Serial Number: DS2 0720292) and Tramex DEC RWS handheld scanner (Serial Number RWS 07203562)	

Testing is conducted using Technique A, Continuous Systematic Scanning and Recording, by rolling the DSAL scanner on the roof membrane in a systematic and continuous row-by-row manner when traversing the roof surface. This results in scanning 100% of the entire roof moisture survey area.

The impedance scanner is calibrated by choosing a reference point at a dry area and setting the scanner's meter to 0%. This allows for comparison of the electrical conductivity from the rest of the roof. Elevated conductivity is an indication of elevated moisture below the membrane.

At Roof Area 'A', rolling impedance scanning initially indicate eight areas of elevated conductivity in comparison to adjacent roof areas. Through further handheld impedance scanning and roof openings, only three of those roof areas have moisture present within the roof assembly.

At Roof Area 'B', rolling impedance scanning indicated one area of elevated conductivity in comparison to adjacent roof areas. Through further handheld impedance scanning and roof openings, this area was confirmed to have moisture present within the roof assembly.

At Roof Area 'C', initial impedance testing at Roof C indicated no areas of elevated electrical conductivity in comparison to adjacent roof areas. Upon conducting a roof opening at the impedance scanner calibration area, moisture was identified within the roof assembly. The impedance scanner was re-calibrated to 100% at this area, and the entire roof area was re-scanned. All areas of the roof measure high conductivity, indicating moisture within the roof assembly. This was confirmed by additional roof openings, all of which identify moisture within the roof assembly.

Refer to Appendix B for a roof plan that shows locations and relative sizes of areas with elevated electric readings and confirmed areas of moisture withing the roof assembly. Appendix B also shows the locations of roof openings and scanner calibration.

Refer to Appendix D for photo documentation of the roof openings conducted.

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3.3 Infrared Scanning

We performed ground based infrared scanning based on the ASTM C1153-10(r15) standard. Refer to Table 2.3 and Table 2.4 for general information related to field work. Refer to Table 3.3 and Table 3.4 for specific information pertaining to infrared scanning.

TABLE 3.3 INFRARED SCANNING DETAILS (ROOF 'A')		
Date of Infrared Scanning	2020/10/26	
Time of Infrared Scanning	0859h to 1040h	
Ambient Temperature, Wind Velocity and Cloud Cover at Time of Infrared Scanning		
37.9 °F, 0 mph, No Cloud Coverage		
Precipitation and Cloud Cover In 24 Hours Prior to Infrared Scanning		
0 inches, No Cloud Coverage		
Infrared Camera Make and Model	Fluke Ti401 PRO handheld camera	
Camera Lens	Fluke Wide Angle Smart Lens	
Camera Spectral Range	7.5 μm to 14 μm (micro-meter)	
Camera Operator and Data Analysi	Cameron Chorney	

TABLE 3.4 INFRARED SCANNING DETAILS (ROOF 'B')	
Date of Infrared Scanning	2020/12/04
Time of Infrared Scanning	1000h to 1040h
Ambient Temperature, Wind Velocity and Cloud Cover at Time of Infrared Scanning	
40.6 °F, 6 mph, No Cloud Coverage	
Precipitation and Cloud Cover In 24 Hours Prior to Infrared Scanning	
0 inches, No Cloud Coverage	
Infrared Camera Make and Model	Fluke Ti401 PRO handheld camera
Camera Lens	Fluke Wide Angle Smart Lens
Camera Spectral Range	7.5 μm to 14 μm (micro-meter)
Camera Operator and Data Analysi	Cameron Chorney

Scanning is performed by making passes approximately 10-15 feet wide. For scans taken during the day at a ballasted roof such as found at the ISB, the test standard requires the exterior temperature to be at least 32°F cooler than the interior temperature, which we did not measure and was assumed to be at least 72°F.

Due to time constraints and associated unfavorable weather conditions during our first IR scanning session on 10/26, we only reviewed Roof Area 'A', equating to approximately 75% of the roof moisture survey area. The minimum temperature differential was achieved at Roof Area 'A' due to the exterior temperature being 37.9°F at the time of scanning, creating a temperature difference of 34°F. This was not achieved at Roof Area 'C' due to the exterior temperature being 52.0°F at the time of scanning, creating a temperature difference of 20°F.

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We conducted an additional IR scanning session at Roof Area 'B' on 12/04. The exterior temperature at the time of scanning was 40.6°F, creating a temperature differential of 31.4°F, assuming an interior temperature of 72°F. Due to the high ceiling of the gym, it is reasonable to assume that the actual interior temperature is much higher and the 32°F minimum differential is met per ASTM requirement.

During both scanning sessions, scans were taken during the day in the mid-morning. When IR scans are taken during the day, the heating effects of the sun greatly impact the accuracy of the results. Therefore, these results should be taken on a comparative basis only

At Roof Area 'A', infrared scanning indicates that some areas of the roof are measured to have elevated temperatures (up to 5 degrees warmer) in comparison to adjacent roof areas. These areas typically correspond with an air bubble or blister in the membrane, indicating trapped subsurface air. Some areas indicate subsurface moisture, as water and wet insulation have lower thermal resistance (R-Value), allowing interior heat to escape. Through roof openings, three of those roof areas have moisture present within the roof assembly.

At Roof Area 'B', infrared scanning indicates that some areas of the roof are measured to have slightly elevated temperatures (0 to 3 degrees warmer) in comparison to adjacent roof areas. As the interior to exterior temperature differential is high, this small temperature difference can be considered negligible and does not conclusively determine the presence of trapped subsurface air or moisture.

Refer to Appendix C for the IR images taken during infrared scanning. Refer to Appendix B for locations of roof openings and impedance scan results, and to Appendix D for photo documentation of the roof openings.

4 Roof Openings

Both ASTM D7954-15a and C1153-10(r15) require that test openings be made into the roof assembly. These openings provide verification of the roof assembly construction and quantify the actual moisture content found within the roof assembly.

With the assistance of Carlson Roofing, we conducted 17 roof core samples total. On 10/26, we conducted 11 cores at suspected areas of moisture as indicated by impedance scans on Roof Areas 'A' and 'C', and one to confirm the roof assembly construction at Roof Area 'B'. On 12/04, we returned to Roof Area 'B' to conduct additional cores at one suspected area of moisture and four cores to confirm the roof assembly construction.

Core sample specimens of the roof assembly having a minimum of 2-in. diameter were obtained by cutting through roof assembly components down to the roof deck and removing them from the roofing section under test.

At Roof Area 'A', three of the seven core samples taken show signs of moisture present within the roof assembly. Minor wood deck delamination and/or percent moisture content (% MC) readings higher than 25% are observed at the same three test openings, indicating minor wood deck deterioration. The wood roof decking is in good condition at the remaining four test openings.

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At Roof Area 'B', the first core sample confirmed the same roof assembly construction as Roof Area 'A'. The core sample taken show no signs of moisture present within the roof assembly. Subsequent cores revealed an asphaltic vapor barrier between the fiberboard and wood decking, only in use at the south portion of the roof. One sample showed signs of moisture present within the roof assembly and deterioration of the fiberboard and vapor barrier materials. All of the MC readings taken were below 13%, and we observed the wood roof decking is in good condition.

At Roof Area 'C', all four of the samples taken show signs of moisture present within the roof assembly. Generally, EPS insulation is heavily saturated with moisture and perlite coverboard is moisture saturated and with minor deterioration. The roof assembly construction varies, with different EPS insulation thicknesses, vapor barrier materials, and/or added layers of perlite present throughout the roof area. Soft plywood and % MC readings higher than 33% are observed two of the test openings, indicating plywood deck deterioration. Minor plywood delamination and/or percent % MC readings higher than 24% are observed at the other two test openings.

Refer to Appendix D for photographic documentation from roof test openings described above and Appendix B for locations and the moisture findings that are combined with the impedance scan results.

5 Summary of Testing

At Roof Area 'A', the roof moisture survey confirms that a small number of areas have moisture within the roof assembly. Our testing, document review and visual observations confirm the roof is generally in fair condition. We recommend proceeding with planned reroofing in approximately 1-2 years. The areas with subsurface moisture need to be addressed prior to or as part of this work to avoid trapping moisture within the assembly. If left unaddressed, the trapped moisture may void the manufacturer's warranty of the new roof system.

At Roof Area 'B', the roof moisture survey confirms that one area has moisture within the roof assembly. The core samples confirm a similar roof assembly construction as Roof Area 'A', and the roof can be covered with a similar system as Roof Area 'A'. The area with subsurface moisture needs to be addressed prior to or as part of this work to avoid trapping moisture within the assembly. If left unaddressed, the trapped moisture may void the manufacturer's warranty of the new roof system.

At Roof Area 'C', the roof moisture survey confirms that the entire roof area has moisture within the roof assembly. Roof openings indicate that varying levels of plywood roof deck deterioration should be expected throughout. We recommend full removal of the existing moisture saturated roof system down to the plywood deck, repairing the plywood deck as needed, and replacement with a new single-ply roof system. We also recommend adding a vapor barrier in the roof system to minimize the potential risk of condensation within the roof system associated with air leakage and vapor drive from interior spaces.

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6 Closure

We appreciate the opportunity to work with CIDA and BSD. Please do not hesitate to contact the writer with any questions or to discuss next steps.

Yours truly,

Cameron Chorney | BASc, CDT Building Science Engineer (EIT) cchorney@rdh.com 503-243-6222 x3152 RDH Building Science Inc. Reviewed by
Scott Mecalis | RA(WA), CSI, CDT
Senior Project Architect
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RDH Building Science Inc.

encl.

Appendix A - Photos of Roof Conditions

Appendix B - Roof Plan - Impedance Scanning and Cores

Appendix C - IR Scan Results

Appendix D - Photos - Roof Cores

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Appendix A Photos of Roof Conditions

Appendix A - Photos of Roof Conditions

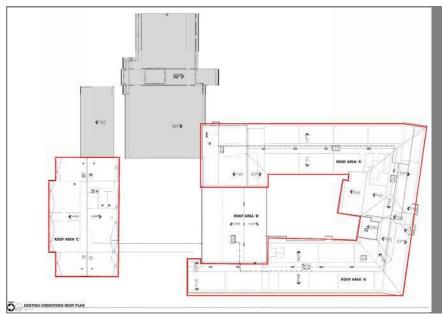


Figure A.1

ISB Overall Roof Plan.

Red outline indicates the area of the roof included in the roof moisture survey.



Figure A.2

Overview of modular building roof (Roof Area 'C') as viewed from west end looking east. Photo taken before moss removed for the moisture survey.



Overview of main roof (Roof Area 'A') as viewed from NE corner looking west. Photo taken before moss removed for the moisture survey.

Figure A.3



Figure A.4

Overview of main roof as viewed from SE corner looking north. Photo taken before moss removed for the moisture survey.



Boiler room roof at Roof Area 'A'. Photo taken before moss removed for the moisture survey.



Figure A.6

Overview of high roof at gyn
(Roof Area 'B'). As viewed
from east edge looking west.
Not included in review.



Figure A.7

Exposed and damaged membrane along north edge. Gravel stop is inadequate in keeping ballast out of the gutter.



Figure A.8

High amount of organic growth (moss) at modular building roof. Photo taken before moss removed for the moisture survey.



Figure A.9

High amount of organic growth (moss) at boiler roof at roof hatch. Photo taken before moss removed for the moisture survey.



Figure A.10

Localized patches of moss at east run of main roof. Photo taken before moss removed for the moisture survey.



Figure A.11

High amount of organic growth at canopy roof along north elevation. Not included in review. Photo taken before moss removed for the moisture survey.



Figure A.12

Gutters along edge of each roof section at Roof Area 'A'. Higher areas drain via downspout onto adjacent lower areas. Photo taken before moss removed for the moisture survey.



Typical drain and overflow scupper at modular building. High amount of moss prevents water from reaching drain. Photo taken before moss removed for the moisture survey.



Figure A.14

Overflow scupper at modular building has no collector box or downspout. Photo taken before moss removed for the moisture survey.



Figure A.15

Multiple trapped air
bubbles/blisters in roof
membrane at NW section of
main roof.



Figure A.16
Exposed asphaltic component of roof membrane.



Figure A.17
Exposed asphaltic component of roof membrane.



Figure A.18

Gutter between BUR

membrane at main roof and

standing seam metal roof (not
included in review). Gutter is
full of debris, which blocks
water flow.



Figure A.19
Typical mechanical curbs at main roof. Flashing paint/coating is delaminating, exposing the asphaltic component of the flashing membrane.



Figure A.20
Typical roof vent at main roof.



Figure A.21
Typical conduit supports at main roof have flashing.



Figure A.22 Roof to wall interface at NW area of main roof.

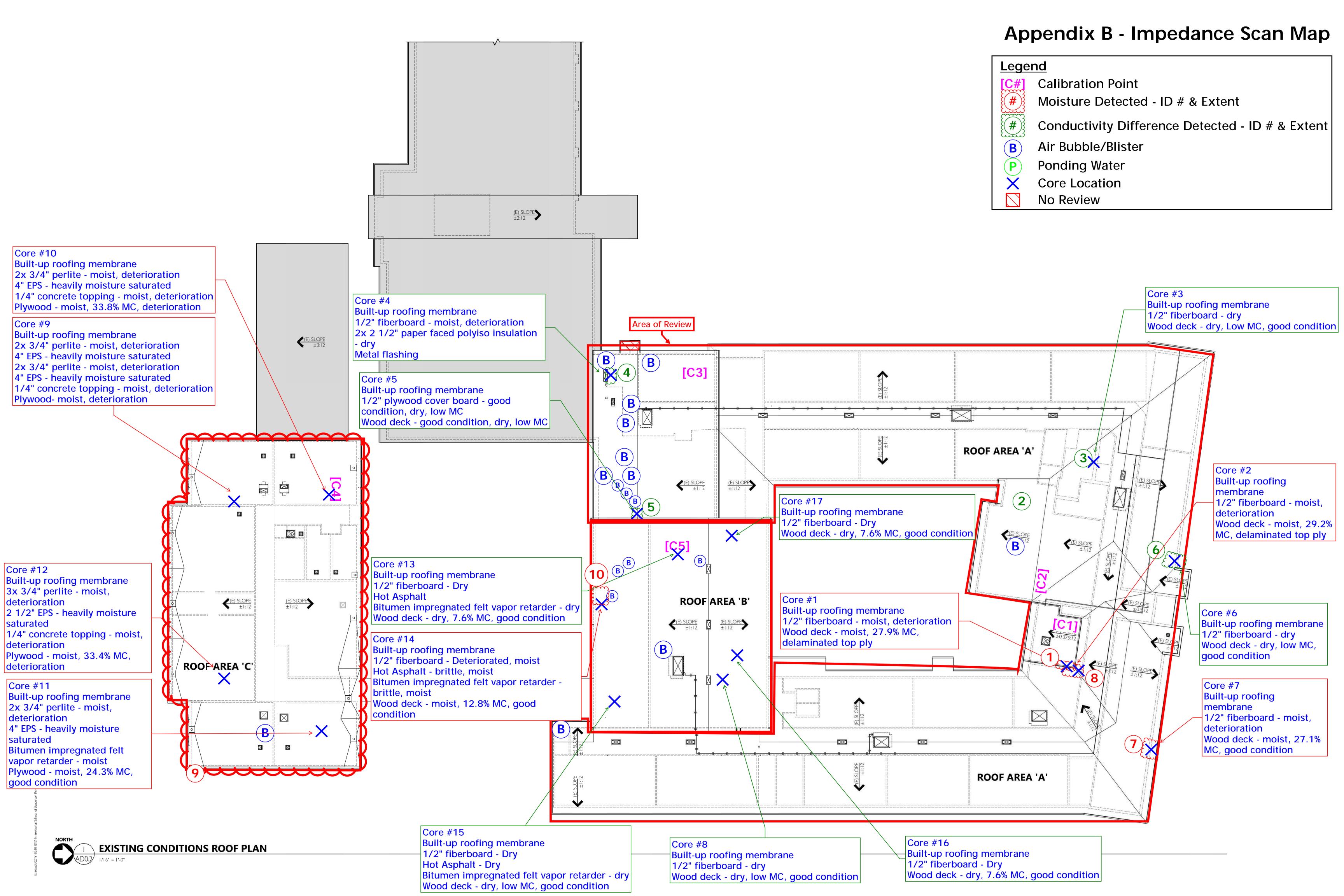


Figure A.23

Curb parapet flashing discontinuity near electric conductivity difference spot #6.

