

CITY OF DE PERE

PROJECT 23-20

NELSON FAMILY PAVILION

**BID DATE:
THURSDAY, APRIL 6, 2023@ 1:00 PM – 1:30
PM (CDT)**

Bid documents, including plans and specifications, are available for download at www.QuestCDN.com. The QuestCDN website can also be accessed through the City website at www.deperewi.gov/projects or by pressing the *Projects* icon at the bottom of any City website page. Download cost is \$22 for each contract. Bidders will be charged an additional fee of \$42 to submit a bid electronically. Bidding documents may be viewed on the QuestCDN website or at the Municipal Service Center, 925 S. Sixth Street, De Pere, WI 54115.

Bid Tabs must be verified by staff prior to posting and will be available for viewing on the website within 7 days following the bid opening. Award information will be pending until approved by the Common Council

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SECTION 00 11 13

MARCH 10, 2023 – MARCH 17, 2023

CITY OF DE PERE

ADVERTISEMENT TO BID

PROJECT 23-20

NELSON FAMILY PAVILION

Online bids will be received and accepted for Project 23-20 Nelson Family Pavilion via the online electronic bidding service through QuestCDN.com, until 1:00 PM, Thursday, April 6, 2023, at which time they will be publicly accepted, displayed and read aloud.

Project Consists of the following work:

The work shall consist of construction of a new multi-use facility at Voyageur Park located at 100 Williams St., De Pere Wisconsin. The building work includes construction of a 1300 s.f. multiuse space and restroom building with covered area of and open-air patio. The building work is to include concrete, masonry, conventional wood trusses, timber beams, steel columns, millwork, metal roof, metal wood look soffit panels at underside of roof, plumbing, HVAC and electrical as outlined in the specifications and bid documents. The site work includes extension of existing utilities, site preparation, site restoration, patio, retaining wall, railings, sidewalks, and concrete driveway.

Complete digital project bidding documents are available for viewing and/or downloading at www.QuestCDN.com or may be examined at the office of the Director of Public Works. Digital plan documents may be downloaded for \$22 by inputting Quest project #8420539 on Quest's Project Search page. Project documents must be downloaded from QuestCDN which will add your company to the Planholder List and allow access to vBid online bidding for the submittal of your bid. Bidders will be charged an additional fee of \$42 to submit a bid electronically. The QuestCDN website can also be accessed through the City website at www.deperewi.gov/projects or by pressing the *Projects* icon at the bottom of any City website page. Contact QuestCDN Customer Support at 952-233-1632 or info@questcdn.com for assistance in membership registration, downloading digital project information and vBid online bid submittal questions.

Each proposal shall be accompanied by a bid bond in an amount equal to five percent (5%) of the bid, payable to the City of De Pere, as a guarantee that if the bid is accepted, the bidder will execute a contract and furnish a contract bond as set forth in the General Conditions of the City of De Pere. In case the bidder fails to file such contract and bond, the amount of the bid bond shall be forfeited to the City of De Pere as liquidated damages.

The letting of the contract is subject to the provisions of the following Wisconsin Statutes:

Section 62.15 regarding Public Works.

Section 66.0901(3) regarding Prequalification of Contractor.

Each bidder shall pre-qualify by submitting proof of responsibility on forms furnished by the Director of Public Works. Such forms shall be filed with the Director of Public Works no later than 4:00 PM, Monday, March 27, 2023. Prospective bidders who have previously submitted such forms subsequent to January 1, 2023 will not be required to separately submit such form for this project.

The City of De Pere reserves the right to reject any or all bids, to waive any informalities in bidding and to accept any proposal which the Common Council deems most favorable to the interest of the City of De Pere.

Dated this 10th day of March 2023.

Board of Public Works
City of De Pere
Eric Rakers, P.E.
City Engineer

Project 23-20

SECTION 00 21 13

INSTRUCTIONS TO BIDDERS

ARTICLE 1 – DEFINED TERMS

- 1.1 Terms used in these Instructions to Bidders have the meanings indicated in the General Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- None

ARTICLE 2 – COPIES OF BIDDING DOCUMENTS

- 2.1 Complete sets of the Bidding documents in the number and for the deposit sum, if any, stated in the Advertisement to Bid may be obtained as stated in the Advertisement for bids.
- 2.2 Complete sets of Bidding Documents shall be used in preparing Bids; Owner does not assume any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
- 2.3 Owner, in providing the Bidding Documents on the terms stated in the Advertisement for Bids, does so only for the purpose of obtaining Bids for the Work and does not confer a license or grant for any other use.

ARTICLE 3 – QUALIFICATIONS OF BIDDERS

- 3.1 In accordance with Section 66.0901(3), each bidder shall pre-qualify by submitting proof of responsibility on forms furnished by the Director of Public Works. Such forms shall be filed with the Director of Public Works as stated in the Advertisement for Bids. Prospective bidders who have previously submitted such forms after January 1st of this year will not be required to separately submit such form for this project.

ARTICLE 4 – EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA AND SITE

- 4.1 Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in the General Conditions.
- 4.2 Underground Facilities
- A. Information and data shown or indicated in the Bidding Documents with respect to existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to Owner and Engineer by owners of such Underground Facilities, including Owner, or others.

4.3 Subsurface and Physical Conditions

A. The technical data includes:

3. No reports of explorations or tests of subsurface conditions at or contiguous to the Site, or drawings of physical conditions relating to existing surface or subsurface structures at the Site, are known to Owner.

B. Limited Reliance by Contractor on Technical Data Authorized: Contractor may rely upon the accuracy of the “technical data” contained in such reports and drawings, but such reports and drawings are not Contract Documents. Contractor may not rely upon or make any claim against Owner, or any of their officers, directors, members, partners, employees, agents, consultants, or subcontractors with respect to:

1. the completeness of such reports and drawings for Contractor’s purposes, including but not limited to, any aspects of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, and safety precautions and programs incident thereto; or
2. Other data, interpretations, opinions, and information contained in such reports or shown or indicated in such drawings; or
3. Any Contractor interpretation of or conclusion drawn from any “technical data” or any such other data, interpretations, opinions, or information.

4.4 On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locates.

4.5 Reference is made to Section 01 10 00: Summary of Work, for work that will be completed and for the identification of the general nature of other work that is to be performed at the Site by Owner or others (such as utilities) that relates to the Work contemplated by these Bidding Documents. On request, Owner will provide to each Bidder for examination access to or copies of Contract Documents (other portions thereof related to price) for such other work.

4.6 It is the responsibility of each Bidder before submitting a Bid to:

- A. Examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda;
- B. Visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work;
- C. Become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work;

- D. Obtain and carefully study (or accept consequences of not doing so) all examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto;
 - E. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents;
 - F. Become aware of the general nature of the work to be performed by Owner and others at the Site that relates to the Work as indicated in the Bidding Documents;
 - G. Correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents;
 - H. Promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies, that bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder; and
 - I. Determine that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work.
- 4.7 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and, procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given Engineer written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by Engineer are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performing and furnishing the Work.

ARTICLE 5 – SITE AND OTHER AREAS

- 5.1 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by Owner unless otherwise provided in the Bidding Documents. All additional lands and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

ARTICLE 6 – INTERPRETATIONS AND ADDENDA

- 6.1 All questions about the meaning or intent of the Bidding Documents are to be submitted to Engineer in writing. Interpretations or clarifications considered necessary by Engineer in response to such questions will be issued by Addenda mailed or delivered to all parties recorded by Engineer as having received the Bidding Documents. Questions received less than ten days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 6.2 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by Owner and Engineer.

ARTICLE 7 – BID SECURITY

- 7.1 A Bid shall be accompanied by Bid security made payable to Owner in an amount of five percent (5%) of Bidder's maximum Bid price and in the form of a certified check or bank money order or Bid bond (on the form attached) issued by a surety meeting the requirements of the General Conditions. Submittal of a Bid Bond on a form other than the Bid Bond form included in the Bidding Documents may be cause for rejection of Bid. The fully executed bid bond must be uploaded into QuestCDN. If the bidder elects to furnish bid security other than a bid bond, the bid security must be submitted in a sealed envelope enclosed in a separate package plainly marked on the outside with the notation "BID SECURITY" along with the project number and name and addressed to the Board of Public Works of the City of De Pere, Municipal Service Center, 925 S. Sixth Street, De Pere, WI 54115 **prior to the deadline for submission of bids.**
- 7.2 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within fifteen (15) days after the Notice of Award, Owner may annul the Notice of Award and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner per the General Conditions.
- 7.3 Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

ARTICLE 8 – CONTRACT TIMES

- 8.1 The number of days within which, or the dates by which, Milestones are to be achieved and the Work is to be substantially completed and ready for final payment are set forth in the Bid Form and Summary of Work.

ARTICLE 9 – LIQUIDATED DAMAGES

9.1 Provisions for liquidated damages are set forth in the General Conditions.

ARTICLE 10 – SUBSTITUTE AND “OR-EQUAL” ITEMS

10.1 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or “or-equal” items. Whenever it is specified or described in the Bidding Documents that a substitute or “or-equal” item of material or equipment may be furnished or used by Contractor if acceptable to Engineer, application for such acceptance will not be considered by Engineer until after the Effective Date of the Bid Form and Summary of Work.

ARTICLE 11 – SUBCONTRACTORS, SUPPLIERS, AND OTHERS

11.1 The Bidder shall submit with the Bid to Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity, Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, in which case apparent Successful Bidder shall submit an acceptable substitute, Bidder’s Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and Owner may consider such price adjustment in evaluating Bids and making the Contract award.

11.2 If apparent Successful Bidder declines to make any such substitution, Owner may award the Contract to the next lowest Bidder that proposed to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which Owner makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to Owner subject to revocation of such acceptance after the Effective Date of the Agreement.

11.3 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has reasonable objection.

ARTICLE 12 – PREPARATION OF BID

12.1 The Bid form is included with the Bidding documents.

12.2 All blanks on the Bid Form shall be completed by printing in ink or by typewrite and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. A Bid price shall be indicated for each alternative, and unit price item listed therein, or the words “No Bid,” “No Change,” or “Not Applicable” entered.

- 12.3 A Bid by a corporation shall be executed in the corporate name by the president or a vice-president or other corporate officer accompanied by evidence of authority to sign. The corporate seal shall be affixed and attested by the secretary or an assistant secretary. The corporate address and state of incorporations shall be shown below the seal.
- 12.4 A Bid by a partnership shall be executed in the partnership name and signed by a partner (whose title must appear under the signature), accompanied by evidence of authority to sign. The official address of the partnership shall be shown below the signature.
- 12.5 A Bid by a limited liability company shall be executed in the name of the firm by a member and accompanied by evidence of authority to sign. The state of formation of the firm and the official address of the firm shall be shown below the signature.
- 12.6 A Bid by an individual shall show the Bidder's name and official address.
- 12.7 A Bid by a joint venture shall be executed by each joint venture in the manner indicated on the Bid Form. The official address of the joint venture shall be shown below the signature.
- 12.8 All names shall be typed or printed in ink below the signatures.
- 12.9 The Bid shall contain an acknowledgement of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 12.10 The address and telephone number for communications regarding the Bid shall be shown.
- 12.11 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the Contract. Bidder's state contractor license number, if any, shall also be shown on the Bid Form.

ARTICLE 14 – SUBMITTAL OF BID

- 14.1 A Bid shall be submitted no later than date and time prescribed and at place indicated in Advertisement for Bids and shall be submitted electronically using the QuestCDN online bidding vBid platform. No paper bids will be accepted.
- 14.2 See Bid Form for a list of documents typically required to be submitted with the Bid.

ARTICLE 15 – MODIFICATION AND WITHDRAWAL OF BID

- 15.1 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.

- 15.2 If within 24 hours after Bids are opened, any Bidder files a duly signed written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of its Bid, that Bidder may withdraw its Bid, and the Bid security will be returned. Thereafter, if the Work is rebid, that Bidder will be disqualified from further bidding on the Work.

ARTICLE 16 – OPENING BIDS

- 16.1 Bids will be opened as indicated in the Advertisement to Bid. The bid opening can be viewed live via the GoToMeeting information shown below. An abstract of the amounts of the base bids and major alternatives, if any, will be made available to bidders after opening the bids.

The bid opening can be viewed live via GoToMeeting as follows:
Please join my meeting from your computer, tablet or smartphone.

<https://meet.goto.com/311792237>

You can also dial in using your phone.
(For supported devices, tap a one-touch number below to join instantly.)

United States (Toll Free): 1 877 309 2073
- One-touch: <tel:+18773092073,,311792237#>

United States: +1 (646) 749-3129
- One-touch: <tel:+16467493129,,311792237#>

Access Code: 311-792-237

New to GoToMeeting? Get the app now and be ready when your first meeting starts:
<https://global.gotomeeting.com/install/811262349>

ARTICLE 17 – BIDS REMAIN SUBJECT TO ACCEPTANCE

- 17.1 All bids will remain subject to acceptance for the period of time stated in the General Conditions, but Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

ARTICLE 18 – EVALUATION OF BIDS AND AWARD OF CONTRACT

- 18.1 Owner reserves the right to reject any or all Bids, including without limitation, nonconforming, nonresponsive, unbalanced, or conditional Bids. Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. Owner

may also reject the Bid of any Bidder if Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. Owner also reserves the right to waive all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

- 18.2 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.
- 18.3 In evaluating Bids, Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices and other data, as may be requested in the Bid Form or prior to the Notice of Award.
- 18.4 In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Supplier, and other individuals or entities proposed for those portions of the Work for which the identify of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplementary Conditions.
- 18.5 Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents.
- 18.6 Bidder agrees to waive any claim it has or may have against the Owner and the respective employees arising out of or in connection with the administration, evaluation or recommendation of any Bid.
- 18.7 If the Contract is to be awarded, Owner will award the Contract to the lowest responsible responsive Bidder whose Bid is in the best interests of the Project.

ARTICLE 19 – CONTRACT SECURITY AND INSURANCE

- 19.1 The General Conditions set forth Owner's requirements as to performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to Owner, it shall be accompanied by such bonds and a certificate of insurance.

ARTICLE 20 – SIGNING OF AGREEMENT

- 20.1 When Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within ten (10) days thereafter, Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to Owner. Within ten (10) days thereafter, Owner shall deliver one fully signed counterpart to Successful Bidder with a complete set of Drawings with appropriate identification.

END OF SECTION

SECTION 00 41 13

CITY OF DE PERE

BID FORM

PROJECT 23-20

This bid, submitted by the undersigned Bidder to the City of De Pere, in accordance with the Advertisement to Bid, which will be received until 1:00 PM, Thursday April 6, 2023 is to furnish and deliver all materials, and to perform and do all work on the project designated per Section 01 10 00 Summary of Work.

Bidder has examined and carefully prepared the bid from the plans and specifications and has checked the same in detail before submitting said proposal or bid; and that said bidder or bidder's agents, officer or employees have not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with this proposal or bid.

Lump Sum Bid

Having examined the site where the work is to be executed and having become familiar with conditions pertinent to the work, and carefully examined all Contract Documents for the above mentioned project, we hereby offer to enter into a Contract to perform the work for the following stated Bid amount(s):

SINGLE PRIME LUMP SUM BID PRICE:

(words) Dollars (\$) (figures).

All applicable Federal, State, and Local taxes are included in the Bid Sum.

Bidder has examined and carefully studied the Bidding Documents, other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged:

<u>Addendum No.</u>	<u>Addendum Date</u>
_____	_____
_____	_____

ATTACHMENTS TO THIS BID

The following documents are submitted with and made a condition of this Bid:

- A. Required Bid Security
- B. Alternates Form (Section 00 43 23)

D. Tabulation of Subcontractors (Section 00 43 36)

BID SUBMITTAL

This Bid is submitted by _____ of _____,

The Bidder, being duly sworn, does dispose that they are an authorized representative of

Bidder, if Bidder is:

An Individual

Name (typed or printed): _____

By: _____
(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: _____

By: _____
(Signature of general partner – attach evidence of authority to sign)

Name (typed or printed): _____

A Corporation

Corporation Name: _____

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability): _____

By: _____
(Signature – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____
(CORPORATE SEAL)

Attest _____

Date of Qualification to do business in Wisconsin is ____/____/____.

Joint Venture

Name of Joint Venture: _____

First Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of first joint venture partner – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

Second Joint Venturer Name: _____ (SEAL)

By: _____
(Signature of second joint venture partner – attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____

(Each joint venturer must sign. Manner of signing for each individual, partnership, and corporation that is a party to joint venture should be in manner indicated above.)

Bidder's Business Address _____

Phone No. _____ Fax No. _____

E-mail _____

SUBMITTED on _____, 20____.

State Contractor License No. _____ (if applicable)

PARTICULARS

- 1.1 The following is the list of alternates referenced in the Bid submitted by:
1.2 (Bidder) _____
1.3 To The City of De Pere
1.4 Dated _____ and which is an integral part of the Bid Form.

ALTERNATES LIST

- 2.1 The following amounts shall be added to or deducted from the Bid amount.
Refer to Section 01 23 00.00 – Alternates.

Alternate No. 1 – Provide asphalt paving and aggregate base in lieu of concrete paving and aggregate base.

Add / Deduct _____ Dollars (\$_____).
(circle one) (words) (figures)

Alternate No. 2 – Provide gypsum board ceiling at room 100 in lieu of linear metal cladding.

Add / Deduct _____ Dollars (\$_____).
(circle one) (words) (figures)

SECTION 00 43 36

TABULATION OF SUBCONTRACTORS

The following information is submitted which gives the name, business address, and portion of work for each subcontractor that will be used in the work if the bidder is awarded the contract, and no subcontractor doing work in excess of one-half of one percent of the total amount of the bid and who is not listed will be used without the written approval of the Engineer. Additional numbered pages outlining this portion of the proposal may be attached to this page.

<u>PORTION OF WORK</u>	<u>BUSINESS NAME</u>	<u>BUSINESS ADDRESS</u>
Earthwork - Excavation		
Concrete Sidewalk and Patio		
Concrete Foundations		
Steel		
Masonry		
Hollow Metal Doors and Frames		
Door Hardware		
Overhead Doors		
Ceiling Panels		
Joint Sealers		
Millwork		
Painting		
HVAC		
Plumbing		
Electrical		
Metal Railings		
Retaining Wall		
Metal Flashing and Trim		
Metal Roof		
Rubber Membrane		
Metal Wall Panels		
Glue Laminated Beams		
Plastic Ceiling		

Project 23-20
Nelson Family Pavilion

City of De Pere

--	--	--

We have included the following items of work at the values stated for the Project/Contract mentioned in Section 00 41 00.00 - Bid Form. Information provided becomes part of the Bid Form and Contract Documents.

Submitted By: _____
(full corporate name) Date _____

<u>Items of Work</u>	<u>Value (including overhead & profit)</u>
Demolition	\$ _____
Site Work	\$ _____
Concrete	\$ _____
Masonry	\$ _____
Carpentry (Rough & Finish)	\$ _____
Architectural Woodwork	\$ _____
Insulation	\$ _____
Standard Doors, Frames & Hardware	\$ _____
Overhead Doors	\$ _____
Window	\$ _____
Gypsum Board Assemblies	\$ _____
Carpet	\$ _____
Painting	\$ _____
Miscellaneous Specialties	\$ _____
Plumbing	\$ _____
HVAC	\$ _____
Electrical	\$ _____
General Conditions	\$ _____
<u>Plastic Ceiling Panels</u>	\$ _____
<u>Metal Roofing</u>	\$ _____
<u>Rubber Roofing</u>	\$ _____
<u>Glue Laminated Beams</u>	\$ _____
<u>Metal Railing</u>	\$ _____
<u>Retaining Wall</u>	\$ _____

SECTION 00 51 00

NOTICE OF AWARD

(Contractor)
(Contractor Name)
(Address)
(Address)

Project Description: 23-20 Nelson Family Pavilion

The City has considered the proposal submitted by you dated (BID DATE) for the above-described project in response to its Advertisement for Bids dated March 10, 2023 and March 17, 2023.

You are hereby notified that the Common Council of the City of De Pere has accepted your bid of (Contract Amount \$_____.00).

You are required to execute the Contract and furnish the required Performance Bond, Payment Bond and Certificates of Insurance within ten (10) calendar days from the date of this notice to you.

If you fail to execute said Agreement and to furnish said bonds within ten (10) days from the date of this notice, said City will be entitled to consider all your rights arising out of the City's acceptance of your bid as abandoned and as a forfeiture of your Bid Bond. The City will be entitled to such other rights as may be granted by law.

You are required to return an acknowledged copy of this NOTICE OF AWARD to the City.

Dated this _____ day of _____ 2023.

DEPARTMENT OF PUBLIC WORKS

BY: Eric P. Rakers, P.E.
City Engineer

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged by:

_____, this the _____ day of _____, 20____

By: _____

Title: _____

SECTION 00 52 13

CONTRACT

This Contract, made and entered into this day _____ (date to be affixed by City), by and between (Contractor Name), hereinafter called Contractor, and the City of De Pere, a municipal corporation of the State of Wisconsin, hereinafter called City.

WITNESSETH: That, in consideration of the covenants and agreements herein contained, to be performed by the parties hereto, and of the payments hereinafter agreed to be made, it is mutually agreed as follows:

ARTICLE I - SCOPE OF WORK

The Contractor shall furnish all materials and all equipment and labor necessary, and perform all work shown on the drawings and described in the specifications for the project entitled Project 23-20 Nelson Family Pavilion, all in accordance with the requirements and provisions of the following documents, which are hereby made a part of this Contract:

- (a) Advertisement for Bids, dated March 10, 2023 and March 17, 2023.
- (b) Drawings designated for Project 23-20 Nelson Family Pavilion dated March 10, 2023.
- (c) City of De Pere 2022 Construction Specifications.
- (d) Special Provisions dated March 10, 2023.
- (e) Proposal submitted by (Contractor Name) dated Bid Date.
- (f) Addenda No. dated

ARTICLE II - TIME OF COMPLETION

- (a) The work to be performed under the Contract shall be commenced within (number spelled out) (__) calendar days after receipt of written notice to proceed. The work shall be completed within (Number spelled out) (__) calendar days) or (specific calendar dates) after receipt of Notice to Proceed.
- (b) Time is of the essence with respect to the date of completion herein above stated. Failure to complete the work within the number of calendar days stated in this Article, or interim dates included in the work sequence in Section 01 10 00, Summary of Work, including any extensions granted thereto, shall entitle the City to deduct from the monies due the Contractor an amount equal to Update based on 00 70 00 - General Conditions (Page 27)(\$ per day for each calendar day of delay in the completion of the work. Such amount shall be considered and treated not as a penalty but as liquidated damages, which the City will sustain, by failure of the Contractor to complete the work within the time stated.

ARTICLE III - PAYMENT

- (a) The Contract Sum. The City shall pay to the Contractor for the performance of the Contract the amounts determined for the total number of each of the following units of work completed at the unit price stated thereafter. The number of units contained in this schedule is approximate only, and the final payment shall be made for the actual number of units that are incorporated in or made necessary by the work covered by the Contract.
- (b) Progress Payments. The City shall make payments on account of the Contract as follows:
1. On not later than the fourth Friday of every month the Contractor shall present to the City an invoice covering an estimate of the amount and proportionate value of the work done as verified by the City under each item of work that has been completed from the start of the job up to and including the fourth Friday of the preceding month, and the value of the work so completed determined in accordance with the schedule of unit prices for such items, together with such supporting evidence as may be required. This invoice shall also include an allowance for the cost of such materials and equipment required in the permanent work as have been delivered to the site but not as yet incorporated in the work.
 2. On not later than the third week of the following month, the City shall, after deducting previous payments made, pay to the Contractor 95% of the amount of the approved invoice, retaining 5% of the estimate of work done until 50% of the work has been completed. At 50% completion of the work, the previous retainage shall not yet be paid, but further partial payments shall be made in full to the contractor without additional retainage being taken unless the engineer certifies that the work is not proceeding satisfactorily. If the work is not proceeding satisfactorily, additional amounts may be retained. After substantial completion, an amount retained may be paid to the contractor, keeping retained only such amount as is needed for the remaining work.
 3. The Contractor shall notify the City in writing when all work under this Contract has been completed. Upon receipt of such notice the City shall, within a reasonable time, make the final inspection and issue a final certificate stating that the work provided for in this Contract has been completed and is accepted under the terms and conditions thereof, and that the entire balance due the Contractor as noted in said final certificate is due and payable. Before issuance of the final certificate the Contractor shall submit evidence satisfactory to the City that payrolls, material bills, and other indebtedness connected with the work under this Contract have been paid. The City shall make final payment as soon after issuance of the final certificate as practicable.

ARTICLE IV – CONTRACT DOCUMENTS

(a) Contents

1. The Contract documents consist of the following:
 - a. This Contract (pages 00 52 13-1 to 0052-13-3, inclusive).
 - b. Payment bond (pages 00 61 13-1 to 00 61 13-2, inclusive).
 - c. Performance bond (page 00 61 16-1).
 - d. General Conditions (pages 00 70 00-1 to 00 70 00-27, inclusive).

- e. Specifications as listed in the table of contents of the Project Manual.
 - f. Drawings consisting of ____ sheets with each sheet bearing the following general title: ____[or] the Drawings listed on attached sheet index.
 - g. Addenda (numbers ____ to ____ inclusive), dated ____.
 - h. Exhibits to this Agreement (enumerated as follows):
 - 1) Contractor's Bid (pages 00 41 13-1 to 00 41 13-3, inclusive).
 - 2) Tabulation of Subcontractors (page 00 43 36-1).
 - 3) Documentation submitted by Contractor prior to Notice of Award (00 51 00-1).
 - i. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - 1) Notice to Proceed (Page 00 55 00-1).
 - 2) Change Orders.
2. The documents listed in Paragraph (a) Contents, are attached to this Agreement (except as expressly noted otherwise above).
3. There are no Contract Documents other than those listed above in this Article IV.

IN WITNESS WHEREOF, the parties hereto have executed this Contract, the day and year first written above.

(WITNESS) (CONTRACTOR) (SEAL)

(WITNESS) BY: _____

(TITLE)

BY: _____

(TITLE)

CITY OF DE PERE (SEAL)

Approved as to Form By: _____ (City Attorney)

Sufficient funds are available to provide for the payment of this obligation.

(COMPTROLLER)

BY: _____
(MAYOR)

BY: _____
(CITY CLERK)

SECTION 00 55 00

NOTICE TO PROCEED

Date: _____

(CONTRACTOR NAME)

(ADDRESS)

(ADDRESS)

Project Description: 23-20 Nelson Family Pavilion

You are hereby notified to commence work in accordance with the CONTRACT dated _____, within ten (10) days of this Notice. All work under this contract shall be completed within _____ (NUMBER IN WORDS) (___#) consecutive days from the start of construction or _____ (DATE) whichever comes first.

Department of Public Works

By: Eric P. Rakers, P.E.

Title: City Engineer

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged by

_____, this _____ day of _____, 20____.
Company Name

Signature

BY: _____
Printed Name

TITLE: _____

SECTION 00 61 13

CITY OF DE PERE

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That (CONTRACTOR NAME), as Principal, hereinafter called Contractor, and _____, as Surety, hereinafter called Surety, are held and firmly bound unto the City of De Pere, a municipal corporation of the State of Wisconsin, as Obligee, hereinafter called the City, for the use and benefit of claimants as herein below defined in the amount _____ (CONTRACT AMT. SPELLED OUT) (\$_____) for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ (date to be affixed by City) entered into a contract with City for Project 23-20, in accordance with drawings and specifications prepared by the Director of Public Works of said City, which contract is by reference made a part hereof, and is hereinafter referred to as the CONTRACT.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if Contractor shall promptly make payments to all claimants as hereinafter defined, for all labor and material used or reasonably required for use in the performance of the CONTRACT, then this obligation shall be null and void; otherwise it shall remain in full force and effect, subject, however, to the following conditions.

1. A claimant is defined as one having a direct contract with Contractor or with a subcontractor of Contractor for labor, material, or both, used or reasonably required for use in the performance of the contract, labor and material being construed to include that part of water, gas, power, lights, heat, oil, gasoline, telephone service, or rental of equipment directly applicable to the contract.
2. The above named Contractor and Surety hereby jointly and severally agree with the City that every claimant as herein defined, who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such claimant's work or labor was done or performed, or materials were furnished by such claimant may sue on this bond for the use of such claimant in the name of the City, prosecute the suit to final judgment for such sum or sums as may be justly due claimant, and have execution thereon, provided, however, that the City shall not be liable for the payment of any costs or expenses of any such suit.
3. No suit or action shall be commenced hereunder by any claimant:
 - a. Unless claimant shall have given written notice to any two of the following: The Contractor, the City, or the Surety above named, within ninety (90) days after such claimant did or performed the last of the work or labor, or furnished the last of the materials for which said claim is made, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were furnished, or for whom the work or labor was done or performed. Such notice shall be served by mailing the same by registered mail, postage prepaid, in an envelope addressed to the Contractor, City, or Surety, at any place where an office is regularly maintained for the transaction of business, or served in any manner in which legal process may be served in the State of Wisconsin, save that such service need not be made by a public officer.
 - b. After the expiration of one (1) year following the date on which Contractor ceased work on said CONTRACT.

Project 23-20
Nelson Family Pavilion

City of De Pere

- c. Other than in a state court of competent jurisdiction in and for the County or other political subdivision of the state in which the project, or any part thereof, is situated, or in the United States District Court for the district in which the project, or any part thereof, is situated, and not elsewhere.
4. The amount of this bond shall be reduced by and to the extent of any payment or payments made in good faith hereunder, inclusive of the payment by Surety of mechanics' liens, which may be filed or recorded against said improvement, whether or not claim for the amount of such lien be presented under and against this bond.

SIGNED AND SEALED THIS _____ DAY OF _____, 20__.

In Presence of:

_____	_____	_____
(WITNESS)	(CONTRACTOR)	(SEAL)
_____	_____	_____
(WITNESS)	(SURETY)	(SEAL)

SECTION 00 61 16

CITY OF DE PERE

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That (CONTRACTOR'S NAME), as Principal, hereinafter called Contractor, and _____, as Surety, hereinafter called Surety, are held and firmly bound unto the City of De Pere, a municipal corporation of the State of Wisconsin, as Obligee, hereinafter called City, in the amount of _____ (AMOUNT WRITTEN OUT) (\$ _____) for the payment whereof Contractor and Surety bind themselves, their heirs, executors, administrators, successors and assign, jointly and severally, firmly by these presents.

WHEREAS, Contractor has by written agreement dated _____ (date to be affixed by City), entered into a contract with the City for Project 23-20, in accordance with drawings and specifications prepared by the Director of Public Works of said City, which contract is by reference made a part hereof, and is hereinafter referred to as the CONTRACT.

NOW THEREFORE, THE CONDITION OF THIS OBLIGATION is such that, if the Contractor shall promptly and faithfully perform said CONTRACT, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

Whenever Contractor shall be, and declared by the City to be in default under the CONTRACT, the City having performed City's obligations there under, the Surety may promptly remedy the default, or shall promptly

1. Complete the CONTRACT in accordance with its terms and conditions or
2. Obtain a bid or bids for submission to City for completing the CONTRACT in accordance with its terms and conditions, and upon determination by the City and Surety of the lowest responsible bidder, arrange for a contract between such bidder and City make available as work progresses (even though there should be a default or succession of defaults under the contract or contracts of completion arranged under this paragraph) sufficient funds to pay the cost of completion less the balance of the contract price; but not exceeding, including other costs and damages for which the Surety may be liable hereunder, the amount set forth in the first paragraph hereof. The term "balance of the contract price" as used in this paragraph shall mean the total amount payable by City to Contractor under the CONTRACT and any amendments thereto, less the amount properly paid by City to Contractor.

Any suit under this bond must be instituted before the expiration of two (2) years from the date on which final payment under the CONTRACT falls due. No right of action shall accrue on this bond to or for the use of any person or corporation other than the owner named herein or the heirs, executors, administrators or successors of City.

SIGNED AND SEALED THIS _____ DAY OF _____, 20_____.

In the Presence of:

_____ (WITNESS)	_____ (CONTRACTOR)	_____ (SEAL)
_____ (WITNESS)	_____ (SURETY)	_____ (SEAL)

SECTION 00 62 76

APPLICATION FOR PAYMENT

Contractor's Application for Payment No.