Appendix B

Roof Plan - Impedance Scanning and Cores



Appendix C IR Scan Results



RDH Building Science, Inc.

5331 S Macadam Ave #314 Portland OR 97239

Appendix C: IR Scan Results

B9164.002 - ISB Roof Moisture Survey

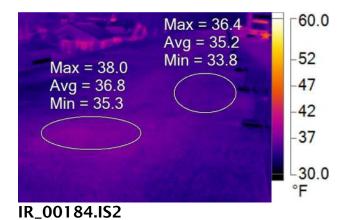
Prepared for:

CIDA on behalf of BSD 15895 SW 72nd Ave Portland OR 97224



Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 8:59:32 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265





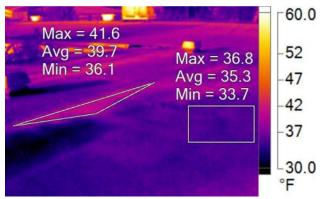
Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
Α0	36.8°F	35.3°F	38.0°F	0.95	0.39
A1	35.2°F	33.8°F	36.4°F	0.95	0.33



Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 9:06:43 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265



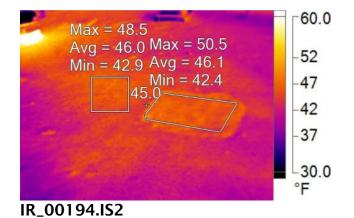
IR_00192.IS2

Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
A0	39.7°F	36.1°F	41.6°F	0.95	0.91
A1	35.3°F	33.7°F	36.8°F	0.95	0.43

Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 9:17:42 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265





Visible Light Image

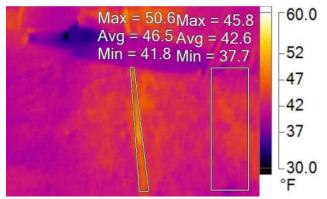
Name	Avg	Min	Max	Emissivity	St. Dev.
A0	46.1°F	42.4°F	50.5°F	0.95	0.95
A1	46.0°F	42.9°F	48.5°F	0.95	0.86

Name	Temperature	Emissivity
Centerpoint	45.0°F	0.95



Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 9:17:51 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265



IR_00195.IS2

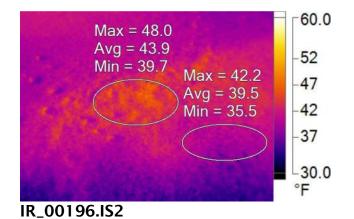
Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
Α0	46.5°F	41.8°F	50.6°F	0.95	1.47
A1	42.6°F	37.7°F	45.8°F	0.95	1.30



Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 9:18:06 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265





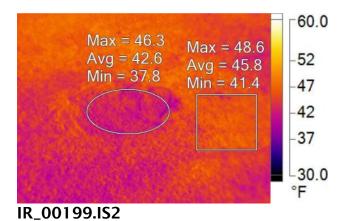
Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
A0	43.9°F	39.7°F	48.0°F	0.95	1.23
A1	39.5°F	35.5°F	42.2°F	0.95	1.12



Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 9:25:15 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265





Visible Light Image

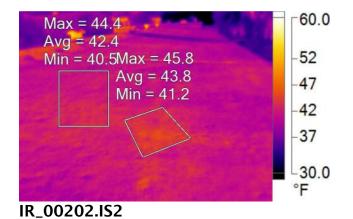
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Name	Avg	Min	Max	Emissivity	St. Dev.
Α0	42.6°F	37.8°F	46.3°F	0.95	1.09
A1	45.8°F	41.4°F	48.6°F	0.95	0.86



Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 9:28:41 AM	Area	Roof Area A
Location	AIVI	Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
·		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265





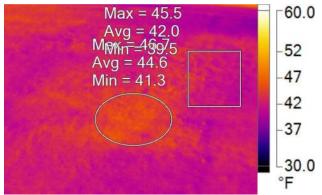
Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
A0	43.8°F	41.2°F	45.8°F	0.95	0.71
A1	42.4°F	40.5°F	44.4°F	0.95	0.73



Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 9:28:56 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265



IR_00203.IS2



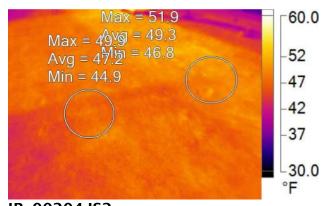
Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
Α0	44.6°F	41.3°F	46.7°F	0.95	0.77
A1	42.0°F	39.5°F	45.5°F	0.95	0.93



Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 9:29:56 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265





IR_00204.IS2

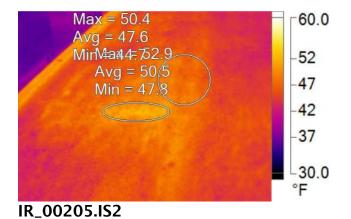
Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
A1	49.3°F	46.8°F	51.9°F	0.95	0.90
A0	47.2°F	44.9°F	49.9°F	0.95	0.80



Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 9:30:31 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265





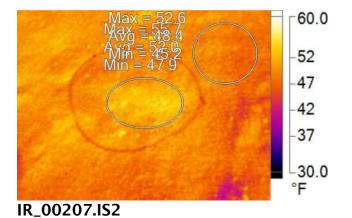
Visible Light Image

Main Image Markers

Name	Avg	Min	Max	Emissivity	St. Dev.
A0	50.5°F	47.8°F	52.9°F	0.95	0.89
A1	47.6°F	44.7°F	50.4°F	0.95	0.98



Inspection Date:	10/26/2020 9:32:08 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265



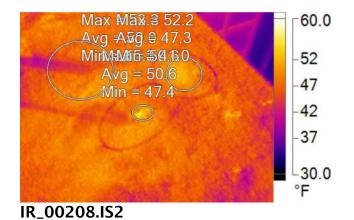


Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
Α0	52.0°F	47.9°F	55.7°F	0.95	1.31
A1	48.4°F	45.2°F	52.6°F	0.95	1.18



Inspection Date:	10/26/2020 9:33:23	Area	Roof Area A
	AM		
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265



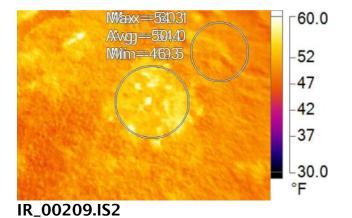


Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
Α0	50.0°F	45.3°F	53.3°F	0.95	1.53
A1	50.6°F	47.4°F	56.6°F	0.95	1.88
A2	47.3°F	41.0°F	52.2°F	0.95	2.02

Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 9:34:41 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265



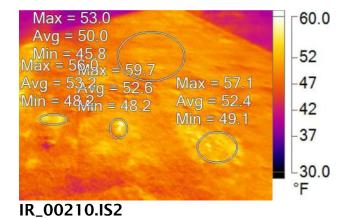


Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
Α0	54.0°F	49.5°F	60.1°F	0.95	1.47
A1	50.4°F	46.3°F	54.3°F	0.95	1.07



Inspection Date:	10/26/2020 9:34:58 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265





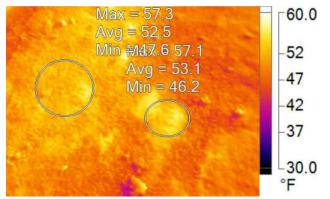
Visible Light Image

			_		
Name	Avg	Min	Max	Emissivity	St. Dev.
A0	52.4°F	49.1°F	57.1°F	0.95	1.17
A1	52.6°F	48.2°F	59.7°F	0.95	2.33
A2	53.2°F	48.2°F	56.0°F	0.95	1.56
A3	50.0°F	45.8°F	53.0°F	0.95	0.89



Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 9:35:07 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265



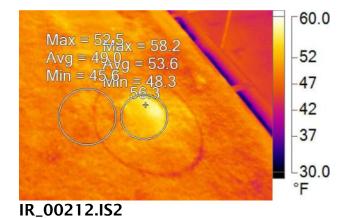
IR_00211.IS2

Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
A0	53.1°F	46.2°F	57.1°F	0.95	2.01
A1	52.5°F	47.6°F	57.3°F	0.95	1.27

Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 9:35:57 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265





Visible Light Image

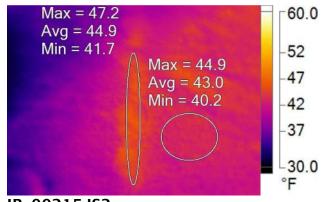
Name	Avg	Min	Max	Emissivity	St. Dev.
Α0	53.6°F	48.3°F	58.2°F	0.95	1.95
A1	49.0°F	45.6°F	52.5°F	0.95	1.25

Name	Temperature	Emissivity
Centerpoint	56.3°F	0.95

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Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 9:49:47 AM	Area	Roof Area A
Location	Alvi	Compace	
		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265



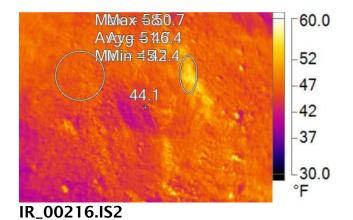
IR_00215.IS2

Visible Light Image

	Name	Avg	Min	Max	Emissivity	St. Dev.
	Α0	44.9°F	41.7°F	47.2°F	0.95	0.73
	A1	43.0°F	40.2°F	44.9°F	0.95	0.52

Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 9:51:35 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265



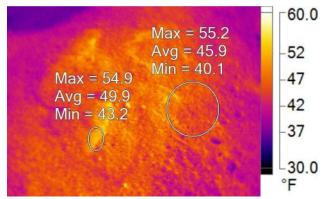
Visible Light Image

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Name	Avg	Min	Max	Emissivity	St. Dev.
Α0	51.7°F	45.1°F	58.1°F	0.95	2.33
A1	46.4°F	42.4°F	50.7°F	0.95	0.94

Name	Temperature	Emissivity
Centerpoint	44.1°F	0.95



Inspection Date:	10/26/2020 9:52:28 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265



IR_00217.IS2

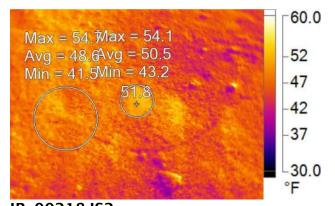
Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
A0	49.9°F	43.2°F	54.9°F	0.95	2.24
A1	45.9°F	40.1°F	55.2°F	0.95	1.83

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Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 9:53:05 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265



IR_00218.IS2

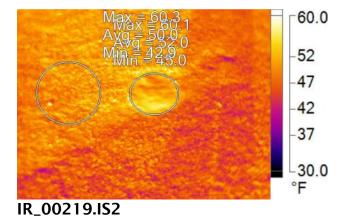
Visible Light Image

<u> </u>					
Name	Avg	Min	Max	Emissivity	St. Dev.
A0	50.5°F	43.2°F	54.1°F	0.95	1.79
A1	48.6°F	41.5°F	54.7°F	0.95	1.69

Name	Temperature	Emissivity
Centerpoint	51.8°F	0.95

Inspected By: Cameron Chorney

Inspection Date:	10/26/2020 10:03:56 AM	Area	Roof Area A
Location		Compass	
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265



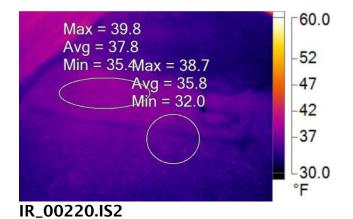


Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
Α0	52.0°F	45.0°F	60.1°F	0.95	2.26
A1	50.0°F	42.9°F	60.3°F	0.95	1.83



Inspection Date:	10/26/2020 10:17:47 AM	Area	Roof Area A at Location #5
Location	10.17.47 AW	Compass	Location #5
Description		Weather Conditions:	Sunny
Indoor Air Temperature		Outdoor Air	38.7
		Temperature	
Indoor Relative		Outdoor Relative	55.6%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	0mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265

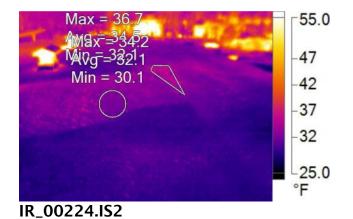


Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
Α0	37.8°F	35.4°F	39.8°F	0.95	0.56
A1	35.8°F	32.0°F	38.7°F	0.95	0.84

Inspected By: Cameron Chorney

Inspection Date:	12/4/2020 10:01:27 AM	Area	Roof Area B
Location	,	Compass	
Description		Weather Conditions:	Fair
Indoor Air Temperature		Outdoor Air	34F
		Temperature	
Indoor Relative		Outdoor Relative	82%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	6mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265





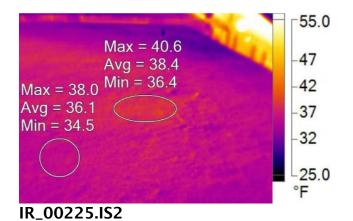
Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
A0	34.5°F	32.1°F	36.7°F	0.95	0.84
A1	32.1°F	30.1°F	34.2°F	0.95	0.51



Inspected By: Cameron Chorney

Inspection Date:	12/4/2020 10:04:04	Area	Roof Area B
	AM		
Location		Compass	
Description		Weather Conditions:	Fair
Indoor Air Temperature		Outdoor Air	34F
		Temperature	
Indoor Relative		Outdoor Relative	82%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	6mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265



Visible Light Image

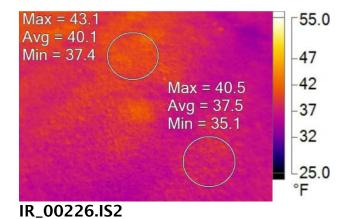
Main Image Markers

Name	Avg	Min	Max	Emissivity	St. Dev.
Α0	38.4°F	36.4°F	40.6°F	0.95	0.53
A1	36.1°F	34.5°F	38.0°F	0.95	0.48



Inspected By: Cameron Chorney

Inspection Date:	12/4/2020 10:05:42 AM	Area	Roof Area B
Location		Compass	
Description		Weather Conditions:	Fair
Indoor Air Temperature		Outdoor Air	34F
		Temperature	
Indoor Relative		Outdoor Relative	82%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	6mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265





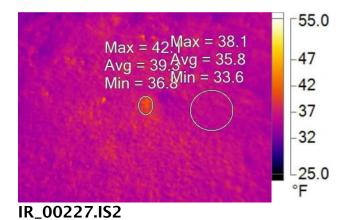
Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
A0	40.1°F	37.4°F	43.1°F	0.95	0.78
A1	37.5°F	35.1°F	40.5°F	0.95	0.74



Inspected By: Cameron Chorney

Inspection Date:	12/4/2020 10:08:49 AM	Area	Roof Area B
Location		Compass	
Description		Weather Conditions:	Fair
Indoor Air Temperature		Outdoor Air	34F
		Temperature	
Indoor Relative		Outdoor Relative	82%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	6mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265





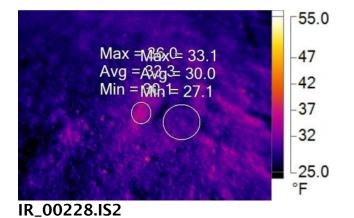
Visible Light Image

Main Image Markers

Name	Avg	Min	Max	Emissivity	St. Dev.
Α0	39.3°F	36.8°F	42.1°F	0.95	0.95
A1	35.8°F	33.6°F	38.1°F	0.95	0.65



Inspection Date:	12/4/2020 10:09:28 AM	Area	Roof Area B
Location		Compass	
Description		Weather Conditions:	Fair
Indoor Air Temperature		Outdoor Air	34F
		Temperature	
Indoor Relative		Outdoor Relative	82%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	6mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265





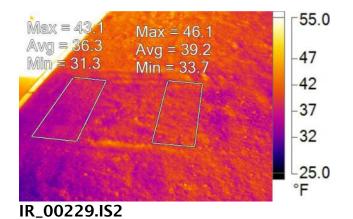
Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
A0	33.3°F	30.1°F	36.0°F	0.95	1.18
A1	30.0°F	27.1°F	33.1°F	0.95	0.93

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Inspected By: Cameron Chorney

Inspection Date:	12/4/2020 10:34:54 AM	Area	Roof Area B at Location #10
Location		Compass	
Description		Weather Conditions:	Fair
Indoor Air Temperature		Outdoor Air	34F
		Temperature	
Indoor Relative		Outdoor Relative	82%
Humidity:		Humidity:	
Dew Point (inside):		Wind Speed	6mph
Problem		Repair Priority:	
Emissivity:	0.95	Reflected	62.0 °F
		Temperature:	
Camera Manufacturer	Fluke Thermography	Camera:	Ti401P-20080265





Visible Light Image

Name	Avg	Min	Max	Emissivity	St. Dev.
Α0	39.2°F	33.7°F	46.1°F	0.95	1.25
A1	36.3°F	31.3°F	43.1°F	0.95	1.48

Appendix D Photos - Roof Cores

Appendix D - Photos of Roof Cores

Main Building Roof (Roof Area 'A')

Core #1



Figure D.1

Core #1 at moisture location
#1



Figure D.2
Roof assembly at core #1.
½" Built-up roofing (BUR)
½" fiberboard cover board
Wood deck



Figure D.3

Fiberboard is deteriorated and moist, as indicated by pink coloring on water reactive paper tape.