Application Period:	Application Date:
Owner: City of De Pere	Contractor:
	Contractor's Project No.:

APPLICATION FOR PAYMENT

Change Order Summary

Approved Change Orders			1. ORIGINAL CONTRACT PRICE:.....	
Number	Additions	Deductions	2. Net change by Change Orders and Written Amendments (+ or -):.....	\$0.00
			3. CURRENT CONTRACT PRICE (Line 1 plus Line 2):.....	\$0.00
			4. Total completed and stored to date Column H on Progress Estimate:.....	\$0.00
			5. Retainage (per Agreement):	
			a. Work Completed - Column H (95% up to 50% of Contract or 2.5% of 100% of Contract)	\$0.00
Total	\$0.00	\$0.00	6. AMOUNT ELIGIBLE TO DATE (Line 4 minus 5):.....	\$0.00
NET CHANGE BY CHANGE ORDERS:			7. LESS PREVIOUS PAYMENTS (Line 6 from prior Application):.....	\$0.00
			8. AMOUNT DUE THIS APPLICATION (Line 6 minus Line 7):.....	\$0.00

CONTRACTOR'S CERTIFICATION

The undersigned Contractor certifies that:(1) all previous progress payments received from Owner on account of Work done under Contract have been applied on account to discharge Contractor's legitimate obligations incurred in connection with Work covered by prior Applications for Payment; (2) title of all Work, materials and equipment incorporated in said Work or otherwise listed in or covered by this Application for Payment will pass to Owner at time of payment free and clear of all Liens, security interests and encumbrances (except such as are covered by a Bond acceptable to Owner indemnifying Owner against any such Liens, security interest or encumbrances); and (3) all Work covered by the Application for Payment is in accordance with the Contract Documents and is not defective.

By: _____ Date: _____

Payment of: \$ _____
(Line 8 or other - attach explanation of other amount)

is recommended by: _____ (Contractor) _____ (Date)

Payment of: \$ _____
(Line 8 or other - attach explanation of other amount)

is recommended by: _____ (Owner) _____ (Date)

SECTION 00 65 16

CERTIFICATE OF SUBSTANTIAL COMPLETION

Project:	
Owner:	Owner's Contract No.:
Contractor:	

This [tentative] [definitive] Certificate of Substantial Completion applies to:

☐ All Work under the Contract Documents: ☐ The following specified portions of the Work:

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Contractor and Engineer, and found to be substantially complete. The Date of Substantial completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [definitive] list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

☐ Amended Responsibilities ☐ Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

The following documents are attached to and made part of this Certificate:

This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by Engineer

Date

Accepted by Contractor

Date

SECTION 01 10 00

SUMMARY OF WORK

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes
 - 1. References
 - 2. Work Covered by the Contract Documents
 - 3. Work Sequence/Schedule
 - 4. Use of Premises
 - 5. Warranty
 - 6. Work by Others
 - 7. Project Utility Sources
 - 8. Miscellaneous Provisions

1.2 REFERENCES

- A. General Specifications. The work under this contract shall be in accordance with the City of De Pere, 2022 Construction Specifications and these Special Provisions and plans, and the latest edition of the Wisconsin Department of Transportation Standards Specifications for Highway and Structure Construction, where referenced in the City Specifications.
- B. Definitions. Any reference to the “state” or the “department” in said Standard Specifications shall mean the “City of De Pere” for the purposes of this contract.
- C. Industry Standards
 - 1. 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.
 - 2. Comply with standards in effect as of date of the Contract Documents, unless otherwise indicated.
 - 3. If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement.
 - 4. 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.

5. Each section of the specifications generally includes a list of reference standards normally referred to in that respective section. The purpose of this list is to furnish the Contractor with a list of standards normally used for outlining the quality control desired on the project. The lists are not intended to be complete or all inclusive, but only a general reference of standards that are regularly referred to.
6. Each entity engaged in construction on the Project shall be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents. Where copies of standards are needed to perform a required construction activity, obtain copies directly from the publication source and make them available on request.

1.3 WORK COVERED BY THE CONTRACT DOCUMENTS

A. Project Identification

1. Project Location

- a. Voyageur Park
100 William Street
De Pere, WI 54115

2. Work will be performed under the following prime contract:

- a. Project 23-20 Nelson Family Pavilion

1.4 WORK SEQUENCE/SCHEDULE

- A. Project shall be completed for occupancy on or before May 1, 2024.
- B. Conduct construction activities to maintain access to businesses and residences throughout construction.
- C. Topsoil, seed, and mulch shall be completed prior to asphaltic concrete pavement placement.
- D. Existing restroom to remain operational until October 1, 2023.

1.5 USE OF PREMISES

- A. Contractor shall have full use of the premises for construction operations, including use of the Project Site, as allowed by law, ordinances, permits, easement agreements and the Contract documents.
- B. Contractor's use of premises is limited only by Owner's right to perform work or to retain other contractors on portions of the Project.
- C. The Project Site is limited to property boundaries, rights-of-way, easements, and other areas designated in the Contract Documents.
- D. Provide protection and safekeeping of material and products stored on or off the premises.

- E. Move any stored material or products which interfere with operations of Owner or other Contractors.

1.6 WARRANTY

- A. The Contractor warrants and guarantees to the City that all work shall be in accordance with the Contract Documents and will not be defective. Prompt notice of all defects will be given to the Contractor. All defective work, whether or not in place, may be rejected, corrected or accepted as provided in this proposal.
- B. If within one (1) year after the date of contract work completion or such longer period of time as may be prescribed by law or by the terms of any applicable special guarantee required by the Contract Documents or by a special provision of the Contract Documents, any work is found to be defective, the Contractor shall comply in accordance with the City's written instructions. These written instructions will include either correcting such defective work or, if it has been rejected by the City, removing it from the site and replacing it with non-defective work. If the Contractor does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk or loss or damage, the City may have the defective work corrected or the rejected work removed and replaced. All direct and indirect costs of correction or removal and replacement of defective work, including compensation for additional professional services, shall be paid by the Contractor.

1.7 WORK BY OTHERS

- A. The City of De Pere Park Department will trim trees in conflict with construction if the City receives advanced notification. Questions regarding trees or landscaping that is bid as part of this contract can be directed to the Engineer.
- C. Cooperate fully with separate contractors and/or Owner so work by others may be carried out smoothly, without interfering with or delaying work under this Contract.

1.8 PROJECT UTILITY SOURCES

- A. Green Bay Metropolitan Sewer District (NEW Water), Lisa Sarau, (lsarau@newwater.us) (920-438-1039)
- B. AT&T, Victoria Kassab, (yk352k@att.com) (920-401-7512)
- C. Wisconsin Public Service, Bob Laskowski, (rtlaskowski@wisconsinpublicservice.com) (920-617-2775)
- D. Charter, Vince Albin, (vince.albin@charter.com) (920-378-0444)

- E. Nsight, Rick Vincent, (rick.vincent@nsight.com) (920-617-7316)
- F. TDS Metrocom, Steve Jakubiec, (steve.jakubiec@tdstelecom.com) (920-882-4166)
- G. Net-Lec (Mi-Tech Services), Dennis Lafave, (dlafave@mi-tech.us) (920-619-9774)
- H. CenturyLink, Relocation Team, (relocations@lumen.com) (800-871-9244)
- I. Central Brown County Water Authority, Rob Michaelson, (rmichaelson@mpu.org) (920-686-4354)

1.9 MISCELLANEOUS PROVISIONS

- A. Notification to Residents –notify individually all residents and businesses 2-weeks prior to the start of operations, giving an estimated time that vehicle movement will be limited or prohibited. Property owners shall be notified 24-hours prior to closing a drive.
- B. List Specific Haul Routes Here
- C. List Special Events that may impact construction – Check the events map.
- D. List any school impacts.

PART 2 – PRODUCTS

PART 3 – EXECUTION

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Description of Alternates.
- B. Procedures for pricing Alternates.

1.2 RELATED REQUIREMENTS

- A. Document 00 43 23 – Alternates Form: List of Alternates as supplement to Bid Form.

1.3 ACCEPTANCE OF ALTERNATES

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Alternat.

1.4 SCHEDULE OF ALTERNATES

- A. Alternate No. 1: Provide asphalt paving and aggregate base in lieu of concrete paving and aggregate base. Section per De Pere Standards.
- B. Alternate No. 2: Provide gypsum board ceiling at Room 100 in lieu of linear metal cladding.
 - 1. Base Bid Item: Section 07 46 17.
 - 2. Alternate Item: Section 09 46 17.

PART 2 – PRODUCTS

PART 3 – EXECUTION

END OF SECTION

SECTION 01 29 00

PAYMENT PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes:
 - 1. Administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as recommended by the Engineer and approved by Owner.
- B. The date for each progress payment should be the 3rd Wednesday of each month. The period covered by each Application for Payment starts on the day following the end of the preceding period and ends the 4th Friday of the Month.
- C. Use forms provided by Engineer for Applications for Payment. Sample copy of the Application for Payment and Continuation Sheet is included in Section 00 62 76.
- D. Application Preparation Procedures
 - 1. When requested by the Contractor, the Engineer will determine the actual quantities and classifications of Unit Price Work performed.
 - a. Preliminary determinations will be reviewed with the Contractor before completing Application for Payment.
 - b. Engineer will complete the Application for Payment based on Engineer's decision on actual quantities and classifications.
 - c. Engineer will submit three original copies of Application for Payment to Contractor for certification of all three original copies.
 - d. Contractor shall submit signed Application for Payment to Owner for approval within time frame agreed to at the Preconstruction Conference.
 - 2. If payment is requested for materials and equipment not incorporated in the Work, then the following shall be submitted with the Application for Payment:
 - a. Evidence that materials and equipment are suitably stored at the site or at another location agreed to in writing.
 - b. A bill of sale, invoice, or other documentation warranting that the materials and equipment are free and clear of all liens.
 - c. Evidence that the materials and equipment are covered by property insurance.

3. Complete every entry on form. Execute by a person authorized to sign legal documents on behalf of Contractor.
- E. With each Application for Payment, submit waivers of liens from subcontractors and suppliers for the construction period covered by the previous application.
1. Submit partial waivers on each item for amount requested before deduction for retainage on each item.
 2. When an application shows completion for an item, submit final or full waivers.
 3. Owner reserves the right to designate which entities involved in the Work shall submit waivers.
 4. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application.
 5. Submit waivers of lien on forms executed in a manner acceptable to Owner.
- F. The following administrative actions and submittals shall precede or coincide with submittal of first Application for Payment:
1. List of subcontractors.
 2. Schedule of Values (For Lump Sum Work).
 3. Contractor's construction schedule.
- G. 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. Consent of Surety to Final Payment.
 5. Final lien waivers as evidence that claims have been settled.
 6. Final liquidated damages settlement statement.

PART 2 – PRODUCTS

PART 3 – EXECUTION

END OF SECTION

SECTION 01 33 00

SUBMITTALS

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for submittals:
 - 1. Progress Schedule.
 - 2. Schedule of Shop Drawings and Sample Submittals.
 - 3. Shop Drawings.
- B. Failure to meet Submittal requirements to the satisfaction of the Engineer will constitute unsatisfactory performance of the work in accordance with the Contract Documents, therefore, the Engineer may recommend to the Owner that all or a portion of payments requested during the corresponding pay period be withheld until these requirements are met.

1.2 SUBMITTAL PROCEDURES

- A. Coordination: Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
 - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 - 2. Coordinate transmittal of different types of submittals for related elements of the work so processing will not be delayed by the need to review submittals concurrently for coordination.
 - a. The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
 - 3. To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for re-submittals.
 - a. Allow two weeks for initial submittal.
 - b. Allow two weeks for reprocessing each submittal.
 - c. No extension of Contract Time will be authorized because of failure to transmit submittals to the Engineer sufficiently in advance of the work to permit processing.
- B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
 - 1. Assign a reference number to each submittal and re-submittal.
 - 2. Provide a space approximately four (4) by five (5) inches (100 by 125 mm) on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
 - 3. Include the following information on the label for processing and recording action taken.

- a. Project name.
 - b. Date.
 - c. Name and address of the Engineer.
 - d. Name and address of the Contractor.
 - e. Name and address of the subcontractor.
 - f. Name and address of the supplier.
 - g. Name of the manufacturer.
 - h. Number and title of appropriate Specification Section.
 - i. Drawing number and detail references, as appropriate.
 4. Each submittal shall be stamped by the Contractor indicating that submittal was reviewed for conformance with the Contract Documents. The Engineer will not accept unstamped submittals.
- C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Transmit each submittal to the Engineer. The Engineer will not accept submittals received from sources other than the Contractor.
1. On the transmittal, record relevant information and requests for Engineer action. On a form, or separate sheet, record deviations from Contract Document requirements, including variations, limitations, and justifications. Include Contractor's certification that information complies with Contract Document requirements.

1.3 CONTRACTOR'S PROGRESS SCHEDULE

- A. Prepare and submit to the Engineer within 10 (ten) days after the Effective Date of the Agreement, four copies of a preliminary progress schedule of the work activities from Notice to Proceed until Substantial Completion.
1. Provide sufficient detail of the work activities comprising the schedule to assure adequate planning and execution of the work, such that in the judgment of the Engineer, it provides an appropriate basis for monitoring and evaluation of the progress of the work. A work activity is defined as an activity which requires substantial time and resources (manpower, equipment, and/or material) to complete and must be performed before the contract is considered complete.
 2. The schedule shall indicate the sequence of work activities. Identify each activity with a description, start date, completion date and duration. Include, but do not limit to the following items, as appropriate to this contract:
 - a. Shop drawing review by the Engineer.
 - b. Excavation and grading.
 - c. Asphalt and concrete placement sequence.
 - f. Subcontractor's items of work.
 - g. Allowance for inclement weather.
 - h. Contract interfaces, date of Substantial Completion.
 - i. Interfacing and sequencing with existing facilities and utilities.
 - j. Sequencing of major construction activities.

k. Milestones and completion dates.

- B. Distribution: Following response to the initial submittal, print and distribute copies of the revised construction schedule to the Engineer, Subcontractors, and other parties required to comply with scheduled dates. When revisions are made, distribute to the same parties. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in construction activities.
- C. Schedule Updating: Revise the schedule after each meeting, event, or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.
- D. Punch List: Prepare and submit to the Engineer within ten (10) days after substantial completion a detailed progress schedule for outstanding work and punch list items.

1.4 SCHEDULE OF SHOP DRAWINGS AND SAMPLE SUBMITTALS

- A. Submit electronic or one (1) hard copy of preliminary submittal schedule in accordance with the General Conditions of the Contract and as follows:
 - 1. Coordinate submittal schedule with the subcontractors, Schedule of Values, and of products as well as the Contractor's Progress Schedule.
 - 2. Prepare the schedule in chronological order. Provide the following information:
 - a. Scheduled date for the first submittal.
 - b. Related Section number.
 - c. Submittal category (Shop Drawings, Product Data, or Samples).
 - d. Name of the subcontractor.
 - e. Description of the part of the work covered.
 - f. Scheduled date for the Engineer's final release or approval.
- B. Distribution: Following response to the initial submittal, print and distribute copies of the revised construction schedule to the Engineer, Subcontractors, and other parties required to comply with scheduled dates. Post copies in the field office. When revisions are made, distribute to the same parties. Delete parties from distribution when they have completed their assigned portion of the work and are no longer involved in construction activities.
- C. Schedule Updating: Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

1.5 SHOP DRAWINGS

- A. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or

copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.

- B. Collect product data into a single submittal for each element of construction of system. Product data includes printed information, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.
 - 1. Mark each copy to show actual product to be provided. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
 - a. Manufacturer's printed recommendations.
 - b. Compliance with trade association standards.
 - c. Compliance with recognized testing agency standards.
 - d. Application of testing agency labels and seals.
 - e. Notation of dimensions verified by field measurement.
 - f. Notation of coordination requirements.
- C. Do not use shop drawings without an appropriate final stamp indicating action taken.
- D. Submittals: Submit electronic of each required submittal. The Engineer will return the submittal to the Contractor marked with action taken and corrections or modifications required.
- E. Distribution: Furnish copies of reviewed submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms. Maintain one copy at the project site for reference.
 - 1. Do not proceed with installation until a copy of the Shop drawing is in the Installer's possession.
 - 2. Do not permit use of unmarked copies of the Shop Drawing in connection with construction.

1.6 ENGINEER'S ACTION

- A. Except for submittals for the record or information, where action and return is required, the Engineer will review each submittal, mark to indicate action taken, and return promptly. The Engineer will stamp each submittal with a uniform action stamp. The Engineer will mark the stamp appropriately to indicate the action taken, as follows:
 - 1. "No Exceptions Taken": The work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents.
 - 2. "Make Corrections Noted – Resubmittal Not Required": The work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents.
 - 3. "Revise and Resubmit or Submit Specific Item": Do not proceed with work covered by the submittal. Resubmit without delay. Do not use, or allow others to use, submittals marked "Amend and Resubmit" at the Project Site or elsewhere where work is in progress.

4. "Rejected": Do not proceed with work covered by the submittal. Resubmit without delay. Do not use, or allow others to use, submittals marked "Rejected and Resubmit" at the Project Site or elsewhere where work is in progress.
 5. Submittal Not Required by Contract Documents – Not Reviewed.
- B. Unsolicited Submittals: The Engineer will return unsolicited submittals to the sender without action.

PART 2 – PRODUCTS

PART 3 – EXECUTION

END OF SECTION

SECTION 01 41 00

REGULATORY REQUIREMENTS

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Underground Utilities.
 - 2. Property Monuments.
 - 3. Traffic Control.
 - 4. Permits for Project.

1.2 UNDERGROUND UTILITIES

- A. Under the provisions of Wisconsin Statutes, Section 182.0175, all contractors, subcontractors, and any firm or individual intending to do work on this Contract shall contact all utility firms in the affected area of construction a minimum of three (3) working days prior to beginning construction so that affected utilities will be located and marked.

1.3 PROPERTY MONUMENTS

- A. Protect iron pipe monuments from movement.
- B. The cost of replacement of any monuments moved or destroyed during construction shall be the Contractor's responsibility.
- C. Perpetuation of destroyed or moved monuments shall be performed in accordance with state statutes by a registered land surveyor.

1.4 TRAFFIC CONTROL

- A. Provide traffic control facilities including barricades, signs, lights, warning devices, pavement markings, flaggers, etc.
- B. Construct and use traffic control facilities in accordance with the U.S. D. O. T. Federal Highway Administration's Manual on Uniform Traffic Control Devices for Streets and Highways.
- C. Maintain traffic control devices as required to properly safeguard the public travel through final completion, including during periods of suspension of work.

1.5

PART 2 – PRODUCTS (Not used)

PART 3 – EXECUTION (Not used)

END OF SECTION

SECTION 01 71 23

FIELD ENGINEERING

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Engineering Surveys Provided by the Engineer.
 - 2. Engineering Surveys Provided by the Contractor.

1.2 SUBMITTALS

- A. None

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION

3.1 PREPARATION

- A. Investigate and verify the existence and location of site improvements, utilities, and other existing facilities.
- B. Before construction, verify the location of invert elevations at points of connection of sanitary sewer, storm sewer, water piping and underground electrical services.
- C. Furnish information to the Engineer and the appropriate utility regarding conflicts that are necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction.

3.2 ENGINEERING SURVEYS TO BE PROVIDED BY THE CONTRACTOR

- A. General
 - 1. Establish benchmarks for construction as shown on the drawings.
 - 2. Establish control points as shown on the drawings.
- B. Gravity Sewer Systems and Water Distribution Systems
 - 1. Provide construction reference stakes set for pipe construction location at critical changes in horizontal and vertical alignment.
 - 2. Provide construction stakes for location of pipe at connections.

C. New Road Construction

1. Provide construction slope intercept stakes for horizontal and vertical alignment on each side of the road base on each cross section in the cross section sheets for requests received at least seventy-two (72) hours before the related work begins.
2. Provide construction reference stakes for subgrade at a minimum of fifty (50) foot intervals and maximum of one-hundred (100) foot intervals on tangents. Provide construction reference stakes for subgrade at twenty-five (25) foot intervals within vertical and horizontal curves. Provide a reference line stake at each location.
3. Provide construction reference stakes for top of crushed aggregate at a minimum of fifty (50) foot intervals and maximum of one-hundred (100) foot intervals on tangents. Provide construction reference stakes for top of crushed aggregate at twenty-five (25) foot intervals within vertical and horizontal curves. Provide a reference or centerline stake.

3.3 ENGINEERING SURVEYS TO BE PROVIDED BY THE CONTRACTOR

A. General

1. Locate, preserve and protect established construction reference stakes, benchmarks and control points.
2. Locate, preserve and protect property corners and section corner monuments. If moved or destroyed due to Contractor negligence, then replace in accordance with state requirements; some of which are referenced in the "Regulatory Requirements".
3. Provide additional construction staking as necessary to complete construction based on the construction reference stakes provided by the Engineer and the Drawings.
4. Before beginning with necessary construction staking, verify the information shown on the Drawings, in relation to the established construction reference stakes, bench marks, control points and property corners. Notify the Engineer of any discrepancies.
5. Remove construction reference stakes when directed by the Engineer.

B. Gravity Sewer Systems and Water Distribution Systems

1. Provide any intermediate construction reference points as required to verify installation at the line and grade established and locate appurtenant structures.
2. Check the line and grade with construction reference stakes at each pipe length.

C. New Road Construction

1. Provide additional construction reference stakes necessary to establish location and grade in accordance with the plans.

END OF SECTION

APPENDIX A

McMAHON ASSOCIATES, INC. SPECIFICATIONS

DIVISION 03 – CONCRETE

SECTION 03 30 00.00

CAST-IN-PLACE CONCRETE

SECTION 03 35 11.00

CONCRETE FLOOR FINISHES

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete formwork.
- B. Floors and slabs on grade.
- C. Concrete foundation walls.
- D. Concrete reinforcement.
- E. Joint devices associated with concrete work.
- F. Miscellaneous concrete elements, Light pole bases, Flag pole bases.
- G. Concrete curing.

1.2 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealants: Products and installation for sealants and joint fillers for saw cut joints and isolation joints in slabs.

1.3 REFERENCE STANDARDS

- A. ACI 117 - Specifications for Tolerances for Concrete Construction and Materials 2010 (Reapproved 2015).
- B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete 1991 (Reapproved 2009).
- C. ACI 301 - Specifications for Structural Concrete 2016.
- D. ACI 302.1R - Guide to Concrete Floor and Slab Construction 2015.
- E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete 2000 (Reapproved 2009).
- F. ACI 305R - Guide to Hot Weather Concreting 2010.
- G. ACI 306R - Guide to Cold Weather Concreting 2016.
- H. ACI 308R - Guide to External Curing of Concrete 2016.
- I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary 2014 (Errata 2018).

- J. ACI 347R - Guide to Formwork for Concrete 2014, with Errata (2017).
- K. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2020.
- L. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2022.
- M. ASTM C33/C33M - Standard Specification for Concrete Aggregates 2018.
- N. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens 2021.
- O. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete 2021.
- P. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete 2020.
- Q. ASTM C150/C150M - Standard Specification for Portland Cement 2021.
- R. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete 2010a (Reapproved 2016).
- S. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete 2019.
- T. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete 2019.
- U. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete 2019.
- V. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete 2020a.
- W. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink) 2017.
- X. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete 2012.
- Y. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types) 2018.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

- C. Mix Design: Submit proposed concrete mix design.
 - 1. Indicate proposed mix design complies with requirements of ACI 301, Section 4 - Concrete Mixtures.
 - 2. Indicate proposed mix design complies with requirements of ACI 318, Chapter 5 - Concrete Quality, Mixing and Placing.
- D. Test Reports: Submit report for each test or series of tests specified.
- E. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

1.5 QUALITY ASSURANCE

- A. Perform work of this section in accordance with ACI 301 and ACI 318.
- B. Follow recommendations of ACI 305R when concreting during hot weather.
- C. Follow recommendations of ACI 306R when concreting during cold weather.

PART 2 PRODUCTS

2.1 FORMWORK

- A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.
- B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
 - 1. Form Coating: Release agent that will not adversely affect concrete or interfere with application of coatings.

2.2 REINFORCEMENT MATERIALS

- A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi).
 - 1. Type: Deformed billet-steel bars.
 - 2. Finish: Unfinished, unless otherwise indicated.
- B. Steel Welded Wire Reinforcement (WWR): Galvanized, plain type, ASTM A1064/A1064M.
 - 1. Form: Coiled Rolls.
- C. Reinforcement Accessories:
 - 1. Tie Wire: Annealed, minimum 16 gauge, 0.0508 inch.

2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

2.3 CONCRETE MATERIALS

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
- B. Fine and Coarse Aggregates: ASTM C33/C33M.
 1. Acquire aggregates for entire project from same source.
- C. Fly Ash: ASTM C618, Class C only.
- D. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

2.4 ADMIXTURES

- A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
- B. Air Entrainment Admixture: ASTM C260/C260M.
- C. Water Reducing Admixture: ASTM C494/C494M Type A.

2.5 ACCESSORY MATERIALS

- A. Underslab Vapor Retarder: Sheet material complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. Single ply polyethylene is prohibited.
 1. Manufacturers:
 - a. Fortifiber Building Systems Group ; Moistop Ultra 10: www.fortifiber.com/#sle.
 - b. Stego Industries, LLC: Stego wrap class A 10-mil www.stegoindustries.com/#sle.
 - c. W. R. Meadows, Inc; PERMINATOR Class A - 10 mils : www.wrmeadows.com/#sle.

2.6 BONDING AND JOINTING PRODUCTS

- A. Epoxy Bonding System:
 1. Complying with ASTM C881/C881M and of Type required for specific application.
 2. Manufacturers:
 - a. BASF MasterEmaco ADH 326.

- B. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.

2.7 CURING MATERIALS

- A. Curing Compound, Naturally Dissipating: Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.
 - 1. Application: Use at all locations.
 - 2. Product dissipates within 4 to 6 weeks.
 - 3. Manufacturers:
 - a. Euclid Chemical Company; Kurez DR VOX
: www.euclidchemical.com/#sle.
 - b. W. R. Meadows, Inc; 1100-Clear: www.wrmeadows.com/#sle.

2.8 CONCRETE MIX DESIGN

- A. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
- B. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
 - 1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
- C. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
- D. Normal Weight Concrete:
 - 1. Compressive Strength, when tested in accordance with ASTM C39/C39M at 28 days: As indicated on drawings.

2.9 MIXING

- A. Transit Mixers: Comply with ASTM C94/C94M.
- B. Adding Water: If concrete arrives on-site with slump less than suitable for placement, do not add water that exceeds the maximum water-cement ratio or exceeds the maximum permissible slump.

PART 3 EXECUTION

3.1 PREPARATION

- A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.
- B. Verify that forms are clean and free of rust before applying release agent.
- C. Coordinate placement of embedded items with erection of concrete formwork and placement of form accessories.
- D. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
 - 1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.

3.2 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS

- A. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.
- B. Install welded wire reinforcement in maximum possible lengths, and offset end laps in both directions. Splice laps with tie wire.

3.3 PLACING CONCRETE

- A. Place concrete in accordance with ACI 304R.
- B. Ensure reinforcement and inserts will not be disturbed during concrete placement.
- C. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.

3.4 FLOOR FLATNESS AND LEVELNESS TOLERANCES

- A. An independent testing agency, as specified in Section 01 40 00, will inspect finished slabs for compliance with specified tolerances.
- B. Maximum Variation of Surface Flatness:
 - 1. Exposed Concrete Floors: 1/4 inch in 10 feet.

- C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.5 CONCRETE FINISHING

- A. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
 - 1. Other Surfaces to Be Left Exposed: Trowel as described in ACI 302.1R, minimizing burnish marks and other appearance defects.
- B. In areas with floor drains, maintain floor elevation at walls; pitch surfaces uniformly to drains at 1:100 nominal.

3.6 CURING AND PROTECTION

- A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.
- B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.
 - 1. Normal concrete: Not less than seven days.
- C. Formed Surfaces: Cure by moist curing with forms in place for full curing period.

3.7 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests, as specified in Section 01 40 00 - Quality Requirements.
- B. Provide free access to concrete operations at project site and cooperate with appointed firm.
- C. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.
- D. Tests of concrete and concrete materials may be performed at any time to ensure compliance with specified requirements.
- E. Compressive Strength Tests: ASTM C39/C39M, for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cubic yards or less of each class of concrete placed.
- F. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
- G. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

3.8 DEFECTIVE CONCRETE

- A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.
- B. Defective Concrete: Concrete not complying with required lines, details, dimensions, tolerances or specified requirements.
- C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
- D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

END OF SECTION

SECTION 03 35 11

CONCRETE FLOOR FINISHES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface treatments for concrete floors and slabs.
- B. Clear penetrating sealers.
- C. Concrete noted as sealed concrete on the drawings.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate the work with concrete floor placement and concrete floor curing.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's published data on each finishing product, including information on compatibility of different products and limitations.

PART 2 PRODUCTS

2.1 CONCRETE FLOOR FINISH APPLICATIONS

- A. Liquid Densifier and Hardener:
 - 1. Use at following locations: interior locations.
- B. Penetrating Clear Sealer:

2.2 DENSIFIERS AND HARDENERS

- A. Liquid Densifier and Hardener: Penetrating chemical compound that reacts with concrete, filling the pores and dustproofing; for application to concrete after set.
- B. Apply to all floors designated as "sealed concrete"
 - 1. Composition: Lithium silicate.
 - 2. Products:
 - a. Euclid Chemical Company; ULTRASIL LI+: www.euclidchemical.com/#sle.
 - b. Kaufman Products Inc; SureHard LS: www.kaufmanproducts.net/#sle.

- c. L&M Construction Chemicals, Inc, a subsidiary of Laticrete International, Inc; LiON HARD: www.lmcc.com/#sle.
- d. PROSOCO, Inc; Consolideck LS: www.prosoco.com/consolideck/#sle.
- e. SpecChem, LLC; LithSeal SC: www.specchemllc.com/#sle.

2.3 COATINGS

- A. Penetrating Sealer: Transparent, non-yellowing, water- or solvent-based coating.
 - 1. Composition: Silane-siloxane mixture.
 - 2. Products:
 - a. Clemons Concrete Coatings; Super Seal M: www.clemonsconcretecoatings.com/#sle.
 - b. Concrete Sealers USA: PS110 Soloxane Water Repellant WB-10. www.concretesealersusa.com/#sle.
 - c. TK Products Construction Coatings; Salt Protector Plus: www.surecretedesign.com/#sle.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that floor surfaces are acceptable to receive the work of this section.
- B. Verify that flaws in concrete have been patched and joints filled with methods and materials suitable for further finishes.

3.2 GENERAL

- A. Apply materials in accordance with manufacturer's instructions.

3.3 COATING APPLICATION

- A. Verify that surface is free of previous coatings, sealers, curing compounds, water repellents, laitance, efflorescence, fats, oils, grease, wax, soluble salts, residues from cleaning agents, and other impediments to adhesion.
- B. Verify that water vapor emission from concrete and relative humidity in concrete are within limits established by coating manufacturer.
- C. Protect adjacent non-coated areas from drips, overflow, and overspray; immediately remove excess material.

END OF SECTION

DIVISION 04 – MASONRY

SECTION 04 20 00.00

UNIT MASONRY

SECTION 04 42 00.00

EXTERIOR STONE CLADDING

SECTION 04 20 00

UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete block.
- B. Clay facing brick.
- C. Mortar and grout.
- D. Reinforcement and anchorage.
- E. Flashings.
- F. Lintels.
- G. Accessories.

1.2 RELATED REQUIREMENTS

- A. Section 07 25 00 - Weather Barriers: Water-resistive barriers applied to exterior face of backing sheathing or unit masonry substrate.
- B. Section 07 92 00 - Joint Sealants: Sealing control and expansion joints.

1.3 REFERENCE STANDARDS

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- B. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip 2022a.
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement 2020.
- D. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire 2019.
- E. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement 2016, with Editorial Revision (2018).
- F. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete 2022.
- G. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units 2016a.

- H. ASTM C144 - Standard Specification for Aggregate for Masonry Mortar 2018.
- I. ASTM C150/C150M - Standard Specification for Portland Cement 2021.
- J. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes 2018.
- K. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale) 2021.
- L. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019.
- M. ASTM C404 - Standard Specification for Aggregates for Masonry Grout 2018.
- N. ASTM C476 - Standard Specification for Grout for Masonry 2020.
- O. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete 2016.
- P. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry 2019a.
- Q. ASTM D226/D226M - Standard Specification for Asphalt-Saturated Organic Felt Used in Roofing and Waterproofing 2017.
- R. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing 2017.
- S. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls 2005.
- T. BIA Technical Notes No. 46 - Maintenance of Brick Masonry 2017.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

PART 2 PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. Concrete Block: Comply with referenced standards and as follows:
 - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depths as indicated on drawings for specific locations.

2. Special Shapes: Provide non-standard blocks configured for corners.
 - a. Provide bullnose units for outside corners.
3. Load-Bearing Units: ASTM C90, normal weight.
 - a. Hollow block.
 - b. Exposed Faces: Manufacturer's standard color and texture.

2.2 BRICK UNITS

A. Manufacturers:

1. Belden Brick: www.beldenbrick.com/#sle.
2. Endicott Clay Products Co: www.endicott.com/#sle.
3. Hockers Brick.
4. Gagnon Clay Products.

B. Facing Brick: ASTM C216, Type FBS Smooth, Grade SW.

1. Color and texture: Belden: Black Diamond.
2. Nominal size: Modular.
3. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.

2.3 MORTAR AND GROUT MATERIALS

- A. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
- B. Hydrated Lime: ASTM C207, Type S.
- C. Mortar Aggregate: ASTM C144.
- D. Grout Aggregate: ASTM C404.
- E. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
 1. Color(s): To match Architect's sample(s) when incorporated into specified mix design(s).
 2. Manufacturers:

- a. Davis Colors, a division of Venator Materials PLC : www.daviscolors.com/#sle.
 - b. Lambert Corporation: www.lambertusa.com/#sle.
 - c. Solomon Colors, Inc: www.solomoncolors.com/#sle.
- F. Water: Clean and potable.
- G. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
 - 1. Type: Type S.
 - 2. Color: Standard gray.
- H. Packaged Dry Material for Grout for Masonry: Premixed cementitious materials and dried aggregates; capable of producing grout of the specified strength in accordance with ASTM C476 with the addition of water only.
 - 1. Type: Fine.

2.4 REINFORCEMENT AND ANCHORAGE

- A. Manufacturers:
 - 1. Hohmann & Barnard, Inc: www.h-b.com/#sle.
 - 2. WIRE-BOND www.wirebond.com/#sle.
- B. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi), deformed billet bars; galvanized.
- C. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated.
- D. Single Wythe Joint Reinforcement: ASTM A951/A951M.
 - 1. Type: Truss.
 - 2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M Class 3.
 - 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.
- E. Adjustable Multiple Wythe Joint Reinforcement: ASTM A951/A951M.
 - 1. Type: Truss, with adjustable ties or tabs spaced at 16 in on center.

2. Material: ASTM A1064/A1064M steel wire, hot dip galvanized after fabrication to ASTM A153/A153M Class B.
 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods and adjustable components of 0.1875 inch wire, width of components as required to provide not less than 5/8 inch of mortar coverage from each masonry face.
 4. Vertical adjustment: Not more than 1 1/4 inches.
- F. Strap Anchors: Bent steel shapes, 1-1/2 inch width, 0.105 inch thick, 24 inch length, with 1-1/2 inch long, 90 degree bend at each end to form a U or Z shape or with cross pins, hot dip galvanized to ASTM A153/A153M Class B.
- G. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not less than 5/8 inch of mortar coverage from masonry face.

2.5 FLASHINGS

- A. Combination Non-Asphaltic Flashing Materials - Stainless Steel:
1. Stainless Steel/Polymer Fabric Flashing: ASTM A240/A240M; 2 mil type 304 stainless steel sheet bonded on one side to one sheet of polymer fabric.
 - a. Manufacturers:
 - 1) Hohmann & Barnard, Inc; Mighty-Flash Stainless Flashing: www.h-b.com/#sle.
 - 2) WIRE-BOND: www.wirebond.com/#sle.
- B. Membrane Asphaltic Flashing Materials:
1. Rubberized Asphalt Flashing: Self-adhering polymer modified asphalt sheet; 40 mils (0.040 inch) minimum total thickness; 8 mil cross-laminated polyethylene bonded to adhesive rubberized asphalt, with a removable release liner.
 - a. Manufacturers:
 - 1) Advanced Building Products, Inc; Strip-N-Flash: www.advancedbuildingproducts.com/#sle.
 - 2) Heckmann Building Products, Inc; No: 82 Rubberized Asphalt Thru Wall flashing: www.heckmannbuildingprods.com/#sle
 - 3) WIRE-BOND; Aquaflash 500: www.wirebond.com/#sle.
- C. Flashing Sealant/Adhesives: Silicone, polyurethane, or silyl-terminated polyether/polyurethane or other type required or recommended by flashing manufacturer; type capable of adhering to type of flashing used.

- D. Termination Bars: Stainless steel; compatible with membrane and adhesives.
- E. Drip Edge: Stainless steel; angled drip with hemmed edge; compatible with membrane and adhesives.
- F. Lap Sealants and Tapes: As recommended by flashing manufacturer; compatible with membrane and adhesives.

2.6 ACCESSORIES

- A. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
 - 1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
 - a. Manufacturers:
 - 1) Advanced Building Products, Inc; Mortar Break
DT: www.advancedbuildingproducts.com/#sle.
 - 2) Mortar Net Solutions; Mortar Net: www.mortarnet.com/#sle.
- B. Building Paper: ASTM D226/D226M, Type I ("No.15") asphalt felt.
- C. Weeps, Cavity Vents:
 - 1. Type: Extruded propylene with honeycomb design.
 - 2. Color(s): match mortar color.
 - 3. Manufacturers:
 - a. Advanced Building Products, Inc; Mortar Maze weep vents
: www.advancedbuildingproducts.com/#sle.
 - b. Blok-Lok Limited; cellvent: www.blok-lok.com/#sle.
 - c. Hohmann & Barnard, Inc; QV Quadrovent: www.h-b.com/#sle.
 - d. WIRE-BOND; Cell Vent: www.wirebond.com/#sle.
- D. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.7 MORTAR AND GROUT MIXING

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
 - 1. Exterior, loadbearing masonry: Type S.
 - 2. Interior, loadbearing masonry: Type S.

- B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
- C. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.
- D. Admixtures: Add to mixture at manufacturer's recommended rate and in accordance with manufacturer's instructions; mix uniformly.
- E. Mixing: Use mechanical batch mixer and comply with referenced standards.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that related items provided under other sections are properly sized and located.
- B. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COLD AND HOT WEATHER REQUIREMENTS

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

3.4 COURSING

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
 - 1. Bond: Running.
 - 2. Coursing: One unit and one mortar joint to equal 8 inches.
 - 3. Mortar Joints: Concave.

D. Brick Units:

1. Bond: one third running.
2. Coursing: Three units and three mortar joints to equal 8 inches.
3. Mortar Joints: Concave.

3.5 PLACING AND BONDING

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Interlock intersections and external corners, except for units laid in stack bond.
- F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

3.6 WEEPS/CAVITY VENTS

- A. Install weeps and cavity vents in veneer and cavity walls at 24 inches on center horizontally below shelf angles and lintels, near top of walls, and at thru-wall flashings.

3.7 CAVITY MORTAR CONTROL

- A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.
- B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.
- C. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

3.8 REINFORCEMENT AND ANCHORAGE - GENERAL, SINGLE WYTHE MASONRY, AND CAVITY WALL MASONRY

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.

- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Embed longitudinal wires of joint reinforcement in mortar joint with at least 5/8 inch mortar cover on each side.
- E. Lap joint reinforcement ends minimum 6 inches.
- F. Reinforce stack bonded unit joint corners and intersections with strap anchors 16 inches on center.
- G. Embed ties and anchors in mortar joint and extend into masonry unit a minimum of 1-1/2 inches with at least 5/8 inch mortar cover to the outside face of the anchor.

3.9 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY

- A. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

3.10 MASONRY FLASHINGS

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
 - 1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent masonry or turn up flashing ends at least 1 inch, minimum, to form watertight pan at non-masonry construction.
 - 2. Remove or cover protrusions or sharp edges that could puncture flashings.
 - 3. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Terminate flashing up 8 inches minimum on vertical surface of backing:
 - 1. Install vertical leg of flashing behind water-resistive barrier sheet over backing.
 - 2. Install vertical leg of flashing over fluid-applied or self-adhered air/vapor barriers over backing or per manufacturer's directions.
 - 3. Terminate vertical leg of flashing into bed joint in masonry or reglet in concrete.
 - 4. Anchor vertical leg of flashing into backing with a termination bar and sealant.
 - 5. Apply cap bead of sealant on top edge of self-adhered flashing.
- C. Install flashing in accordance with manufacturer's instructions.
- D. Extend metal flashings to within 1/2 inch of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.
- E. Support flexible flashings across gaps and openings.

- F. Extend flashings to within 1/2 inch of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.
- G. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

3.11 LINTELS

- A. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
 - 1. Openings to 42 inches: Place two, No. 3 reinforcing bars 1 inch from bottom web.
 - 2. Openings from 42 inches to 78 inches: Place two, No. 5 reinforcing bars 1 inch from bottom web.
 - 3. Openings over 78 inches: Reinforce openings as detailed.
 - 4. Do not splice reinforcing bars.
 - 5. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
 - 6. Place and consolidate grout fill without displacing reinforcing.
 - 7. Allow masonry lintels to attain specified strength before removing temporary supports.
- B. Maintain minimum 8 inch bearing on each side of opening.

3.12 GROUTED COMPONENTS

- A. Reinforce bond beams with 2, No. 5 bars, 1 inch from bottom web.
- B. Lap splices minimum 24 bar diameters.
- C. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.
- D. Place and consolidate grout fill without displacing reinforcing.
- E. At bearing locations, fill masonry cores with grout for a minimum 12 inches either side of opening.

3.13 CONTROL AND EXPANSION JOINTS

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Form control joint with a sheet building paper bond breaker fitted to one side of the hollow contour end of the block unit. Fill the resultant core with grout fill. Rake joint at exposed unit faces for placement of backer rod and sealant.

- C. Size control joints as indicated on drawings; if not indicated, 1/2 inch wide and deep.
- D. Form expansion joint as detailed on drawings.

3.14 BUILT-IN WORK

- A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.
- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
 - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

3.15 TOLERANCES

- A. Maximum Variation from Alignment of Columns: 1/4 inch.
- B. Maximum Variation from Unit to Adjacent Unit: 1/16 inch.
- C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- D. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.

3.16 CUTTING AND FITTING

- A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.
- B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.17 CLEANING

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

END OF SECTION

SECTION 04 42 00

EXTERIOR STONE CLADDING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Cut limestone veneer at exterior walls.
- B. Sealing exterior joints.

1.2 RELATED REQUIREMENTS

- A. Section 04 20 00 Unit Masonry
- B. Section 07 92 00 - Joint Sealants: Sealing perimeter and expansion joints in interior stone work.

1.3 REFERENCE STANDARDS

- A. ASTM C270 - Standard Specification for Mortar for Unit Masonry 2019.
- B. ASTM C568/C568M - Standard Specification for Limestone Dimension Stone 2022.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate layout, pertinent dimensions, anchorages, head, jamb, and sill opening details, and jointing methods.
- C. Samples: Submit two stone samples 6-inch in size, illustrating color range and texture, markings, surface finish.

1.5 FIELD CONDITIONS

- A. During temporary storage on site, at the end of working day, and during rainy weather, cover stone work exposed to weather with non-staining waterproof coverings, securely anchored.

PART 2 PRODUCTS

2.1 STONE

- A. Limestone: Indiana Oolitic Limestone; complying with ASTM C568/C568M Classification II - Medium Density.
 - 1. Grade: ILI Standard.
 - 2. Color: Grey.

3. Surface Texture: Smooth.
4. Acceptable Producers:
 - a. Indiana Limestone Company: www.indianalimestonecompany.com/#sle.
 - b. Kasota Stone Fabricators, Inc: www.kasotasf.com/#sle.
 - c. Mezger Enterprises Ltd: www.mezger.com/#sle.
 - d. Vetter Stone Co: www.vetterstone.com/#sle.
 - e. Lannon Stone Products, Inc.
 - f. Footville Rock & Lime corporation.
 - g. Rockdale Quarry.Bjoin Limestone.

2.2 MORTAR

- A. Mortar: ASTM C270, Type N, Proportion specification, using Portland cement of white color.
- B. Mortar: As specified in Section 04 05 11.

2.3 ANCHORS AND ACCESSORIES

- A. Anchors and Other Components in Contact with Stone: Stainless steel, ASTM A666 Type 304.
 1. Sizes and configurations: As required for vertical and horizontal support of stone and applicable loads.
 2. Wire ties are not permitted.
- B. Setting Buttons and Shims: Plastic type.
- C. Back Coating: Cementitious parging of mortar to a minimum thickness of 1/8 inch.
- D. Cleaning Solution: Type that will not harm stone, joint materials, or adjacent surfaces.

2.4 STONE FABRICATION

- A. Thickness and width: As shown on the drawings.
- B. Fabricate units for uniform coloration between adjacent units and over the full area of the installation.
- C. Where corner detail is not indicated, form external corners to quirk joint profile.
- D. Slope exposed top surfaces of stone and horizontal sill surfaces for natural wash.

- E. Cut drip slot in bottom surface of work projecting more than 1/2 inch over wall openings. Size slot not less than 3/8 inch wide and 1/4 inch deep; full width of projection.

PART 3 EXECUTION

3.1 PREPARATION

- A. Clean stone prior to erection. Do not use wire brushes or implements that will mark or damage exposed surfaces.
- B. Coat back surfaces with back coating. Allow coating to cure.

3.2 INSTALLATION

- A. Set stone with a consistent joint width of 3/8 inch.
- B. Install anchors and place setting buttons to support stone and to establish joint dimensions.
- C. Joints in Exterior Work: Seal joints with joint sealant over backer rod, following sealant manufacturer's instructions; tool sealant surface to concave profile.

3.3 TOLERANCES

- A. Positioning of Elements: Maximum 1/4 inch from true position.
- B. Maximum Variation Between Face Plane of Adjacent Panels: 1/16 inch.
- C. Maximum Variation from Level Coursing: 1/8 inch in 3 feet; 1/4 inch in 10 feet; 1/2 inch maximum.
- D. Maximum Variation of Joint Thickness: 1/8 inch in 3 feet.

3.4 CUTTING AND FITTING

- A. Obtain approval prior to cutting or fitting any item not so indicated on drawings.
- B. Do not impair appearance or strength of stone work by cutting.

3.5 CLEANING

- A. Remove excess joint material upon completion of work.
- B. Clean soiled surfaces with cleaning solution.
- C. Use non-metallic tools in cleaning operations.

END OF SECTION

DIVISION 05 – METALS

SECTION 05 52 13.00

PIPE AND TUBE RAILINGS

SECTION 05 52 13

PIPE AND TUBE RAILINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Free-standing railings.

1.2 RELATED REQUIREMENTS

- A. Section 09 91 13 - Exterior Painting: Paint finish.

1.3 REFERENCE STANDARDS

- A. ADA Standards - 2010 ADA Standards for Accessible Design 2010.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless 2022.
- C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- D. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes 2021a.
- E. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing 2021.
- F. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings 2021.
- G. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination 2020.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
 - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

1.5 QUALITY ASSURANCE

- A. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.

B. Fabricator Qualifications:

1. A company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.

PART 2 PRODUCTS

2.1 RAILINGS - GENERAL REQUIREMENTS

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
- B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935
- C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935
- D. Allow for expansion and contraction of members and building movement without damage to connections or members.
- E. Dimensions: See drawings for configurations and heights.
- F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
- G. Provide mechanical and welding fittings where indicated to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

2.2 STEEL RAILING SYSTEM

- A. Steel Tube: ASTM A500/A500M Grade B cold-formed structural tubing.
- B. Steel Pipe: ASTM A53/A53M Grade B Schedule 80, black finish.
- C. Non-Weld Mechanical Fittings: Slip-on, galvanized malleable iron castings, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.
- D. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- E. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.
- F. Galvanizing: In accordance with requirements of ASTM A123/A123M.

2.3 FABRICATION

- A. Accurately form components to suit specific project conditions and for proper connection to building structure.
- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- D. Welded Joints:
 - 1. Exterior Components: Continuously seal joined pieces by continuous welds . Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
 - 2. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

PART 3 EXECUTION

3.1 PREPARATION

- A. Supply items required to be cast into concrete with setting templates, for installation as work of other sections.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Install railings in compliance with ADA Standards for accessible design at applicable locations.
- D. Anchor railings securely to structure.
- E. Conceal anchor bolts and screws whenever possible.

3.3 TOLERANCES

- A. Maximum Variation from Plumb: 1/4 inch per floor level, non-cumulative.
- B. Maximum Offset from True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

3.4 SCHEDULE

- A. Exterior railing: Hot dipped galvanized. Fabricate to allow all sections to be removed and reinstalled without damage or bending.

END OF SECTION

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

SECTION 06 10 00.00	ROUGH CARPENTRY
SECTION 06 17 53.00	SHOP-FABRICATED WOOD TRUSSES
SECTION 06 18 00.00	GLUED-LAMINATED CONSTRUCTION
SECTION 06 41 00.00	ARCHITECTURAL WOOD CASEWORK
SECTION 06 64 00.00	PLASTIC PANELING

SECTION 06 10 00

ROUGH CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sheathing.

1.2 REFERENCE STANDARDS

- A. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings 2018, with Errata (2019).
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- C. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing 2017.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- E. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. ICC (IECC) - International Energy Conservation Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. PS 1 - Structural Plywood 2009 (Revised 2019).
- H. PS 2 - Performance Standard for Wood-Based Structural-Use Panels 2010.
- I. PS 20 - American Softwood Lumber Standard 2015.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

PART 2 PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
 - 1. Species: Spruce-Pine-Fir (South), unless otherwise indicated.

2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.2 DIMENSION LUMBER FOR CONCEALED APPLICATIONS

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
 1. Lumber: S4S, No. 2 or Standard Grade.
 2. Boards: Standard or No. 3.

2.3 CONSTRUCTION PANELS

- A. Roof Sheathing: APA rated sheathing structural wood panel, PS 1-83, G-2, Exposure 1, C-D grade.
 1. Sheathing Panel:
 - a. Grade: Sheathing.
 - b. Size: 4 feet wide by 8 feet long.
 - c. Span Rating: 24/16.
 - d. Edge Profile: Square edge.
- B. Wall Sheathing: Plywood, PS 1, Grade C-D, Exposure I.
- C. Wall Sheathing: Glass mat faced gypsum, ASTM C1177/C1177M, 5/8 inch Type X fire resistant.
 1. Edges: Square.
 2. Manufacturers:
 - a. CertainTeed Corporation; GlasRoc Brand: www.certainteed.com/#sle.
 - b. Georgia-Pacific Gypsum; DensGlass Sheathing: www.gpgypsum.com.

- D. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.
- E. Other Applications:
 - 1. Plywood Concealed from View but Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
 - 2. Plywood Exposed to View but Not Exposed to Weather: PS 1, A-D, or better.
 - 3. Other Locations: PS 1, C-D Plugged or better.

2.4 ACCESSORIES

- A. Fasteners and Anchors:
 - 1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
 - 2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
 - 3. Anchors: Toggle bolt type for anchorage to hollow masonry.
- B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
 - 1. For contact with preservative treated wood in exposed locations, provide minimum G185 galvanizing complying with ASTM A653/A653M.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including shims, bracing, and blocking.

3.2 FRAMING INSTALLATION

- A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
- B. Make provisions for temporary construction loads and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
- C. Install structural members full length without splices unless otherwise specifically detailed.

- D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.
- E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.
- F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.3 BLOCKING, NAILERS, AND SUPPORTS

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- D. Provide the following specific non-structural framing and blocking:
 - 1. Cabinets and shelf supports.
 - 2. Wall brackets.
 - 3. Handrails.
 - 4. Grab bars.
 - 5. Towel and bath accessories.
 - 6. Wall-mounted door stops.

3.4 INSTALLATION OF CONSTRUCTION PANELS

- A. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
 - 1. At long edges use sheathing clips where joints occur between roof framing members.
 - 2. Nail panels to framing; staples are not permitted.
- B. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails or screws.

- C. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.

3.5 TOLERANCES

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

END OF SECTION

SECTION 06 17 53

SHOP-FABRICATED WOOD TRUSSES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Shop fabricated wood trusses for roof framing.
- B. Bridging, bracing, and anchorage.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Material requirements for blocking, bridging, plates, and miscellaneous framing.

1.3 REFERENCE STANDARDS

- A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2022.
- B. SPIB (GR) - Grading Rules 2014.
- C. TPI 1 - National Design Standard for Metal-Plate-Connected Wood Truss Construction 2014.
- D. TPI BCSI 1 - Building Component Safety Information Booklet: The Guide to Good Practice for Handling, Installing & Bracing of Metal Plate Connected Wood Trusses 2018.
- E. TPI DSB-89 - Recommended Design Specification for Temporary Bracing of Metal Plate Connected Wood Trusses 1989.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Show truss configurations, sizes, spacing, size and type of plate connectors, cambers, framed openings, bearing and anchor details, and bridging and bracing.
 - 1. Include identification of engineering software used for design.
 - 2. Provide shop drawings stamped or sealed by design engineer.

1.5 QUALITY ASSURANCE

- A. Designer Qualifications: Perform design by or under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

- B. Fabricator Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle and erect trusses in accordance with TPI BCSI 1.
- B. Store trusses in vertical position resting on bearing ends.

PART 2 PRODUCTS

2.1 TRUSSES

- A. Wood Trusses: Designed and fabricated in accordance with TPI 1 and TPI DSB-89 to achieve structural requirements indicated.
 - 1. Connectors: Steel plate.
 - 2. Structural Design: Comply with applicable code for structural loading criteria.
 - 3. Design to live and dead loads as shown on the structural drawings.
 - 4. Roof Deflection: 1/240, maximum.

2.2 MATERIALS

- A. Lumber:
 - 1. Moisture Content: Between 7 and 9 percent.
- B. Steel Connectors: Hot-dipped galvanized steel sheet, ASTM A653/A653M Structural Steel (SS) Grade 33/230, with G90/Z275 coating; die stamped with integral teeth; thickness as indicated.
- C. Truss Bridging: Type, size and spacing recommended by truss manufacturer.

2.3 ACCESSORIES

- A. Wood Blocking, Bridging, Plates, and Miscellaneous Framing: Softwood lumber, any species, construction grade, 19 percent maximum and 7 percent minimum moisture content.
- B. Fasteners: Electrogalvanized steel, type to suit application.

PART 3 EXECUTION

3.1 ERECTION

- A. Install trusses in accordance with manufacturer's instructions and TPI DSB-89 and TPI BCSI 1.

- B. Set members level and plumb, in correct position.
- C. Make provisions for erection loads, and for sufficient temporary bracing to maintain structure plumb, and in true alignment until completion of erection and installation of permanent bracing.
- D. Do not field cut or alter structural members without approval of Architect.
- E. Install permanent bridging and bracing.

END OF SECTION

SECTION 06 18 00

GLUED-LAMINATED CONSTRUCTION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Glue laminated wood beams and purlins.
- B. Steel hardware and attachment brackets.

1.2 RELATED REQUIREMENTS

- A. Section 09 93 00 - Staining and Transparent Finishing: Field finishing.

1.3 REFERENCE STANDARDS

- A. AITC 117 - Standard Specifications for Structural Glued Laminated Timber of Softwood Species 2010.
- B. AITC A190.1 - American National Standard for Wood Products - Structural Glued Laminated Timber 2007.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel 2019.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products 2017.
- E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware 2016a.
- F. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts 2021a.
- G. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric) 2021a.
- H. ASTM D2559 - Standard Specification for Adhesives for Bonded Structural Wood Products for Use Under Exterior Exposure Conditions 2012a (Reapproved 2018).
- I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- J. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength 2022.
- K. AWS D1.1/D1.1M - Structural Welding Code - Steel 2020, with Errata (2022).
- L. RIS (GR) - Standard Specifications for Grades of California Redwood Lumber 2000.

M. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17 2015.

N. WWPA G-5 - Western Lumber Grading Rules 2017.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide technical data on wood preservative materials, application technique and resultant performance information.

C. Shop Drawings: Indicate framing system, sizes and spacing of members, loads and cambers, bearing and anchor details, bridging and bracing, framed openings.

1. Submit design calculations signed and sealed by design engineer.

1.5 QUALITY ASSURANCE

A. Designer Qualifications: Design structural members under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.

B. Manufacturer/Fabricator Qualifications: Company specializing in manufacture of glue laminated structural units with three years of documented experience and certified by AITC in accordance with AITC A190.1.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect members to AITC requirements for not wrapped.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Glued-Laminated Structural Units:

1. Sentinel Structures, Inc: www.sentinelstructures.com/#sle.

2. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 GLUED-LAMINATED UNITS

A. Glued-Laminated Units: Fabricate in accordance with AITC 117 Industrial grade.

1. Verify dimensions and site conditions prior to fabrication.

2. Cut and fit members accurately to length to achieve tight joint fit.

3. Fabricate member with camber built in.

4. Do not splice or join members in locations other than those indicated without permission.
 5. Fabricate steel hardware and connections with joints neatly fitted, welded, and ground smooth.
 6. Welding: Perform welding in accordance with AWS D1.1/D1.1M.
 7. After end trimming, seal with penetrating sealer in accordance with AITC requirements.
- B. Performance Criteria:
1. Comply with applicable code for loads, seismic zoning, and other load criteria.

2.3 MATERIALS

- A. Lumber: Softwood lumber complying with RIS (GR) grading rules with 12 percent maximum moisture content before fabrication. Design for the following values:
1. Design to meet the loads shown on the structural drawings.
- B. Steel Connections and Brackets: ASTM A36/A36M weldable quality, galvanize per ASTM A123/A123M.
- C. Anchor Bolts: ASTM F3125/F3125M, Type 1 heavy hex high strength bolts and ASTM A563 (ASTM A563M) nuts; hot-dip galvanized to meet requirements of ASTM A153/A153M, matching washers.
- D. Laminating Adhesive: Tested for wet/exterior service in accordance with ASTM D2559.

2.4 FABRICATION

- A. Fabricate glue laminated structural members in accordance with AITC Architectural grade.
- B. Verify dimensions and site conditions prior to fabrication.
- C. Cut and fit members accurately to length to achieve tight joint fit.
- D. Fabricate member with camber built in.
- E. Do not splice or join members in locations other than those indicated without permission.
- F. Fabricate steel hardware and connections with joints neatly fitted, welded, and ground smooth.
- G. Field Finishing of Members: Specified in Section 09 93 00.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that supports are ready to receive units.
- B. Verify sufficient end bearing area.

3.2 ERECTION

- A. Lift members using protective straps to prevent visible damage.
- B. Set structural members level and plumb, in correct positions or sloped where indicated.
- C. Provide temporary bracing and anchorage to hold members in place until permanently secured.
- D. Fit members together accurately without trimming, cutting, splicing, or other unauthorized modification.
- E. Field Finishing: Specified in Section 09 91 23 and 09 93 00.

3.3 TOLERANCES

- A. Framing Members: 1/2 inch maximum from true position.

END OF SECTION

SECTION 06 41 00

ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Specially fabricated cabinet units.
- B. Hardware.
- C. Preparation for installing utilities.

1.2 RELATED REQUIREMENTS

- A. Section 12 36 00 - Countertops.

1.3 REFERENCE STANDARDS

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards 2021, with Errata.
- C. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood 2020.
- D. NEMA LD 3 - High-Pressure Decorative Laminates 2005.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
 - 1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
 - 2. Provide the information required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
- C. Product Data: Provide data for hardware accessories.
- D. Samples: Submit actual samples of architectural cabinet finish material, minimum 12 inches square, illustrating proposed cabinet material and finish.

1.5 QUALITY ASSURANCE

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Protect units from moisture damage.

1.7 FIELD CONDITIONS

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

PART 2 PRODUCTS

2.1 CABINETS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Plastic Laminate Faced Cabinets: Custom grade.
- C. Cabinets:
 - 1. Finish - Exposed Exterior Surfaces: Decorative laminate.
 - 2. Finish - Exposed Interior Surfaces: Decorative laminate.
 - 3. Finish - Semi-Exposed Surfaces: Solid phenolic
 - 4. Finish - Concealed Surfaces: Manufacturer's option.
 - 5. Door and Drawer Front Edge Profiles: Square edge with thin applied band.
 - 6. Adjustable Shelf Loading: 50 lbs. per sq. ft.
 - 7. Shelf thickness: Less than 32 inches: 3/4" thick.
 - 8. Shelf thickness: 32 inch wide to 36 inch wide: 1" thick.
 - 9. Shelf thickness; Over 36 inch wide: 1" thick if Laminate on both surfaces.
 - 10. Cabinet Style: Reveal overlay on face frame.
 - 11. Cabinet Doors and Drawer Fronts: Flush style.
 - 12. Drawer Construction Technique: Dovetail joints.

2.2 LAMINATE MATERIALS

- A. Manufacturers:
 - 1. Formica Corporation: www.formica.com/#sle.
 - 2. Panolam Industries International, Inc: www.panolam.com/#sle.

3. Wilsonart LLC: www.wilsonart.com/#sle.
- B. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.
- C. Provide specific types as indicated.
 1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color, colors as indicated.
 2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color, colors as indicated.
 3. Post-Formed Horizontal Surfaces: HGP, 0.039 inch nominal thickness, through color, colors as indicated.

2.3 COUNTERTOPS

- A. Countertops are specified in Section 12 36 00.

2.4 HARDWARE

- A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- B. Adjustable Shelf Supports: Standard side-mounted system using recessed metal shelf standards or multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch spacing adjustments.
- C. Drawer and Door Pulls: "U" shaped wire pull, steel with chrome finish, 5 inch centers.
 1. Product: MC 400 manufactured by Engineered Products Co..
- D. Catches: Magnetic.
 1. Product: 918 Alum. manufactured by Knape & Vogt.
- E. Drawer Slides:
 1. Type: Full extension.
 2. Static Load Capacity: Commercial grade.
 3. Mounting: Side mounted.
 4. Stops: Integral type.
 5. Features: Provide self closing/stay closed type.
 6. Manufacturers:

- a. Accuride International, Inc; 3634 EC: www accuride.com/#sle.
 - b. Grass America Inc: www.grassusa.com/#sle.
 - c. Hettich America, LP: www.hettich.com/#sle.
 - d. Knappe & Vogt Manufacturing Company: www.knappeandvogt.com/#sle.
- F. Hinges: European style concealed self-closing type, steel with polished finish.
 - 1. Manufacturers:
 - a. Grass America Inc; TEC Self-Close: www.grassusa.com/#sle.
 - b. Hettich America, LP: www.hettich.com/#sle.

2.5 FABRICATION

- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Locate counter butt joints minimum 2 feet from sink cut-outs.
 - 1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
 - 2. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- E. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

- A. Install work in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade indicated.
- B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- C. Use fixture attachments in concealed locations for wall mounted components.
- D. Use concealed joint fasteners to align and secure adjoining cabinet units.
- E. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- F. Secure cabinets to floor using appropriate angles and anchorages.

3.3 ADJUSTING

- A. Adjust installed work.
- B. Adjust moving or operating parts to function smoothly and correctly.

END OF SECTION

SECTION 06 64 00

PLASTIC PANELING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Plastic ceiling panel assemblies.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 53 - Miscellaneous Rough Carpentry.

1.3 REFERENCE STANDARDS

- A. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- C. ASTM F1941/F1941M - Standard Specification for Electrodeposited Coatings on Mechanical Fasteners, Inch and Metric 2016.
- D. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi 2015, with Editorial Revision (2021).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: For each panel and trim type.
- C. Samples: For each ceiling panel type, two samples, 6 inches by 6 inches in size, indicating specified color and texture.
- D. Manufacturer's Instructions: For each panel type and associated trim, provide installation instructions.
- E. Specimen warranty.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project:
 - 1. See Section 01 60 00 - Product Requirements for additional provisions.
 - 2. Extra Stock Materials: Two of each type of liner panel.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in manufacturer's original, unopened packaging, with labels clearly identifying product name and manufacturer.

- B. Store products in clean, dry, interior areas in accordance with manufacturer's instructions.
- C. Store plastic panels and trim flat.

1.6 FIELD CONDITIONS

- A. Ambient Field-Cutting Conditions: Before field-cutting panels in temperatures below 40 degrees F, warm space to 60 degrees F minimum. Maintain temperature for 24 hours before, during, and after field-cutting.
- B. Ambient Conditions for Installation: When ambient temperatures are below 40 degrees F, warm space to 60 degrees F minimum. Maintain temperature for 24 hours before, during, and after installation.
- C. Ambient Conditions for Installation: When ambient temperatures are above 70 degrees F, cool space to 60 degrees F. Maintain temperature for 24 hours before, during, and after installation.

1.7 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Manufacturer Warranty: Provide 10-year manufacturer warranty for products free from manufacturing defects. Complete forms in Owner's name and register with manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Plastic Paneling:
 - 1. Extrutech Plastics, Inc: www.epiplastics.com/#sle.
 - 2. Palram Americas Ltd: www.palram.com/#sle.
 - 3. Trusscore: www.trusscore.com/#sle.