Figure D.4

Wood decking is visibly discolored and moisture present. Top ply is delaminating.



Figure D.5

27.9% moisture content (MC)
recorded using TRAMEX
CMEXpert II moisture scanner
equipped with insulated pintype probes.

Core #2



Figure D.6

Core #2 at moisture location #8



Figure D.7
Roof assembly at core #2.
½" BUR
½" fiberboard
Wood deck



Figure D.8

Fiberboard is deteriorated and moist. Moisture detected in fiberboard using water reactive paper tape.



Figure D.9

Wood deck is visibly
discolored, top ply is
delaminated.



Figure D.10 MC of 29.2% recorded.

Core #3



Figure D.11
Core #3 at elevated
conductivity location #3.



Figure D.12
Roof assembly at core #3.
½" BUR
½" fiberboard
Wood deck



Figure D.13

Negligible moisture detected at wood decking. Wood decking is in good condition.



Figure D.14

Core #4 at elevated conductivity location #4.



Roof assembly at core #4.

1/2" BUR

½" fiberboard

2x 2 ½" paper faced polyisocyanurate insulation

Metal flashing at mechanical curb

Figure D.15



Figure D.16

Dry polyiso insulation.



Figure D.17

Core #5 at elevated conductivity location #5.



Figure D.18
Roof assembly at core #5.
½" BUR membrane
½" plywood cover board
Wood deck



Figure D.19
Low MC of 7.8% recorded at wood decking. Wood decking is in good condition.



Figure D.20

Core #6 at elevated conductivity location #6.



Figure D.21
Roof assembly at core #6
½" BUR membrane
½" fiberboard
Wood deck



Figure D.22
Low MC of 7.1% recorded at wood decking. Wood decking is in good condition.



Figure D.23

Core #7 at moisture location #7.



Figure D.24
Roof assembly at Core #7.
½" BUR membrane
½" fiberboard
Wood deck



Gym Roof (Roof Area 'B')





Figure D.27
Roof assembly at core #8.
½" BUR
½" fiberboard
Wood deck



Figure D.28

Low MC recorded at wood decking. Wood decking is in good condition.

Modular Building Roof (Roof Area C)

Core #9



Figure D.29

Core #9 at modular building SW quadrant.

½" BUR membrane

2x ¾" perlite

4" Expanded Polystyrene (EPS) insulation

2x ¾" perlite

4" EPS insulation

¼" concrete topping

Plywood deck



Figure D.30

Moisture saturated and deteriorated perlite coverboard layers.



Figure D.31
Heavily moisture saturated
EPS insulation layers.



Figure D.32

Core #10 at calibration point

C4



Figure D.33
½" BUR membrane
2x ¾" perlite sheathing
4" EPS insulation
¼" concrete topping
Plywood deck



Figure D.34

Moisture saturated and deteriorated perlite coverboard layers.

Heavily moisture saturated EPS insulation layers.



Figure D.35 MC of 33.8% recorded. Plywood soft and deteriorated.



Figure D.36

Core #11 at modular building NE quadrant. Roof assembly.

½" BUR membrane

2x ¾" perlite

4" EPS insulation

Single ply asphaltimpregnated vapor retarder

Plywood deck



Figure D.37

Moisture saturated and deteriorated perlite coverboard layers.

Heavily moisture saturated EPS insulation layers.



Figure D.38 Moist asphalt-impregnated vapor barrier.







Figure D.41
Roof assembly at core #12.
½" BUR membrane
3x ¾" perlite sheathing
2 ½" EPS insulation
¼" concrete topping
Plywood deck



Figure D.42
Moisture saturated and deteriorated perlite coverboard layers.

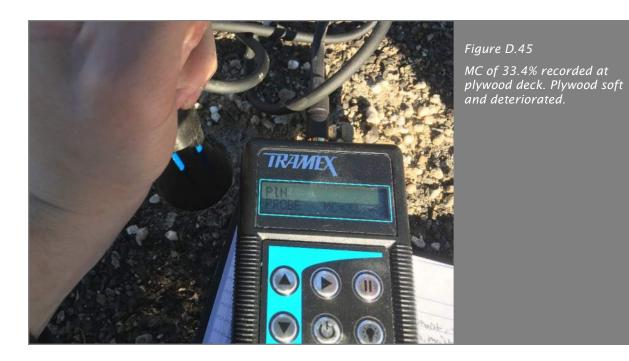


Figure D.43
Heavily moisture saturated
EPS insulation layers.



Figure D.44

Moist concrete topping.



Gym Roof (Roof Area 'B')

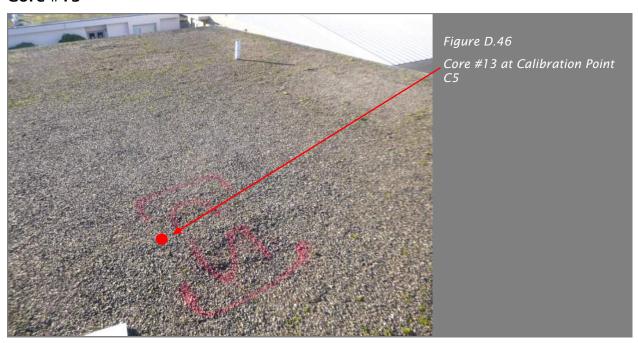




Figure D.47

Roof assembly at core #13.

Ballasted BUR Membrane
½" Fiberboard - Dry

Hot Asphalt - Dry

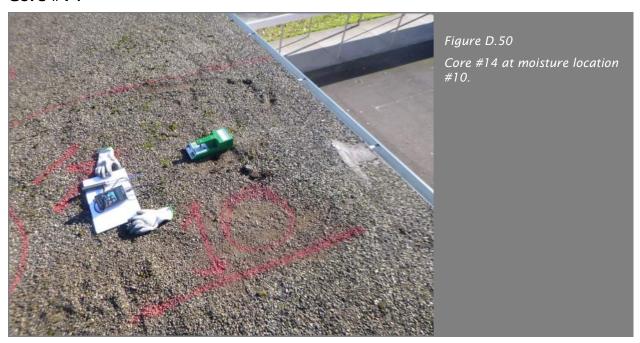
Asphalt Felt - Dry

Wood Deck - Dry, 7.6% MC, good condition



Figure D.48
Wood deck is dry.







Roof assembly at core #14.

Ballasted BUR Membrane

½" Fiberboard – Deteriorated,
Moist

Hot Asphalt – Brittle, Moist

Asphalt Felt – Brittle, Moist

Wood Deck – Good condition,
moist, 12.8% MC

Figure D.51



Figure D.52

Wood deck substrate is in good condition.



Figure D.53 MC of 12.8% recorded.



Figure D.54

Core #15 at SE section of roof



Figure D.55

Roof assembly at core #15.

Ballasted BUR Membrane

½" Fiberboard – Dry

Hot Asphalt – Dry

Asphalt Felt – Dry

Wood Deck – Dry, Good
condition, Negligible moisture



Figure D.56 Low MC recorded.



Figure D.57

Core #16 at NE section of roof.



Figure D.58
Roof assembly at core #16.
Ballasted BUR Membrane
½" Fiberboard - Dry
Wood Deck - Dry



Figure D.59 MC of 7.6% recorded at wood deck.



Figure D.60

Core #17 at NW section of roof.



Figure D.61
Roof assembly at core #17.
Ballasted BUR Membrane
½" Fiberboard - Dry
Wood Deck - Dry



Figure D.62 MC of 9.2% recorded at wood.

SUPPLEMENTAL ASBESTOS SURVEY REPORT

International School of Beaverton

17770 SW Blanton Street Beaverton, OR 97078

Prepared for:

Beaverton School District

16550 SW Merlo Road Beaverton, OR 97006

Inspection Dates: October 9, 2020 **Report Prepared:** October 27, 2020

Prepared By:



4105 SE International Way, Suite 505 Milwaukie, OR 97222 503.387.3251

TRC Project Number: 414070

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Appendices

Appendix A – Figures
Appendix B – Laboratory Analytical Data Sheets
Appendix C – Prior Documentation

Appendix D – Inspector Certification(s)

EXECUTIVE SUMMARY

TRC Environmental Corporation (TRC) was contracted by the Beaverton School District to conduct a supplemental asbestos survey, including collection of bulk asbestos samples, laboratory analysis, and preparation of a report for International School of Beaverton located at 17770 SW Blanton Street in Beaverton, Oregon 97078. Mr. Jason Stone, AHERA accredited building inspector performed the survey on October 9th, 2020. The survey activities included the review of prior sampling documentation and reports provided by the District, inspection and assessment of accessible suspect building materials, collection of bulk samples of suspect asbestos containing building materials that had previously not be sampled, and submission of bulk samples for laboratory analysis.

ASBESTOS MATERIAL SUMMARY

Suspect asbestos containing building materials were sampled and submitted under the chain-of-custody (COC) protocol to an accredited laboratory for polarized light microscopy (PLM) bulk sample analysis. Inspection, sampling and analytical procedures were performed in general accordance with the U.S. Environmental Protection Agency's (EPA's) National Emission Standards for Hazardous Air Pollutants (NESHAP) EPA 40 CFR 61 Subpart M, the EPA Asbestos Hazard Emergency Response Act (AHERA) 40 CFR Part 763, and Federal Occupational Safety and Health Administration (OSHA) 29 CFR 1926.1101 guidelines.

The following materials sampled during this investigation and prior investigations were identified as asbestos containing materials:

- HVAC Mastic
- 9" x 9" Brown Floor Tile (Mastic is Non-Detect)
- Gypsum Board and Joint Compound (Previously Sampled)
- Hard Fittings and Pipe Run Insulation (Previously Sampled)
- Roof Penetration Sealant, Black (Previously Sampled)
- Fire Doors (Assumed)

Additionally, any materials uncovered during renovation activities that are not addressed in this inspection report or prior reports for the building are considered presumed asbestos containing materials and must be sampled by an accredited asbestos inspector prior to disturbance, or they must be treated as asbestos containing.



INTRODUCTION

A supplemental asbestos survey was conducted by TRC at International School of Beaverton, located at 17770 SW Blanton Street in Beaverton, Oregon. It was reported by the client that this hazardous materials survey is being conducted in conjunction with their roof and HVAC upgrade project. The survey activities were performed on October 9th, 2020 and included the review of prior sampling documentation and reports as well as the inspection, assessment and bulk sampling of suspect asbestos containing building materials that had not previously been sampled. Sample locations are presented on the Sample Location Diagrams in Appendix A. Laboratory analytical results are presented in Appendix B and Prior Documentation is presented in Appendix C.

Mr. Jason Stone, AHERA accredited building inspector conducted the survey inspection and sampling activities. Copies of training certificates and state licenses (where applicable) are presented in Appendix D, Inspector Certifications.

BACKGROUND

Asbestos Containing Materials

The United States Environmental Protection Agency (EPA) define an asbestos-containing material (ACM) as any material containing more than one percent (>1.0%) asbestos by weight. In addition, ACMs are designated as:

Friable asbestos - material which can be crumbled, pulverized or reduced to powder by hand pressure, a.k.a. Regulated Asbestos Containing Materials (RACM).

Category I Non-friable - includes resilient floor coverings, asphalt roofing products, gaskets and packing.

Category II Non-friable - any non-friable ACM that is not in Category I (i.e. Asbestoscement (Transite) siding or roofing material).

OSHA Regulated Materials

The Occupational Safety and Health Administration (OSHA) regulates all materials containing any detectable level of asbestos by weight, including those materials containing 1.0% or less.

Asbestos Sampling and Analytical Procedures

Representative bulk samples of suspect asbestos-containing building materials were randomly collected from the interior of the building. Homogenous material determination was based on the following criteria:

- Similar physical characteristics (same color and texture, etc.),
- Application (sprayed or trowel-on, assembly into a system, etc.),
- Material function (thermal insulation, floor tile, wallboard system, etc.).

The bulk samples were collected, labeled, and shipped to the certified analytical laboratory under proper COC documentation, and condition and approximate quantity assessments were performed by the accredited inspector during the inspection.



Laboratory services were provided by TRC Labs, in Windsor, Connecticut, a National Voluntary Laboratory Accreditation Program (NVLAP code #101424-0).

Bulk samples were analyzed by PLM utilizing the EPA's Test Methods: Methods for the Determination of Asbestos in Bulk Building Materials (EPA 600/R-93/116, July 1993) and the McCrone Research Institute's The Asbestos Particle Atlas as method references.

Analysis by PLM was performed by visual observation of the bulk sample and slides prepared of the bulk sample for microscopic examination and identification. The samples were analyzed for asbestos (Chrysotile, Amosite, Crocidolite, Anthophyllite, and Actinolite/Tremolite), fibrous non-asbestos constituents (mineral wool, cellulose, etc.) and non-fibrous constituents. Using a stereoscope, the microscopist visually estimates the relative amounts of each constituent by determining the estimated area of the asbestos compared with the area estimate of the total sample.