2.2 PLASTIC PANELING

- A. Material: 100 percent virgin PVC (polyvinyl chloride), exterior grade.
- B. Surface Burning Requirements, Interior Use: Flame spread index of 25 or less and smoke-development index of 450 or less; Class A classification when tested in accordance with ASTM E84.
- C. Fungi Resistance: No visible growth, when tested in accordance with ASTM G21.

2.3 PLASTIC LINER PANEL ASSEMBLIES

- A. Description: Double-wall, hollow, rib-reinforced plastic liner panels; with nailing fins for hidden fastener attachment to furring members; interlocking panels.

1. Applications: Ceilings.
2. Panel Material: Extruded PVC.
3. Panel Width, Ceiling Assemblies: 16 inches.
4. Panel Thickness: 1/2 inch.
5. Panel Color: White.
6. Trim: Extruded PVC, same color as liner panels, sized to fit liner panel thickness; types:
 - a. J-shape perimeter wall trim.

B. Products:

1. Extrutech Plastics, Inc; P1300: www.epioplastics.com/#sle.
2. Palram Americas Ltd; jDuraclad: www.palram.com/#sle.
3. Trusscore; Wall and Ceiling Board: www.trusscore.com/#sle.

2.4 ACCESSORIES

- A. Threaded Fasteners: Type and size as recommended by paneling manufacturer for substrate, application, and corrosion risk.
 1. Low Corrosion Risk: Carbon steel with electrodeposited zinc coatings ASTM F1941/F1941M Coating Designation Fe/Zn 5.
- B. Joint Sealants: Clear silicone; ASTM C920, Type S, Grade NS, Class 50, Uses NT and G.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify field measurements are as indicated on shop drawings.
- B. Verify substrates are prepared to receive plastic paneling.
- C. If substrate preparation is responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. Verify mechanical, electrical, and other building components affecting work of this section are placed and ready to receive work of this section.

3.2 INSTALLATION - GENERAL

- A. Maintain manufacturer recommended gap tolerances between panels and adjacent abutments.
- B. Field-cut panels in accordance with manufacturer's written instructions. Make straight and square cuts; do not damage panels.

3.3 INSTALLATION - PLASTIC CEILING LINER PANELS

- A. See Section 06 17 53 for installation of wood support framing for paneling attachment.
- B. Ceiling Panel Installation: Install panels level within specified tolerances.
- C. Install threaded fasteners into nailing fins with gaps between fasteners and nailing fins and without overtightening in accordance with manufacturer recommendations.
- D. Apply sealant between panels and trim in accordance with panel manufacturer's written instructions.

3.4 TOLERANCES

- A. Maximum Variation from True Position: 1/4 inch.
- B. Maximum Variation from Level: 1/4 inch in 10 feet.

3.5 CLEANING

- A. Clean exposed surfaces of panels and trim in accordance with manufacturer's instructions.

END OF SECTION

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

SECTION 07 21 00.00	THERMAL INSULATION
SECTION 07 21 19.00	FOAMED-IN-PLACE INSULATION
SECTION 07 25 00.00	WEATHER BARRIERS
SECTION 07 41 13.00	METAL ROOF PANELS
SECTION 07 42 94.00	LINEAR METAL SOFFITS
SECTION 07 46 17.00	LINEAR METAL CLADDING
SECTION 07 53 00.00	ELASTOMERIC MEMBRANE ROOFING
SECTION 07 62 00.00	SHEET METAL FLASHING AND TRIM
SECTION 07 92 00.00	JOINT SEALANTS

SECTION 07 21 00

THERMAL INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Board insulation at perimeter foundation wall, under slabs on grade, in masonry cavity wall, over roof deck and exterior wall behind a metal wall finish.
- B. Batt insulation in exterior ceiling construction.

1.2 RELATED REQUIREMENTS

1.3 REFERENCE STANDARDS

- A. ASTM D1621 - COMPRESSIVE STRENGTH.
- B. ASTM C272 - WATER ABSORPTION.
- C. ASTM D2126- STANDARD TEST METHOD FOR RESPONSE OF RIGID CELLULAR PLASTICS TO THERMAL AND HUMID AGING.
- D. ASTM D2842 - STANDARD TEST METHOD FOR WATER ABSORPTION OF RIGID CELLULAR PLASTICS.
- E. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2017.
- F. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation 2019.
- G. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing 2017.
- H. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2021.
- I. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- J. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.
- K. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750°C 2019a.
- L. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components 2019.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

PART 2 PRODUCTS

2.1 APPLICATIONS

- A. Insulation Under Concrete Slabs: Extruded polystyrene (XPS) board.
- B. Insulation at Perimeter of Foundation: Extruded polystyrene (XPS) board.
- C. Insulation Inside Masonry Cavity Walls: Extruded polystyrene (XPS) board.
- D. Insulation on Outside of Masonry Exterior Walls: Extruded polystyrene (XPS) board.
- E. Insulation in Wood Framed Ceiling Structure: Batt insulation with separate vapor retarder.
- F. Insulation Over Roof Deck: Polyisocyanurate board.

2.2 FOAM BOARD INSULATION MATERIALS

- A. Extruded Polystyrene (XPS) Board Insulation: Complies with ASTM C578 with either natural skin or cut cell surfaces.
 - 1. Type and Compressive Resistance: Type IV, 25 psi (173 kPa), minimum.
 - 2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 - 3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 - 4. Type and Thermal Resistance, R-value: Type IV, 5.0 (0.88) per 1 inch thickness at 75 degrees F mean temperature.
 - 5. Board Edges: Square.
 - 6. Type and Water Absorption: Type IV, 0.3 percent by volume, maximum, by total immersion.
 - 7. Products:
 - a. Dow Chemical Company: www.dowbuildingsolutions.com/#sle.
 - b. Kingspan Insulation LLC: www.kingspan.com/#sle.

- c. Owens Corning Corporation: www.ocbuildingspec.com/#sle.
- B. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
 - 1. Classifications:
 - a. Type I: Faced with aluminum foil on both major surfaces of the core foam.
 - 1) Class 2 - Glass fiber reinforced or non-reinforced core foam.
 - 2) Compressive Strength: 16 psi, minimum.
 - 3) Thermal Resistance, R-value: At 1-1/2 inch thick; 9.0, minimum, at 75 degrees F.
 - 2. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
 - 3. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
 - 4. Water Vapor Permeance: 0.3 perm, maximum, at 1 inch thickness, and when tested in accordance with ASTM E96/E96M, desiccant method.
 - 5. Complies with fire resistance requirements indicated on drawings as part of an exterior non-load-bearing exterior wall assembly when tested in accordance with NFPA 285.
 - 6. Board Size: 48 inch by 96 inch.
 - 7. Board Thickness: As shown on the drawings.
 - 8. Board Edges: Square.
 - 9. Products:
 - a. Atlas Roofing Corporation; EnergyShield CGF PRO: www.atlasroofing.com.
 - b. Dow Chemical Company; THERMAX Sheathing: www.dowbuildingsolutions.com.

2.3 BATT INSULATION MATERIALS

- A. Where batt insulation is indicated, either glass fiber or mineral fiber batt insulation may be used, at Contractor's option.
- B. Glass Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C665; friction fit.

1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
 2. Smoke Developed Index: 50 or less, when tested in accordance with ASTM E84.
 3. Combustibility: Non-combustible, when tested in accordance with ASTM E136.
 4. Formaldehyde Content: Zero.
 5. Thermal Resistance: R-value as shown on the drawings.
 6. Thickness: As shown on drawings.
 7. Products:
 - a. CertainTeed Corporation; Smartbatt: www.certainteed.com/#sle.
 - b. Johns Manville; Formaldehyde free: www.jm.com/#sle.
 - c. Owens Corning Corporation; EcoTouch PINK FIBERGLAS Insulation: www.ocbuildingspec.com/#sle.
- C. Mineral Fiber Batt Insulation: Flexible or semi-rigid preformed batt or blanket, complying with ASTM C665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
 2. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
 3. Thickness: As shown on drawings.
 4. Products:
 - a. Johns Manville; MinWool Sound Attenuation Fire Batts: www.jm.com/#sle.
 - b. Knauf Insulation; EcoBatt Insulation: www.knaufinsulation.com/#sle.
 - c. ROCKWOOL (ROXUL, Inc); AFB: www.rockwool.com/#sle.
 - d. Thermafiber, Inc; SAFB: www.thermafiber.com/#sle.

2.4 ACCESSORIES

- A. Sheet Vapor Retarder: clear polyethylene film for above grade application, 6 mil, 0.006 inch thick.
- B. Protection Board for Above Grade Insulation: Fiberglass reinforce plastic.
 1. Products: NUDO Ground breaker, 0.060 inch thick manufactured by Verzatec company.

- C. Adhesive: Type recommended by insulation manufacturer for application.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.
- B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

3.2 BOARD INSTALLATION AT FOUNDATION PERIMETER

- A. Apply adhesive to back of boards:
 - 1. Three continuous beads per board length.
- B. Install boards horizontally on foundation perimeter.
 - 1. Place boards to maximize adhesive contact.
 - 2. Butt edges and ends tightly to adjacent boards and to protrusions.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- D. Immediately following application of board insulation, place protective boards over exposed insulation surfaces.
 - 1. Apply adhesive in five continuous beads per board length.
 - 2. Install boards horizontally from base of foundation to top of insulation.
 - 3. Butt boards tightly, with joints staggered from insulation joints.

3.3 BOARD INSTALLATION AT EXTERIOR WALLS

- A. Install rigid insulation directly to masonry with manufacturer recommended mechanical fasteners.
- B. Install boards horizontally on walls.
 - 1. Place boards to maximize adhesive contact.
 - 2. Install in running bond pattern.
 - 3. Butt edges and ends tightly to adjacent boards and protrusions.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.4 BOARD INSTALLATION AT CAVITY WALLS

- A. Install boards to fit snugly between wall ties.
- B. Install boards horizontally on walls.
 - 1. Butt edges and ends tightly to adjacent boards and protrusions.
- C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.5 BOARD INSTALLATION UNDER CONCRETE SLABS

- A. Place insulation under slabs on grade after base for slab has been compacted.
- B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
- C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.6 BOARD INSTALLATION OVER LOW SLOPE ROOF DECK

- A. Board Installation Over Roof Deck, General:
 - 1. See applicable roofing specification section for specific board installation requirements.
 - 2. Fasten insulation to deck in accordance with roofing manufacturer's written instructions and applicable Factory Mutual requirements.
 - 3. Do not apply more insulation than can be covered with roofing on the same day.

3.7 BATT INSTALLATION

- A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
- B. Install in exterior roof spaces without gaps or voids. Do not compress insulation.
- C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
- D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
- E. At wood framing, place vapor retarder on warm side of insulation by stapling at 6 inches on center. Lap and seal sheet retarder joints over face of member.
- F. Tape seal tears or cuts in vapor retarder.
- G. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane; tape seal in place.

3.8 PROTECTION

- A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION

SECTION 07 21 19

FOAMED-IN-PLACE INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Foamed-in-place insulation.
 - 1. In masonry cores.

1.2 REFERENCE STANDARDS

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2017.
- B. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics 2019.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.
- E. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2004 (Reapproved 2012).
- F. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials 2021a.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, insulation properties, and preparation requirements.

1.4 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing work of the type specified, with minimum three years documented experience.

1.5 FIELD CONDITIONS

- A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Masonry Core fill insulation.
 - 1. Tailored Chemical Products, Inc: Core-Fill 500
 - 2. Thermal Corporation of Americal: Thermco Foam.
 - 3. NBCFI Polyurethanes; Insul Bloc

2.2 MATERIALS

- A. Foamed-In-Place Insulation: Medium-density, rigid or semi-rigid, open or closed cell polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
 - 1. Thermal Resistance: R-value of 5.0, minimum, per 1 inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.
 - 2. Water Vapor Permeance: Vapor retarder; 2 perms, maximum, when tested at intended thickness in accordance with ASTM E96/E96M, desiccant method.
 - 3. Water Absorption: Less than 2 percent by volume, maximum, when tested in accordance with ASTM D2842.
 - 4. Air Permeance: 0.04 cfm/sq ft, maximum, when tested at intended thickness in accordance with ASTM E2178 or ASTM E283 at 1.57 psf.
 - 5. Closed Cell Content: At least 90 percent.
 - 6. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify work within construction spaces or crevices is complete prior to insulation application.
- B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation adhesion.

3.2 APPLICATION

- A. Apply insulation in accordance with manufacturer's instructions.
- B. Apply insulation injection method, to a uniform monolithic density without voids.

3.3 PROTECTION

- A. Do not permit subsequent construction work to disturb applied insulation.

END OF SECTION

SECTION 07 25 00

WEATHER BARRIERS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Vapor Retarders: Materials to make exterior walls, joints between exterior walls and roof, joints around frames of openings in exterior walls and openings water vapor resistant and air tight.
- B. Air Barriers: Materials that form a system to stop passage of air through exterior walls and joints around frames of openings in exterior walls.

1.2 DEFINITIONS

- A. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.
- B. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
 - 1. Water Vapor Permeance: For purposes of conversion, $57.2 \text{ ng}/(\text{Pa s sq m}) = 1 \text{ perm.}$

1.3 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- B. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.
- C. ASTM E2178 - Standard Test Method for Determining Air Leakage Rate and Calculation of Air Permeance of Building Materials 2021a.
- D. ICC-ES AC212 - Acceptance Criteria for Water-Resistive Coatings Used as Water-Resistive Barriers over Exterior Sheathing 2015.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on material characteristics.

1.5 FIELD CONDITIONS

- A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

PART 2 PRODUCTS

2.1 WEATHER BARRIER ASSEMBLIES

- A. Exterior Air Vapor Retarder:
 - 1. On outside surface of inside wythe of masonry cavity wall use vapor retarder coating.
 - 2. On outside surface of sheathing use vapor retarder coating.

2.2 VAPOR RETARDER MATERIALS (AIR BARRIER AND WATER-RESISTIVE)

- A. Vapor Retarder Coating: Liquid applied, resilient, UV-resistant coating and associated joint treatment.
 - 1. Dry Film Thickness (DFT): 40 mils, 0.040 inch, minimum.
 - 2. Water Vapor Permeance: 1.0 perm, maximum, when tested in accordance with ASTM E96/E96M.
 - 3. Code Acceptance: Comply with applicable requirements of ICC-ES AC212.
 - 4. Suitable for use on concrete, masonry, plywood and gypsum sheathing.
 - 5. Joint Preparation Treatment: Coating manufacturer's recommended method, either tape or reinforcing mesh saturated with coating material.
 - 6. Manufacturers:
 - a. BASF Corporation; MasterSeal AWB 660 I: www.master-builders-solutions.basf.us/#sle.
 - b. Carlisle Coatings and Waterproofing, Inc; Barriseal-R: www.carlisleccw.com/#sle.
 - c. Henry Company; Air-Bloc 16MR: www.henry.com/#sle.
 - d. Hohmann & Barnard, Inc; ENVIRO-BARRIER: www.h-b.com/#sle.
 - e. PROSOCO, Inc; R-GUARD VB: www.prosoco.com/r-guard/#sle.
 - f. W.R. Meadows, Inc; Air-Shield LSR: www.wrmeadows.com/#sle.
 - 7. Joint Filler: As recommended by coating manufacturer and suitable to the substrate.

2.3 ACCESSORIES

- A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.
- B. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.
 - 1. Composition: Any material that meets physical requirements of ASTM D1970/D1970M with exceptions indicated.
 - 2. Thickness: 20 mil, 0.020 inch, nominal; exception from ASTM D1970/D1970M.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and conditions are ready to accept the work of this section.

3.2 PREPARATION

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.
- B. Clean and prime substrate surfaces to receive adhesives in accordance with manufacturer's instructions.

3.3 INSTALLATION

- A. Install materials in accordance with manufacturer's instructions.
- B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Coatings:
 - 1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
 - 2. Where exterior masonry veneer is to be installed, install masonry anchors before installing weather barrier over masonry; seal around anchors air tight.
 - 3. Use flashing to seal to adjacent construction and to bridge joints.
- D. Openings and Penetrations in Exterior Weather Barriers:
 - 1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.

2. At openings to be filled with non-flanged frames, seal weather barrier to each side of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
3. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
4. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

3.4 PROTECTION

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION

SECTION 07 41 13

METAL ROOF PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Architectural roofing system of preformed steel panels.

1.2 RELATED REQUIREMENTS

- A. Section 06 10 00 - Rough Carpentry: Roof sheathing.
- B. Section 07 21 00 - Thermal Insulation: Rigid roof insulation.
- C. Section 07 60 00-Sheet metal flashing and trim.
- D. Section 07 92 00 - Joint Sealants: Sealing joints between metal roof panel system and adjacent construction.

1.3 REFERENCE STANDARDS

- A. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2022.
- C. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process 2022.
- D. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection 2020.
- E. ASTM E108 - Standard Test Methods for Fire Tests of Roof Coverings 2020a.
- F. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference 2005 (Reapproved 2017).
- G. ASTM E1680 - Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems 2016 (Reapproved 2022).
- H. ICC-ES AC207 - Acceptance Criteria for Polypropylene Roof Underlayments 2012, with Editorial Revision (2015).
- I. UL 580 - Standard for Tests for Uplift Resistance of Roof Assemblies Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Installation methods.
 - 2. Specimen warranty.
- C. Shop Drawings: Include layouts of roof panels, details of edge and penetration conditions, spacing and type of connections, flashings, underlayments, and special conditions.
 - 1. Show work to be field-fabricated or field-assembled.
- D. Verification Samples: For each roofing system specified, submit samples of minimum size 12 inches square, representing actual roofing metal, thickness, profile, color, and texture.
- E. Warranty: Submit specified manufacturer's warranty and ensure that forms have been completed in Owner's name and are registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Finish Warranty: Provide manufacturer's special warranty covering failure of factory-applied exterior finish on metal roof panels and agreeing to repair or replace panels that show evidence of finish degradation, including significant fading, chalking, cracking, or peeling within specified warranty period of twenty years from Date of Substantial Completion.
- C. Waterproofing Warranty: Provide manufacturer's warranty for weathertightness of roofing system, including agreement to repair or replace roofing that fails to keep out water within specified warranty period of twenty years from Date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Metal Roof Panels:
 - 1. ATAS International, Inc; Field-Lok 2-3/8: www.atas.com/#sle.

2. Berridge Manufacturing Company; Zee-Lock Panel: www.berridge.com/#sle.
3. Englert, Inc; Series 2000: www.englertinc.com/#sle.
4. Fabral; Powerseam: www.fabral.com/#sle.
5. Firestone Building Products LLC; UC-6: www.firestonebpco.com/#sle.
6. Petersen Aluminum Corporation; Tite-Loc Panel: www.pac-clad.com/#sle.

2.2 ARCHITECTURAL METAL ROOF PANELS

- A. Architectural Metal Roofing: Provide complete engineered system complying with specified requirements and capable of remaining weathertight while withstanding anticipated movement of substrate and thermally induced movement of roofing system.
- B. Metal Panels: Factory-formed panels with factory-applied finish.
 1. Steel Panels:
 - a. Aluminum-zinc alloy-coated steel complying with ASTM A792/A792M; minimum AZ50 coating.
 - b. Steel Thickness: Minimum 24 gage (0.024 inch).
 2. Profile: Standing seam, with minimum 2.0 inch seam height; concealed fastener system for field seaming with special tool.
 3. Texture: Smooth, with intermediate ribs for added stiffness.
 4. Length: Maximum possible length to minimize lapped joints. Where lapped joints are unavoidable, space laps so that each sheet spans over three or more supports.
 5. Width: Maximum panel coverage of 24 inches.

2.3 ATTACHMENT SYSTEM

- A. Concealed System: Provide manufacturer's standard stainless steel or nylon-coated aluminum concealed anchor clips designed for specific roofing system and engineered to meet performance requirements, including anticipated thermal movement.

2.4 FABRICATION

- A. Panels: Provide factory or field fabricated panels with applied finish and accessory items, using manufacturer's standard processes as required to achieve specified appearance and performance requirements.
- B. Joints: Provide captive gaskets, sealants, or separator strips at panel joints to ensure weathertight seals, eliminate metal-to-metal contact, and minimize noise from panel movements.

2.5 FINISHES

- A. Fluoropolymer Coil Coating System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of coil coated aluminum surfaces having minimum total dry film thickness (DFT) of 0.9 mil, 0.0009 inch; color and gloss as selected by Architect from manufacturer's standard line.
 - 1. Manufacturers:
 - a. PPG Metal Coatings; Duranar, Kynar 500: www.ppgmetalcoatings.com.
 - b. Valspar; Fluropon: www.valsparcoilextrusion.com/#sle.

2.6 ACCESSORIES

- A. Miscellaneous Sheet Metal Items: Provide flashings, gutters, downspouts, trim, and similar sheet metal items of the same material, thickness, and finish as used for the roofing panels. Items completely concealed after installation may optionally be made of stainless steel.
 - 1. Downspouts: Open face, rectangular profile.
- B. Rib and Ridge Closures: Provide prefabricated, close-fitting components of steel with corrosion resistant finish or combination steel and closed-cell foam.
- C. Sealants:
 - 1. Exposed Sealant: Elastomeric; silicone
 - a. Dow: 790
 - b. Tremco: Spectrem one
 - c. Pecora 890NST
 - 2. Concealed Sealant: Non-curing butyl sealant or tape sealant.
 - 3. Seam Sealant: Factory-applied, non-skinning, non-drying type.
- D. Underlayment: Synthetic non-asphaltic sheet, intended by manufacturer for mechanically fastened roofing underlayment without sealed seams.
 - 1. Type: Woven polypropylene with anti-slip polyolefin coating on both sides.
 - 2. Minimum Requirements: Comply with requirements of ICC-ES AC207 for non-self-adhesive sheet.
 - 3. Self Sealability: Passing nail sealability test specified in ASTM D1970/D1970M.

4. Low Temperature Flexibility: Passing test specified in ASTM D1970/D1970M.
 5. Water Vapor Permeance: Vapor retarder; maximum of 1 perm, when tested in accordance with ASTM E96/E96M Procedure A (desiccant method).
 6. Fasteners: Corrosion resistant nails with polyethelene washers as specified by manufacturer and building code qualification report or approval.
- E. Snow Guards: Snowgem; 2 inch I-clad seam mounted snow guard retention system: Powder coated aluminum.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation of preformed metal roof panels until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Broom clean wood sheathing prior to installation of roofing system.
- B. Coordinate roofing work with provisions for roof drainage, flashing, trim, penetrations, and other adjoining work to assure that the completed roof will be free of leaks.
- C. Remove protective film from surface of roof panels immediately prior to installation. Strip film carefully, to avoid damage to prefinished surfaces.
- D. Separate dissimilar metals by applying a bituminous coating, self-adhering rubberized asphalt sheet, or other permanent method approved by roof panel manufacturer.
- E. Where metal will be in contact with wood or other absorbent material subject to wetting, seal joints with sealing compound and apply one coat of heavy-bodied bituminous paint.

3.3 INSTALLATION

- A. Overall: Install roofing system in accordance with approved shop drawings and panel manufacturer's instructions and recommendations, as applicable to specific project conditions. Anchor all components of roofing system securely in place while allowing for thermal and structural movement.
 1. Install roofing system with concealed clips and fasteners.
 2. Minimize field cutting of panels. Where field cutting is absolutely required, use methods that will not distort panel profiles. Use of torches for field cutting is absolutely prohibited.

- B. Accessories: Install all components required for a complete roofing assembly, including flashings, gutters, downspouts, and rib closures.
- C. Install roofing underlayment sheet on roof deck before installing preformed metal roof panels. Secure by methods acceptable to roof panel manufacturer, minimizing use of metal fasteners. Apply from eaves to ridge in shingle fashion, overlapping horizontal joints a minimum of 2 inches and side and end laps a minimum of 3 inches.
- D. Roof Panels: Install panels in strict accordance with manufacturer's instructions, minimizing transverse joints except at junction with penetrations.
 - 1. Form weathertight standing seams incorporating concealed clips, using an automatic mechanical seaming device approved by the panel manufacturer.
 - 2. Install sealant or sealant tape, as recommended by panel manufacturer, at end laps and side joints.
- E. Insulation: Install insulation between seam clips. Fill cracks or gaps with foamed in place insulation.

3.4 CLEANING

- A. Clean exposed sheet metal work at completion of installation. Remove grease and oil films, excess joint sealer, handling marks, and debris from installation, leaving the work clean and unmarked, free from dents, creases, waves, scratch marks, or other damage to the finish.

END OF SECTION

SECTION 07 42 94

LINEAR METAL SOFFITS

PART 1 GENERAL

1.1 RELATED SECTIONS

- A. Section 06 10 00: Rough Carpentry.
- B. Section 07 92 00: Joint Sealants.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM).
 - 1. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E136: Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
 - 3. ASTM E2768-11: Standard Test Method for Extended Duration Surface Burning Characteristics for Building Materials (30 min Tunnel Test). Results: Zero Flame Spread, Smoke Developed Index of 5. Meets criteria for Class A fire rating.
- B. UL & Underwriters Laboratories of Canada (UL / ULC)
 - 1. UL 723: Standard Method of Test for Surface Burning Characteristics for Building Materials.
- C. American Architectural Manufacturers Association (AAMA)
 - 1. AAMA 2605: Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
 - 2. AAMA 2604: Voluntary Specification, Performance Requirements and Test Procedures for High Performing Organic Coatings on Aluminum Extrusions and Panels.
 - 3. AAMA 509: Voluntary Test and Classification Method for Drained and Back Ventilated Rainscreen Wall Cladding Systems.
 - 4. AAMA 501.1-17: Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure.
- D. International Code Council Evaluation Service (ICC-ES)
 - 1. ICC-ED Evaluation Report.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's printed product literature, specifications, and data sheet.
- B. Submit duplicate 6 inch x 6 inch samples of soffit material, of color and profile specified.
- C. Shop drawings to indicate dimensions, profiles, attachment methods, schedule of wall elevations, trim and closure pieces, soffits, fascia, metal furring, and related work.

1.4 WARRANTY

- A. Provide a written guarantee, signed and issued in the name of the Owner, covering the metal cladding / cladding material for 15 years from the date of Substantial Completion.

PART 2 PRODUCTS

2.1 ALUMINUM CLADDING AND COMPONENTS

- A. Six inch V-Groove Planks Extruded Aluminum 6063 T5.
 - 1. Finish coating: Powder coated finish.
 - 2. Color: Color selected by Owner's representative.
 - 3. Gloss: 30 plus or minus 5.
 - 4. Thickness: 1/16 inch base metal thickness.
 - 5. Profile: Six inch V-Grove x 24 foot plank.

2.2 ACCESSORIES

- A. Starter Strip, J-Track, Termination Set, 6 inch V-Groove perforated in same material and finishes as soffit planks.
- B. Plank Clips: 316 stainless steel quick-screen clips that are shipped loose for field installation.

2.3 MANUFACTURERS

- A. Longboard Architectural Products #102-1777 Clearbrook Rd., Abbotsford, BC, Canada V2T 5X5; info@longboardproducts.com; 1-800-604-0343.

PART 3 EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials and components in manufacturer's unopened containers or bundles. Prevent damage during unloading, storing, and installation.

- B. Store, protect, and handle materials and components in accordance with manufacturer's recommendations to prevent twisting, bending, mechanical damage, contamination, and deterioration.
- C. Stack metal cladding horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal cladding to ensure dryness, with positive slope for drainage of water. Do not store metal cladding in contact with other materials that might cause staining, denting, or other surface damage.

3.2 INSTALLATION

- A. Install cladding and components in accordance with manufacturer's written instructions and shop drawings, including product technical bulletins and datasheets.
- B. Install all cladding planks using quick-screen clips in accordance with the manufacturer's written instructions, technical bulletins, datasheets and install videos to not restrict thermal movement at specified o.c. spacings. Install screws in pre-punched holes. Install one hard-fastened screw per plank, directly through the plank flange to prevent plank mitigation. All fasteners should penetrate into solid, secure framing or blocking.
- C. Install components in accordance with the manufacturer's written instructions and shop drawings, including technical bulletins, datasheets, and install videos with positive anchorage to building and provide for thermal movement.
- D. Install screw fasteners using power tools having controlled torque adjusted to compress quick-screen clips tight without damage or deformation of the quick-screen clips, screw heads, screw threads or cladding.
- E. Hard-fasten any and all butt-joints into solid secure framing or blocking, to maintain tight fitting hairline joints. Never exceed one hard-fastener per plank, all other attachment points to use quick-screen clips to not restrict thermal movement.
- F. Do not install damaged panels; repair or replace as required.

3.3 CLEANING

- A. Upon completion of installation, remove surplus materials, rubbish, tools, and equipment barriers.

END OF SECTION

SECTION 07 46 17

LINEAR METAL CLADDING

PART 1 GENERAL

1.1 RELATED SECTIONS

- A. Section 06 10 00: Rough Carpentry,
- B. Section 07 92 00: Joint Sealants.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM).
 - 1. ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials.
 - 2. ASTM E136: Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 degrees C.
 - 3. ASTM E331-00: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
 - 4. ASTM E2768-11: Standard Test Method for Extended Duration Surface Burning Characteristics for Building Materials (30 min Tunnel Test). Results: Zero Flame Spread, Smoke Developed Index of 5. Meets criteria for Class A fire rating.
- B. UL & Underwriters Laboratories of Canada (UL / ULC).
 - 1. UL 723: Standard Method of Test for Surface Burning Characteristics of Building Materials.
- C. American Architectural Manufacturers Association (AAMA).
 - 1. AAMA 2605: Voluntary Specification, Performance Requirements, and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
 - 2. AAMA 2604: Voluntary Specification, Performance Requirements and Test Procedures for High Performing Organic Coatings on Aluminum Extrusions and Panels.
 - 3. AAMA 509: Voluntary Test and Classification Method for Drained and Back Ventilated Rainscreen Wall Cladding Systems.
 - 4. AAMA 501.1-17: Standard Test Method for Water Penetration of Windows, Curtain Walls and Door Using Dynamic Pressure.

D. International Code Council Evaluation Service (ICC-ES):

1. ICC-ES Evaluation Report.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's printed product literature, specifications, and data sheet.
- B. Submit duplicate 6 inch x 6 inch samples of cladding material, of color and profile specified.
- C. Shop drawings to indicate dimensions, profiles, attachment methods, schedule of wall elevations, trim and closure pieces, soffits, fascia, metal furring, and related work.

1.4 WARRANTY

- A. Provide a written guarantee, signed, and issued in the name of the Owner, covering the metal cladding / cladding material for 15 years from the date of Substantial Completion.

1.5 PRICE AND PAYMENT PROCEDURES

- A. Alternates: See Section 01 23 00 - Alternates, for product alternatives affecting this section.

PART 2 PRODUCTS

2.1 ALUMINUM CLADDING AND COMPONENTS

- A. Six inch V-Grove Planks Extruded Aluminum 6063 T5.
 - 1. Finish Coating: Powder coated finish.
 - 2. Color: Color selected by Architect,
 - 3. Gloss: 30 plus or minus 5.
 - 4. Thickness: 1/16 inch base metal thickness.
 - 5. Profile: 6 inch V-Grove x 24 ft plank.

2.2 ACCESSORIES

- A. Starter strip, J-track, inside corner, and outside corner in same material and finishes as cladding.
- B. Plank clips: 316 stainless steel quick-screen clips for field installation.

2.3 MANUFACTURERS

- A. Longboard Architectural Products: #120, 1777 Clearbrook Road, Abbotsford, BC, Canada V2T 5X5; info@longboardproducts.com; 1-800-604-0343.

PART 3 EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials and components in manufacturers' unopened containers or bundles. Prevent damage during unloading, storing, and installation.
- B. Store, protect, and handle materials and components in accordance with manufacturer's recommendations to prevent twisting, bending, mechanical damage, contamination, and deterioration.
- C. Stack metal cladding horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal cladding to ensure dryness with positive slope for drainage of water. Do not store metal cladding in contact with other materials that might cause staining, denting, or other surface damage.

3.2 INSTALLATION

- A. Install cladding and components in accordance with manufacturer's written instructions and shop drawings, including product technical bulletins and datasheets.
- B. Install all cladding planks using quick-screen clips in accordance with the manufacturer's written instructions, technical bulletins, datasheets and install videos to not restrict thermal movement at specified o.c. spacings. Install screws in pre-punched holes. Install one hard-fastened screw per plank, directly through the plank flange to prevent plank migration. All fasteners should penetrate into solid, secure framing or blocking.
- C. Install screw fasteners using power tools having controlled torque adjusted to compress quick-screen clips tight without damage or deformation of the quick-screen clips, screwheads, screw threads or cladding.
- D. Hard-fasten any and all butt joints into solid secure framing or blocking, to maintain tight fitting hairline joints. Never exceed one hard-fastened per plank, all other attachment points to use quick-screen clips to not restrict thermal movement.
- E. Do not install damaged panels; repair or replace as required.

3.3 CLEANING

- A. Upon completion of installation, remove surplus materials, rubbish, tools, and equipment barriers.

END OF SECTION

SECTION 07 53 00

ELASTOMERIC MEMBRANE ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Elastomeric roofing membrane, adhered conventional application.
- B. Insulation, flat and tapered.
- C. Flashings.

1.2 REFERENCE STANDARDS

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus 2017.
- B. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board 2021.
- C. ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers--Tension 2016 (Reapproved 2021).
- D. ASTM D624 - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers 2000 (Reapproved 2020).
- E. ASTM D746 - Standard Test Method for Brittleness Temperature of Plastics and Elastomers by Impact 2020.
- F. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane 2015, with Editorial Revision (2022).
- G. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- H. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials 2016.
- I. FM (AG) - FM Approval Guide Current Edition.
- J. FM DS 1-28 - Wind Design 2015, with Editorial Revision (2022).
- K. NRCA (RM) - The NRCA Roofing Manual 2022.
- L. SPRI RP-4 - Wind Design Standard for Ballasted Single-Ply Roofing Systems 2022.
- M. UL (DIR) - Online Certifications Directory Current Edition.
- N. UL (FRD) - Fire Resistance Directory Current Edition.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with installation of associated counterflashings installed under other sections.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, and fasteners.
- C. Shop Drawings: Indicate joint or termination detail conditions and conditions of interface with other materials.
- D. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.
- B. Store materials in weather protected environment, clear of ground and moisture.
- C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
- D. Protect foam insulation from direct exposure to sunlight.

1.7 FIELD CONDITIONS

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane when ambient temperature is below 20 degrees F or above 85 degrees F.
- C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- E. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.8 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a two year period after Date of Substantial Completion.
- C. Provide 10 year manufacturer's material and labor warranty to cover failure to prevent penetration of water.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. EPDM Membrane Materials:
 - 1. Carlisle Roofing Systems, Inc; Sure-Seal EPDM: www.carlisle-syntec.com/#sle.
 - 2. Firestone Building Products, LLC; Full Force EPDM : www.firestonebpco.com/#sle.
 - 3. Johns Manville; JM EPDM: www.jm.com/#sle.
 - 4. Versico Roofing Systems; VersiGard EPDM: www.versico.com/#sle.
- B. Insulation:
 - 1. GAF: Energy Guard Ultra; www.gaf.com/#sle.
 - 2. Hunter Panels; H Shield CG: www.hunterpanels.com/#sle.
 - 3. Atlas: AC Foam III.
 - 4. Firestone Building Products: Isogard CG
 - 5. Carlisle syntec: Securshield NH

2.2 ROOFING

- A. Elastomeric Membrane Roofing: One ply membrane, fully adhered , over insulation.
- B. Roofing Assembly Requirements:
 - 1. Roof Covering External Fire Resistance Classification: UL (DIR) certified Class A.
 - 2. Factory Mutual Classification: Class 1 and windstorm resistance of 1-90, in accordance with FM DS 1-28.
 - 3. Insulation Thermal Resistance (R-Value): 6.1 per inch, minimum.
- C. Acceptable Insulation Types - Constant Thickness Application:

1. Minimum 2 layers of polyisocyanurate board.

D. Acceptable Insulation Types - Tapered Application:

1. Tapered polyisocyanurate board.

2.3 ROOFING MEMBRANE AND ASSOCIATED MATERIALS

A. Membrane: Ethylene-propylene-diene-monomer (EPDM); non-reinforced; complying with minimum properties of ASTM D4637/D4637M.

1. Thickness: 0.060 inch (60 mil).
2. Sheet Width: 76 inch, minimum; factory-fabricate into largest sheets possible .
3. Color: Black.
4. Tensile Strength: 1300 psi, measured in accordance with ASTM D412.
5. Ultimate Elongation: 300 percent, measured in accordance with ASTM D412.
6. Tear Strength: 150 lbf/inch, measured in accordance with ASTM D624.
7. Water Vapor Permeability: 0.10 perm inch, measured in accordance with ASTM E96/E96M.
8. Brittleness Temperature: -49 degrees F, measured in accordance with ASTM D746.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Flexible Flashing Material: Same material as membrane.

2.4 INSULATION

A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.

1. Classifications:

- a. Type II:

- 1) Class 2 - Faced with coated polymer-bonded glass fiber mat facers on both major surfaces of core foam.
 - 2) Compressive Strength: Classes 1-2-3, Grade 2 - 20 psi (138 kPa), minimum.
 - 3) Thermal Resistance, R-value: At 1-1/2 inch thick; Class 2 - 8.0 (1.41) at 75 degrees F.

2. Board Size: 48 by 96 inch.
3. Board Thickness: 2.0 inch, max each layer.
4. Tapered Board: Slope as indicated; minimum thickness 1 inch; fabricate of fewest layers possible.
5. Board Edges: Square.
6. Manufacturers:
 - a. As listed above.

2.5 ACCESSORIES

- A. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
 1. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.
- B. Membrane Adhesive: As recommended by membrane manufacturer.
- C. Surface Conditioner for Adhesives: Compatible with membrane and adhesives.
- D. Roofing Nails: Galvanized, hot dipped type, size and configuration as required to suit application.
- E. Strip Reglet Devices: Galvanized steel, maximum possible lengths per location, with attachment flanges.
- F. Sealants: As recommended by membrane manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and nailing strips are in place.

3.2 INSULATION - UNDER MEMBRANE

- A. Attachment of Insulation: Mechanically fasten insulation to deck in accordance with roofing manufacturer's instructions and FM (AG) Factory Mutual requirements.
- B. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer.
- C. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.
- D. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- E. Do not apply more insulation than can be covered with membrane in same day.

3.3 MEMBRANE APPLICATION

- A. Apply elastomeric membrane roofing system in accordance with manufacturer's recommendations and NRCA (RM) applicable requirements.
- B. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- C. Shingle joints on sloped substrate in direction of drainage.
- D. Specified membrane is Self-Adhering. Follow manufacturers instruction for layout and removal of the release paper.
- E. Fully Adhered Application: Apply adhesive to substrate at rate required by manufacturer. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.
- F. Overlap edges and ends and seal seams by contact adhesive or contact tape, minimum 3 inches. Seal permanently waterproof. Apply uniform bead of sealant to joint edge.
- G. At intersections with vertical surfaces:
 - 1. Extend membrane up a minimum of 8 inches onto vertical surfaces.
 - 2. Fully adhere flexible flashing over membrane and up to reglets.
 - 3. Insert flashing into reglets and secure.
- H. At gravel stops, extend membrane under gravel stop and to the outside face of the wall.
- I. Around roof penetrations, seal flanges and flashings with flexible flashing.

3.4 PROTECTION

- A. Protect installed roofing and flashings from construction operations.

- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fabricated sheet metal items, including flashings, counterflashings, gutters, and downspouts.
- B. Sealants for joints within sheet metal fabrications.
- C. Precast concrete splash pads.

1.2 RELATED REQUIREMENTS

- A. Section 07 61 00 - Sheet Metal Roofing.
- B. Section 07 92 00 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

1.3 REFERENCE STANDARDS

- A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix) 2022.
- B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2022.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- D. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free 2007 (Reapproved 2018).
- E. SMACNA (ASMM) - Architectural Sheet Metal Manual 2012.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Samples: Submit two samples 4 x 8 inch in size illustrating metal finish color.

1.5 QUALITY ASSURANCE

- A. Perform work in accordance with SMACNA (ASMM) requirements and standard details, except as otherwise indicated.

PART 2 PRODUCTS

2.1 SHEET MATERIALS

- A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage, (0.0239 inch) thick base metal.
- B. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage, (0.0239) inch thick base metal, shop pre-coated with PVDF coating.
 - 1. PVDF (Polyvinylidene Fluoride) Coating: Superior Performance Organic Finish, AAMA 2605; multiple coat, thermally cured fluoropolymer finish system.
 - 2. Color: As indicated on drawings.

2.2 FABRICATION

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Fabricate cleats of galvanized type sheet metal, continuous length, interlocking with sheet.
- C. Form pieces in longest possible lengths.
- D. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- E. Form material with overlapped seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- F. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- G. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.
- H. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

2.3 GUTTER AND DOWNSPOUT FABRICATION

- A. Gutters: SMACNA (ASMM) Rectangular profile.
- B. Downspouts: Rectangular profile.
- C. Gutters and Downspouts: Size indicated on the drawings.
- D. Accessories: Profiled to suit gutters and downspouts.
 - 1. Anchorage Devices: In accordance with SMACNA (ASMM) requirements.
 - 2. Gutter Supports: Brackets.

3. Downspout Supports: Brackets.

E. Splash Pads: Precast concrete type, of size and profiles indicated; minimum 3000 psi at 28 days, with minimum 5 percent air entrainment.

F. Seal metal joints.

2.4 ACCESSORIES

A. Fasteners: Galvanized steel, with soft neoprene washers.

B. Concealed Sealants: Non-curing butyl sealant.

C. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

1. Manufacturers:

a. Franklin International, Inc; Titebond WeatherMaster Metal Roof Sealant: www.titebond.com/#sle.

b. Dow Chemical: 790.

D. Plastic Cement: ASTM D4586/D4586M, Type I.

PART 3 EXECUTION

3.1 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Install surface mounted reglets true to lines and levels, and seal top of reglets with sealant.

C. Back paint concealed metal surfaces in contact with masonry, with protective backing paint to a minimum dry film thickness of 15 mil. Or separate with underlayment felt.

3.2 INSTALLATION

A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted.

B. Apply plastic cement compound between metal flashings and felt flashings.

C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

D. Secure gutters and downspouts in place with galvanized fasteners.

E. Slope gutters 1/4 inch per 10 feet, minimum.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

1.2 RELATED REQUIREMENTS

- A. Section 07 25 00 - Weather Barriers: Sealants required in conjunction with water-resistive barriers.
- B. Section 08 80 00 - Glazing: Glazing sealants and accessories.

1.3 REFERENCE STANDARDS

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer 2015 (Reapproved 2022).
- B. ASTM C794 - Standard Test Method for Adhesion-in-Peel of Elastomeric Joint Sealants 2018 (Reapproved 2022).
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants 2018.
- D. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.
- E. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants 2022.
- F. ASTM C1311 - Standard Specification for Solvent Release Sealants 2022.
- G. ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid-Applied Sealants 2018.
- H. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints 2019 (Reapproved 2020).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.

1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
 2. List of backing materials approved for use with the specific product.
 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
 4. Substrates the product should not be used on.
 5. Substrates for which use of primer is required.
- C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- D. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing the work of this section and with at least five years of documented experience.
- B. Field Adhesion Test Procedures:
1. Allow sealants to fully cure as recommended by manufacturer before testing.
 2. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
 3. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer and report any deficiencies.
 4. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.
- C. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
1. Sample: At least 18 inches long.
 2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by two; then multiply 1 inch by that percentage; if adhesion failure occurs before the "1 inch mark" is that distance from the substrate, the test has failed.

3. If either adhesive or cohesive failure occurs prior to minimum elongation, take necessary measures to correct conditions and re-test; record each modification to products or installation procedures.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
 1. Dow Chemical Company: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
 2. Master Builders Solutions by BASF: www.master-builders-solutions.basf.us/en-us/#sle.
 3. Momentive Performance Materials, Inc (formerly GE Silicones) : www.momentive.com/#sle.
 4. Pecora Corporation: www.pecora.com/#sle.
 5. Sika Corporation: www.usa-sika.com/#sle.
 6. Tremco Commercial Sealants & Waterproofing: www.tremcosealants.com/#sle.
 7. W.R. Meadows, Inc: www.wrmeadows.com/#sle.
- B. Self-Leveling Sealants: Pourable or self-leveling sealant that has sufficient flow to form a smooth, level surface when applied in a horizontal joint.

2.2 JOINT SEALANT APPLICATIONS

- A. Scope:
 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
 - a. Wall expansion and control joints.

- b. Joints between door, window, and other frames and adjacent construction.
 - c. Joints between different exposed materials.
 - d. Openings below ledge angles in masonry.
 - e. Other joints scheduled below.
2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
- a. Joints between door, window, and other frames and adjacent construction.
 - b. Other joints indicated below.

2.3 JOINT SEALANTS - GENERAL

2.4 NONSAG JOINT SEALANTS

- A. Type S-1 - Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
- 1. Movement Capability: +50 -50, minimum.
 - 2. Non-Staining to Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
 - 3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
 - 4. Hardness Range: 15 to 35, Shore A, when tested in accordance with ASTM C661.
 - 5. Color: To be selected by Architect from manufacturer's standard range.
 - 6. Cure Type: [_____].
 - 7. Service Temperature Range: Minus 20 to 180 degrees F.
 - 8. Manufacturers:
 - a. Dow Chemical Company; DOWSIL 756 SMS Building Sealant: consumer.dow.com/en-us/industry/ind-building-construction.html/#sle.
 - b. Sika Corporation; Sikasil WS-290: www.usa.sika.com/#sle.
 - c. Tremco Commercial Sealants & Waterproofing; Spectrem 3: www.tremcosealants.com/#sle.

- d. Pecora; 864NST.
- B. Type S-3 - Mildew-Resistant Silicone Sealant: ASTM C920, Grade NS, Uses M and A; single component, mildew resistant; not expected to withstand continuous water immersion or traffic.
 - 1. Color: White.
 - 2. Manufacturers:
 - a. Pecora Corporation; 898NST: www.pecora.com/#sle.
 - b. Sika Corporation; Sikasil GP: www.usa.sika.com/#sle.
 - c. Dow Chemical Company; Dowsil 999-A.

2.5 SELF-LEVELING SEALANTS

- A. Type PSL-3 - Self-Leveling Polyurethane Sealant for Continuous Water Immersion: Polyurethane; ASTM C920, Grade P, Uses M and A; single or multi-component; explicitly approved by manufacturer for traffic exposure and continuous water immersion.
 - 1. Movement Capability: Plus and minus 25 percent, minimum.
 - 2. Hardness Range: 35 to 55, Shore A, when tested in accordance with ASTM C661.
 - 3. Color: Gray.
 - 4. Manufacturers:
 - a. Sika Corporation; Sikaflex-1c SL: www.usa.sika.com/#sle.
 - b. Sika Corporation; Sikaflex-2c SL: www.usa.sika.com/#sle.
 - c. W. R. MEADOWS, Inc; POURTHANE SL: www.wrmeadows.com.

2.6 ACCESSORIES

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
 - 1. All sealants unless otherwise specified by the manufacturer: ASTM C1330; Type C - Closed Cell Polyethylene.
 - 2. Open Cell: 40 to 50 percent larger in diameter than joint width.
 - 3. Closed Cell and Bi-Cellular: 25 to 33 percent larger in diameter than joint width.

- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.
- C. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and sealants.
- D. Joint Cleaner: Non-corrosive and non-staining type, type recommended by sealant manufacturer; compatible with joint forming materials.
- E. Primers: Type recommended by sealant manufacturer to suit application; non-staining.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.
- D. Preinstallation Adhesion Testing: Install a sample for each test location i.
 - 1. Notify Architect of date and time that tests will be performed, at least seven days in advance.
 - 2. Record each test on Preinstallation Adhesion Test Log as indicated.
 - 3. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
 - 4. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

3.2 PREPARATION

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

3.3 INSTALLATION

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
 - 1. Width/depth ratio of 2:1.
 - 2. Neck dimension no greater than 1/3 of the joint width.
 - 3. Surface bond area on each side not less than 75 percent of joint width.
- D. Install bond breaker backing tape where backer rod cannot be used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
- F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
- G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.
- H. Concrete Floor Joint Filler: After full cure, shave joint filler flush with top of concrete slab.

3.4 SCHEDULE LOCATION

Door and Window Perimeter - Exterior	S-1
Control & Expansion Joints in Concrete Slab	PSL-3
Under Thresholds	S-1
Where Walks Abut Vertical Surfaces	PSL-3
Masonry Control Joints	S-1
Interior Frames	S-3
Sheet Metal Flashing	S-1
Sealant at plumbing fixtures	S-3

END OF SECTION

DIVISION 08 – OPENINGS

SECTION 08 11 13.00	HOLLOW METAL DOORS AND FRAMES
SECTION 08 36 13.00	SECTIONAL DOORS
SECTION 08 43 13.00	ALUMINUM-FRAMED STOREFRONTS
SECTION 08 71 00.00	DOOR HARDWARE
SECTION 08 80 00.00	GLAZING

SECTION 08 11 13

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Non-fire-rated hollow metal doors and frames.
- B. Thermally insulated hollow metal doors with frames.
- C. Hollow metal borrowed lites glazing frames.

1.2 RELATED REQUIREMENTS

- A. Section 08 71 00 - Door Hardware.
- B. Section 08 80 00 - Glazing: Glass for doors and borrowed lites.
- C. Section 09 91 13 - Exterior Painting: Field painting.
- D. Section 09 91 23 - Interior Painting: Field painting.

1.3 ABBREVIATIONS AND ACRONYMS

- A. ANSI: American National Standards Institute.
- B. HMMA: Hollow Metal Manufacturers Association.
- C. NAAMM: National Association of Architectural Metal Manufacturers.
- D. NFPA: National Fire Protection Association.
- E. SDI: Steel Door Institute.
- F. UL: Underwriters Laboratories.

1.4 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors 2011.
- C. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames 2003 (R2009).
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100) 2017.

- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames 2011.
- F. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- G. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2022.
- H. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable 2021.
- I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength 2018a.
- J. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- K. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames 2016.
- L. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.
- M. UL 1784 - Standard for Air Leakage Tests of Door Assemblies Current Edition, Including All Revisions.

1.5 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced standards/guidelines.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Hollow Metal Doors and Frames:
 - 1. Ceco Door, an Assa Abloy Group company: www.assaabloydss.com/#sle.

2. Curries, an Assa Abloy Group company: www.assaabloydss.com/#sle.
3. Republic Doors, an Allegion brand: www.republicdoor.com/#sle.
4. Steelcraft, an Allegion brand: www.allegion.com/#sle.
5. LaForce Hardware.

2.2 PERFORMANCE REQUIREMENTS

A. Requirements for Hollow Metal Doors and Frames:

1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
2. Accessibility: Comply with ICC A117.1 and ADA Standards.
3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
4. Door Edge Profile: Beveled, both sides.
5. Glazed Lights: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Style: Flush.
6. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
7. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvanized) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
 - a. Based on SDI Standards: Provide at least A40/ZF120 (galvanized) when necessary, coating not required for typical interior door applications, and at least A60/ZF180 (galvanized) for exterior locations.

2.3 HOLLOW METAL DOORS

- A. Door Finish: Factory primed and field finished.
- B. Exterior Doors: Thermally insulated.
 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).

- a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.
 - d. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.
 - e. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.
2. Door Core Material: Polyurethane, 1.8 lbs/cu ft minimum density.
- a. Foam Plastic Insulation: Manufacturer's standard board insulation with maximum flame spread index (FSI) of 75, and maximum smoke developed index (SDI) of 450 in accordance with ASTM E84, and completely enclosed within interior of door.
3. Door Thermal Resistance: R-Value of 8.7, minimum, for installed thickness of polyurethane.
4. Door Thickness: 1-3/4 inch, nominal.
- C. Interior Doors, Non-Fire-Rated:
- 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
 - a. Level 2 - Heavy-duty.
 - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
 - c. Model 1 - Full Flush.
 - d. Door Face Metal Thickness: 18 gage, 0.042 inch, minimum.
 - e. Zinc Coating: A60/ZF180 galvanized coating; ASTM A653/A653M.
 - 2. Door Core Material: Manufacturers standard core material/construction and in compliance with requirements.
 - 3. Door Thickness: 1-3/4 inch, nominal.
 - 4. Door Finish: Factory primed and field finished.

2.4 HOLLOW METAL FRAMES

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Frame Finish: Factory primed and field finished.

- C. Exterior Door Frames: Face welded type.
 - 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A60/ZF180 coating.
 - 2. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
- D. Interior Door Frames, Non-Fire Rated: Face welded type.
 - 1. Frame Metal Thickness: 16 gage, 0.053 inch, minimum.
 - 2. Frame Finish: Factory primed and field finished.
- E. Borrowed Lites Glazing Frames: Construction and face dimensions to match door frames, and as indicated on drawings.
- F. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- G. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inch high to fill opening without cutting masonry units.

2.5 FINISHES

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Bituminous Coating: Asphalt emulsion or other high-build, water-resistant, resilient coating.

2.6 ACCESSORIES

- A. Glazing: As specified in Section 08 80 00, factory installed.
- B. Removable Stops: Formed sheet steel, mitered or butted corners; prepared for countersink style tamper proof screws.
- C. Mechanical Fasteners for Concealed Metal-to-Metal Connections: Self-drilling, self-tapping, steel with electroplated zinc finish.
- D. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- E. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

PART 3 EXECUTION

3.1 PREPARATION

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

3.2 INSTALLATION

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Coordinate frame anchor placement with wall construction.
- C. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- D. Install door hardware as specified in Section 08 71 00.
 - 1. Comply with recommended practice for hardware placement of doors and frames in accordance with ANSI/SDI A250.6 or NAAMM HMMA 861.
- E. Comply with glazing installation requirements of Section 08 80 00.

3.3 TOLERANCES

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

3.4 ADJUSTING

- A. Adjust for smooth and balanced door movement.

3.5 SCHEDULE

- A. Refer to Door and Frame Schedule on the drawings.

END OF SECTION

SECTION 08 36 13

SECTIONAL DOORS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Overhead sectional door electrically operated.
- B. Operating hardware and supports.
- C. Electrical controls.

1.2 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.
- B. Division 26: Conduit from electric circuit to operator and from operator to control station.

1.3 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015 (Reaffirmed 2020).
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2022.
- D. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate 2014.
- E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- G. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- H. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2004 (Reapproved 2012).

- I. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.
- J. DASMA 102 - American National Standard Specifications for Sectional Doors 2018.
- K. ITS (DIR) - Directory of Listed Products Current Edition.
- L. NEMA ICS 2 - Industrial Control and Systems Controllers, Contactors and Overload Relays Rated 600 Volts 2008 (Reaffirmed 2020).
- M. NEMA MG 1 - Motors and Generators 2021.
- N. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum) 2020.
- O. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- P. UL 325 - Standard for Door, Drapery, Gate, Louver, and Window Operators and Systems Current Edition, Including All Revisions.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- C. Product Data: Show component construction, anchorage method, and hardware.
- D. Operation Data: Include normal operation, troubleshooting, and adjusting.
- E. Maintenance Data: Include data for motor and transmission, shaft and gearing, lubrication frequency, spare part sources.
- F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of type specified and with at least three years documented experience.
- B. Comply with applicable code for motor and motor control requirements.
- C. Products Requiring Electrical Connection: Listed and classified by ITS (DIR), UL (DIR), or testing firm acceptable to authorities having jurisdiction, as suitable for purpose specified.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for electric motor.
- D. Provide five year manufacturer warranty for electric operating equipment.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Sectional Doors:
 - 1. Clopay Building Products; 904U: www.clopaydoor.com/#sle.
 - 2. Raynor Garage Doors; ThermalSeal Series, Model TM200 : www.raynor.com/#sle.
 - 3. The Overhead Door Corporation; www.overheaddoor.com. Aluminum Glass Door series

2.2 ALUMINUM DOORS

- A. Aluminum Doors: Flush aluminum, insulated; standard lift operating style with track and hardware; complying with DASMA 102, Commercial application.
 - 1. Performance: Withstand positive and negative wind loads equal to 1.5 times design wind loads specified by local code without damage or permanent set, when tested in accordance with ASTM E330/E330M, using 10 second duration of maximum load.
 - 2. Door Nominal Thickness: 2 inches thick.
 - 3. Thermal Transmittance: U-factor of 0.31 Btu/hr sq ft degrees F, maximum, in accordance with DASMA 102.
 - 4. Air Leakage Rate: Less than 0.40 cfm/sf when tested in accordance with ASTM E283 at test pressure difference of 1.57 psf.
 - 5. Finish: Factory anodized; clear anodized.
 - 6. Electric Operation: Electric control station.
- B. Door Panels: Paneled aluminum construction; extruded aluminum stiles and rails; 1/2 inch thick infill panels of insulated glass; stile and rail joints welded; rabbeted weather joints at meeting rails.
- C. Glazing: Fully tempered glass; insulated glass units; clear; 1 inch overall thickness.

2.3 COMPONENTS

- A. Track: Rolled galvanized steel, 0.090 inch minimum thickness; 2 inch wide, continuous one piece per side; galvanized steel mounting brackets 1/4 inch thick.
- B. Hinge and Roller Assemblies: Heavy duty hinges and adjustable roller holders of galvanized steel; floating hardened steel bearing rollers, located at top and bottom of each panel, each side.
- C. Lift Mechanism: Torsion spring on cross head shaft, with braided galvanized steel lifting cables.
 - 1. For Manual Operation: Requiring maximum exertion of 25 lbs force to open.
- D. Sill Weatherstripping: Resilient hollow rubber strip, one piece; fitted to bottom of door panel, full length contact.
- E. Jamb Weatherstripping: Roll formed steel section full height of jamb, fitted with resilient weatherstripping, placed in moderate contact with door panels.
- F. Head Weatherstripping: EPDM rubber seal, one piece full length.
- G. Panel Joint Weatherstripping: Neoprene foam seal, one piece full length.

2.4 MATERIALS

- A. Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G60/Z180 coating, plain surface.
- B. Aluminum Extrusions: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper.
- C. Float Glass: Provide float glass glazing, unless noted otherwise.
 - 1. Heat-Strengthened and Fully Tempered Types: ASTM C1048.
- D. Insulation: Foamed-in-place polyurethane, bonded to facing.

2.5 ELECTRIC OPERATION

- A. Operator, Controls, Actuators, and Safeties: Comply with UL 325; provide products listed by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction.
 - 1. Provide interlock switches on motor operated units.
- B. Electric Operators:
 - 1. Mounting: Side mounted on cross head shaft.
 - 2. Motor Enclosure:

- a. Interior Doors: NEMA MG 1, Type 1; open drip proof.
- 3. Motor Rating: 3/4 hp; continuous duty.
- 4. Motor Voltage: 230 volts, single phase, 60 Hz.
- 5. Motor Controller: NEMA ICS 2, full voltage, reversing magnetic motor starter.
- 6. Controller Enclosure: NEMA 250, Type 1.
- 7. Opening Speed: 12 inches per second.
- 8. Brake: Adjustable friction clutch type, activated by motor controller.
- 9. Manual override in case of power failure.
- 10. Refer to Division 26 for electrical connections.
- C. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated; enclose terminal lugs in terminal box sized to comply with NFPA 70.
- D. Control Station: Provide standard three button (Open-Close-Stop) momentary-contact control device for each operator complying with UL 325.
 - 1. 24 volt circuit.
 - 2. Surface mounted, at interior door jamb.
 - 3. Entrapment Protection Devices: Provide sensing devices and safety mechanisms complying with UL 325.
 - a. Primary Device: Provide electric sensing edge, wireless sensing, NEMA 1 photo eye sensors, or NEMA 4X photo eye sensors as required with momentary-contact control device.
 - b. Secondary Device: Provide electric sensing edge with wireless edge kit or non-monitored safety edge as an option along with continuous-constant control device.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- B. Verify that electric power is available and of the correct characteristics.

3.2 INSTALLATION

- A. Install door unit assembly in accordance with manufacturer's instructions.
- B. Anchor assembly to wall construction and building framing without distortion or stress.
- C. Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- D. Fit and align door assembly including hardware.
- E. Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

3.3 TOLERANCES

- A. Maximum Variation from Plumb: 1/16 inch.
- B. Maximum Variation from Level: 1/16 inch.
- C. Longitudinal or Diagonal Warp: Plus or minus 1/8 inch from 10 ft straight edge.
- D. Maintain dimensional tolerances and alignment with adjacent work.

3.4 ADJUSTING

- A. Adjust door assembly for smooth operation and full contact with weatherstripping.

3.5 CLEANING

- A. Clean doors and frames and glazing.
- B. Remove temporary labels and visible markings.

END OF SECTION

SECTION 08 43 13

ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aluminum-framed storefront, with vision glass.
- B. Aluminum doors and frames.
- C. Weatherstripping.

1.2 RELATED REQUIREMENTS

- A. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.
- B. Section 08 71 00 - Door Hardware: Hardware items other than specified in this section.
- C. Section 08 80 00 - Glazing: Glass and glazing accessories.

1.3 REFERENCE STANDARDS

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site 2015.
- B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems 2015.
- C. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections 2009.
- D. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2021.
- F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2021.
- G. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen 2004 (Reapproved 2012).
- H. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference 2014.

- I. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference 2000 (Reapproved 2023).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass, door hardware, and internal drainage details.
- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related work, expansion and contraction joint location and details, and field welding required.
- D. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Handle products of this section in accordance with AAMA CW-10.

1.7 FIELD CONDITIONS

- A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.8 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Aluminum-Framed Storefront and Doors:
 - 1. C.R. Laurence Company, Inc; U.S. Aluminum; Series 451/IT451: www.crl-arch.com/#sle.

2. Kawneer North America; VG 451/451T: www.kawneer.com/#sle.
3. Oldcastle BuildingEnvelope; Series 3000 Thermal Multiplane : www.oldcastlebe.com/#sle.
4. Tubelite, Inc; T 14000: www.tubeliteinc.com/#sle.
5. YKK AP America Inc; YES 45 TU: www.ykkap.com/#sle.

2.2 ALUMINUM-FRAMED STOREFRONT

- A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
 1. Glazing Rabbet: For 1 inch insulating glazing.
 2. Glazing Position: Centered (front to back).
 3. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.
 4. Finish: Class I natural anodized.
 - a. Factory finish all surfaces that will be exposed in completed assemblies.
 5. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
 6. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
 7. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
 8. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
 9. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
 10. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.
 11. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glazing and heel bead of glazing compound.
- B. Performance Requirements:

1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
 - a. Design Wind Loads: Comply with requirements of ASCE 7.
 - b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
2. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 8 psf.
3. Air Leakage Laboratory Test: Maximum of 0.06 cu ft/min sq ft of wall area, when tested in accordance with ASTM E283 at 6.27 psf pressure differential across assembly.
4. Condensation Resistance Factor of Framing: 60, minimum, measured in accordance with AAMA 1503.
5. Overall U-value Including Glazing: 0.44 Btu/(hr sq ft deg F), maximum.

2.3 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
 1. Framing members for interior applications need not be thermally broken.
 2. Glazing Stops: Flush.
 3. Structurally Reinforced Members: Extruded aluminum with internal reinforcement of structural steel member.
- B. Glazing: As specified in Section 08 80 00.
- C. Swing Doors: Glazed aluminum.
 1. Thickness: 1-3/4 inches.
 2. Top Rail: 6 inches wide.
 3. Vertical Stiles: 6 inches wide.
 4. Bottom Rail: 10 inches wide.
 5. Glazing Stops: Square.
 6. Finish: Same as storefront.

2.4 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Sheet Aluminum: ASTM B209 (ASTM B209M).
- C. Fasteners: Stainless steel.
- D. Exposed Flashings: Aluminum sheet, 20 gage, 0.032 inch minimum thickness; finish to match framing members.
- E. Concealed Flashings: Sheet aluminum, 26 gage, 0.017 inch minimum thickness.
- F. Sill Flashing Sealant: Elastomeric, silicone or polyurethane, compatible with flashing material.
- G. Sealant for Setting Thresholds: Non-curing butyl type.
- H. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- I. Glazing Accessories: As specified in Section 08 80 00.

2.5 FINISHES

- A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

2.6 HARDWARE

- A. For each door, include weatherstripping, sill sweep strip, and threshold.
- B. Other Door Hardware: As specified in Section 08 71 00.
- C. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.
- D. Sill Sweep Strips: Resilient seal type, of brush type; provide on all doors.
- E. Threshold: Extruded aluminum, one piece per door opening, ribbed surface; provide on all doors.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.2 INSTALLATION

- A. Install wall system in accordance with manufacturer's instructions.

- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
- H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- I. Set thresholds in bed of sealant and secure.
- J. Install glass in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.

3.3 TOLERANCES

- A. Maximum Variation from Plumb: 0.06 inch per 3 feet non-cumulative or 0.06 inch per 10 feet, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 ADJUSTING

- A. Adjust operating hardware for smooth operation.