ASBESTOS FINDINGS & RECOMMENDATIONS

The following table presents the location and quantities of each suspect building material identified and sampled during this survey as well as all applicable analytical results:

Sample No.	Material	Sample Location	Asbestos Content	Approximate Quantity
ISB-01A ISB-01B ISB-01C				
ISB-01D	Built-Up Roofing	Throughout Roof	ND	N/A
ISB-01E				
ISB-01F				
ISB-02A			5%	
ISB-02B ISB-02C	HVAC Mastic	Roof HVAC Units	Chrysotile	500 LF
ISB-03A				
ISB-03B	Roof Mastic	Throughout Roof	ND	N/A
ISB-03C				
ISB-04A	10/4000	D (11) / A O 11it-	ND	N1/A
ISB-04B ISB-04C	HVAC Caulk	Roof HVAC Units	ND	N/A
ISB-04C				
ISB-05B	Gaskets, Black	Roof HVAC Units	ND	N/A
ISB-05C	- ,			
ISB-06A				
ISB-06B	Caulking Debris	M-Wing Roof	ND	N/A
ISB-06C				
ISB-07A				
ISB-07B	Light Gray HVAC Caulk	HVAC Room	ND	N/A
ISB-07C				
ISB-08A	Window Clazing	Original Building	ND	NI/A
ISB-08B ISB-08C	Window Glazing	Windows	ND	N/A

ND = Non-detect

SF = Square feet

LF = Linear Feet

N/A = Not Applicable



Sample No.	Material	Sample Location	Asbestos Content	Approximate Quantity
ISB-09A ISB-09B ISB-09C	Dark Gray HVAC Caulk	Attic	ND	N/A
ISB-10A ISB-10B ISB-10C	Tar Paper	Attic	ND	N/A
ISB-11A ISB-11B ISB-11C	Blown-in Insulation	Attic	ND	N/A
ISB-12A ISB-12B ISB-12C	12" x 12" Off-White Floor Tile with Gray Flecks and Associated Glue	Hallways	Tile – ND Glue – ND	N/A
ISB-13A ISB-13B ISB-13C	12" x 12" White Floor Tile with Gray Flecks and Associated Glue	Classrooms	Tile – ND Glue – ND	N/A
ISB-14A ISB-14B ISB-14C	12" x 12" Beige Floor Tile with Black Specks and Associated Glue	Stairs at Stage	Tile – ND Glue – ND	N/A
ISB-15A ISB-15B ISB-15C	12" x 12" Gray Floor Tile with Gray Flecks and Associated Glue	Landing Below Stage	Tile – ND Glue – ND	N/A
ISB-16A ISB-16B ISB-16C	9" x 9" Brown Floor Tile and Associated Mastic	Book Storage Room	Tile – 3% Chrysotile Mastic – ND	300 SF
ISB-17A ISB-17B ISB-17C	Sink Undercoating, Gray	New Building	ND	N/A
ISB-18A ISB-18B ISB-18C	Sink Undercoating, White	M-Wing	ND	N/A

Asbestos Containing Materials (ACMs)

Asbestos was detected in the following materials sampled during this and prior investigations:

Material	Approximate Location(s)	Approximate Quantity
HVAC Mastic	Roof HVAC Units	500 LF
9" x 9" Brown Floor Tile (Mastic is non-detect for asbestos)	Book Storage Room	300 SF
Gypsum Wallboard and Joint Compound	Throughout Original Building	Previously Sampled
Hard Fittings and Insulation	Throughout	Previously Sampled
Roof Penetration Sealant, Black	Throughout Roof	Previously Sampled
Fire Doors	Throughout	Assumed



Non-Detect Materials (ND)

Asbestos was not detected in the following materials sampled during this investigation:

Built-Up Roofing Roof Mastic HVAC Caulk Gaskets, Black Caulking Debris Light Gray HVAC Caulk Tar Paper Blown-in Insulation 12" x 12" Off-White Floor Tile with Gray Flecks and Glue 12" x 12" Beige Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue Sink Undercoating, Gray New Building New Building
Roof Mastic HVAC Caulk Original Building Roof HVAC Units Gaskets, Black Original Building Roof HVAC Units Caulking Debris HVAC Caulk Uindow Glazing Original Building Roof HVAC Room Window Glazing Original Building Windows Dark Gray HVAC Caulk Attic Tar Paper Attic Blown-in Insulation Attic 12" x 12" Off-White Floor Tile with Gray Flecks and Glue 12" x 12" White Floor Tile with Gray Flecks and Glue 12" x 12" Beige Floor Tile with Black Specks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue Landing Below Stage Landing
HVAC Caulk Gaskets, Black Caulking Debris Caulking Debris M-Wing Roof Light Gray HVAC Caulk Window Glazing Original Building Roof HVAC Units HVAC Room Original Building Windows Original Building Windows Attic Attic Tar Paper Attic Blown-in Insulation Attic 12" x 12" Off-White Floor Tile with Gray Flecks and Glue 12" x 12" White Floor Tile with Gray Flecks and Glue 12" x 12" Beige Floor Tile with Black Specks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue Landing Below Stage Landing
Gaskets, Black Caulking Debris M-Wing Roof Light Gray HVAC Caulk Window Glazing Original Building Roof HVAC Units HVAC Room Original Building Windows Original Building Windows Attic Attic Tar Paper Attic Blown-in Insulation Attic 12" x 12" Off-White Floor Tile with Gray Flecks and Glue 12" x 12" White Floor Tile with Gray Flecks and Glue 12" x 12" Beige Floor Tile with Black Specks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue Landing Below Stage Landing
Caulking Debris Light Gray HVAC Caulk Window Glazing Dark Gray HVAC Caulk Tar Paper Blown-in Insulation 12" x 12" Off-White Floor Tile with Gray Flecks and Glue 12" x 12" White Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue Landing Below Stage Landing
Light Gray HVAC Caulk Window Glazing Original Building Windows Dark Gray HVAC Caulk Tar Paper Blown-in Insulation 12" x 12" Off-White Floor Tile with Gray Flecks and Glue 12" x 12" White Floor Tile with Gray Flecks and Glue 12" x 12" Beige Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue Landing Below Stage Landing
Window Glazing Dark Gray HVAC Caulk Tar Paper Blown-in Insulation Attic 12" x 12" Off-White Floor Tile with Gray Flecks and Glue 12" x 12" White Floor Tile with Gray Flecks and Glue 12" x 12" Beige Floor Tile with Black Specks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue Landing Below Stage Landing
Dark Gray HVAC Caulk Tar Paper Attic Blown-in Insulation Attic 12" x 12" Off-White Floor Tile with Gray Flecks and Glue 12" x 12" White Floor Tile with Gray Flecks and Glue 12" x 12" Beige Floor Tile with Black Specks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue Landing Below Stage Landing
Tar Paper Blown-in Insulation Attic 12" x 12" Off-White Floor Tile with Gray Flecks and Glue 12" x 12" White Floor Tile with Gray Flecks and Glue 12" x 12" Beige Floor Tile with Black Specks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue Landing Below Stage Landing
Blown-in Insulation Attic 12" x 12" Off-White Floor Tile with Gray Flecks and Glue 12" x 12" White Floor Tile with Gray Flecks and Glue 12" x 12" Beige Floor Tile with Black Specks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue Landing Below Stage Landing
12" x 12" Off-White Floor Tile with Gray Flecks and Glue 12" x 12" White Floor Tile with Gray Flecks and Glue 12" x 12" Beige Floor Tile with Black Specks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue 12" x 12" Off-White Floor Tile with Gray Flecks and Glue 12" x 12" White Floor Tile with Gray Flecks and Glue 12" x 12" Gray Floor Tile with Gray Flecks and Glue 13" x 12" Gray Floor Tile with Gray Flecks and Glue
12" x 12" Beige Floor Tile with Black Specks and GlueStairs at Stage12" x 12" Gray Floor Tile with Gray Flecks and GlueLanding Below Stage Landing
12" x 12" Beige Floor Tile with Black Specks and GlueStairs at Stage12" x 12" Gray Floor Tile with Gray Flecks and GlueLanding Below Stage Landing
12" x 12" Gray Floor Tile with Gray Flecks and Glue Landing Below Stage Landing
Sink Undercoating, White M-Wing
1' x 1' Nailed-on Ceiling Tile with Even Holes B116
12" x 12" Vinyl Floor Tile, Black A Hall
12" x 12" Vinyl Floor Tile, Off-White A Hall
12" x 12" Vinyl Floor Tile, Red A Hall
Black Cove Base and Glue A Hall, A108, A114, Health Room, Main Office, M116
Leveling Compound A Hall
Blown-in Insulation Attic Above Hall East Principal
BATT Insulation and Paper Attic Above Hall East Principal
Wall Panel Gym
Concealed Grid Ceiling Tile (1' x1') Gym
Asphalt Impregnated Paper Gym Storage Wall
Vapor Barrier A Corridor, Health Room, Main Corridor, Main Office
Gray Vinyl Floor Tile A Corridor, B108, Main Corridor
1' x 1' Ceiling Tile, White/Brown A Hall
Carpet Mastic A100
Cream / Tan Cove Base and Associated Glue A108, A114, B106
White Board Mastic, Tan A112
Blue Paint A112
Gypsum Wallboard and Joint Compound Modular Building
Tack Board Mastic, Tan A112
12" x 12" White Floor Tile with Light Blue Flecks and Mastic B106
Ceiling Plaster Boiler Room
Boiler Gasket, Tan Boiler Room
Boiler Jacket Boiler Room
Boiler Insulating Cement Boiler Room
White Paint Custodial 1



Material	Location	
Stapled-on Ceiling	Health Room	
Floor Tile Mastic, Black	Main Corridor	
Tack Board Mastic, Black	Main Office	
Brown Cove Base Mastic	Main Office, Boy's Restroom 2, Girl's Restroom 2, Staff Room	
Green Paint	Principal's Office	
Cement Sink	Boy's Restroom 1	
Wall Panel Mastic	Boy's Restroom 1, Girl's Restroom 2	
Grey Paint	Boy's Restroom 2	
Wall and Ceiling Plaster	Boy's Restroom 2, Girl's Restroom 2	
Floor Tile Grout	Boy's Restroom 2	
Tan Cove Base Mastic	Boy's Restroom 2	
Wall Tile Grout	Boy's Restroom 2	
Wall Tile Mastic	Girl's Restroom 1	
Wall Tile Mastic, Brown	Girl's Restroom 1	
Floor Tile Grout	Girl's Restroom 2	
Blue and Tan Paint	Girl's Restroom 2	
White Paint	Staff Room	
Composition Roofing	Roof	
Silver Paint	Boy's Restroom Vent (Roof)	
12" x 12" Tan Vinyl Floor Tile with Yellow Mastic	East Stairs	
Vapor Barrier (Between plywood and T&G Sub-roofing)	ISB2 -Boy's and Girl's Restroom	
Tack Board Mastic, Tan	M100, M116	
Wainscot Mastic, Tan	M102, M116	
Cove Base and Mastic	M102, M110, M112	
Flooring Core Sample	M110	
Floor Tile and Mastic	M112, M108	
Vapor Barrier	M116	
Sink Undercoating	M116	
Sheet Flooring	M116	
Insulation	M116	
Lay-in Ceiling Tiles	M116, M118	
12" x 12" Gray Floor Tile	M116	
Off-White Paint	M116	
Formica	Modular Boy's Restroom	

Due to the Site being an occupied building at the time of the inspection and sampling, a full destructive investigation for concealed materials was not performed. Hidden building materials (e.g., old floor mastic patches hidden under carpeting, chalkboard mastic, mirror mastic, wood paneling mastic, etc.), other than those discussed in this report, could be uncovered when removing building finishes during renovation activities. Any materials encountered during the renovation activities that are not identified in this report, should either be presumed to be asbestos containing and handled as ACM or be sampled by an accredited asbestos inspector to determine if it contains asbestos.



RECOMMENDATIONS

All identified asbestos containing and OSHA regulated materials from this investigation and previous investigations must be removed by a licensed asbestos abatement contractor prior to them being impacted by any renovation or demolition activities.

Additionally, any materials uncovered during renovation or demolition activities that are not addressed in this inspection report or prior reports for the building are considered presumed asbestos containing materials and must be sampled by an accredited asbestos inspector prior to disturbance, or they must be treated as asbestos containing.

DISCLAIMER

The content presented in this report is based on data collected during the site inspection and survey, review of pertinent regulations, requirements, guidelines and commonly followed industry standards, and information provided by the Beaverton School District, their clients, agents, and representatives.

The work has been conducted in an objective and unbiased manner and in accordance with generally accepted professional practice for this type of work. TRC believes the data and analysis to be accurate and relevant, but cannot accept responsibility for the accuracy or completeness of available documentation or possible withholding of information by other parties.

This asbestos survey report is designed to aid the property owner, architect, construction manager, general contractor, and asbestos abatement contractor in locating potential ACMs. This report is not intended for, and may not be utilized as, a bidding document or as an abatement project specification document.

If you have any questions, or need any further clarification regarding this report, please do not hesitate to contact Mr. Ron Landolt at (503) 407-0734.

Sincerely,

TRC Environmental Corporation

Latthew Cuda

Matthew Cuda Project Manager

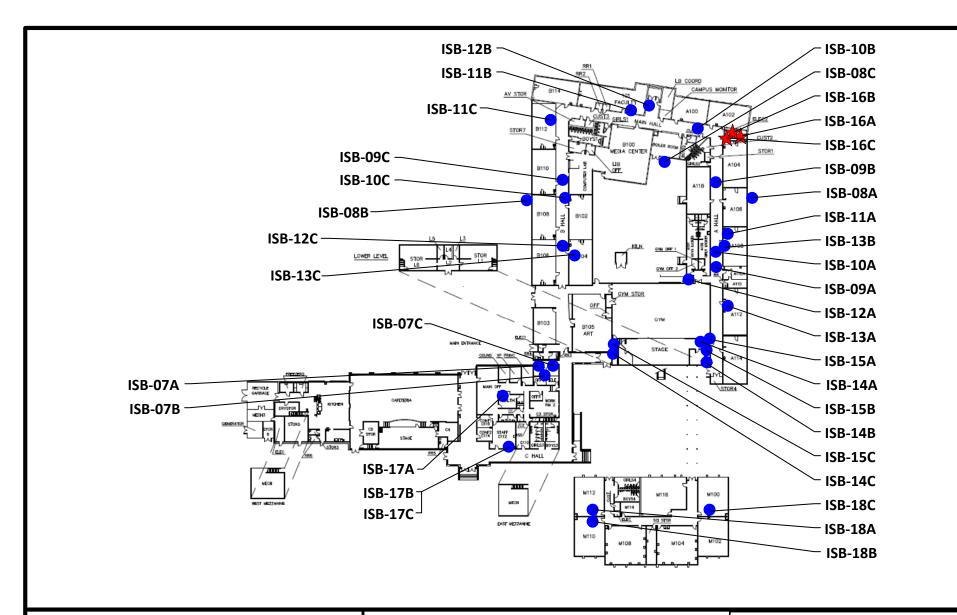
NW Region BSI Practice Manager

Ron Landolt, CAC



Appendix A – Figure(s)





LEGEND



Asbestos-Containing Sample Location

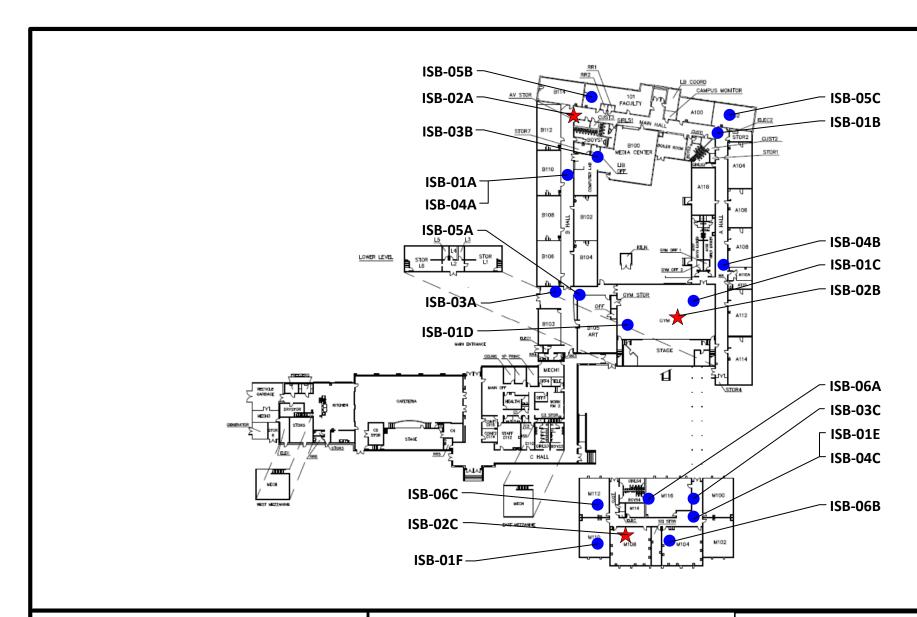
SUPPLEMENTAL ASBESTOS SURVEY REPORT SAMPLE LOCATION DIAGRAM

INTERNATIONAL SCHOOL OF BEAVERTON 17770 SW BLANTON STREET BEAVERTON, OREGON 97078

TRC Project No.: 414070		Figure: 1.1
Drawn by: MC	Reviewed by: RAL	Date: October 2020