3.5 CLEANING

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

END OF SECTION

SECTION 08 71 00

~~DOOR HARDWARE~~

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Mechanical door hardware for the following:
 - a. Swinging doors.
2. Cylinders for door hardware specified in other Sections.
3. Electrified door hardware.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Details of electrified door hardware.

C. Other Action Submittals:

1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - a. Format: Use same scheduling sequence and format and use same door numbers as in the Contract Documents.
 - b. Content: Include the following information:
 - 1) Identification number, location, hand, fire rating, size, and material of each door and frame.
 - 2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
 - 3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
 - 4) Description of electrified door hardware sequences of operation and interfaces with other building control systems.

2. Keying Schedule: Prepared by or under the supervision of Installer, detailing Owner's final keying instructions for locks.

- D. Schedules shall be kept current with all changes to the project. If changes occur, project hardware schedules shall be maintained to reflect the changes as they are approved. Omitted items shall be deleted from openings, added and replaced items shall be included. Installation submittals shall be kept current as changes occur. Upon request, a complete updated hardware schedule shall be provided to the contractor. Supplemental submittals that include only the changed openings will not be acceptable.
- E. Prior to final payment, provide a record copy of hardware schedules, including all revisions and updates. All openings shall be listed to reflect final installed configuration only.

1.3 QUALITY ASSURANCE

- A. Supplier Qualifications: The hardware supplier shall be a corporate member in good standing of The Door and Hardware Institute (DHI), employing at least one Architectural Hardware Consultant (AHC) who is currently participating in DHI's continuing education program (CEP).
- B. Source Limitations: Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated.
- C. Items of hardware not definitely specified herein but necessary for completion of the work shall be provided. Such items shall be of type and quality suitable to the service required and comparable to the adjacent hardware. Where size and shape of members is such as to prevent the use of types specified, hardware shall be furnished of suitable types having as nearly as practicable the same operation and quality as the type specified. Sizes shall be adequate for the service required.
- D. Include such nuances as strike type, strike lip length, raised barrel hinges, mounting brackets, blade stop spacers, special templates, fasteners, shims, and coordination between conflicting products. All doors shall be provided with a stop.
- E. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated. Provide positive latching and self-closing, regardless if specified in sets.
- F. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meet requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
 - 1. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at the tested pressure differential of 0.3-inch wg (75 Pa) of water.
- G. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

- H. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- I. Accessibility Requirements: For door hardware on doors in an accessible route, comply with ICC/ANSI A117.1.
 - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
 - 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
 - b. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
 - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 - 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
 - 4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a point 12 degrees from the latch, measured to the leading edge of the door.
- J. Keying Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination."

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver keys to Owner by registered mail or overnight package service.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Manufacturers' standard warranty period.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Article to comply with requirements in this Section.
 - 1. Door Hardware Sets: Provide quantity, item, size, finish, or color indicated, and named manufacturers' products.

2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.

2.2 HINGES

- A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. IVES Hardware; an Allegion company.
 - c. Stanley Commercial Hardware; Div. of The Stanley Works.
2. Interior Door Hinges: Steel, 0.134 inch minimum thickness except as noted. Provide heavyweight 0.180 inch minimum thickness on doors wider than 3'0".
3. Exterior Door Hinges: Stainless steel, provide heavyweight 0.180 inch minimum thickness unless noted otherwise.
4. Hinge Size: 4-1/2" x 4-1/2" unless noted otherwise.
5. Hinge Options:
 - a. Nonremovable Pins: Provide set screw in hinge barrel that when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for outswinging exterior doors, outswinging lockable corridor doors and doors with access control components.
 - b. Corners: Square.
6. Provide quantity as follows unless otherwise indicated.
7. For doors up to 60 inches in height, provide 1 pair hinges; for doors 60 inches to 90 inches in height, provide 1-1/2 pairs of hinges; for doors over 90 inches and up to 120 inches in height, provide 1 additional hinge for each 30 inches of height.

2.3 MECHANICAL LOCKS AND LATCHES

- A. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
- B. Mortise Locks: BHMA A156.13; Operational Grade 1; stamped steel case with steel or brass parts; Series 1000.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

- a. Schlage Commercial Lock Division.

2.4 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

1. Manufacturer: Same manufacturer as for locking devices.

2.5 KEYING

- A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.

1. Existing System:

- a. Master key or grand master key locks to Owner's existing Schlage C system.

- B. Keys:

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

- a. Notation: Information to be furnished by Owner.

2.6 SURFACE CLOSERS

- A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force. Provide extra-duty arms at parallel arm applications.

1. Manufacturers: Subject to compliance with requirements, provide products by the following:

- a. LCN.

2.7 MECHANICAL STOPS AND HOLDERS

- A. Wall- and Floor-Mounted Stops: BHMA A156.16; polished cast brass base metal.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Hager Companies.

- b. IVES Hardware; an Allegion company.

- c. Rockwood Manufacturing Company.
- d. Trimco.

2.8 OVERHEAD STOPS AND HOLDERS

A. Overhead Stops and Holders: BHMA A156.8.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Glynn-Johnson; an Allegion company.
 - b. Rixson Specialty Door Controls.
 - c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.9 DOOR GASKETING

A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. National Guard Products.
 - c. Reese Enterprises, Inc.
 - d. Zero International.

2.10 THRESHOLDS

A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. National Guard Products.
 - c. Reese Enterprises, Inc.
 - d. Zero International.

2.11 METAL PROTECTIVE TRIM UNITS

- A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- (1.3-mm-) thick stainless steel; four sides beveled, with manufacturer's standard machine or self-tapping screw countersunk fasteners.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager.
 - b. IVES.
 - c. Rockwood.
 - d. Trimco.

2.12 AUXILIARY DOOR HARDWARE

- A. Auxiliary Hardware: BHMA A156.16.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Hager Companies.
 - b. IVES Hardware; an Allegion company.
 - c. Rockwood Manufacturing Company.
 - d. Trimco.

2.13 ELECTRIC STRIKES

- A. Electric Strikes: BHMA A156.31.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Folger Adams.
 - b. HES.
 - c. Von Duprin.

2.14 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:
 - a. Wood or Machine Screws: For the following:
 - 1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
 - b. Steel Through Bolts: For the following unless door blocking is provided:
 - 1) Surface hinges to doors.
 - 2) Closers to doors and frames.
 - 3) Surface-mounted exit devices.
3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.15 FINISHES

- A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.
- B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

- C. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.
 - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
 - 2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- D. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- E. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, in equipment room. Verify location with Architect.
 - 1. Configuration: Provide least number of power supplies required to adequately serve doors with electrified door hardware.
- F. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- G. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.
- H. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- I. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- J. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.
- K. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.2 DOOR HARDWARE SCHEDULE

HARDWARE SET 1

EA	HINGES	AS SPECIFIED	630	HAG
1 EA	ELECTRIC STRIKE	1600CDB	630	HES
1 EA	STOREROOM W/INDICATOR	LV9480P 06A L283-722	626	SCH
1 EA	CLOSER	4040XP SCUSH	689	LCN
1 EA	KICK PLATE	10" X 2" LDW	630	ROC
1 EA	THRESHOLD	8425	719	NGP
1 EA	SWEEP	200NA	628	NGP
1 SET	WEATHERSTRIPPING	9700A	628	NGP
1 EA	DOOR POSITION SWITCH	BY SECURITY CONTRACTOR		

HARDWARE SET 2

EA	HINGES	AS SPECIFIED	630	HAG
1 EA	STOREROOM	LV9080P 06A	626	SCH
1 EA	CLOSER	4040XP SCUSH	689	LCN
1 EA	KICK PLATE	10" X 2" LDW	630	ROC
1 EA	THRESHOLD	8425	719	NGP
1 EA	SWEEP	200NA	628	NGP
1 SET	WEATHERSTRIPPING	9700A	628	NGP

HARDWARE SET 3

EA	HINGES	AS SPECIFIED	652	HAG
1 EA	PRIVACY W/INDICATOR	LV9040 06A L283-722	626	SCH
1 EA	OVERHEAD STOP	90S	630	GLY

HARDWARE SET 4

EA	HINGES	AS SPECIFIED	652	HAG
1 EA	PASSAGE	L9010 06A	626	SCH
1 EA	OVERHEAD STOP	90S	630	GLY

HARDWARE SET 5

EA	HINGES	AS SPECIFIED	652	HAG
1 EA	STOREROOM	LV9080P 06A	626	SCH
1 EA	WALL STOP	403	626	ROC

HARDWARE SET 6

EA	HINGES	AS SPECIFIED	630	HAG
1 EA	ELECTRIC STRIKE	96001600CS	630	HES
1 EA	STOREROOM	LV9080P 06A	626	SCH
1 EA	EXIT DEVICE	99NL	626	VON
1 EA	CYLINDER	AS REQUIRED	626	SCH
1 EA	CLOSER	4040XP SCUSH	689	LCN
1 EA	KICK PLATE	10" X 2" LDW	630	ROC
1 EA	THRESHOLD	8425	719	NGP
1 EA	SWEEP	200NA	628	NGP
1 SET	WEATHERSTRIPPING	9700A	628	NGP
1 EA	DOOR POSITION SWITCH	BY SECURITY CONTRACTOR		
1 EA	CARD READER	BY SECURITY CONTRACTOR		

HARDWARE SET 7

EA	HINGES	AS SPECIFIED	630	HAG
1	EA	ELECTRIC STRIKE	9600	630 HES
1	EA	EXIT DEVICE	33A-NL	626 VON
1	EA	CYLINDER	AS REQUIRED	626 SCH
1	EA	CLOSER	4040XP SCUSH X 18PA X 30 X 61	689 LCN
1	EA	THRESHOLD	8425	719 NGP
1	EA	SWEEP	200NA	628 NGP
1	SET	WEATHERSTRIPPING	BY DOOR AND FRAME MANUFACTURER	
1	EA	DOOR POSITION SWITCH	BY SECURITY CONTRACTOR	
1	EA	CARD READER	BY SECURITY CONTRACTOR	

END OF SECTION

<u>DOOR NUMBER</u>	<u>HARDWARE SET</u>	<u>DOOR NUMBER</u>	<u>HARDWARE SET</u>
100A	6		
100B	-		
100C	-		
100D	-		
100E	-		
100F	-		
101	1		
102	3		
103	1		
104	1		
105	1		
106	1		
107	1		
108	1		
109	1		
110	2		
111	2		
111A	5		
112	4		

SECTION 08 80 00

GLAZING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Insulating glass units.
- B. Glazing compounds.

1.2 RELATED REQUIREMENTS

- A. Section 08 11 13 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.
- B. Section 08 36 13 - Sectional Doors: Glazed lites in doors.

1.3 REFERENCE STANDARDS

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test 2015 (Reaffirmed 2020).
- C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures Most Recent Edition Cited by Referring Code or Reference Standard.
- D. ASTM C1036 - Standard Specification for Flat Glass 2021.
- E. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- F. ASTM C1193 - Standard Guide for Use of Joint Sealants 2016.
- G. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings 2016.
- H. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation 2019.
- I. GANA (GM) - GANA Glazing Manual 2022.
- J. ICC (IBC) - International Building Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use 1990 (2016).

L. NFRC 100 - Procedure for Determining Fenestration Product U-factors 2020.

1.4 QUALITY ASSURANCE

- A. Perform Work in accordance with GANA (GM) and IGMA TM-3000 for glazing installation methods.
- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.5 FIELD CONDITIONS

- A. Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.6 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals for additional warranty requirements.
- B. Insulating Glass Units: Provide a five (5) year manufacturer warranty to include coverage for seal failure, interpane dusting or misting, including providing products to replace failed units.

PART 2 PRODUCTS

2.1 MANUFACTURERS

2.2 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
 - 1. Design Pressure: Calculated in accordance with ASCE 7.
 - 2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
 - 3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
 - 4. Glass thicknesses listed are minimum.
- B. Weather-Resistive Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure water-resistive barrier, vapor retarder, and/or air barrier.
 - 1. In conjunction with weather barrier related materials described in other sections, as follows:

2. To utilize inner pane of multiple pane insulating glass units for continuity of vapor retarder and/or air barrier seal.
- C. Thermal and Optical Performance: Provide exterior glazing products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
 2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.

2.3 INSULATING GLASS UNITS

- A. Manufacturers:
1. AGC Glass North America, Inc: www.agcglass.com/#sle.
 2. Cardinal Glass Industries: www.cardinalcorp.com/#sle.
 3. Guardian Glass, LLC: www.guardianglass.com/#sle.
 4. Pilkington North America Inc: www.pilkington.com/na/#sle.Pilkington North America Inc: www.pilkington.com/na/#sle.
 5. Viracon, Apogee Enterprises, Inc: www.viracon.com/#sle.
 6. Vitro Architectural Glass (formerly PPG Glass): www.vitroglazings.com/#sle.

2.4 BASIS OF DESIGN - INSULATING GLASS UNITS

- A. Basis of Design - Insulating Glass Units: Vision glazing.
1. Applications: Exterior insulating glass glazing unless otherwise indicated.
 2. Space between lites filled with argon.
 3. Total Thickness: 1 inch.
 4. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.29, nominal.
 5. Glazing Method: Wet/dry glazing method, preformed tape and sealant.
 6. Metal Edge Spacers: Aluminum, bent and soldered corners.
 7. Spacer Color: Aluminum.
 8. Edge Seal:

- a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone sealant as secondary seal applied around perimeter.

9. Color: Black.

10. Purge interpane space with dry air, hermetically sealed.

11. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum.

- a. Glass: Clear.

12. Inboard Lite: Fully tempered float glass, 1/4 inch thick.

- a. Glass: Clear.

2.5 GLAZING COMPOUNDS

- A. Type GC-2 - Butyl Sealant: Single component; ASTM C920 Grade NS, Class 12-1/2, Uses M and A, Shore A hardness of 10 to 20; black color.

2.6 ACCESSORIES

- A. Setting Blocks: Thermoplastic, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Silicone, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.
- C. Glazing Tape, Back Bedding Mastic Type: Preformed, butyl-based, 100 percent solids compound with integral resilient spacer rod applicable to application indicated; 5 to 30 cured Shore A durometer hardness; coiled on release paper; black color.

PART 3 EXECUTION

3.1 VERIFICATION OF CONDITIONS

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.

3.2 PREPARATION

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

- B. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.3 INSTALLATION, GENERAL

- A. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

3.4 INSTALLATION - WET/DRY GLAZING METHOD (PREFORMED TAPE AND SEALANT)

- A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.
- B. Cut glazing tape to length and set against permanent stops, 3/16 inch below sight line. Seal corners by butting tape and dabbing with butyl sealant.
- C. Apply heel bead of butyl sealant along intersection of permanent stop with frame ensuring full perimeter seal between glass and frame to complete the continuity of the air and vapor seal.
- D. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.
- E. Rest glazing on setting blocks and push against tape and heel bead of sealant with sufficient pressure to attain full contact at perimeter of pane or glass unit.
- F. Install removable stops, with spacer strips inserted between glazing and applied stops 1/4 inch below sight lines.
 - 1. Place glazing tape on glazing pane of unit with tape flush with sight line.
- G. Fill gap between glazing and stop with sealant to depth equal to bite of frame on glazing, but not more than 3/8 inch below sight line.
- H. Apply cap bead of sealant along void between the stop and the glazing, to uniform line, flush with sight line. Tool or wipe sealant surface smooth.

3.5 INSTALLATION - WET/DRY GLAZING METHOD (TAPE AND SEALANT)

- A. Application - Interior Glazed: Set glazing infills from the interior of the building.
- B. Cut glazing tape to length and install against permanent stops, projecting 1/16 inch above sight line.
- C. Place setting blocks at 1/3 points with edge block no more than 6 inch from corners.
- D. Rest glazing on setting blocks and push against tape to ensure full contact at perimeter of pane or unit.
- E. Install removable stops, spacer shims inserted between glazing and applied stops at 24 inch intervals, 1/4 inch below sight line.
- F. Fill gaps between pane and applied stop with butyl type sealant to depth equal to bite on glazing, to uniform and level line.

G. Carefully trim protruding tape with knife.

3.6 CLEANING

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove nonpermanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.

END OF SECTION

DIVISION 09 – FINISHES

SECTION 09 21 16.00	GYPSUM BOARD ASSEMBLIES
SECTION 09 91 13.00	EXTERIOR PAINTING
SECTION 09 91 23.00	INTERIOR PAINTING
SECTION 09 93 00.00	STAINING AND TRANSPARENT FINISHING

SECTION 09 21 16

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Metal stud wall framing.
- B. Metal channel ceiling framing.
- C. Gypsum wallboard.
- D. Joint treatment and accessories.

1.2 REFERENCE STANDARDS

- A. AISI S220 - North American Standard for Cold-Formed Steel Nonstructural Framing 2020.
- B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing 2015, with Errata (2020).
- C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process 2022.
- D. ASTM A1003/A1003M - Standard Specification for Steel Sheet, Carbon, Metallic- and Nonmetallic-Coated for Cold-Formed Framing Members 2015.
- E. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board 2017 (Reapproved 2022).
- F. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board 2020.
- G. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs 2022.
- H. ASTM C1047 - Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base 2019.
- I. ASTM C1396/C1396M - Standard Specification for Gypsum Board 2017.
- J. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber 2021.
- K. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.

- L. GA-216 - Application and Finishing of Gypsum Panel Products 2021.

PART 2 PRODUCTS

2.1 GYPSUM BOARD ASSEMBLIES

- A. Provide completed assemblies complying with ASTM C840 and GA-216.

2.2 METAL FRAMING MATERIALS

- A. Steel Sheet: ASTM A1003/A1003M, subject to the ductility limitations indicated in AISI S240.

- B. Manufacturers - Metal Framing, Connectors, and Accessories:

1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com/#sle.
2. Jaimes Industries: www.jaimesind.com/#sle.
3. Marino: www.marinoware.com/#sle.
4. SCAFCO Corporation: www.scafco.com/#sle.
5. Steel Construction Systems: www.steelconsystems.com/#sle.
6. Steeler Construction supply.

- C. Nonstructural Framing System Components: AISI S220; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/120 at 5 psf.

1. Studs: C-shaped with knurled or embossed faces.
2. Runners: U shaped, sized to match studs.
3. Furring Members: Hat-shaped sections, minimum depth of 7/8 inch.

2.3 BOARD MATERIALS

2.4 MANUFACTURERS:

- A. American Gypsum Company: www.americangypsum.com/#sle.
- B. CertainTeed Corporation: www.certainteed.com/#sle.
- C. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
- D. National Gypsum Company: www.nationalgypsum.com/#sle.
- E. USG Corporation: www.usg.com/#sle.

- F. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
 - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
 - 2. Thickness:
 - a. Vertical Surfaces: 5/8 inch.
 - b. Ceilings: 5/8 inch.

2.5 GYPSUM BOARD ACCESSORIES

- A. Beads, Joint Accessories, and Other Trim: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
 - 1. Corner Beads: Low profile, for 90 degree outside corners.
 - 2. L-Trim with Tear-Away Strip: Sized to fit 5/8 inch thick gypsum wallboard.
 - 3. Expansion Joints:
 - a. Type: Accordion profile with factory-installed protective tape.
- B. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for project conditions.
 - 1. Paper Tape: 2 inch wide, creased paper tape for joints and corners.
 - 2. Joint Compound: Drying type, vinyl-based, ready-mixed.
- C. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inches in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion-resistant.

PART 3 EXECUTION

3.1 FRAMING INSTALLATION

- A. Metal Framing: Install in accordance with AISI S220 and manufacturer's instructions.
- B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
 - 1. Level ceiling system to a tolerance of 1/1200.
 - 2. Laterally brace entire suspension system.
- C. Standard Wall Furring: Install at masonry walls scheduled to receive gypsum board, not more than 4 inches from floor and ceiling lines and abutting walls. Secure in place on alternate channel flanges at maximum 24 inches on center.

1. Orientation: Vertical.
2. Spacing: At 16 inches on center.

3.2 BOARD INSTALLATION

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Nonrated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
 1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Installation on Metal Framing: Use screws for attachment of gypsum board.

3.3 INSTALLATION OF TRIM AND ACCESSORIES

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
 1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

3.4 JOINT TREATMENT

- A. Paper Faced Gypsum Board: Use paper joint tape, embed with drying type joint compound and finish with drying type joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
 1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
 2. Level 1: Fire-resistance-rated wall areas above finished ceilings, whether or not accessible in the completed construction.
- C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
 1. Feather coats of joint compound so that camber is maximum 1/32 inch.

3.5 TOLERANCES

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

END OF SECTION

SECTION 09 91 13

EXTERIOR PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.

1.2 RELATED REQUIREMENTS

- A. Section 09 91 23 - Interior Painting.

1.3 REFERENCE STANDARDS

- A. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials 2020.
- B. SSPC V1 (PM1) - Good Painting Practice: Painting Manual Volume 1 2016.
- C. SSPC-SP 1 - Solvent Cleaning 2015, with Editorial Revision (2016).
- D. SSPC-SP 2 - Hand Tool Cleaning 2018.
- E. SSPC-SP 3 - Power Tool Cleaning 2018.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
 - 2. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
 - 1. Where sheen is specified, submit samples in only that sheen.
 - 2. Provide sheen as scheduled below, unless otherwise shown on the drawings.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 60 00 - Product Requirements, for additional provisions.
2. Extra Paint and Finish Materials: 1 gallon of each color; store where directed.
3. Label each container with color in addition to the manufacturer's label.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years experience.

1.6 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the paint product manufacturer's temperature ranges.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Paints:

1. Diamond Vogel Paints: www.diamondvogel.com/#sle.
2. PPG Paints: www.ppgpaints.com/#sle.
3. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
4. Devo coatings.

B. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready-mixed, unless required to be a field-catalyzed paint.

1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.

2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 3. Supply each paint material in quantity required to complete entire project's work from a single production run.
 4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is described explicitly in manufacturer's product instructions.
- B. Flammability: Comply with applicable code for surface burning characteristics.
- C. Sheens: Provide the sheens specified below if not shown on the drawings.
- D. Colors: As indicated on drawings.

2.3 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
1. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.

- E. Galvanized Surfaces:
 - 1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.
- F. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and SSPC-SP3. Protect from corrosion until coated.
- G. Exterior Wood Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior calking compound after prime coat has been applied. Back prime concealed surfaces before installation.
- H. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.3 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions.
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.5 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

3.6 COLOR SCHEDULE

- A. See drawings.

3.7 PAINT AND STAIN SCHEDULE

A. Surface Preparation:

1. Notes to S-W 3 and 12 refer to the Sherwin Williams System of surface preparation specifications.
2. Notes to SSPC-SP# Refer to Steel Structures Painting Council system of surface preparation.
3. NOTE: All Mils/ct are DFT (Dry Film Thickness).

B. Ferrous Metal (Epoxy)

1. Surface Prep SSPC-SP
2. 1 coat S. Williams Kem Bond HS Primer 3.0 mils/ct
3. 2 coats S. Williams Pro Industrial Pre-catalyzed waterbased Urethane, B65-1100, semi-gloss 3.4 - 4.4 mils/ct

3.8 EXTERIOR ITEMS TO RECEIVE PAINT:

- A. Metal Doors
- B. Metal Frames
- C. Steel columns
- D. Ferrous Metal Lintels
- E. Pipe Guard Rails

END OF SECTION

SECTION 09 91 23

INTERIOR PAINTING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
 - 1. Mechanical and Electrical:
 - a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, and hangers, brackets, collars and supports, unless otherwise indicated.
 - b. In finished areas, paint shop-primed items.

1.2 RELATED REQUIREMENTS

- A. Section 09 91 13 - Exterior Painting.

1.3 REFERENCE STANDARDS

- A. SSPC V1 (PM1) - Good Painting Practice: Painting Manual Volume 1 2016.
- B. SSPC V2 (PM2) - Systems and Specifications: Steel Structures Painting Manual Volume 2 2021.
- C. SSPC-SP 1 - Solvent Cleaning 2015, with Editorial Revision (2016).
- D. SSPC-SP 2 - Hand Tool Cleaning 2018.
- E. SSPC-SP 3 - Power Tool Cleaning 2018.
- F. SSPC-SP 13 - Surface Preparation of Concrete 2018.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g., "alkyd enamel").

2. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
 3. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
1. Where sheen is specified, or shown on the drawings, provide required sheen.
- D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
1. See Section 01 60 00 - Product Requirements, for additional provisions.
 2. Extra Paint and Finish Materials: 1 gallon of each color; store where directed.
 3. Label each container with color in addition to the manufacturer's label.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.7 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Do not apply materials when relative humidity exceeds 85 percent, at temperatures less than 5 degrees F above the dew point, or to damp or wet surfaces.
- D. Minimum Application Temperatures for Paints: 50 degrees F for interiors unless required otherwise by manufacturer's instructions.
- E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide paints and finishes from the same manufacturer to the greatest extent possible.
- B. Paints:
 - 1. Diamond Vogel Paints: www.diamondvogel.com/#sle.
 - 2. PPG Paints: www.ppgpaints.com/#sle.
 - 3. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
- C. Substitutions: See Section 01 60 00 - Product Requirements.

2.2 PAINTS AND FINISHES - GENERAL

- A. Paints and Finishes: Ready-mixed, unless intended to be a field-catalyzed paint.
 - 1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 - 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 - 3. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Flammability: Comply with applicable code for surface burning characteristics.
- C. Sheens: Provide the sheens specified or as shown on the drawings.
- D. Colors: As indicated on drawings.

2.3 PAINT SYSTEMS - INTERIOR

2.4 ACCESSORY MATERIALS

- A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 - 1. Masonry, Concrete, and Concrete Masonry Units: 12 percent.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Masonry:
 - 1. Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
- F. Ferrous Metal:
 - 1. Solvent clean according to SSPC-SP 1.
 - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces.
 - 3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and SSPC_SP3. Protect from corrosion until coated.
- G. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

3.3 APPLICATION

- A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- B. Apply products in accordance with manufacturer's written instructions.
- C. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

- D. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- E. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- F. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.4 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.5 PROTECTION

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

3.6 SCHEDULE

A. Surface Preparation:

1. Notes to S-W 3 and 12 refer to the Sherwin Williams System of surface preparation specifications.
2. Notes to SSPC-SP# Refer to Steel Structures Painting Council system of surface preparation.
3. NOTE: All Mils/ct are DFT (Dry Film Thickness).

B. Concrete Block (Epoxy Paint)

1. 1 coat S. Williams Heavy Duty Block Filler 10 mils DFT
2. 2 coats S. Williams Tile Clad High Solids 3 mils DFT
3. OR
4. 1 coat PPG Perma-Crete Concrete Block and Masonry (100XI) 12 mils/ct
Surfacer/Filler
5. 2 coats PPG Aquapon WB EP WaterBorne Gloss Polyamide
Epoxy (98E) 1/100 Series) 2.0 mils/ct

C. Ferrous Metal - Alkyd

1. Preparation SSPC SP-3
2. 1 coat PPG Multiprime 4360 (4360) 2.5 mils/ct

- | | | | |
|----|---------|-------------|--|
| 3. | 2 coats | PPG | HPC Industrial Alkyd (43 Series) 1.6 - 2 mils/ct |
| 4. | OR | | |
| 5. | 1 coat | S. Williams | Kem Kromik Metal Primer 3 mils DFT |
| 6. | 2 coats | S. Williams | Industrial Enamel 2 mils each DFT |
- D. Gypsum Board
- | | | | |
|----|-----------------|-------------|---|
| 1. | 1 coat
(6-2) | PPG | Speedhide Interior Quick-Drying Latex Sealer
1 mil/ct |
| 2. | 2 coats
411 | PPG | Speedhide Interior Eggshell Latex Enamel (6-
Series) 1.6 mils/ct |
| 3. | 1 coat | S. Williams | Preprite Wall and Wood Primer 1.6 mils/ct |
| 4. | 2 coats
1.2 | S. Williams | Promar 200 Latex Eggshell Enamel
mils/ct |

3.7 INTERIOR ITEMS TO RECEIVE PAINT:

- A. Concrete Block Walls
- B. Metal Doors
- C. Metal Frames
- D. Gypsum Board

END OF SECTION

SECTION 09 93 00

STAINING AND TRANSPARENT FINISHING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Surface preparation.
- B. Field application of stains and transparent finishes.

1.2 RELATED REQUIREMENTS

- A. Section 09 91 13 - Exterior Painting: Stains and transparent finishes for concrete substrates.

1.3 REFERENCE STANDARDS

- A. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials 2020.

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
 - 1. Manufacturer's name, product name and/or catalog number, and general product category.
- C. Samples: Submit two samples, illustrating selected colors and sheens for each system with specified coats cascaded. Submit on actual wood substrate to be finished.
- D. Manufacturer's Instructions: Indicate special surface preparation procedures.
- E. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, safety data sheets (SDS), care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.
- F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
 - 2. Extra Stain and Transparent Finish Materials: 1 gallon of each color and type; from the same product run, store where directed.
 - 3. Label each container with color and type in addition to the manufacturer's label.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years of experience and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of stain or transparent finish, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Stain and Transparent Finish Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.7 FIELD CONDITIONS

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by manufacturer of stains and transparent finishes.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Provide finishes from the same manufacturer to the greatest extent possible.
- B. Stains and Transparent Finishes:
 - 1. PPG Paints Flood Exterior Transparent Finishes: www.flood.com/#sle.
 - 2. Sherwin-Williams Company: www.sherwin-williams.com/#sle.
 - 3. Sansin Corporation.
- C. Water repellant:
 - 1. Sansin Corp: .
 - 2. Arxada AG:

2.2 STAINS AND TRANSPARENT FINISHES - GENERAL

- A. Finishes:

1. Provide finishes capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
 2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
 3. Do not reduce, thin, or dilute finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.
- B. Colors: To be selected from manufacturer's full range of available colors.
1. Selection to be made by Architect after award of contract.

2.3 EXTERIOR STAIN AND TRANSPARENT FINISH SYSTEMS

- A. Finish on Wood:
1. Stain: Exterior Semi-Transparent Stain for Wood.
 - a. Products:
 - 1) Sansin Corporation: SDF Enviro Stain.
 2. Top Coat(s): Exterior Clear.
 - a. Products:
 - 1) Sansin Corporation ENS Optimum Clear.

2.4 INTERIOR STAIN AND TRANSPARENT FINISH SYSTEMS

- A. Finish on Wood.
1. Stain: Semi-Transparent Stain for Wood.
 - a. Products:
 - 1) PPG Paints Deft Interior Oil-Based Fast Dry Stain, DFT570 Series.
 2. Top Coat(s): Polyurethane Varnish, Oil Modified.
 - a. Products:
 - 1) PPG Paints Defthane Interior/Exterior Polyurethane Oil-Based Satin.

2.5 ACCESSORY MATERIALS

- A. Accessory Materials: Cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of finished surfaces.
- B. Water repellant: Arxada; Lotus Pro, Or Sansin Corporation: Boracol, Two coats.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin application of stains and finishes until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces is below the following maximums:
 - 1. Wood: 15 percent, measured in accordance with ASTM D4442.

3.2 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.
- D. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer.
- E. Apply water repellant to exposed end grain areas of glue-laminated beams.

3.3 APPLICATION

- A. Apply products in accordance with manufacturer's written instructions.
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance in thicknesses specified by manufacturer.
- D. Reinstall items removed prior to finishing.

3.4 CLEANING

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

END OF SECTION

DIVISION 10 – SPECIALTIES

SECTION 10 14 00.00	SIGNAGE
SECTION 10 14 19.00	DIMENSIONAL LETTER SIGNAGE
SECTION 10 28 00.00	TOILET, BATH, AND LAUNDRY ACCESSORIES
SECTION 10 44 00.00	FIRE PROTECTION SPECIALTIES

SECTION 10 14 00

SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Room and door signs.
- B. Interior directional and informational signs.

1.2 REFERENCE STANDARDS

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines current edition.
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- C. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign styles, font, foreground and background colors, locations, overall dimensions of each sign.
- C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
 - 1. Submit for approval by Owner through Architect prior to fabrication.
- D. Samples: Submit two samples of each type of sign, of size similar to that required for project, illustrating sign style, font, and method of attachment.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Flat Signs:
 - 1. Best Sign Systems, Inc: www.bestsigns.com/#sle.
 - 2. Cosco Industries (ADA signs); ADA Series 1: www.coscoarchitecturalsigns.com/#sle.

3. FASTSIGNS: www.fastsigns.com/#sle.
4. Inpro: www.inprocorp.com/#sle.
5. Mohawk Sign Systems, Inc: www.mohawksign.com/#sle.

2.2 SIGNAGE APPLICATIONS

- A. Accessibility Compliance: Signs are required to comply with ADA Standards and ICC A117.1, unless otherwise indicated; in the event of conflicting requirements, comply with the most comprehensive and specific requirements.
- B. Room and Door Signs: Provide a sign for scheduled doorways.
 1. Sign Type: Flat signs with engraved panel media as specified.
 2. Provide "tactile" signage, with letters raised minimum 1/32 inch and Grade II braille.
 3. Character Height: 1 inch.
 4. Sign Height: 2 inches, unless otherwise indicated.
 5. Rest Rooms: Identify with pictograms, the names " Restroom", "Restroom with Baby Changing station", "Multipurpose" and braille.
- C. Interior Informational Signs:
 1. Sign Type: Same as room and door signs: "Maximum occupancy 49 persons"

2.3 SIGN TYPES

- A. Flat Signs: Signage media without frame.
 1. Edges: Square.
 2. Corners: Radiused.
 3. Wall Mounting of One-Sided Signs: Concealed screws.
- B. Color and Font: Unless otherwise indicated:
 1. Character Font: Helvetica, Arial, or other sans serif font.
 2. Character Case: Upper case only.
 3. Background Color: black.
 4. Character Color: Contrasting color.

2.4 TACTILE SIGNAGE MEDIA

- A. Engraved Panels: Laminated colored plastic; engraved through face to expose core as background color:

2.5 ACCESSORIES

- A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install neatly, with horizontal edges level.
- C. Locate signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

END OF SECTION

SECTION 10 14 19

DIMENSIONAL LETTER SIGNAGE

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Dimensional letter signage.

1.2 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Manufacturer's product literature for each type of dimensional letter sign, indicating style, font, colors, locations, and overall dimensions of each sign.
- C. Shop Drawings:
 - 1. Include dimensions, locations, elevations, materials, text and graphic layout, and attachment details.
- D. Selection Samples: Where materials, colors, and finishes are not specified, submit two sets of selection charts or chips.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Dimensional Letter Signs:
 - 1. Gemini Inc.
 - 2. Impact Signs.
 - 3. Woodland manufacturing
 - 4. Century sign Builders

2.2 DIMENSIONAL LETTERS

- A. Applications: Building identification.
 - 1. Use individual metal letters.
 - 2. Mounting Location: Exterior as indicated on drawings.
- B. Metal Letters:
 - 1. Material: Aluminum casting.

2. Thickness: 1/8 inch minimum.
3. Letter Height: As indicated on drawings.
4. Text and Typeface:
 - a. Character Font: Helvetica, Arial, or other sans serif font.
 - b. Character Case: Upper case only.
5. Finish: Brushed, satin.
6. Color: As selected.
7. Mounting: Concealed screws.

2.3 ACCESSORIES

- A. Concealed Screws: Noncorroding metal; stainless steel or galvanized steel.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that substrate surfaces are ready to receive work.
- B. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

3.2 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install with horizontal edges level.

END OF SECTION

SECTION 10 28 00

TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Commercial toilet accessories.
- B. Diaper changing stations.
- C. Utility room accessories.

1.2 REFERENCE STANDARDS

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design 2010.
- B. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service 2022.
- C. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar 2015.
- D. ASTM B86 - Standard Specification for Zinc and Zinc-Aluminum (ZA) Alloy Foundry and Die Castings 2022.
- E. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium 2017 (Reapproved 2022).
- F. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass 2018.
- G. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use 2022.
- H. ICC A117.1 - Accessible and Usable Buildings and Facilities 2017.

1.3 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Commercial Toilet, Shower, and Bath Accessories:

1. AJW Architectural Products: www.ajw.com/#sle.
2. American Specialties, Inc: www.americanspecialties.com/#sle.
3. Bradley Corporation: www.bradleycorp.com/#sle.
4. Bobrick Washroom Equipment Inc.: www.bobrick.com.

B. Diaper Changing Stations:

1. American Specialties, Inc; 9018: www.americanspecialties.com/#sle.
2. Bradley Corporation; 961: www.bradleycorp.com/#sle.
3. Koala Kare Products; KB-100ST: www.koalabear.com/#sle.

2.2 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.

1. Grind welded joints smooth.
2. Fabricate units made of metal sheet of seamless sheets with flat surfaces.

B. Keys: Provide 2 keys for each accessory to Owner.

C. Stainless Steel Sheet: ASTM A666, Type 304.

D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.

E. Zinc Alloy: Die cast, ASTM B86.

F. Mirror Glass: Tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.

G. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

2.3 FINISHES

A. Stainless Steel: Satin finish, unless otherwise noted.

B. Chrome/Nickel Plating: ASTM B456, SC 2, polished finish, unless otherwise noted.

2.4 COMMERCIAL TOILET ACCESSORIES

- A. Mirrors: Stainless steel framed, 1/4 inch thick tempered safety glass; ASTM C1048.
 - 1. Frame: 0.05 inch angle shapes, with mitered and welded and ground corners, and tamperproof hanging system; satin finish.
 - 2. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.
- B. Grab Bars: Stainless steel, smooth surface.
 - 1. Standard Duty Grab Bars:
 - a. Push/Pull Point Load: 250 pound-force, minimum.
 - b. Dimensions: 1-1/4 inch outside diameter, minimum 0.05 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
 - c. Finish: Satin.
 - d. Length and Configuration: As indicated on drawings.
- C. Other Accessories as shown on Drawings.

2.5 COMMERCIAL ACCESSORIES

- A. Robe Hook: Heavy-duty stainless steel, single-prong, rectangular-shaped bracket and backplate for concealed attachment, satin finish.
 - 1. Products:
 - a. Bradlely: 9314.

2.6 DIAPER CHANGING STATIONS

- A. Diaper Changing Station: Wall-mounted folding diaper changing station for use in commercial toilet facilities, meeting or exceeding ASTM F2285.
 - 1. Material: Polyethylene and stainless steel
 - 2. Mounting: Recessed.
 - 3. Color: As selected.
 - 4. Minimum Rated Load: 250 pounds.

2.7 UTILITY ROOM ACCESSORIES

- A. Combination Utility Shelf/Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, with 1/2 inch returned edges, 0.06 inch steel wall brackets.
 - 1. Hooks: Two, 0.06 inch stainless steel rag hooks at shelf front.
 - 2. Mop/broom holders: Three spring-loaded rubber cam holders at shelf front.
 - 3. Length: Manufacturer's standard length for number of holders/hooks.
 - 4. Products:
 - a. Bradley: 9984.

PART 3 EXECUTION

3.1 PREPARATION

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

3.2 INSTALLATION

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.

END OF SECTION

SECTION 10 44 00

FIRE PROTECTION SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.

1.2 REFERENCE STANDARDS

- A. NFPA 10 - Standard for Portable Fire Extinguishers 2022.
- B. UL (DIR) - Online Certifications Directory Current Edition.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Fire Extinguishers:
 - 1. Ansul, a Tyco Business: www.ansul.com/#sle.
 - 2. Kidde, a unit of United Technologies Corp: www.kidde.com/#sle.
 - 3. Nystrom, Inc: www.nystrom.com/#sle.
 - 4. Potter-Roemer: www.potterroemer.com/#sle.
- B. Fire Extinguisher Cabinets and Accessories:
 - 1. Activar Construction Products Group - JL Industries: www.activarcpg.com/#sle.
 - 2. Ansul, a Tyco Business: www.ansul.com/#sle.
 - 3. Kidde, a unit of United Technologies Corp: www.kidde.com/#sle.
 - 4. Larsen's Manufacturing Co: www.larsensmfg.com/#sle.
 - 5. Nystrom, Inc: www.nystrom.com/#sle.
 - 6. Potter-Roemer: www.potterroemer.com/#sle.

2.2 FIRE EXTINGUISHERS

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.

1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
 1. Stored Pressure Operated.
 2. Class: A:B:C type.
 3. Size: 10 pound.

2.3 FIRE EXTINGUISHER CABINETS

- A. Cabinet Construction: Non-fire rated.
 1. Formed primed steel sheet; 0.036 inch thick base metal.
- B. Cabinet Configuration: Surface mounted type.
 1. Size to accommodate accessories.
 2. Trimless type.
- C. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180 degree opening with two butt hinges.
- D. Door Glazing: Acrylic plastic, clear, 1/8 inch thick, flat shape and set in resilient channel glazing gasket.
- E. Finish of Cabinet Exterior Trim and Door: Baked enamel, color as selected.
- F. Finish of Cabinet Interior: White colored enamel.

2.4 ACCESSORIES

- A. Extinguisher Brackets: Formed steel, chrome-plated.
- B. Lettering: "FIRE EXTINGUISHER" decal, or vinyl self-adhering, pre-spaced black lettering in accordance with authorities having jurisdiction (AHJ).

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Install cabinets plumb and level, 48 inches from finished floor to inside top of cabinet.
- C. Secure rigidly in place.

- D. Place extinguishers in cabinets and at maximum 48 inches to the top of the extinguisher if no cabinet.

END OF SECTION

DIVISION 12 – FURNISHINGS

SECTION 12 36 00.00

COUNTERTOPS

SECTION 12 36 00

COUNTERTOPS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Countertops for architectural cabinet work.

1.2 RELATED REQUIREMENTS

- A. Section 06 41 00 - Architectural Wood Casework.

1.3 REFERENCE STANDARDS

- A. ANSI A208.1 - American National Standard for Particleboard 2016.
- B. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use 2009.
- C. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position 2014.
- D. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials 2022.
- E. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition 2014, with Errata (2016).
- F. NEMA LD 3 - High-Pressure Decorative Laminates 2005.
- G. PS 1 - Structural Plywood 2009 (Revised 2019).

1.4 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Complete details of materials and installation .
- C. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

PART 2 PRODUCTS

2.1 COUNTERTOPS

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Plastic Laminate Countertops: High-pressure decorative laminate (HPDL) sheet bonded to substrate.

- 1. Laminate Sheet: NEMA LD 3, Grade HGS, 0.048 inch nominal thickness.

- a. Manufacturers:

- 1) Formica Corporation: www.formica.com/#sle.
- 2) Lamin-Art, Inc: www.laminart.com/#sle.
- 3) Panolam Industries International, Inc; Nevamar Standard HPL: www.panolam.com/#sle.
- 4) Panolam Industries International, Inc; Pionite Standard HPL: www.panolam.com/#sle.
- 5) Wilsonart: www.wilsonart.com/#sle.

- b. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.

- c. NSF approved for food contact.

- d. Wear Resistance: In addition to specified grade, comply with NEMA LD 3 High Wear Grade requirements for wear resistance.

- e. Finish: Matte or suede, gloss rating of 5 to 20.

- f. Surface Color and Pattern: As indicated on drawings.

- 2. Exposed Edge Treatment: Square, substrate built up to minimum 1-1/4 inch thick; covered with matching laminate.

- 3. Back and End Splashes: Same material, same construction.

- 4. Fabricate in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), Section 11 - Countertops, Custom Grade.

2.2 MATERIALS

- A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch thick; join lengths using metal splines.
- B. Particleboard for Supporting Substrate: ANSI A208.1 Grade 2-M-2, 45 pcf minimum density; minimum 3/4 inch thick; join lengths using metal splines.
- C. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- D. Joint Sealant: Mildew-resistant silicone sealant, white.

2.3 FABRICATION

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
 - 1. Join lengths of tops using best method recommended by manufacturer.
 - 2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
 - a. Rout a 1/8 inch drip groove at underside of exposed overlapping edges, set back 1/2 inch from face of edge.
 - 3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
 - 1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
 - 2. Height: 4 inches, unless otherwise indicated.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

3.2 INSTALLATION

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

- B. Attach plastic laminate countertops using screws with minimum penetration into substrate board of 5/8 inch.
- C. Seal joint between back/end splashes and vertical surfaces.
 - 1. Where applied cove molding is not indicated use specified sealant.

3.3 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

3.4 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION

DIVISION 22 – PLUMBING

SECTION 22 00 10.00	PLUMBING GENERAL PROVISIONS
SECTION 22 05 10.00	PIPE LINE TRENCHING, BACKFILLING & COMPACTING
SECTION 22 05 29.00	HANGERS & SUPPORTS FOR PLUMBING PIPING & EQUIPMENT
SECTION 22 05 53.00	IDENTIFICATION FOR PLUMBING PIPING & EQUIPMENT
SECTION 22 07 19.00	PLUMBING PIPING INSULATION
SECTION 22 11 13.00	FACILITY WATER DISTRIBUTION PIPING
SECTION 22 11 19.00	DOMESTIC WATER PIPING SPECIALTIES
SECTION 22 11 23.00	DOMESTIC WATER PUMPS
SECTION 22 13 16.00	SANITARY WASTE & VENT PIPING
SECTION 22 13 19.00	SANITARY WASTE PIPING SPECIALTIES
SECTION 22 14 16.00	STORM & CLEARWATER PIPING
SECTION 22 14 23.00	STORM DRAINAGE PIPING SPECIALTIES
SECTION 22 30 00.00	PLUMBING EQUIPMENT
SECTION 22 40 00.00	PLUMBING FIXTURES

SECTION 22 00 10.00

PLUMBING GENERAL PROVISIONS

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Plumbing work shall consist of grease trap, sanitary waste and vent,[potable water, insulation, excavation and backfill, fixtures, specialties, supports, concrete pads, and accessories, for a complete and operational system. Perform all work in conformance with the Drawings and Specifications, and Federal, State and local codes.

1.2 WORK BY OTHERS

- A. Line voltage wiring by Electrical CONTRACTOR.
- B. HVAC equipment.

1.3 VISIT TO SITE

- A. CONTRACTOR shall visit building site and become thoroughly familiar with all conditions affecting the work.

1.4 PERMITS, FEES, CODES & REGULATIONS

- A. Comply with all Federal, State and Local codes, laws, regulations and requirements.
- B. CONTRACTOR shall obtain all permits and pay all fees associated with the work involved.
- C. CONTRACTOR shall coordinate the sewer and water tap and pay all fees associated with the water and sewer connections.
- D. CONTRACTOR shall register reduced pressure backflow preventer(s) with the State of Wisconsin Department of Safety & Professional Services (DSPS) and pay registration fee.

1.5 STATE PLAN APPROVAL

- A. Preparation of Drawings for State plan approval and plan approval fee will be performed by ENGINEER / ARCHITECT, except for reduced pressure backflow preventer(s). Approval and registration shall be by CONTRACTOR, per Paragraph 1.05.E.

1.6 INTENT OF DRAWINGS & SPECIFICATIONS

- A. The Specifications and Drawings are intended to provide for a finished and complete plumbing system. Incidental details not usually shown or specified, but necessary for proper installation, are considered part of the Plumbing Scope Of Work.

- B. Minor deviations from the drawings may be made to allow for better accessibility or routing. Change of magnitude will not be allowed, unless authorized by the ENGINEER / ARCHITECT.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.1 RECORD DRAWINGS

- A. Plumbing CONTRACTOR shall provide a marked-up set of Plumbing Drawings to the ENGINEER / ARCHITECT that indicate dimensions and depths of buried piping, and any piping, equipment or fixture changes from the Design Drawings.

END OF SECTION

SECTION 22 05 10.00

PIPE LINE TRENCHING, BACKFILLING & COMPACTING

PART 1 - GENERAL

1.1 SUBMITTALS

- A. Submit product data, as specified in Division 1, Section 01 33 00.00 - Submittals.
- B. Submit Testing Laboratory Test Reports of analysis of soil materials, which will be utilized as backfill material.

PART 2 - PRODUCTS

2.1 PIPE LINE BACKFILL MATERIALS

- A. Materials for backfilling trenches are specified in PART 3 - EXECUTION.

PART 3 - EXECUTION

3.1 PIPE LINE TRENCHING, BACKFILLING & COMPACTING

- A. Trenching:
 - 1. All trenching shall be by open cut, unless otherwise shown or specified.
 - 2. The maximum trench width 2-feet above the top of the pipe to the trench bottom shall be the outside diameter of the pipe, plus 24-inches. The trench walls shall be kept vertical whenever possible. Side-sloping or 'benching down' of the trench will be permitted, except where the trench is excavated within a permanent pavement or where such side-sloping or benching would encroach upon private property or endanger existing or future underground utilities or structures. Where side-sloping or 'benching down' is used, the normal trench width at the top of the pipe shall not be exceeded. The ENGINEER / ARCHITECT may prohibit side-sloping or benching for any of the above reasons.
 - 3. Trenches shall be sufficiently straight between designated angle points to permit the pipe to be laid straight and true to line and grade.
 - 4. Where the normal trench width below 2-feet above the top of the pipe is exceeded for any reason, except due to the use of tight sheathing, the CONTRACTOR, at their own expense, shall furnish an adequate section for the actual trench width. This may be accomplished by furnishing a stronger pipe, a concrete cradle, cap or envelope or trench restoration, whichever is an adequate section. Tight sheathing may be used in lieu of a stronger pipe section to maintain the required trench width for the required height and depth. When the pipe specified is strong enough for the actual trench width, no further provision need be made for the greater trench width.

5. The trench shall be excavated to the required depth below the flow line (invert) of the pipe line being constructed allowing for the thickness of the pipe and the depth required for bedding. If the CONTRACTOR excavates too deep for underground mains, the CONTRACTOR shall, at their own expense, shall refill all such excavated space with such material and in such manner as directed by the ENGINEER / ARCHITECT.
6. All backfilling shall be carried along as speedily as possible. Backfilling shall not be left unfinished more than 100-feet behind the completed pipe work unless permitted by the ENGINEER / ARCHITECT. New trenching will not be permitted when earlier trenches need backfilling or labor is needed to restore the surfaces of streets or other areas to a safe and proper condition. Not more than one (1) street crossing may be obstructed by the same trench at any one time. All trenches and excavation shall be barricaded and lighted in accordance with the State, County and local jurisdiction.
7. CONTRACTOR shall have available a supply of steel plates with minimum dimensions of 4'x 8'x 1". The plates shall be used to bridge open trenches crossing roadways. When used, they shall be secured against the possibility of shifting or dropping into the excavation. During winter months, these plates shall not be left in the roadway over night unless specifically required by the ENGINEER / ARCHITECT.

B. Unstable Foundation:

1. All undesirable material below the trench bottom, manhole or any structure, such as organic soils, etc., which cannot adequately support the sewer, shall be removed and replaced with crushed stone. Where the distance to stable ground is excessive, the ENGINEER / ARCHITECT reserves the right to order, in writing, as an extra, such other types of foundation as deemed necessary.
2. ENGINEER / ARCHITECT shall be informed immediately, and later in writing, of all locations of unstable trench conditions where additional stone fill will be required.

C. Pipe Bedding Sections & Materials:

1. Standard Section, Class C
 - a. Class C bedding shall have a layer of bedding material conforming to the specifications in Table 22 05 10.00-1 or Table 22 05 10.00-2, depending upon the pipe to be installed, spread over the bottom of the trench and solidly compacted so after the pipe has been placed thereon, imbedded to grade and aligned, there remains a 4-inch minimum depth of bedding material below the pipe barrel and a minimum of 3-inches below the bell.
 - b. If excavation has been carried deeper than 6-inches below the pipe barrel, the excess depth shall be filled with Class D concrete or crushed stone. Care shall be taken to ensure that the pipe does not rest directly on the bell

but is uniformly supported through its entire length.

- c. After the pipe has been properly laid and jointed, bedding material shall be carefully placed to 12-inches above the top of pipe, making sure that the lower quadrants of the pipe are firmly bedded and supported. The trench section above the bedding shall be carefully backfilled with excavated material, except in paved areas or those areas requiring special backfill.
- d. All bedding material proposed for use in this project shall be reviewed for use by the ENGINEER / ARCHITECT prior to the beginning of construction. Substitutions for bedding material will be permitted only by a written authorization by the ENGINEER / ARCHITECT. The materials to be provided for the pipe being installed are listed in Table 22 05 10.00-1, Table 22 05 10.00-2 and Table 22 05 10.00-3.

TABLE 22 05 10.00-1

**BEDDING MATERIAL FOR BUILDING DRAIN & SEWERS
18-INCHES IN DIAMETER OR LESS**

Crushed pit-run gravel, pea gravel or crushed stone chips shall conform substantially to these grading requirements: (3/8-inch size).

Sieve Size	Percentage Passing By Weight
1-inch	100
3/4-inch	95-100
3/8-inch	30-55
No. 4	0-10
No. 8	0-5

TABLE 22 05 10.00-2

**BEDDING MATERIAL FOR BUILDING DRAIN & SEWERS
LARGER THAN 18-INCHES IN DIAMETER**

Crushed pit-run gravel, pea gravel or crushed stone chips shall conform substantially to these grading requirements: (3/4" size).

Sieve Size	Percentage Passing By Weight
1-inch	100
3/4-inch	95-100
3/8-inch	20-55
No. 4	0-10

TABLE 22 05 10.00-3

BEDDING MATERIAL FOR WATER MAINS & FORCE MAINS

Bedding sand shall consist of durable particles ranging in size from fine to coarse in a substantially uniform combination. Unwashed bank-run sand, rejected concrete sand and crushed bank-run gravel will be considered generally acceptable under this specification. The presence of approximately 6% of fine clay or loam particles is desirable, but clay or loam lumps are not permitted. The maximum moisture content shall be 10%. Bedding sand shall conform substantially to these grading requirements:

Sieve Size	Percentage Passing By Weight
1-inch	100
No. 16	45-80
Material Finer Than No. 200	2-10

D. Backfilling Trenches:

1. Excavated Material for Backfill in Lawn Area

- a. When specified in the Contract Documents, material excavated from an open trench may be used for backfilling, provided a different type of backfill material has not been specified on the Drawings or ordered in writing as an extra by the OWNER, and it meets the following requirement.

- 1) Excavated material may be used as backfill provided that such material consists of loam, clay or other materials, which, in the judgment of the ENGINEER / ARCHITECT, are suitable for backfilling. Unstable backfill materials include vegetable or other organic matter, all types of refuse, large pieces or fragments of concrete, large stones or boulders and such other material as in the judgment of the ENGINEER / ARCHITECT are unsuitable for backfilling. Frozen backfill material shall not be used.

- b. Where excavated material is used for backfilling and there is a deficiency due to the rejection of a part thereof, the CONTRACTOR, upon the written order of the OWNER as an extra, shall remove rejected material from the site of the work and shall furnish an additional quantity of suitable clay, loam or gravel backfill.

- c. The backfilling of the trench section above the bedding section of all pipe lines shall be carefully placed to a level 3-feet above the pipe to avoid disturbance to the completed pipe line. The backfill material in this section shall be free of any stones or concrete larger than 3-inches in diameter.

2. Special Backfill

- a. In buildings and in areas where the work lies under or crosses aggregate bases, concrete or bituminous paved streets or alleys, or curbing or sidewalk, the backfilling of the pipe and trenches shall be made with Special Backfill, as specified in Table 22 05 10.00-4, and mechanically com-

pacted. CONTRACTOR shall include the cost of this work and hauling away any excavated material.

- b. Material to be used for Special Backfill shall consist of durable particles ranging in size from fine to coarse in a substantially uniform combination. Unwashed bank-run sand and crushed bank-run gravel will be considered acceptable under this Specification if this material conforms substantially to the gradations listed in Table 22 05 10.00-4. Bedding material may be substituted for Special Backfill material in building drain and sewer installation.

TABLE 22 05 10.00-4

REQUIREMENTS FOR SPECIAL BACKFILL

Sieve Size	Percentage Passing By Weight
2-inch	95-100
3/4-inch	70-100
No. 4	35-65
No. 40	15-45
No. 200	5-15

E. Surface Restoration:

1. The restoration of all paved, concrete or gravel surfaces shall be completed in accordance with the requirements of the State, County and Local jurisdiction.
2. The restoration of all unpaved surfaces shall restore the surface to its original condition.
3. The restoration of the project area shall be completed to return the project site to a 'before construction' condition. All work, material and equipment required to return the project area to its original condition shall be considered as incidental to the Contract. The opinion of the OWNER shall be final in determining the condition of the project site restoration.

F. Compaction Of Trench Backfill:

1. Mechanical Compaction shall be as specified in Table 22 05 10.00-5.
2. The initial compacted lift shall not exceed 2'-0", with subsequent lifts to not exceed 1'-0" up to finished grade.

TABLE 22 05 10.00-5

MECHANICAL COMPACTION

Excavated Area	% Compaction Fine-Grained Soil	% Compaction Coarse-Grained Soil	Relative Density *
Within 10' of building lines under footings, floor slabs and structures attached to buildings (i.e., walls,			

TABLE 22 05 10.00-5

MECHANICAL COMPACTION

Excavated Area	% Compaction Fine-Grained Soil	% Compaction Coarse-Grained Soil	Relative Density *
stoops, steps) and the upper 4' or a distance twice the trench width, whichever is greater, of any trench located under any concrete or asphalt paved surfaces.	90%	95%	70%
10' beyond building lines under walks, driveways, curbing, concrete or asphalt paving, sub-grade preparation and the remaining section of any trench located under these paved surfaces.	80%	90%	60%
10' beyond building lines under seeded, sodded and landscaped areas, and any trench located under these areas.	80%	90%	---
Coarse-grained soils are classified as those soils with more than 50% (by weight) larger than the No. 200 mesh sieve and with a plastic index less than 4.			
Compaction requirements maximum density shall be determined by AASHTO Designation T99, Method C, with replacement of the fraction of material retained in the 3/4-inch sieve with No. 4 to 3/4-inch material.			
* <i>Minimum relative density requirements apply to coarse-grained soils and apply only in cases where the percentage compaction requirements are not being reached.</i>			

END OF SECTION

SECTION 22 05 29.00

HANGERS & SUPPORTS FOR PLUMBING PIPING & EQUIPMENT

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Equipment and pipe hangers, supports and associated anchors.
- B. Sleeves and seals.
- C. Flashing and sealing equipment and pipe penetrations.

1.2 RELATED WORK

- A. Division 22, Section 22 07 19.00 - Plumbing Piping Insulation.

1.3 SUBMITTALS

- A. Submit product data under provisions of Division 1, Section 01 33 00.00 - Submittals.
- B. Indicate hanger and support framing, and attachment methods.

PART 2 - PRODUCTS

2.1 PIPE HANGERS & SUPPORTS

- A. Hangers For Insulated Pipe Sizes ½ to 12-Inches: Galvanized steel, adjustable, clevis; Eaton B-Line, B3100, or equal.
- B. Multiple Or Trapeze Hangers: Galvanized steel, 1-5/8" x 1-5/8"; Eaton B-Line, B24, or equal. 14-gauge Unistrut with Unistrut clamp at each hanger. Where copper or plastic pipes are clamped to Unistrut, provide Eaton B-Line, BVT or BVP, VIBRA clamp, or equal.
- C. Vertical Support: Steel riser clamp compatible with pipe material; PVC coated for plastic and copper pipe.
- D. Hangers For Non-Insulated Steel Pipe Sizes ½ to 12-Inches: Galvanized steel, adjustable, clevis; Eaton B-Line, B3100, or equal.
- E. Copper Pipe Support - Non-Insulated: Carbon steel ring, adjustable, copper plated with plastic coating; Eaton B-Line, B3170 CTC, or equal.
- F. Plastic Pipe Support - Non-Insulated: Carbon steel ring, adjustable, pre-galvanized, plastic coated; Eaton B-Line, Figure 200 C, or equal.
- G. Roof Top Supports: Rubber support base with galvanized Unistrut channel and galvanized Unistrut clamp; Eaton B Line, DB10 Dura-Blok, or equal,

- H. Shield For Insulated Piping (2-inch & Smaller): 16-gauge stainless steel shield over insulation in 120° segments, minimum 12-inches long at pipe support.
- I. Shields For Insulated Piping 2½-inches & Larger: Hard block non-conducting saddles in 90° segments, 12-inch minimum length, block thickness same as insulation thickness.
- J. All hangers shall be oversized so that insulation extends continuous through hanger for all insulated piping.

2.2 HANGER RODS

- A. Steel Hanger Rods: Galvanized steel, continuous threaded.

2.3 INSERTS

- A. Malleable iron case with slotted cadmium plated threaded insert for hanger rod.

PART 3 - EXECUTION

3.1 MECHANICAL ANCHORS

- A. All mechanical anchors for anchorage to concrete shall comply with American Concrete Institute (ACI) 318, Appendix D, for use in cracked concrete.

3.2 INSERTS

- A. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
- B. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4-inches.
- C. Where concrete slabs form finished ceiling, provide inserts to be flush with slab surface.
- D. Where inserts are omitted, provide self-drilling anchor, expansion bolts or drill through concrete slab from below, and provide thru-bolt with recessed square steel plate and nut above flush with top, recessed into and grouted flush with slab.

3.3 PIPE HANGERS & SUPPORTS

- A. Support piping as provided in Table 22 05 29.00-1.

Pipe Material	Pipe Size	Max. Horizontal Hanger Spacing	Hanger Rod Diameter	Max. Vertical Support Spacing
Steel	½" - 1¼"	6'-6"	3/8"	15'-0"
	1½" - 2"	10'-0"	3/8"	15'-0"
	2½" - 3"	10'-0"	1/2"	15'-0"
	4" - 6"	10'-0"	5/8"	15'-0"
	8" - 12"	14'-0"	3/4"	15'-0"
	14" - 18"	20'-0"	7/8"	15'-0"
Copper	½" - 1¼"	6'-0"	3/8"	10'-0"
	1½" - 2"	10'-0"	3/8"	10'-0"
	2½" - 4"	10'-0"	1/2"	10'-0"
	5" - 6"	10'-0"	5/8"	10'-0"
Cast Iron	1½" - 4"	5'-0"	3/8"	15'-0"
	5" - 6"	5'-0"	1/2"	15'-0"
	8" - 10"	5'-0"	5/8"	15'-0"
	12"	5'-0"	3/4"	15'-0"
Plastic	½" - 4"	4'-0"	3/8"	10'-0"
	6" - 8"	4'-0"	1/2"	10'-0"
	10" - 12"	4'-0"	5/8"	10'-0"

- B. Install hangers to provide minimum 1½-inch space between finished covering and adjacent work.
- C. Place a hanger within 12-inches of each horizontal elbow.
- D. Use hangers with 1½-inch minimum vertical adjustment.
- E. Support horizontal cast iron pipe adjacent to each hub, with 5-feet maximum spacing between hangers.
- F. Support vertical piping at every floor, and as scheduled.
- G. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.
- H. Support riser piping independently of connected horizontal piping.
- I. At trapeze hangers, roof supports, and pipe supported by wall brackets, provide Unistrut clamp or U-bolt pipe at each bracket or hanger. Unistrut clamps shall be of the same material specified for channel system.
- J. Provide hanger or floor stand on piping adjacent to each flexible connection to equipment or pumps.
- K. Review drawings for spacing of structural members and provide additional structural supports, as required, so maximum hanger spacing is not exceeded.

END OF SECTION

SECTION 22 05 53.00

IDENTIFICATION FOR PLUMBING PIPING & EQUIPMENT

PART 1 - GENERAL

1.1 SUBMITTALS

- A. Submit product data as specified in Division 1, Section 01 33 00.00 - Submittals.

1.2 DELIVERY, STORAGE & HANDLING

- A. Deliver and store products under provisions of Division 1, Section 01 60 00.00 - Material & Equipment.

1.3 RELATED SECTIONS

- A. Division 22, Section 22 07 19.00 - Plumbing Piping Insulation.
- B. Division 22, Section 22 11 13.00 - Facility Water Distribution Piping.
- C. Division 22, Section 22 13 13.00 - Facility Sanitary Sewers.
- D. Division 22, Section 22 14 13.00, Facility Storm Sewers.

PART 2 - PRODUCTS

2.1 PIPING IDENTIFICATION

- A. All new piping exposed or in access spaces shall be identified at 20'- 0" intervals with vinyl film indoor/outdoor with pressure sensitive tape; W.H. Brady labels, Series 946, or equal.
- B. Wrap pipe with directional arrows at each end of the pipe marking tape.

2.2 VALVE IDENTIFICATION

- A. Identify each valve with 1½-inch brass tags with number and system; Brady, Series 23000, or equal.
- B. Provide two (2) copies of a typed chart on 8½" x 11" paper and one (1) plastic laminate chart for mounting in the Mechanical Room, as designated.

PART 3 - EXECUTION

3.1 IDENTIFICATION DEVICES

- A. Provide identification devices per Manufacturer's recommendations.

END OF SECTION

SECTION 22 07 19.00

PLUMBING PIPING INSULATION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Domestic Water Piping Insulation: Cold, Hot, Hot water re-circulating
- B. Clearwater condensation drain piping insulation.

1.2 RELATED WORK

- A. Division 22, Section 22 05 29.00 - Hangers & Supports For Plumbing Piping & Equipment.