4105 SE International Way, Suite 505 Milwaukie, Oregon 97222 Phone: (503) 387-3251 Fax: (503) 908-1318





Non-Asbestos Sample Location



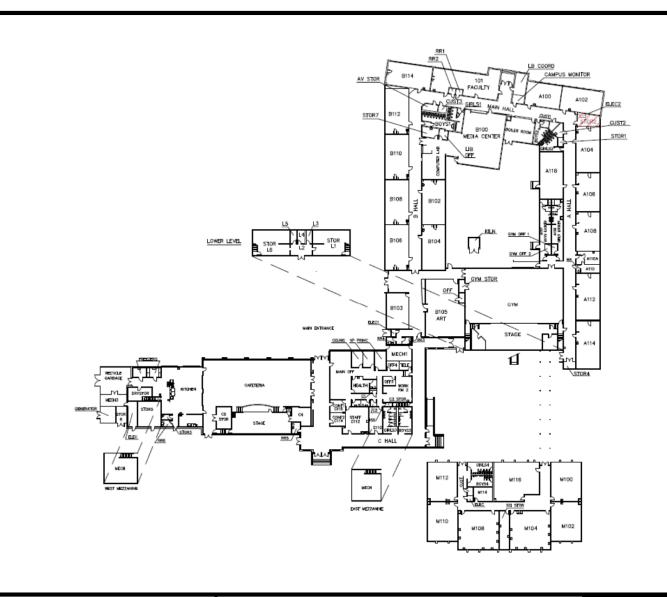
Asbestos-Containing Sample Location

SUPPLEMENTAL ASBESTOS SURVEY REPORT SAMPLE LOCATION DIAGRAM

INTERNATIONAL SCHOOL OF BEAVERTON 17770 SW BLANTON STREET BEAVERTON, OREGON 97078

TRC Project No.: 414070		Figure: 1.2
Drawn by: MC	Reviewed by: RAL	Date: October 2020







Asbestos-Containing 9" x 9" Floor Tile (mastic is non-asbestos)

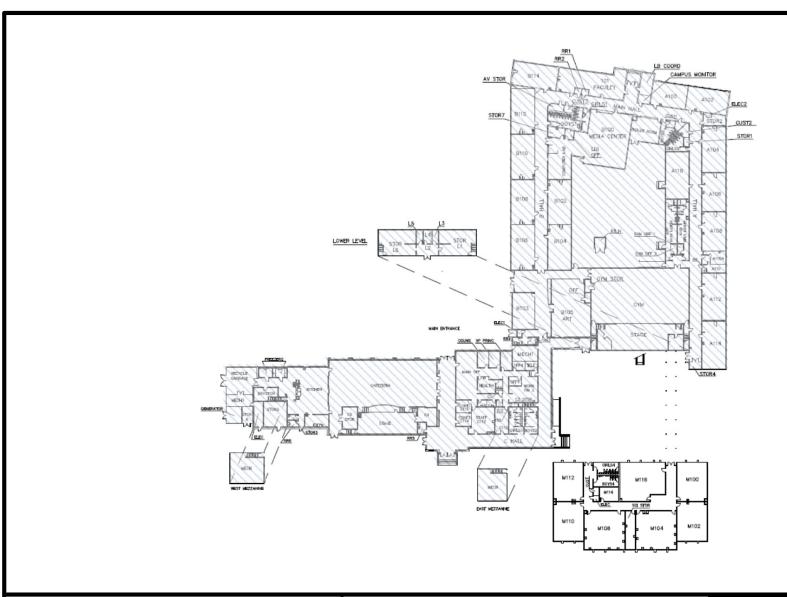
Additional Asbestos-Containing Floor Tile and Mastic may be present under walls/cabinetry.

SUPPLEMENTAL ASBESTOS SURVEY REPORT MATERIAL LOCATION DIAGRAM

INTERNATIONAL SCHOOL OF BEAVERTON 17770 SW BLANTON STREET BEAVERTON, OREGON 97078

TRC Project No.: 414070		Figure: 2.1
Drawn by: MC	Reviewed by: RAL	Date: October 2020







Asbestos-Containing Gypsum Wallboard and Joint Compound and Pipe Insulation Throughout

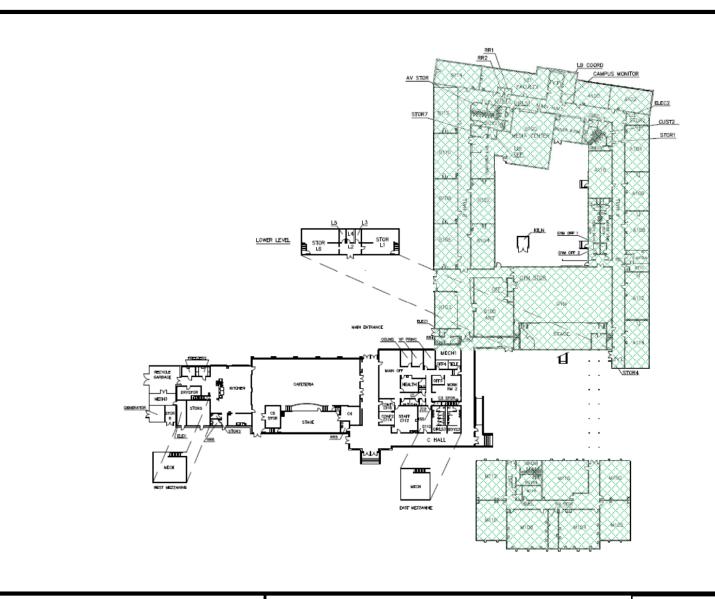
Assumed Asbestos-Containing Fire Doors located Throughout.

SUPPLEMENTAL ASBESTOS SURVEY REPORT MATERIAL LOCATION DIAGRAM

INTERNATIONAL SCHOOL OF BEAVERTON 17770 SW BLANTON STREET BEAVERTON, OREGON 97078

TRC Project No.: 414070		Figure: 2.2
Drawn by: MC	Reviewed by: RAL	Date: October 2020





>>> -

Asbestos-Containing HVAC Mastic and Roof Penetration Sealant

SUPPLEMENTAL ASBESTOS SURVEY REPORT MATERIAL LOCATION DIAGRAM

INTERNATIONAL SCHOOL OF BEAVERTON 17770 SW BLANTON STREET BEAVERTON, OREGON 97078

TRC Project No.: 414070		Figure: 2.3
Drawn by: MC	Reviewed by: RAL	Date: October 2020



Appendix B – Laboratory Analytical Data Sheets





CLIENT: Beaverton School District

Lab Log #: 0055729

Project #: 414070.0000.0000

Date Received: 10/12/2020 Date Analyzed: 10/15/2020

Site: International School of Beaverton, 17770 SW Blanton Street, Beaverton, OR

Sample No.	Color	Homogenous	Multi- Layered	Layer No.	0	other Matrix Materials	Asbestos %	Asbestos Type
ISB-01A	Brown (fiber board)	No	Yes	1	60% 10%	cellulose synthetic fiber	ND	None
ISB-01A	Black (built up roofing)	No	Yes	2	10%	synthetic fiber	ND	None
ISB-01A	Black (tar)	No	Yes	3	5% 5%	cellulose fibrous glass	ND	None
ISB-01B	Brown (fiber board)	No	Yes	1	60% 10%	cellulose synthetic fiber	ND	None
ISB-01B	Black (built up roofing)	No	Yes	2	10%	synthetic fiber	ND	None
ISB-01B	Black (tar)	No	Yes	3	5% 5%	cellulose fibrous glass	ND	None
ISB-01C	Brown (fiber board)	No	Yes	1	60% 10%	cellulose synthetic fiber	ND	None
ISB-01C	Black (built up roofing)	No	Yes	2	40%	cellulose	ND	None
ISB-01C	Black (tar)	No	Yes	3	5% 5%	cellulose fibrous glass	ND	None
ISB-01D	Black (concrete)	No	Yes	1	5%	cellulose	ND	None
ISB-01D	Black (built up roofing)	No	Yes	2	40%	cellulose	ND	None
ISB-01E	Beige (concrete)	No	Yes	1			ND	None
ISB-01E	Black (built up roofing)	No	Yes	2	20%	synthetic fiber	ND	None
ISB-01E	Black (tar)	No	Yes	3	5% 5%	cellulose fibrous glass	ND	None



Sample No.	Color	Homogenous	Multi- Layered	Layer No.		ther Matrix Materials	Asbestos %	Asbestos Type
ISB-01F	Beige (concrete)	No	Yes	1			ND	None
ISB-01F	Black (built up roofing)	No	Yes	2	20%	synthetic fiber	ND	None
ISB-01F	Black (tar)	No	Yes	3	5% 5%	cellulose fibrous glass	ND	None
ISB-02A	Black/Silver (hvac mastic)	Yes	No				5%	Chrysotile
ISB-02B							NA/PS	
ISB-02C							NA/PS	
ISB-03A	Black (roof mastic)	Yes	No		10%	cellulose	ND	None
ISB-03B	Black (roof mastic)	Yes	No		10%	cellulose	ND	None
ISB-03C	Black (roof mastic)	Yes	No		10%	cellulose	ND	None
ISB-04A	Grey (hvac caulk)	Yes	No		2%	cellulose	ND	None
ISB-04B	Grey (hvac caulk)	Yes	No		2%	cellulose	ND	None
ISB-04C	Grey (hvac caulk)	Yes	No		2%	cellulose	ND	None
ISB-05A	Black (gasket)	Yes	No		40%	synthetic fiber	ND	None
ISB-05B	Black (gasket)	Yes	No		40%	synthetic fiber	ND	None
ISB-05C	Black (gasket)	Yes	No		40%	synthetic fiber	ND	None
ISB-06A	Grey (caulking debris)	Yes	No				ND	None
ISB-06B	Grey (caulking debris)	Yes	No				ND	None
ISB-06C	Grey (caulking debris)	Yes	No				ND	None
ISB-07A	Grey (hvac caulk)	Yes	No		2%	cellulose	ND	None
ISB-07B	Grey (hvac caulk)	Yes	No		2%	cellulose	ND	None
ISB-07C	Grey (hvac caulk)	Yes	No		2%	cellulose	ND	None
ISB-08A	Beige/Grey (window glazing)	Yes	No				ND	None
ISB-08B	Beige/Grey (window glazing)	Yes	No				ND	None



Sample No.	Color	Homogenous			Asbestos %	Asbestos Type		
ISB-08C	Beige/Grey (window glazing)	Yes	No				ND	None
ISB-09A	Dark Grey (hvac caulk)	Yes	No		3% 2%	cellulose synthetic fiber	ND	None
ISB-09B	Dark Grey (hvac caulk)	Yes	No		3% cellulose 2% synthetic fiber		ND	None
ISB-09C	Dark Grey (hvac caulk)	Yes	No		3% 2%	cellulose synthetic fiber	ND	None
ISB-10A	Black/Brown (tar paper)	Yes	No		90%	cellulose	ND	None
ISB-10B	Black/Brown (tar paper)	Yes	No		90%	cellulose	ND	None
ISB-10C	Black/Brown (tar paper)	Yes	No		90%	cellulose	ND	None
ISB-11A	Dark Grey/Light Grey (blown-in insulation)	Yes	No		10% 85%	cellulose fibrous glass	ND	None
ISB-11B	Dark Grey/Light Grey (blown-in insulation)	Yes	No		10% 85%	cellulose fibrous glass	ND	None
ISB-11C	Dark Grey/Light Grey (blown-in insulation)	Yes	No		10% 85%	cellulose fibrous glass	ND	None
ISB-12A	Yellow (mastic)	No	Yes	1	5%	cellulose	ND	None
ISB-12A	Grey/White (12x12 floor tile)	No	Yes	2	3%	cellulose	ND	None
ISB-12B	Yellow (mastic)	No	Yes	1	5%	cellulose	ND	None
ISB-12B	Grey/White (12x12 floor tile)	No	Yes	2	3%	cellulose	ND	None
ISB-12C	Yellow (mastic)	No	Yes	1	5%	cellulose	ND	None
ISB-12C	Grey/White (12x12 floor tile)	No	Yes	2	3%	cellulose	ND	None
ISB-13A	Brown (mastic)	No	Yes	1	3%	cellulose	ND	None
ISB-13A	Grey/White (12x12 floor tile)	No	Yes	2			ND	None
ISB-13B	Brown (mastic)	No	Yes	1	3%	cellulose	ND	None
ISB-13B	Grey/White (12x12 floor tile)	No	Yes	2			ND	None



Sample No.	Color	Homogenous	Multi- Layered	Layer No.	. Other Matrix Materials		Asbestos %	Asbestos Type
ISB-13C	Brown (mastic)	No	Yes	1	3%	cellulose	ND	None
ISB-13C	Grey/White (12x12 floor tile)	No	Yes	2			ND	None
ISB-14A	Yellow (mastic)	No	Yes	1			ND	None
ISB-14A	Beige (12x12 floor tile)	No	Yes	2			ND	None
ISB-14B	Yellow (mastic)	No	Yes	1			ND	None
ISB-14B	Beige (12x12 floor tile)	No	Yes	2			ND	None
ISB-14C	Yellow (mastic)	No	Yes	1			ND	None
ISB-14C	Beige (12x12 floor tile)	No	Yes	2			ND	None
ISB-15A	Black (mastic)	No	Yes	1	5%	cellulose	ND	None
ISB-15A	Grey/White (12x12 floor tile)	No	Yes	2			ND	None
ISB-15B	Black (mastic)	No	Yes	1	5%	cellulose	ND	None
ISB-15B	Grey/White (12x12 floor tile)	No	Yes	2			ND	None
ISB-15C	Black (mastic)	No	Yes	1	5%	cellulose	ND	None
ISB-15C	Grey/White (12x12 floor tile)	No	Yes	2			ND	None
ISB-16A	Black (mastic)	No	Yes	1	5%	cellulose	ND	None
ISB-16A	Brown/Red (9x9 floor tile)	No	Yes	2			3%	Chrysotile
ISB-16B	Black (mastic)	No	Yes	1	5%	cellulose	ND	None
ISB-16B							NA/PS	
ISB-16C	Black (mastic)	No	Yes	1	5%	cellulose	ND	None
ISB-16C							NA/PS	
ISB-17A	Grey (sink undercoat)	Yes	No		20%	cellulose	ND	None
ISB-17B	Grey (sink undercoat)	Yes	No		20%	cellulose	ND	None
ISB-17C	Grey (sink undercoat)	Yes	No		20%	cellulose	ND	None
ISB-18A	White (sink undercoat)	Yes	No		30%	cellulose	ND	None



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POLARIZED LIGHT MICROSCOPY by EPA 600/R-93/116

Sample No.	Color	Homogenous	Multi- Layered	Layer No.	Other Matrix Materials		Asbestos %	Asbestos Type
ISB-18B	White (sink undercoat)	Yes	No		30%	cellulose	ND	None
ISB-18C	White (sink undercoat)	Yes	No		30%	cellulose	ND	None

Reporting limit- asbestos present at 1%

ND - asbestos was not detected

Trace - asbestos was observed at level of less than 1%

NA/PS - Not Analyzed / Positive Stop

SNA- Sample Not Analyzed- See Chain of Custody for details

Note: Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. In those cases, EPA recommends, and certain states (e.g. NY) require, that negative results be confirmed by quantitative transmission electron microscopy.

The Laboratory at TRC follows the EPA's Interim Method for the Determination of Asbestos in Bulk Insulation 1982 (EPA 600/M4-82-020) Bulk Analysis Code 18/A01 and the EPA recommended Method for the Determination of Asbestos in Bulk Building Materials July 1993, R.L. Perkins and B.W. Harvey, (EPA/600/R-93/116) Bulk Analysis Code 18/A03, which utilize polarized light microscopy (PLM). Our analysts have completed an accredited course in asbestos identification. TRC's Laboratory is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP), for Bulk Asbestos Fiber Analysis, NVLAP Code 18/A01, effective through June 30, 2021. TRC is accredited by the AIHA Laboratory Accreditation Programs (AIHA-LAP), LLC in the Industrial Hygiene Program (IHLAP) for PLM effective through October 1, 2020. Asbestos content is determined by visual estimate unless otherwise indicated. Quality Control is performed in-house on at least 10% of samples and QC data related to the samples is available upon written request from client.

This report shall not be reproduced, except in full, without the written approval of TRC. This report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S. Government. This report relates only to the items tested.

Analyzed by:	Wellin /	Reviewed by: K. Welliami	Date Issued
	Joel Corso, Laboratory Analyst	Kathleen Williamson, Laboratory Manager	10/15/2020

4105 SE In Milwaukie,	TTC 4105 SE International Way, Suite 505, Milwaukie, OR 97222	uite 505,	ASBESTOS BUL	LK SAMPLE C.	HAIN OF C	ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM
Client: Beaverton	Client: Beaverton School District		Project Number: 414070		Inspector(s): Jason Stone	
Project Name: BSD-Interna Internationa 17770 SW B Beaverton,	Project Name: BSD-International School of Beaverton International School of Beaverton 17770 SW Blanton St Beaverton, OR 97078	Beaverton erton	Tracking Number:		Requested TAT: 3 DAY	
Email Results to: jstone@trccomp mcuda@trccomp rlandolt@trccom	Email Results to: jstone@trccompanies.com, mcuda@trccompanies.com, rlandolt@trccompanies.com		Analytical Method: PLM EPA 600/R-93/116		Lab Comments:	
Date Collected	Sample Identification	Mate	Material Description	Homogeneous Area	rea Sample Location	le Lab Identification (Lab on Use Only)
2020-10-09	ISB-01A	Bu	Built-up Roofing	Original Building Roof	Roof See Diagram	WI.
2020-10-09	ISB-01B	Bu	Built-up Roofing	Original Building Roof	Roof See Diagram	ŒI.
2020-10-09	ISB-01C	Bu	Built-up Roofing	Original Building Roof	Roof Diagram	WI.
2020-10-09	ISB-01D	Bu	Built-up Roofing	Original Building Roof	Roof Diagram	WI
2020-10-09	ISB-01E	Bu	Built-up Roofing	Original Building Roof	Roof See Diagram	ш
2020-10-09	ISB-01F	Bu	Built-up Roofing	Original Building Roof	Roof See Diagram	E

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Lab Identification (Lab Use Only)																•
Sample Location	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram
Homogeneous Area	Original Building Roof HVAC Units	Original Building Roof HVAC Units	Original Building Roof HVAC Units	Original Building Roof	Original Building Roof	Original Building Roof	Original Building Roof HVAC Units	M-Wing Roof	M-Wing Roof	M-Wing Roof	HVAC Room					
Material Description	HVAC Mastic	HVAC Mastic	HVAC Mastic	Roof Mastic	Roof Mastic	Roof Mastic	HVAC Caulk	HVAC Caulk	HVAC Caulk	Gaskets, Black	Gaskets, Black	Gaskets, Black	Caulking Debris	Caulking Debris	Caulking Debris	Light Gray HVAC Caulk
Sample Identification	ISB-02A	ISB-02B	ISB-02C	ISB-03A	ISB-03B	ISB-03C	ISB-04A	ISB-04B	ISB-04C	ISB-05A	ISB-05B	ISB-05C	ISB-06A	ISB-06B	ISB-06C	ISB-07A
Date Collected	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09

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Lab Identification (Lab Use Only)																
Sample Location	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram
Homogeneous Area	HVAC Room	HVAC Room	Original Building Windows	Original Building Windows	Original Building Windows	Attic	Attic	Attic	Attic	Attic	Attic	Attic	Attic	Attic	Hallways	Hallways
Material Description	Light Gray HVAC Caulk	Light Gray HVAC Caulk	Window Glazing	Window Glazing	Window Glazing	Dark Gray HVAC Caulk	Dark Gray HVAC Caulk	Dark Gray HVAC Caulk	Tar Paper	Tar Paper	Tar Paper	Blown-in Insulation	Blown-in Insulation	Blown-in Insulation	12" x 12" Off-White Floor Tile with Gray Flecks & Associated Glue	12" x 12" Off-White Floor Tile with Gray Flecks & Associated Glue
Sample Identification	ISB-07B	ISB-07C	ISB-08A	ISB-08B	ISB-08C	ISB-09A	ISB-09B	SB-09C	ISB-10A	ISB-10B	ISB-10C	ISB-11A	ISB-11B	ISB-11C	ISB-12A	ISB-12B
Date Collected	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09

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Lab Identification (Lab Use Only)																
Sample Location	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram	See Diagram
Homogeneous Area	Hallways	Classrooms	Classrooms	Classrooms	Stairs at Stage	Stairs at Stage	Stairs at Stage	Landing Below Stage Landing	Landing Below Stage Landing	Landing Below Stage Landing	Book Storage Room	Book Storage Room	Book Storage Room	New Building	New Building	New Building
Material Description	12" x 12" Off-White Floor Tile with Gray Flecks & Associated Glue	12" x 12" White Floor Tile with Gray Flecks & Associated Glue	12" x 12" White Floor Tile with Gray Flecks & Associated Glue	12" x 12" White Floor Tile with Gray Flecks & Associated Glue	12" x 12" Beige Floor Tile with Black Specks & Associated Glue	12" x 12" Beige Floor Tile with Black Specks & Associated Glue	12" x 12" Beige Floor Tile with Black Specks & Associated Glue	12" x 12" Gray Floor Tile with Gray Flecks & Associated Glue	12" x 12" Gray Floor Tile with Gray Flecks & Associated Glue	12" x 12" Gray Floor Tile with Gray Flecks & Associated Glue	9" x 9" Brown Floor Tile & Associated Mastic	9" x 9" Brown Floor Tile & Associated Mastic	9" x 9" Brown Floor Tile & Associated Mastic	Sink Undercoat, Gray	Sink Undercoat, Gray	Sink Undercoat, Gray
Sample Identification	ISB-12C	ISB-13A	ISB-13B	ISB-13C	ISB-14A	ISB-14B	ISB-14C	ISB-15A	ISB-15B	ISB-15C	ISB-16A	ISB-16B	ISB-16C	ISB-17A	ISB-17B	ISB-17C
Date Collected	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09	2020-10-09

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Date Collected	Sample Identification	Material Description	cription	Homogeneous Area	Sample Location	Lab Ident Use	Lab Identification (Lab Use Only)
2020-10-09	ISB-18A	Sink Undercoat, White	at, White	M-Wing	See Diagram	g a was p	
2020-10-09	ISB-18B	Sink Undercoat, White	at, White	M-Wing	See Diagram		
2020-10-09	ISB-18C	Sink Undercoa	ndercoat, White	M-Wing	See Diagram		
Special Instru N/A	Special Instruction to Laboratory: N/A						
		CF	HAIN OF CUSTO	CHAIN OF CUSTODY INFORMATION			
Œ	Relinquished By:	Date	Time	Received By:		Date	Time
I. (Print): Jason Stone	on Stone			1. (Print): Jod Corso		,	
(Sign):		2020-10-09	14:14:09 PDT	(Sign): And Clan	[0]	077,1101	1300
II. (Print):				II. (Print):			
(Sign):				(Sign):			

Appendix C – Prior Documentation



Report Date: October 2020

ASBESTOS MATERIALS

The following materials either tested positive or are presumed to be asbestos-containing. Materials that had mixed results are considered positive. Materials not sampled or not listed in this report may contain asbestos and should be tested to verify asbestos content prior to impact, demolition, renovation, etc.

(+) Tested Positive, (M) Mixed Results, (P) Presumed Positive

ISB Ma	in Building (ISB1)		
Result	Material	Location	Quantity
+	Vinyl Floor Tile/Mastic / Cmnt: Abated Dec 2018	A-hall; by bathroom, 12"x12" vinyl floor tile, brown	0
Р	Pipe Covering / / HSA 10,50,52, Cmnt: Enclosed by wood panels per inspector. [ID: 24148]	Attic	650 If
Р	MJP Pipe Fittings / / / HSA 7,11,13,51,53, Cmnt: Enclosed by wood panels per inspector. [ID: 24147]	Attic	66 ea
Р	Pipe Covering / PACM / / HSA 10,50,52 [ID: 24150]	Attic / West Corridor	34 If
Р	MJP Pipe Fittings / / / HSA 7,11,13,51,53 [ID: 24149]	Attic / West Corridor	6 ea
+	Floor Tile Mastic / Black / Tested Positive, Cmnt: 6% Chrysotile / not observed [ID: 26423]	Level 1 / A Corridor / Outside Custodial 2	999 nq
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: Abated 730 SF-Summer 2007 [ID: 24151]	Level 1 / A100	0 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: starting to separate [ID: 24170]	Level 1 / A102	239 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: cracked/separated near doorways [ID: 24171]	Level 1 / A104	314 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: cracking at doorway [ID: 24172]	Level 1 / A106	160 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: Abated 680 SF-Summer 2007 [ID: 24173]	Level 1 / A108	0 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: Abated 1275 SF-Summer 2007 [ID: 24176]	Level 1 / A112	0 sf
+	Gypsum Wallboard and Joint Compound / Fine Compact Powder with Paper / Tested Positive, Cmnt: 2% Chrysotile / Abated Summer 2007 [ID: 26158]	Level 1 / A112 / South Wall	0 sf

ISB Main Building (ISB1)

Result	Material	Location	Quantity
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: Abated 1275 SF-Summer 2007 [ID: 24177]	Level 1 / A114	0 sf
+	Gypsum Wallboard and Joint Compound / Fine Compact Powder with Paper / White / Tested Positive, Cmnt: 1% Chrysotile / Abated Summer 2007 [ID: 26152]	Level 1 / A114 / North Soffit	0 sf
Р	Floor Tile and Mastic / Non-Visible PACM / / HSA 54,13, Cmnt: abated summer 2006 [ID: 24178]	Level 1 / A116- Reconfigured, now part of Boys & Girls locker rooms	0 sf
Р	Floor Tile and Mastic / Visible-Positive / 9 x 9 / HSA 54,13, Cmnt: abated summer 2006 [ID: 24179]	Level 1 / A116A- Reconfigured, now part of Boys & Girls locker rooms	0 sf
Р	Floor Tile and Mastic / Non-Visible PACM / / HSA 54,13, Cmnt: abated summer 2006 [ID: 24180]	Level 1 / A118	0 sf
Р	Floor Tile and Mastic / Visible-Positive / 9 x 9 / HSA 54,13, Cmnt: abated summer 2006 [ID: 24181]	Level 1 / A118A- Reconfigured, now part of Boys & Girls locker rooms	0 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, (Old Room: Main Building / Level 1 / Storage 6), Cmnt: floor tile removed, bare cement present [ID: 24213]	Level 1 / AV Storage	0 sf
Р	Floor Tile and Mastic / Visible-Positive / 12x12 / HSA 54,13, Cmnt: Abated Summer 2007 [ID: 24214]	Level 1 / B Hall	0 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: abated Summer 2008 [ID: 24183]	Level 1 / B102	0 sf
Р	MJP Pipe Fittings / / / HSA 7,11,13,51,53, (Old Room: Main Building / Level 1 / Cafeteria), Cmnt: abated summer 2006 [ID: 24192]	Level 1 / B103	0 ea
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, (Old Room: Main Building / Level 1 / Cafeteria), Cmnt: abated 2002 [ID: 24184]	Level 1 / B103	0 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, (Old Room: Main Building / Level 1 / Cafeteria), Cmnt: Abated July 2002. [ID: 24191]	Level 1 / B103	0 sf

ISB Main Building (ISB1)

Result	Material	Location	Quantity
Р	Ceiling Joint Compound / White / / 1, (Old Room: Main Building / Level 1 / Kitchen), Cmnt: ceiling has glue-up ceiling tile. Part of new remodel [ID: 24198]	Level 1 / B105	900 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, (Old Room: Main Building / Level 1 / Kitchen), Cmnt: abated summer 2006 [ID: 24199]	Level 1 / B105	0 sf
Р	Floor Tile and Mastic / Non-Visible PACM / / HSA 54,13, Cmnt: under carpet and under some 12x12 tiles [ID: 24185]	Level 1 / B106	576 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: minor gouge in 1 tile [ID: 24187]	Level 1 / B108	298 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: looks new [ID: 24188]	Level 1 / B110	285 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: minor tile separation [ID: 24189]	Level 1 / B112	285 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: minor tile separation [ID: 24190]	Level 1 / B114	274 sf
Р	Floor Tile and Mastic / Non-Visible PACM / / HSA 54,13, (Old Room: Main Building / Level 1 / B100), Cmnt: abated summer 2006 [ID: 24182]	Level 1 / Computer Lab	0 sf
Р	MJP Pipe Fittings / / / HSA 7,11,13,51,53, Cmnt: not observed [ID: 24210]	Level 1 / Custodial 1	10 ea
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: Some cracked and broken tiles per inspector. [ID: 24193]	Level 1 / Custodial 2	146 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: Abated Summer 2007 [ID: 24194]	Level 1 / East Corridor	0 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13 [ID: 24195]	Level 1 / East Stage Stairwell	130 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: Abated Summer 2007 [ID: 24196]	Level 1 / Entrance Lobby	0 sf

ISB Main Building (ISB1)

Result	Material	Location	Quantity
+	Gypsum Wallboard and Joint Compound / Fine Compact Powder / Grey / Tested Positive, Cmnt: 11% Chrysotile / Abated Summer 2007 [ID: 26119]	Level 1 / Health Room	0 sf
Р	Floor Tile and Mastic / Visible Positive / 12 x 12, Cmnt: Abated Summer 2007 [ID: 24197]	Level 1 / Health Room	0 sf
Р	Floor Tile and Mastic / Non-Visible PACM / / HSA 54,13, Cmnt: abated summer 2006 [ID: 24200]	Level 1 / Library	0 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: abated summer 2006 [ID: 24201]	Level 1 / Library Work Room	0 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: Abated Summer 2007 [ID: 24202]	Level 1 / Main Corridor	0 sf
+	Vinyl Floor Tile / Brown / Tested Positive, Cmnt: Abated Summer 2007 [ID: 26424]	Level 1 / Main Corridor / NE Corner	0 sf
+	Vinyl Floor Tile / Brown / Bottom Layer / Tested Positive, Cmnt: 4% Chrysotile / Abated Summer 2007 [ID: 26345]	Level 1 / Main Corridor / Outside North Workroom	0 sf
+	Floor Tile Mastic / Black / Bottom Layer / Tested Positive, Cmnt: 1% Chrysotile / Abated Summer 2007 [ID: 26346]	Level 1 / Main Corridor / Outside North Workroom	0 sf
Р	Floor Tile and Mastic / Non-Visible PACM / / HSA 54,13, Cmnt: Abated Summer 2007 [ID: 24203]	Level 1 / Main Office	0 sf
+	Hard Fittings and Insulation / Underneath Main Office / Tested Positive, Cmnt: Abated 19 LF- Summer 2007 [ID: 26359]	Level 1 / Main Office Crawl Space	0 sf
Р	Floor Tile and Mastic / Non-Visible PACM / / HSA 54,13, Cmnt: Abated Summer 2007 [ID: 24204]	Level 1 / Principal	0 sf
Р	Pipe Covering (Air cell), Cmnt: Abated 105 LF- Summer 2007 [ID: 25984]	Level 1 / Restroom Boys & Girls 1	0 lf
Р	MJP Pipe Fittings, Cmnt: Abated 105 LF- Summer 2007 [ID: 25985]	Level 1 / Restroom Boys & Girls 1	0 ea
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13 [ID: 24206]	Level 1 / Restroom Unisex 2	0 sf
Р	Floor Tile and Mastic / Visible-Positive / 12 x 12 / HSA 54,13, Cmnt: Abated Summer 2007 [ID: 24207]	Level 1 / Staff	0 sf

ISB Mai	in Building (ISB1)		
Result	Material	Location	Quantity
+	Sink Undercoat / Loose Particulate / Purple / Tested Positive, Cmnt: 3% Chrysotile / Abated Summer 2007 [ID: 26126]	Level 1 / Staff Room	0 ea
M	Joint Compound with Gypsum Wallboard / White / Tested Positive, Cmnt: < 1% Chrysotile /	Level 1 / Stage	0
Р	Asbestos Insulated Wiring	Level 1 / Stage (6) + Gym (6)	12
Р	Pipe Covering / PACM / / HSA 10,50,52, Cmnt: Needs repair per inspector. Not observed by inspector, 6/2008 [ID: 24209]	Level 1 / Stage Loft	28 lf
Р	MJP Pipe Fittings / / / HSA 7,11,13,51,53, Cmnt: Needs repair per inspector. Not observed by inspector, 6/2008 [ID: 24208]	Level 1 / Stage Loft	5 ea
Р	Floor Tile and Mastic / Visible-Positive / 12x12 / HSA 54,13, Cmnt: lifting on bottom landing, tile appears negative though. should test - 2018 [ID: 24215]	Level 1 / Stage West Stairwell	130 sf
Р	Floor Tile and Mastic / Visible-Positive / 9 x 9 / HSA 54,13, Cmnt: Broken tiles per inspector. (On tunnel access hatch in electrical room.) [ID: 24211]	Level 1 / Storage 2	236 sf
Р	Floor Tile and Mastic / Non-Visible PACM / / HSA 54,13, Cmnt: carpet [ID: 24212]	Level 1 / Storage 4	78 sf
Р	Floor Tile and Mastic / Non-Visible PACM / / HSA 54,13, Cmnt: abated Summer 2007 [ID: 24216]	Level 1 / Work Room 1	0 sf
+	Gypsum Wallboard/Joint Compound	Library; computer lab, gypsum wallboard and joint compound	0
+	Sealant / Tar / Black / Tested Positive, Cmnt: 6% Chrysotile [ID: 26350]	Rooftop / Boys restroom Vent	999 nq
+	Gypsum Wallboard/Joint Compound	Room B110; gypsum- joint compound wall system	0
Р	Pipe Covering / / / HSA 10,50,52, Cmnt: 13 LF abated Summer 2007. [ID: 24218]	Tunnel	662 lf
Р	MJP Pipe Fittings / / / HSA 7,11,13,51,53, Cmnt: debris / contamination in tunnels [ID: 24217]	Tunnel	410 ea

MATERIALS THAT TESTED NEGATIVE

The following materials tested negative. Although no asbestos was detected, it is possible that further sampling could indicate asbestos content. It may be prudent to test prior to impact, demolition, renovation, etc.

ISB Main Building (ISB1)	
Material	Location
Vinyl Floor Tile/Mastic	A-hall; by store room, 12"x12" vinyl floor tile, black
Vinyl Floor Tile/Mastic	A-hall; by store room, 12"x12" vinyl floor tile, off-white
Vinyl Floor Tile/Mastic	A-hall; by store room, 12"x12" vinyl floor tile, red
Covebase/Mastic	A-hall; by store room, covebase, black
Leveling Compound	A-hall; by store room, leveling compound
Blown-in Insulation / Fibrous Material / Off White / Tested Negative, Cmnt: non-detect [ID: 26310]	Attic / Above Hall East of Principal
BATT Insulation / Paper / Tan / Tested Negative, Cmnt: non-detect [ID: 26311]	Attic / Above Hall East of Principal
BATT Insulation / Tar / Black / Tested Negative, Cmnt: non-detect [ID: 26312]	Attic / Above Hall East of Principal
BATT Insulation / Fibrous Material / Yellow / Tested Negative, Cmnt: non-detect [ID: 26313]	Attic / Above Hall East of Principal
1'x1' Nailed-on Ceiling Tile with even holes	Classroom B116
Wall Panel	Gym; north wall, white wood fiber wall panel
Concealed Grid Ceiling Tile	Gym; southwest corner, 1' by 1' white wood fiber concealed grid ceiling tile
Concealed Grid Ceiling Tile	Gym; southwest wall, 1' by 1' white wood fiber wall tile
Asphalt Impregnated Paper	Gym; storage wall, tar paper under gym wood board paneling
Vapor Barrier / Tarry Paper / Brown and Black / Tested Negative, Cmnt: non-detect [ID: 26421]	Level 1 / A Corridor
Vinyl Floor Tile / Grey / Tested Negative, Cmnt: non- detect [ID: 26422]	Level 1 / A Corridor / Outside Custodial 2
Ceiling Tiles / 1' x 1' / White/Brown and White/Tan / Tested Negative, Cmnt: Non-detect full hallway (0016874-001,002,003) [ID: 29160]	Level 1 / A Hall
Carpet Mastic / Tan / Tested Negative, Cmnt: non- detect [ID: 26133]	Level 1 / A100 / North Wall
Covebase / Vinyl / Black / Tested Negative, Cmnt: non- detect [ID: 26316]	Level 1 / A108
Covebase Mastic / Cream & tan / Tested Negative, Cmnt: non-detect [ID: 26317]	Level 1 / A108
No Inventoried Asbestos Material / None / / / [ID: 24174]	Level 1 / A110
No Inventoried Asbestos Material / None / / / [ID: 24175]	Level 1 / A110A

Report Date: October 2020

ISB Main Building (ISB1)	
Material	Location
Whiteboard Mastic / Tan / Tested Negative, Cmnt: non-detect [ID: 26315]	Level 1 / A112 / South
Paint / Blue / Tested Negative, Cmnt: non-detect [ID: 26157]	Level 1 / A112 / South Wall
Gypsum Wallboard and Joint Compound / Compact Chalky Material with Paper / White / Tested Negative, Cmnt: non-detect [ID: 26159]	Level 1 / A112 / South Wall
Tack Board Mastic / Tan / Tested Negative, Cmnt: non-detect [ID: 26314]	Level 1 / A112 / West Wall
Tack Board Mastic / Tan / Tested Negative, Cmnt: non-detect [ID: 26154]	Level 1 / A114
Covebase / Vinyl / Black / Tested Negative, Cmnt: non-detect [ID: 26155]	Level 1 / A114
Covebase Mastic / Cream / Tested Negative, Cmnt: non-detect [ID: 26156]	Level 1 / A114
Gypsum Wallboard and Joint Compound / Paint / Off White / Tested Negative, Cmnt: non-detect [ID: 26151]	Level 1 / A114 / North Soffit
Gypsum Wallboard and Joint Compound / Compact Chalky Material with Paper / White / Tested Negative, Cmnt: non-detect [ID: 26153]	Level 1 / A114 / North Soffit
Vinyl Floor Tile / Grey / Tested Negative, Cmnt: non-detect [ID: 26347]	Level 1 / B Hall / Outside B108
Floor Tile Mastic / Black / Tested Negative, Cmnt: non-detect [ID: 26348]	Level 1 / B Hall / Outside B108
Floor Tile and Mastic / 12 x 12 / White and Lt. Blue / Yellow mastic / Tested Negative, Cmnt: Non-detect (ISB-01 0016598-002, ISB-02 0016598-002), 9x9 tile under 12x12 in some areas [ID: 24186]	Level 1 / B106
Covebase Mastic / Cream / Tested Negative, Cmnt: non-detect (ISB-03 0016598-003) [ID: 29145]	Level 1 / B106
Ceiling Plaster / Off White/Beige / Tested Negative, Cmnt: non-detect (0017260-00-,002,003) [ID: 29166]	Level 1 / Boiler Room
Boiler South End / Gasket / Loose Fibrous Material / Tan / Tested Negative, Cmnt: non-detect (19766.020-0006 phase 100) [ID: 27788]	Level 1 / Boiler Room
Boiler / Jacket / Loose Fibrous Material / Yellow & Black / Tested Negative, Cmnt: non-detect (19766.020-0004,5&7 phase 100) [ID: 27787]	Level 1 / Boiler Room
Boiler North End / Insulating Cement / Compact Powder / Light Yellow / Tested Negative, Cmnt: non- detect (19766.020-0001,2,3&8 phase 100) [ID: 27786]	Level 1 / Boiler Room

ISB Main Building (ISB1)	
Material	Location
Paint / White / Tested Negative, Cmnt: non-detect [ID: 26426]	Level 1 / Custodial 1
Gypsum Wallboard and Joint Compound / Tested Negative, Cmnt: non-detect [ID: 26427]	Level 1 / Custodial 2
Gypsum Wallboard and Joint Compound / Paint / Brown / Tested Negative, Cmnt: non-detect [ID: 26118]	Level 1 / Health Room
Gypsum Wallboard and Joint Compound / Paper / Off White / Tested Negative, Cmnt: non-detect [ID: 26120]	Level 1 / Health Room
Stapled-on Ceiling / Compressed Fibers / Brown / Tested Negative / 1 x 2, Cmnt: non-detect [ID: 26121]	Level 1 / Health Room
Vapor Barrier / Fibrous Tarry Material / Black / Under 2nd layer of VAT / Tested Negative, Cmnt: non-detect [ID: 26122]	Level 1 / Health Room
Vapor Barrier / Paper, Tar and Wood / Between Plywood and Subfloor / Tested Negative, Cmnt: non-detect [ID: 26123]	Level 1 / Health Room
Covebase / Black / East Wall / Tested Negative / 3", Cmnt: non-detect [ID: 26124]	Level 1 / Health Room
Covebase Mastic / Brown and Cream / Tested Negative [ID: 26125]	Level 1 / Health Room
Vapor Barrier / Fibrous Tar / Black / Tested Negative, Cmnt: non-detect [ID: 26420]	Level 1 / Main Corridor / NE Corner
Floor Tile Mastic / Black / Tested Negative, Cmnt: non-detect [ID: 26425]	Level 1 / Main Corridor / NE Corner
Vinyl Floor Tile / Grey / Top Layer / Tested Negative, Cmnt: non-detect [ID: 26343]	Level 1 / Main Corridor / Outside North Workroom
Floor Tile Mastic / Tan / Top Layer / Tested Negative, Cmnt: non-detect [ID: 26344]	Level 1 / Main Corridor / Outside North Workroom
Vapor Barrier / Loose Particulate / Black & Brown / Tested Negative, Cmnt: non-detect [ID: 26129]	Level 1 / Main Office
Vapor Barrier / Fibrous Tarry Material / Black / Tested Negative, Cmnt: non-detect [ID: 26309]	Level 1 / Main Office
Tack Board Mastic / Black / Tested Negative, Cmnt: non-detect [ID: 26351]	Level 1 / Main Office
Mastic / Behind Tack Board / Tested Negative, Cmnt: non-detect (19766.020-0001 phase 3) [ID: 27327]	Level 1 / Main Office
Tack Board Mastic / Tested Negative, Cmnt: non-detect [ID: 26130]	Level 1 / Main Office / East Wall
Covebase / Black / Tested Negative / 4", Cmnt: non-detect [ID: 26131]	Level 1 / Main Office / South Wall
	Depart Date: October 20

ISB Main Building (ISB1)					
Material	Location				
Covebase Mastic / Brown and Cream / Tested Negative, Cmnt: non-detect [ID: 26132]	Level 1 / Main Office / South Wall				
Paint / Green / Tested Negative, Cmnt: non-detect [ID: 26127]	Level 1 / Principal / West Wall				
Gypsum Wallboard and Joint Compound / Fine Compact Powder with Paper / White / Tested Negative, Cmnt: non-detect [ID: 26128]	Level 1 / Principal / West Wall				
Cement Sink / Cementitious Material / Brown / Tested Negative, Cmnt: non-detect [ID: 26148]	Level 1 / Restroom Boys 1				
Wall Panel Mastic / Mastic with Paint / Yellow and Off White / Tested Negative, Cmnt: non-detect [ID: 26149]	Level 1 / Restroom Boys 1				
Paint / Grey / Tested Negative, Cmnt: non-detect [ID: 26140]	Level 1 / Restroom Boys 2				
Wall and Ceiling Plaster / Cementitious Material / White / Tested Negative, Cmnt: non-detect [ID: 26141]	Level 1 / Restroom Boys 2				
Floor Tile Grout / Cementitious / Tan / Tested Negative, Cmnt: non-detect [ID: 26142]	Level 1 / Restroom Boys 2				
Covebase / Brown / Tested Negative / 4", Cmnt: non-detect [ID: 26143]	Level 1 / Restroom Boys 2				
Covebase Mastic / Tan / Tested Negative, Cmnt: non-detect [ID: 26144]	Level 1 / Restroom Boys 2				
Wall Tile Grout / Hard Compact Powder / Off White / Tested Negative, Cmnt: non-detect [ID: 26145]	Level 1 / Restroom Boys 2				
Wall Tile Mastic / / / Tested Negative, Cmnt: non-detect [ID: 26150]	Level 1 / Restroom Boys 2				
Wall Tile Mastic / Tan / Tested Negative, Cmnt: non-detect [ID: 26146]	Level 1 / Restroom Girls 1				
Wall Tile Mastic / Brittle / Brown / At Floor Level / Tested Negative, Cmnt: non-detect [ID: 26147]	Level 1 / Restroom Girls 1				
Floor Tile Grout / Cementitious / Tan / Tested Negative, Cmnt: non-detect [ID: 26134]	Level 1 / Restroom Girls 2				
Covebase / Brown / Tested Negative / 4", Cmnt: non-detect [ID: 26135]	Level 1 / Restroom Girls 2				
Covebase Mastic / Brown / Tested Negative, Cmnt: non-detect [ID: 26136]	Level 1 / Restroom Girls 2				
Paint / Blue and Tan / Tested Negative, Cmnt: non-detect [ID: 26137]	Level 1 / Restroom Girls 2				
Wall and Ceiling Plaster / Cementitious Material / Tested Negative, Cmnt: non-detect [ID: 26138]	Level 1 / Restroom Girls 2				

ISB Main Building (ISB1)		
Material	Location	
Wall Panel Mastic / Yellow / Tested Negative, Cmnt: non-detect [ID: 26139]	Level 1 / Restroom Girls 2	
No Inventoried Asbestos Material / None / / / [ID: 24205]	Level 1 / Restroom Unisex 1	
Paint / White / Tested Negative, Cmnt: non-detect [ID: 26115]	Level 1 / Staff / North Wall	
Covebase / Vinyl / Brown / Tested Negative / 4", Cmnt: non-detect [ID: 26116]	Level 1 / Staff / North Wall	
Covebase Mastic / Brown / Tested Negative, Cmnt: non-detect [ID: 26117]	Level 1 / Staff / North Wall	
Composition Roofing / Tested Negative, Cmnt: non-detect (19766.020-0001,0002 phase 8) [ID: 27340]	Roof	
Paint / Silver / Tested Negative, Cmnt: non-detect [ID: 26349]	Rooftop / Boys restroom Vent	
Gypsum Wallboard/Joint Compound	Room A100; gypsum- joint compound wall system	
Gypsum Wallboard/Joint Compound	Room A114; gypsum- joint compound wall system	
Gypsum Wallboard/Joint Compound	Room M100; gypsum- joint compound wall system	
Gypsum Wallboard/Joint Compound	Room M104; gypsum- joint compound wall system	
Gypsum Wallboard/Joint Compound	Room M112; gypsum- joint compound wall system	
Vinyl Floor Tile/Mastic	Top east stair; 12"X12", tan vinyl floor tile with yellow mastic	

ASBESTOS SUMMARY

The following shows asbestos activities and projects. For more detailed information or related documents see the individual activity information in the database.

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June 2003 to September 2003 - ISB12019-1 Activity: Inspection/Survey - Location: ISB

January 2004 to December 2012 -

Activity: Database Update - Location: ISB1

ISB1 Import Historical Materials without samples

January 2004 to December 2012 - 19766.020 p03 Activity: Database Update - Location: ISB1 p03

ISB1 Import Historical materials with Samples

January 2004 to December 2012 - 19766.020 p08 Activity: Database Update - Location: ISB1 p08

ISB1 Import Historical materials with Samples

January 2004 to December 2012 - 19766.020 p100 Activity: Database Update - Location: ISB1 p100

ISB1 Import Historical materials with Samples

October 2017 to November 2017 - ISBsampling1

Activity: Sampling - Location: Level 1 / Computer Lab and A Hall

Floor plan x

x Results received

x Results in Verdant

Consultant Invoice

November 2017 to November 2017 - 23816.165 Phase 0001

Activity: Sampling - Location: Library, A-Hall

floor plan x

samples in verdant **x**

PBS closeout docs x

PBS invoice x

December 2018 to December 2018 - 23816.208 Activity: Major Abatement - Location: ISB1

Floor Plan X

Daily Log X

Contractor Invoice X

DEQ Notification

Disposal Manifest

Air clearance samples X

Consultant Close out documentation in Verdant X

Consultant Invoice X

Consultant's notes:

PBS and PMG abated a strip of floor tile and mastic in the A Hall near A104 at the margin of the concrete and wood subfloors.

April 2019 to April 2019 - 23816.236

Activity: Sampling - Location: ISB Main Building (ISB1)

Sampled ceiling materials associated with the ceiling truss system. The ceiling appeared to be stapled/grid ceiling tiles over an empty wood attic cavity. The beams were just wood. The pipes on the overhead heaters appeared to all be fiberglass. The walls were wood fiberboards or tiles over wood. PBS was unable to sample the wires on the lights, as they were potentially electrified. Wallboard around the stage was identified to have joint compound containing less than 1% asbestos, similar to conditions that exist throughout the building.

- x Floor plan
- x Results in Verdant
- x Consultant Invoice

July 2020 to July 2020 - TRC #403033

Activity: Sampling - Location: International School of Beaverton

- _ Floor plan
- _ Results received
- _ Results in Verdant
- _ Daily log
- _ Consultant Invoice
- _ Contractor Invoice
- _ DEQ Notification
- _ Disposal Manifest
- _ Lab samples in Verdant
- _ TEM Air clearance samples
- _ Consultant Close out documents in Verdant
- _ BOLI Form
- _ Certified Payroll dates

ACTIVITIES

The following shows historic activities and projects. For more detailed information or related documents see the individual activity information in the database.

Activity Type	Location	Start Date	Related Documents
Sampling	International School of Beaverton	07/07/2020	Yes
Sampling	ISB Main Building (ISB1)	04/24/2019	Yes
Major Abatement	ISB1	12/27/2018	Yes
Sampling	Library, A-Hall	11/01/2017	Yes
Sampling	Level 1 / Computer Lab and A Hall	10/23/2017	Yes
Database Update	ISB1	01/01/2004	No
Database Update	ISB1 p03	01/01/2004	No
Database Update	ISB1 p08	01/01/2004	No
Database Update	ISB1 p100	01/01/2004	No
Inspection/Survey	ISB	06/01/2003	Yes

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ASBESTOS MATERIALS

The following materials either tested positive or are presumed to be asbestos-containing. Materials that had mixed results are considered positive. Materials not sampled or not listed in this report may contain asbestos and should be tested to verify asbestos content prior to impact, demolition, renovation, etc.

(+) Tested Positive, (M) Mixed Results, (P) Presumed Positive

ISB Modular Building (ISB2)			
Result	Material	Location	Quantity
+	Mastic on Wood Substrate / Tested Positive, Cmnt: Abated Summer 2008 [ID: 27544]	Level 1 / M100	0 sf
+	Mastic on Wood Substrate / Tested Positive, Cmnt: Abated Summer 2008 [ID: 27543]	Level 1 / M102	0 sf
+	Sheet Flooring Material under Floor Tile / Tested Positive, Cmnt: Mastic Tested 2% Chrysotile ()19766.020-0011 phase 5) Abated Summer 2008 [ID: 27333]	Level 1 / M110	0 sf
+	Vapor Barrier / Woven Material with Tar / Brown / Tested Positive, Cmnt: 2% Chrysotile/ Abated Summer 2007 [ID: 26318]	Level 1 / M116	0 sf
+	Vapor Barrier / Woven Material with Tar / Brown / Tested Positive, Cmnt: Abated Summer 2007 [ID: 26357]	Level 1 / M117	0 sf
+	Vapor Barrier / Woven Material with Tar / Brown / Tested Positive, Cmnt: Abated Summer 2007 [ID: 26358]	Level 1 / M118	0 sf

MATERIALS THAT TESTED NEGATIVE

The following materials tested negative. Although no asbestos was detected, it is possible that further sampling could indicate asbestos content. It may be prudent to test prior to impact, demolition, renovation, etc.

ISB Modular Building (ISB2)		
Material	Location	
Vapor Barrier / Between plywood and T&G subroofing / Fibrous Tarry Backing / Black / Tested Negative, Cmnt: non-detect (19766.020-0001 phase 100) [ID: 28184]	Level 1 / Boys Restroom	
Vapor Barrier / Between plywood and T&G subroofing / Fibrous Tarry Backing / Black / Tested Negative, Cmnt: non-detect (19766.020-0002 phase 100) [ID: 28185]	Level 1 / Girls Restroom	
Tack Board Mastic / Tan / Tested Negative, Cmnt: non-detect [ID: 26338]	Level 1 / M100 / West Wall	
Wainscot / Wood / Tan / Tested Negative, Cmnt: non-detect [ID: 26341]	Level 1 / M102	

ISB Modular Building (ISB2)		
Material	Location	
Wainscot Mastic / Tan / Tested Negative, Cmnt: non-detect [ID: 26342]	Level 1 / M102	
Covebase and Mastic / Tested Negative, Cmnt: non-detect (19766.020-0015 phase 5) [ID: 27337]	Level 1 / M102	
Top Layer Floor Tile and Mastic / Tested Negative, Cmnt: non-detect (19766.020-0016 phase 5) [ID: 27338]	Level 1 / M102	
Bottom Layer Floor Tile and Mastic / Tested Negative, Cmnt: non-detect (19766.020-0017 phase 5) [ID: 27339]	Level 1 / M102	
Wainscot / Hard Fibrous Material / Tan / Tested Negative, Cmnt: non-detect [ID: 26339]	Level 1 / M102 / NE Corner	
Covebase and Mastic / Tested Negative, Cmnt: non-detect (19766.020-0012 phase 5) [ID: 27334]	Level 1 / M110	
Floor Tile and Mastic / Tested Negative, Cmnt: non-detect (19766.020-0010 phase 5) [ID: 27332]	Level 1 / M110	
Flooring Core Sample / Tested Negative, Cmnt: non-detect (19766.020-0013, 0014 phase 5) [ID: 27335]	Level 1 / M110	
Flooring Core Sample / Tested Negative, Cmnt: non-detect (19766.020-0014 phase 5) [ID: 27336]	Level 1 / M110	
Covebase and Mastic / Tested Negative, Cmnt: non-detect (19766.020-0007 phase 5) [ID: 27329]	Level 1 / M112	
Sheet Flooring Material under Floor Tile / Tested Negative, Cmnt: non-detect (19766.020-0009 phase 5) Abated Summer 2008 [ID: 27331]	Level 1 / M112	
Floor Tile and Mastic / Tested Negative, Cmnt: non-detect (19766.020-0008 phase 5) [ID: 27330]	Level 1 / M112	
Flooring Core Sample / Tested Negative, Cmnt: non-detect (19766.020-0006 phase 5) [ID: 27328]	Level 1 / M112	
Vapor Barrier / Wood / Tan / Tested Negative, Cmnt: non-detect [ID: 26319]	Level 1 / M116	
Wainscot / Hard Fibrous Material / Brown / Tested Negative Miscellaneous / Wainscot / Hard Fibrous Material / Brown / Tested Negative, Cmnt: non-detect [ID: 26320]	Level 1 / M116	
Sink Undercoating / Loose Fibrous Particulate / Off White / Tested Negative, Cmnt: non-detect [ID: 26321]	Level 1 / M116	
Sheet Flooring / Vinyl / Grey / Tested Negative / 12 x 12, Cmnt: non-detect [ID: 26322]	Level 1 / M116	
Sheet Flooring / Fibrous Backing with Mastic / Grey / Tested Negative / 12 x 12, Cmnt: non-detect [ID: 26323]	Level 1 / M116	

ISB Modular Building (ISB2)		
Material	Location	
Sheet Flooring Mastic / Black / Tested Negative, Cmnt: non-detect [ID: 26324]	Level 1 / M116	
Covebase / Vinyl / Black / Tested Negative / 4", Cmnt: non-detect [ID: 26325]	Level 1 / M116	
Covebase Mastic / Cream / Tested Negative, Cmnt: non-detect [ID: 26326]	Level 1 / M116	
Mesh Screen / Black / Ceiling Vent / Tested Negative, Cmnt: non-detect [ID: 26328]	Level 1 / M116	
Insulation / Fibrous Material / White / Ceiling Vent / Tested Negative, Cmnt: non-detect [ID: 26329]	Level 1 / M116	
Lay-in Ceiling Tiles / Compressed Fibers / Grey / Tested Negative, Cmnt: non-detect [ID: 26330]	Level 1 / M116	
Lay-in Ceiling Tiles / Compressed Fibers / Tan / Tested Negative, Cmnt: non-detect [ID: 26334]	Level 1 / M116	
Vinyl Floor Tile / Grey / Tested Negative / 12 x 12, Cmnt: non-detect [ID: 26335]	Level 1 / M116	
Wainscot Mastic / Tan / Tested Negative Miscellaneous / Wainscot Mastic / Tan / Tested Negative, Cmnt: non-detect [ID: 26336]	Level 1 / M116	
Tack Board Mastic / Tan / Tested Negative, Cmnt: non-detect [ID: 26327]	Level 1 / M116 / East Wall	
Paint / Off White / Tested Negative, Cmnt: non-detect [ID: 26331]	Level 1 / M116 / East Wall	
Gypsum Wallboard and Joint Compound / Fine Compact Powder with Paper / White / Tested Negative, Cmnt: non-detect [ID: 26332]	Level 1 / M116 / East Wall	
Gypsum Wallboard and Joint Compound / Compact Chalky Material with Paper / White / Tested Negative, Cmnt: non-detect [ID: 26333]	Level 1 / M116 / East Wall	
Lay-in Ceiling Tiles / Compressed Fibers / Tan / Tested Negative, Cmnt: non-detect [ID: 26337]	Level 1 / M118	
Formica	Modular boys restroom; formica wall panel and mastic	
Gypsum Wallboard	Modular boys restroom; gypsum board wall	
Vinyl Floor Tile/Mastic	Room M108; north floor, 12" white vinyl floor tile with yellow mastic	
Vinyl Floor Tile/Mastic	Room M108; south floor, 12" white vinyl floor tile with yellow mastic	
Covebase/Mastic	Room M108; south wall, 4" black covebase with white mastic	

ASBESTOS SUMMARY

The following shows asbestos activities and projects. For more detailed information or related documents see the individual activity information in the database.

January 2004 to December 2012 -

Activity: Database Update - Location: ISB2

ISB2 Import Historical Materials without samples

January 2004 to December 2012 - 19766.020 p05 Activity: Database Update - Location: ISB2 p05

ISB2 Import Historical materials with Samples

January 2004 to December 2012 - 19766.020 p100 Activity: Database Update - Location: ISB2 p100

ISB2 Import Historical materials with Samples

May 2019 to May 2019 - ISB22019-1 Activity: Sampling - Location: ISB2

Sampled wall paneling, mastic, and wallboard in the boy's restroom ADA stall at a damaged wall location. Materials tested negative for asbestos.

Floor plan X

Results received X
Results in Verdant X

Consultant Invoice X

July 2019 to July 2019 - 23816.253 Activity: Sampling - Location: ISB2

Sampled floor materials in the M108 classroom. Floor tile, mastic, and covebase tested negative. Flooring sits on OSB underlayment. Inspector did not go beneath the underlayment to see if any materials were concealed.

Floor plan X

Results received X

Results in Verdant X

Consultant Invoice X

ACTIVITIES

The following shows historic activities and projects. For more detailed information or related documents see the individual activity information in the database.

Activity Type	Location	Start Date	Related Documents
Sampling	ISB2	07/29/2019	Yes
Sampling	ISB2	05/01/2019	Yes
Database Update	ISB2	01/01/2004	No
Database Update	ISB2 p05	01/01/2004	No
Database Update	ISB2 p100	01/01/2004	No

Appendix D – Inspector Certification(s)



Certificate of Completion

This is to certify that

Jason Stone

AHERA Building Inspector 4 hours of refresher training as an has satisfactorily completed

to comply with the training requirements of TSCA Title II, 40 CFR 763 (AHERA)

EPA Provider # 1085

ARGUS DAILING OHIO

Certificate Number 175978

Date(s) of Training Dec 9, 2019

Exam Score: N/A (if applicable)

ARGUS PACIFIC, INC / 21905 64th AVE W, SUITE 100 / MOUNTLAKE TERRACE, WASHINGTON 98043 / 206,285,3373 / ARGUSPACIFIC. COM

Instructor

ATTACHMENT L



SUBSTITUTION REQUEST (During the Bidding Phase)

Project:	Substitution Request Number:
	From:
То:	Date:
Re:	A/E Project Number:
	Contract For:
Specification Title:	Description:
Section:Page:	
Proposed Substitution:	
Manufacturer:Address:	Phone: Model No.:
Attached data includes product description, specifications, drawing	es, 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 Contractinstallation.	et Documents that the proposed substitution will require for its proper
 Same maintenance service and source of replacement parts, as Proposed substitution will have no adverse effect on other trace Proposed substitution does not affect dimensions and function Payment will be made for changes to building design, including substitution. 	des and will not affect or delay progress schedule. nal clearances.
Submitted by:	
Signed by: Firm: Address:	
Telephone:	
A/E's REVIEW AND ACTION	
Substitution approved - Make submittals in accordance with Sp Substitution approved as noted - Make submittals in accordance Substitution rejected - Use specified materials. Substitution Request received too late - Use specified materials	e with Specification Section 01330.
Signed by:	Date:
Supporting Data Attached: Drawings X Product Da	ta Samples Tests Reports