1.3 REFERENCES

- A. ASTM C-177 - Steady State Thermal Transmission Properties By Means Of The Guarded Hot Plate
- B. ASTM C-518 - Steady State Thermal Transmission Properties By Means Of Heat-Flow Meter
- C. ASTM E-84 - Surface Burning Characteristics Of Building Materials

1.4 QUALITY ASSURANCE

- A. Applicator: Company specializing in piping insulation application with 3-years minimum experience.

1.5 SUBMITTALS

- A. Submit product data as provided in Division 1, Section 01 33 00.00 - Submittals.
- B. Include product description, list of materials and thickness for each service, and locations.
- C. Submit Manufacturer's installation instructions.
- D. Submit Underwriters Laboratories (UL) listed system for penetrations through smoke and/or fire-rated floors or walls.

PART 2 - PRODUCTS

2.1 COLD WATER, HOT WATER, HOT WATER RE-CIRCULATING

- A. Heavy density, 2-piece, fiberglass, with ASJ/SSL-II jacket; Owens-Corning, or equal.

- B. Insulate fittings with insulating cement to an equal thickness to the adjoining pipe insulation. Alternatively, 'Zeston' style pre-molded PVC fittings may be used.
- C. Thickness of insulation shall be 1-inch.
- D. Insulation shall be tested in accordance with UL-723, with a fire hazard classification not exceeding 25 flame spread or 50 smoke developed.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Install materials after piping has been tested and reviewed.

3.2 INSTALLATION

- A. Install materials in accordance with Manufacturer's instructions.
- B. Continue insulation with vapor barrier through penetrations and hangers. Insulation shall be continuous through valves and unions.
- C. Through fire-rated assemblies, provide an Underwriter's Laboratory (UL) listed insulation system, as required for the piping material and fire-rated assembly.
- D. Seal and secure butt ends and fittings with adhesive; Aeroseal, or equal.
- E. At hangers, where a continuous vapor barrier is maintained, provide a molded foam glass insulation block on the bottom half of the pipe. Provide a 16-gauge saddle, 12-inches long, over the pipe insulation between the jacket and the hanger.

3.3 AIR PLENUM INSULATION

- A. Insulation CONTRACTOR shall carefully review HVAC Drawings for piping to be insulated in ventilation air plenum spaces.
- B. All materials shall conform to Wisconsin Administrative Code, Comm 64.0602 for use in air plenums.

END OF SECTION

SECTION 22 11 13.00

FACILITY WATER DISTRIBUTION PIPING

PART 1 - GENERAL

1.1 SUBMITTALS

- A. Submit product data, as specified in Division 1, Section 01 33 00.00 - Submittals.
- B. Include data on pipe, fittings, valves and accessories.
- C. Submit Underwriter's Laboratories (UL) listed fire-stopping system for penetrations through fire-rated assemblies.

1.2 DELIVERY, STORAGE & HANDLING

- A. Deliver and store products under provisions of Division 1, Section 01 60 00.00 - Materials & Equipment.

1.3 RELATED SECTIONS

- A. Division 22, Section 22 05 10.00 - Pipeline Trenching, Backfilling & Compacting.
- B. Division 22, Section 22 05 29.00 - Hangers & Supports For Plumbing Piping & Equipment.
- C. Division 22, Section 22 05 53.00 - Identification For Plumbing Piping & Equipment.
- D. Division 22, Section 22 07 19.00 - Plumbing Piping Insulation.

1.4 REFERENCE STANDARDS

- A. Pipe & Pipe Fittings For Water Supply Systems:
- B. Made of a material that contains a weighted average of not more than 0.25% lead in the wetted surface material.
- C. Plumbing fixture fittings that are end-point devices covered by the scope of NSF 61, Section 9, and installed to supply water intended for human ingestion:
- D. Conform to NSF 61, Section 9.

PART 2 - PRODUCTS

2.1 INTERIOR WATER - BELOW GRADE

- A. Copper: ASTM B-88, Type L, soft; Fittings - ANSI B-16.26, flared.

2.2 WATER PIPE - ABOVE GRADE

- A. Copper: Type L, hard drawn pipe - ASTM B-88; Wrought Iron Copper Fittings - ANSI/ASME B-16.29 or cast brass fittings - ANSI/ASME B-16.23; Joints - ANSI/ASTM B-32; Solder Grade - Lead free fittings; Nibco.

2.3 WATER SHUT-OFF VALVE (3-inch & Smaller)

- A. Apollo, 77FLF-140: Brass threaded full port ball valve, 600 psig WOG, 150 psig saturated steam, 316 stainless steel ball and stem, RPTFE seats and packing, zinc-plated lever with vinyl cover.
- B. Apollo, 77FLF-240: Brass sweat full port ball valve, 600 psig WOG, 316 stainless steel ball and stem, RPTFE seats and packing, zinc plated lever with vinyl cover.

2.4 WATER BALANCING VALVE

- A. Caleffi, Model 132 Quicksetter+ calibrated valve with brass body, brass ball, and graduated scale flow meter.

2.5 WATER CHECK VALVE

- A. Nibco, S-413-Y-LF/ T-413-Y-LF: Swing check, bronze body, soldered or threaded ends, PTFE disk.

2.6 DRAIN VALVES

- A. Nibco #74: ½-inch, M.I.P. x ¾-inch hose.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

- A. Provide non-conducting dielectric connections when joining dissimilar metals.
- B. Provide adapters between piping of dissimilar metals.

3.3 APPLICATION

- A. Install unions downstream of equipment or apparatus connections.

3.4 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify system is complete, flushed and clean.
- B. Inject disinfectant (free chlorine in liquid, powder, tablet or gas form) throughout system to obtain 50 to 80 mg/L residual.
- C. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15% of outlets.
- D. Maintain disinfectant in system for 24-hours.
- E. Flush disinfectant from system until residual is equal to that of incoming water or 1.0 mg/L.
- F. Take samples no sooner than 24-hours after flushing from furthest outlet and from water entry, and analyze in accordance with AWWA C-601. CONTRACTOR shall include cost of analyzing water sample.

3.5 TESTING OF PIPING SYSTEMS

- A. Test interior water piping to a minimum of 1½-times the maximum working pressure of the system, or a minimum of 100 psi. Hold test for a minimum of 2-hours.

3.6 SEALING & FIRE-STOPPING

- A. Plumbing CONTRACTOR shall reference the Drawings for identification of fire and/or smoke related floors or walls.
- B. Penetrations or installation within all fire rated assemblies shall be performed to provide a fire resistant rating of at least equal to the hourly resistant rating of the floor, wall or partition. All systems shall meet the test standards of ASTM E-814 and UL 1479, and utilize a UL-approved through penetration fire stop system, which is applicable to the fire rated assembly material, pipe material, and classification of the fire rated assembly.
- C. Materials for fire-stopping shall consist of intumescent wrap-strips, intumescent fire-stop collars, fire-stop putty, fire-stop mortar, or a combination of the systems, to provide a UL listed system.
- D. For non-fire rated floors and walls, caulk annular space to provide a smoke-proof and water-proof penetration.

3.7 PIPING IN AIR PLENUMS

- A. PVC, CPVC and PEX piping shall not be used in ventilation plenum spaces, including plenum ceilings. CONTRACTOR shall carefully review HVAC Drawings and transition to non-combustible material in ventilation plenum spaces and plenum ceilings.

END OF SECTION

SECTION 22 11 19.00

DOMESTIC WATER PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUBMITTALS

- A. Submit product data, as specified in Division 1, Section 01 33 00.00 - Submittals.
- B. Include data on all specialties.

1.2 DELIVERY, STORAGE & HANDLING

- A. Deliver and store products under provisions of Division 1, Section 01 60 00.00 - Material & Equipment.

1.3 RELATED SECTIONS

- A. Division 22, Section 22 11 13.00 - Facility Water Distribution Piping.

1.4 REFERENCE STANDARDS

- A. Water Supply Systems:
 - 1. Pipes and pipe fittings for water supply systems shall be made of a material that contains a weighted average of not more than 0.25% lead in the wetted surface material.
- B. Plumbing Fixture Fittings Which Are End-Point Devices:
 - 1. Covered by the scope of NSF 61, Section 9.
 - 2. Installed to supply water intended for human ingestion.
 - 3. Conform to NSF 61, Section 9.

PART 2 - PRODUCTS

2.1 HOSE BIBBS

- A. (HB-1) Woodford Model B74. Wall hydrant with square box and keyed door. For non-freezing areas only.

2.2 WATER HAMMER ARRESTOR

- A. Watts, Series 15, M2: ½-inch to 1-inch. Sizes to be selected based on manufacturers recommendations.

2.3 THERMOMETER

- A. Tterice, BX-91403-½: A105 socket W/30°F to 180°F range.

2.4 THERMAL EXPANSION TANK

- A. Therm-X-Trol, Model ST-12C: ASME, thermal expansion tank.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install specialties in compliance with Manufacturer's recommendations.
- B. Install water piping specialties in accordance with Manufacturer's recommendations. Coordinate equipment located with piping, ductwork, conduit and equipment of other trades to allow sufficient clearances. Locate specialties and arrange plumbing piping to provide access space for servicing all components.

3.2 POURED CONCRETE WALL PENETRATIONS

- A. Poured concrete walls shall be sleeved, with space between sleeve and pipe sealed with link seal modular links. In lieu of sleeving wall, the concrete wall may be core drilled and the annular space between pipe and wall sealed with link seals on the interior and exterior surface of the wall.
 - 1. Acceptable Manufacturer - Sleeves
 - a. Thunderline, Century Line.
 - b. Or equal.

END OF SECTION

SECTION 22 11 23.00

DOMESTIC WATER PUMPS

PART 1 - GENERAL

1.1 SUBMITTALS

- A. Submit product data, as specified in Division 1, Section 01 33 00.00 - Submittals.
- B. Include data on pipe, fittings, valves and accessories.

1.2 DELIVERY, STORAGE & HANDLING

- A. Deliver and store products under provisions of Division 1, Section 01 60 00.00 - Material & Equipment.

1.3 RELATED SECTIONS

- A. Division 22, Section 22 11 13.00 - Facility Water Distribution Piping.

PART 2 - PRODUCTS

2.1 HOT WATER RE-CIRCULATING PUMPS

- A. Bell & Gossett, NBF-9U/LW: Lead-free bronze circulator pump, 115-volt, 1/40-HP, with TC-1 automatic timer kit.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install domestic water pumps in accordance with Manufacturer's recommendations. Coordinate equipment located with piping, ductwork, conduit and equipment of other trades to allow sufficient clearances. Locate specialties and arrange plumbing piping to provide access space for servicing all components.

END OF SECTION

SECTION 22 13 16.00

SANITARY WASTE & VENT PIPING

PART 1 - GENERAL

1.1 SUBMITTALS

- A. Submit product data, as specified in Division 1, Section 01 33 00.00 - Submittals.
- B. Include data on pipe and fittings.
- C. Submit Underwriter's Laboratories (UL) listed fire-stopping system for penetrations through fire-rated assemblies.

1.2 DELIVERY, STORAGE & HANDLING

- A. Deliver and store products under provisions of Division 1, Section 01 60 00.00 - Materials & Equipment.

1.3 RELATED SECTIONS

- A. Division 22, Section 22 05 10.00 - Pipeline Trenching, Backfilling & Compacting.
- B. Division 22, Section 22 05 29.00, Hanger & Supports For Plumbing Piping & Equipment.
- C. Division 22, Section 22 05 53.00 - Identification For Plumbing Piping & Equipment.

PART 2 - PRODUCTS

2.1 SANITARY WASTE & VENT - BELOW GRADE

- A. PVC: Schedule 40 - ASTM D-1785; Schedule 40 DWV Fittings - ASTM D-2466; Solvent Cement - Connections per ASTM D-2855.

2.2 SANITARY WASTE & VENT - ABOVE GRADE

- A. PVC: Schedule 40 - ASTM D-1785; Schedule 40 DWV Fittings - ASTM D-2466; Solvent Cement - Connections per ASTM D-2855.

PART 3 - EXECUTION

3.1 SANITARY WASTE & VENT TESTING

- A. Test sanitary waste and vent by filling with water so that the highest point in the system is under a 10-foot head of water. Hold test for 15-minutes before the start of inspection. The system shall be water tight throughout the system.
- B. Alternately, test the sanitary waste and vent system by filling with compressed air to a gauge pressure of 5 psi. Hold test for 15-minutes without introducing additional air.

3.2 SEALING & FIRE-STOPPING

- A. Plumbing CONTRACTOR shall reference the Drawings for identification of fire and/or smoke related floors or walls.
- B. Penetrations or installation within all fire rated assemblies shall be performed to provide a fire resistant rating of at least equal to the hourly resistant rating of the floor, wall or partition. All systems shall meet the test standards of ASTM E-814 and UL 1479, and utilize a UL approved through penetration fire stop system, which is applicable to the fire rated assembly material, pipe material and classification of the fire rated assembly.
- C. Materials for fire-stopping shall consist of intumescent wrap-strips, intumescent fire-stop collars, fire-stop putty, fire-stop mortar, or a combination of the systems, to provide a UL listed system.
- D. For non-fire rated floors and walls, caulk annular space to provide a smoke-proof and water-proof penetration.

3.3 PIPING IN AIR PLENUMS

- A. PVC piping shall not be used in ventilation plenum spaces, including plenum ceilings. CONTRACTOR shall carefully review HVAC Drawings and transition to non-combustible material in ventilation plenum spaces and plenum ceilings.

END OF SECTION

SECTION 22 13 19.00

SANITARY WASTE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUBMITTALS

- A. Submit product data, as specified in Division 1, Section 01 33 00.00 - Submittals.
- B. Include data on specialties in this section.

1.2 DELIVERY, STORAGE & HANDLING

- A. Deliver and store products under provisions of Division 1, Section 01 60 00.00 - Material & Equipment.

PART 2 - PRODUCTS

2.1 FLOOR DRAINS

- A. (FD-1) - Zurn, ZN-415-B: 6-inch round nickel bronze top.

2.2 HUB DRAIN

- A. (HD) - Pipe extended 3-inches above finished floor surface.

2.3 CLEAN-OUTS

- A. (FCO-1) - Zurn ZN-1400: Nickel bronze top and neo-loc outlet.

2.4 INTERIOR GREASE INTERCEPTOR

- A. (GI-1) - Schier, GB-1-FCR1, Interior flush-with-floor (27" X 23" X 12") grease interceptor with riser, 4" inlet and outlet, 70-pound capacity at 20 gallons per minute.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install specialties in compliance with Manufacturer's recommendations.

3.2 INSTALLATION OF FLOOR DRAINS

- A. Unless otherwise specified, Plumbing CONTRACTOR shall set floor drains at elevations per Table 22 13 19.00-1:

Table 22 13 19.00-1

FLOOR DRAIN ELEVATION

Room Type	Drain Grate Elevation	Floor Slope
Toilet Rooms	½-inch Below Finished Floor	Slope Floor at 2'-0" Radius Around Drain
Mechanical Rooms	Varies	Uniform, continuous slope of entire room at not less than 1/8-inch per foot measured in long direction. Not to exceed 3/8-inch per foot in short direction.
Wet Areas	Varies	Uniform, continuous slope of entire area from high point, at not less than 3/16-inch per foot measured in long direction. Not to exceed ½-inch per foot in short direction.

3.3 POURED CONCRETE WALL PENETRATIONS

- A. Thunderline, Centuryline, or equal: Poured concrete walls shall be sleeved with sleeves, with annular space between sleeve and pipe sealed with modular links.
 - 1. Acceptable Manufacturer - Modular Links
 - a. Link Seal.
 - b. Or equal.
- B. In lieu of sleeving wall, the concrete wall may be core drilled, and the annular space between pipe and wall sealed with modular links on the interior and exterior surface of the wall.
 - 1. Acceptable Manufacturer - Modular Links
 - a. Link Seal.
 - b. Or equal.

END OF SECTION

SECTION 22 14 16.00

STORM & CLEAR WATER PIPING

PART 1 - GENERAL

1.1 SUBMITTALS

- A. Submit product data, as specified in Division 1, Section 01 33 00.00 - Submittals.
- B. Include data on pipe and fittings.
- C. Submit Underwriter's Laboratories (UL) listed fire-stopping system for penetrations through fire-rated assemblies.

1.2 DELIVERY, STORAGE & HANDLING

- A. Deliver and store products under provisions of Division 1, 01 60 00.00 - Material & Equipment.

1.3 RELATED SECTIONS

- A. Division 22, Section 22 05 10.00 - Pipe Line Trenching, Backfilling & Compacting.
- B. Division 22, Section 22 05 29.00 - Hangers & Supports For Plumbing Piping & Equipment.
- C. Division 22, Section 22 05 53.00 - Identification For Plumbing Piping & Equipment.

PART 2 - PRODUCTS

2.1 CONDENSATE DRAINAGE

- A. CPVC: Schedule 80 Pipe - ASTM F441; Schedule 80 DWV Fittings - ASTM F493; Solvent Cement - Connections per ASTM D-2855.

2.2 CONDENSATE VENT

- A. PVC: Schedule 40 Pipe - ASTM D-1785; Schedule 40 DWV Fittings - ASTM D-2466; Solvent Cement - Connections per ASTM D-2855.

PART 3 - EXECUTION

3.1 STORM & CLEAR WATER WASTE & VENT TESTING

- A. Test storm and clear water waste and vent by filling with water so that the highest point in the system is under a 10-foot head of water. Hold test for 15-minutes before the start of inspection. The system shall be water tight throughout the system.

- B. Alternately, test the storm and clear water waste and vent system by filling with compressed air to a gauge pressure of 5 psi. Hold test for 15-minutes without introducing additional air.

3.2 SEALING & FIRE-STOPPING

- A. Plumbing CONTRACTOR shall reference the Drawings for identification of fire and/or smoke related floors or walls.
- B. Penetrations or installation within all fire rated assemblies shall be performed to provide a fire resistant rating of at least equal to the hourly resistant rating of the floor, wall or partition. All systems shall meet the test standards of ASTM E-814 and UL 1479, and utilize a UL approved through penetration fire stop system, which is applicable to the fire rated assembly material, pipe material, and classification of the fire rated assembly.
- C. Materials for fire-stopping shall consist of intumescent wrap-strips, intumescent fire-stop collars, fire-stop putty, fire-stop mortar, or a combination of the systems, to provide a UL listed system.
- D. For non-fire rated floors and walls, caulk annular space to provide a smoke-proof and water-proof penetration.

3.3 PIPING IN AIR PLENUMS

- A. PVC piping shall not be used in ventilation plenum spaces, including plenum ceilings. CONTRACTOR shall carefully review HVAC Drawings and transition to non-combustible material in ventilation plenum spaces and plenum ceilings.

END OF SECTION

SECTION 22 14 23.00

STORM DRAINAGE PIPING SPECIALTIES

PART 1 - GENERAL

1.1 SUBMITTALS

- A. Submit product data, as specified in Division 1, Section 01 33 00.00 - Submittals.
- B. Include data on specialties in this Section.

1.2 DELIVERY, STORAGE & HANDLING

- A. Deliver and store products under provisions of Division 1, Section 01 60 00.00 - Material & Equipment.

PART 2 - PRODUCTS

2.1 CONDENSATE HUB DRAINS

- A. (CHD-1) – Condensate drainage CPVC pipe extended 3-inches above floor surface.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install specialties in compliance with Manufacturer's recommendations.

3.2 POURED CONCRETE WALL PENETRATIONS

- A. Poured concrete walls shall be sleeved with sleeves, with annular space between sleeve and pipe sealed with modular links.
- B. In lieu of sleeving wall, the concrete wall may be core drilled, and the annular space between pipe and wall sealed with mechanical links, on the interior and exterior surface of the wall.
 - 1. Acceptable Manufacturer - Modular Link
 - a. Thunderline, Centuryline.
 - b. Or equal:

END OF SECTION

SECTION 22 30 00.00

PLUMBING EQUIPMENT

PART 1 - GENERAL

1.1 SUBMITTALS

- A. Submit product data, as specified in Division 1, Section 01 33 00.00 - Submittals.
- B. Include data on all equipment.
- C. Submit Manufacturer's installation instructions.

1.2 DELIVERY, STORAGE & HANDLING

- A. Deliver and store products under provisions of Division 1, Section 01 60 00.00 - Material & Equipment.

1.3 RELATED SECTIONS

- A. Division 22, Section 22 05 53.00 - Identification For Plumbing Piping & Equipment.

PART 2 - PRODUCTS

2.1 WATER HEATER (GWH-1)

- A. HTP Phoenix, PH 100-55: 35,000 to 100,000 BTUH natural gas input, 94% combustion efficiency, 55-gallon, Type 316L stainless steel tank, 90/10 Cupronickel and stainless steel heat exchanger, 2-inch foam insulation, plastic enclosure, temperature and fault display, AGA rated temperature and pressure relief valve, and 3-year commercial warranty.
- B. Vent material and equivalent length, as recommended by Manufacturer.
- C. Roof penetrations to be coordinated with roofing manufacturer for proper flashing.
- D. Set water heater on 3.5-inch thick concrete pad.
- E. Include condensate piping from water heater to hub drain in mechanical room. Piping to be CPVC plastic with solvent weld joints.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install plumbing equipment in accordance with Manufacturer's recommendations. Coordinate equipment located with piping, ductwork, conduit and equipment of other trades to allow sufficient clearances. Locate equipment and arrange plumbing piping to provide access space for servicing all components.

3.2 GAS WATER HEATER INSTALLATION

- A. Provide materials and vent inlet and exhaust, per Manufacturer recommendations.
- B. Coordinate inlet and exhaust locations with HVAC air handling equipment intake air locations. Maintain 10'-0" minimum distance from HVAC air intakes.
- C. Provide 3½-inch thick concrete pad to extend 3-inches beyond edge of water heater.
- D. Provide sanitary hub drain adjacent water heater and pipe condensation drain to hub drain.

3.3 GAS WATER HEATER START-UP

- A. CONTRACTOR shall retain the services of an authorized Factory Representative to inspect the installation and place the water heater in operation. Representative shall provide instruction to the OWNER on operation, maintenance and troubleshooting of the water heater. Representative shall provide a written report, which details the start-up activities and instructions to the OWNER.
- B. Start-up shall include adjustment of controls under actual or simulated load conditions. Start-up and adjustment of system shall be performed after all piping, thermostatic mixing valve and hot water re-circulating pumps are operating.
- C. Set water heater temperature to owner's specification.

END OF SECTION

SECTION 22 40 00.00

PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SUBMITTALS

A. Shop Drawings:

1. Submit product data, as specified in Division 1, Section 01 33 00.00 - Submittals.
2. Include fixtures, sizes, utility sizes, trim and finishes.

B. Operation & Maintenance Data:

1. Submit operation and maintenance data, as specified in Division 1, Section 01 78 23.00 - Operation & Maintenance Data.
2. Include fixture trim exploded view and replacement parts list.

PART 2 - PRODUCTS

2.1 ADA WATER CLOSET (WC-1)

- A. Kohler, K-96057 Highcliff: White.
- B. Kohler, K-4731-C: White elongated open front plastic seat with self-sustaining check hinge.
- C. Sloan, 8111-1.6-OR: High efficiency battery powered flush valve.
- D. Mounting height to rim of toilet: 16-5/8".

2.2 LAVATORY (L-1)

- A. Kohler, K-2007; Kingston: White vitreous china wall-mount sink with single faucet hole.
- B. Sloan, SF-2400-4-PLG-BDM-CP-0.5GPM-MLM-IR-FCT: AC-powered faucet with battery backup 0.5 gpm aerator.
- C. Kohler, K-13885: Off-set drain.
- D. Kohler K-8998: 1¼-inch chrome-plated, cast brass trap and tubing outlet.
- E. Brasscraft, KTSCR-19KC: Stops with loose key.
- F. Brasscraft, 1-12AC: 3/8-inch O.D.: Chrome plated riser.

- G. McGuire, Pro-Wrap: Cover on offset drain, trap, and water supplies.
- H. Floor mounted arm chair carrier.
- I. Mounting Height To Rim: Per ADA Requirements.

2.3 SERVICE SINK (MB-1)

- A. E.L. Mustee, Model 63-M: 24" x 24" x 10" mop service basin.
- B. Chicago, 835-XKCCP: Faucet with ceramic cartridges, ball valve stops, and E27JKCP vacuum breaker.
- C. E.L. Mustee, 65.700: 5/8" x 31" hose with hose bracket.

2.4 SINKS (S-1)

- A. Elkay, LR-3322PD: 33" X 22" X 8-1/8" Two compartment stainless steel sink.
- B. Elkay model LKD232SBH5C, 1.5 gpm aerator, and ceramic cartridges.
- C. PVC 1½-inch P-trap.
- D. Brasscraft, KTSCR-19X: Stops with loose key.
- E. Brasscraft, 1-12 AC: 3/8-inch O.D. chrome-plated riser.

2.5 ADA DRINKING FOUNTAIN (DF-1)

- A. Elkay, EDFP217C: Two-level drinking fountain, barrier-free with front controls, stainless steel, front single button activation.
- B. Ball valve stops.
- C. PVC p-trap.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install fixtures in accordance with Manufacturer's recommendations.
- B. Test all fixtures for leaks, and demonstrate operation to OWNER's Representative.
- C. For Americans with Disabilities Act (ADA) accessible water closets, position flush valve actuator to face wide side of toilet stall or room.

END OF SECTION

DIVISION 23 – HVAC

SECTION 23 00 13.00	HVAC GENERAL PROVISIONS
SECTION 23 05 00.00	HVAC BASIC MATERIALS AND METHODS
SECTION 23 07 00.00	MECHANICAL SYSTEMS INSULATION
SECTION 23 74 00.00	HEATING AND AIR CONDITIONING EQUIPMENT
SECTION 23 76 00.00	VENTILATING SYSTEMS AND EQUIPMENT

SECTION 23 00 13

H.V.A.C. GENERAL PROVISIONS

PART 1 - SCOPE

1.1 Work Included:

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PART 2 - GENERAL

2.1 In general, this division of the work includes a complete heating, ventilating, and air conditioning system including equipment appurtenances and accessories necessary to complete all work under all of the sections listed hereunder as hereinafter specified and shown on the drawings.

- A. Section 23 00 13 General Provisions
- B. Section 23 05 00 Basic Materials and Methods
- C. Section 23 07 00 Mechanical Systems Insulation
- D. Section 23 74 00 Heating & Air Conditioning Equipment
- E. Section 23 76 00 Ventilating Systems & Equipment

2.2 Furnish and install a complete heating, ventilating and air conditioning system in the building in accordance with drawings, specifications and the intent of the design. Qualified workmen shall install system in the approved manner.

- 2.3 Where materials are specified without specific mention to one or more manufacturers, they shall be regarded as "standard to the trade" items not requiring approval.
- 2.4 Substitute materials or equipment must meet all requirements of the base bid intent.
- 2.5 The Owners Representative reserves the right to accept or reject any Substitutes.
- 2.6 Substitutions will not be allowed after contract has been awarded unless authorized by the Owners Representative.
- 2.7 Submittal of This Contractor's bid will indicate he has examined the drawings and specifications of other trades whose work is related with his so as to avoid any extras, and has examined his own drawings and has included all required allowances in his bid.
- 2.8 No allowance will be made for any error resulting from This Contractor's failure to thoroughly familiarize himself with all conditions.

PART 3 - CODES, PERMITS AND TAXES

- 3.1 This system shall be installed in compliance with all National, State and Local Codes and Regulations in force at the building location.
- 3.2 This Contractor shall secure and pay for all permits, licenses and certificates of inspection applicable to this work.
- 3.3 This Contractor shall pay for all taxes applicable to this work.
- 3.4 Furnish one copy of all required permits, etc., to the Owners Representative.

PART 4 - SHOP DRAWINGS

- 4.1 Submit electronic copies of manufacturer's certified drawings to the engineer for all equipment and controls.
- 4.2 Drawings to include details dimensions, capacities, gauges, arrangement and operating clearances.
- 4.3 Incomplete submittals will be disapproved and Contractor will be held responsible for correction of work not having final approval.
- 4.4 Approval of certified drawings does not relieve Contractor of responsibility of furnishing and installing all system components, as per plans and specifications for proper system operation with particular respect to BTU outputs and water and air flow capacities, minimum noise requirements and space limitations.
- 4.5 This Contractor shall thoroughly check all shop drawings prepared by sub-contractors and materials or equipment suppliers as regards to measurements, size of members, materials and details to satisfy himself that they conform to the intent of the Architect's and Engineer's specifications and plans, and each drawing shall have the date of approval and signature of the checker.

4.6 The Owners Representative's approval of shop drawings shall not relieve the Contractor from responsibility for deviations from the contract documents, unless approval of such deviations has been requested in writing and specifically approved by the Engineer. Neither does the Owners Representative's approval relieve the Contractor from responsibility for error or omissions of any sort in shop drawings. The Engineer assumes no responsibility for figured dimensions or exact quantities of materials on shop drawings.

4.7 Furnish approved shop drawings to all other Contractors whose work is affected.

PART 5 - CHANGES IN THE WORK

5.1 No changes shall be made or extra work done except on written order from the Owner's Representative. Upon request, the contractor shall submit to the Owner's Representative an itemized proposal for any changes in the work that may be considered. No claim for extra cost will be allowed unless ordered in writing before the execution of the work involved.

PART 6 - PROTECTION

6.1 Each Contractor as required shall:

- A. Provide, erect and maintain barricades, warning signs and guards as necessary for protection of material storage adjoining property, public building. Use caution at all times to protect persons against injury resulting from job operations, movement of materials and standing equipment.
- B. Weather Protection: Provide protection against rain, snow, wind, ice, storms or heat so as to maintain work materials, apparatus and fixtures free from injury or damage. At end of day's work cover new work likely to be damaged. Remove snow, ice, as necessary for safety and proper execution of work.
- C. Water Protection: Protect building from damage at all times from rain water, ground water, backing up of drains or sewers and other water. Provide pumps, equipment and enclosures to provide this protection.
- D. Protection of Finished Floors: No wheeling of loads over finished floor with or without plank for protection will be permitted in anything except rubber tired wheelbarrows, buggies, trucks, dollies. Applies to finished floors and to concrete floors which are not to be covered with applied surfacing.
- E. Protect adequately, surrounding areas and materials including glass when welding, flame cutting or other operations requiring the use of flame, arcs or sparking devices that are necessary in the course of the work.
- F. Use only flameproof type tarpaulins.

6.2 Fire Retardant Plastic Sheeting:

- A. The contractor shall furnish one standard roll of anti-static plastic sheeting, for emergency protection. Roll to be kept on location, so as to be accessible to Owner or contractor's representative at all times.

PART 7 - CLEANING UP

- 7.1 The Contractor shall keep the building and premise free from the accumulation of waste material and rubbish. Such material shall be gathered and disposed of in a satisfactory manner.

PART 8 - SUPERVISION OF WORK

- 8.1 The Heating Contractor shall furnish the services of an experienced Engineer or Superintendent.
- 8.2 He shall be constantly in charge of the installation of the work together with all sub-contractors, skilled workmen, helpers and labor required to unload, transfer, erect, connect, adjust, start, operate and test each system.
- 8.3 He shall be thoroughly acquainted with and be responsible for the various sub-contractors work so that it is properly coordinated and supervised to the satisfaction of the Owners Representative.

PART 9 - COORDINATION AND COOPERATION

- 9.1 This Contractor shall give full cooperation to other trades and furnish any information necessary to permit the work of all trades to be installed satisfactorily and with the least possible interference or delay.
- 9.2 Where the work of This Contractor will be installed in close proximity to the work of other trades or where there is evidence that the work of This Contractor shall interfere with the work of other trades, he shall assist in working out space conditions to make a satisfactory adjustment.
- 9.3 If this Contractor installs his work before coordinating it with other trades or so as to cause interference with work of other trades, he shall make necessary changes in his work to correct the condition without extra charge.

PART 10 - RECORD DRAWINGS

- 10.1 This Contractor (including all his sub-contractors) is to convey any information on changes made from the drawings to the Owners Representative on the job.
- 10.2 The Contractor's Superintendent will mark up a set of the Owners Representative's blue-line prints from the above data.
- 10.3 Changes made from the plan are to be reported immediately and records are to be made on the set of blue-line prints as the job progresses.
- 10.4 All Contractors shall post all changes for their particular work each day as the changes occur.

PART 11 - SLEEVES, OPENINGS, CUTTING AND PATCHING

- 11.1 As necessary to permit the installation of ductwork and all other work under this branch will be provided by the General Contractor.

11.2 The Heating Contractor must cut all openings in concrete 8" in diameter and under.

11.3 The General Contractor must cut all openings in concrete over 8" in diameter.

11.4 By Heating Contractor:

- A. Cooperate with other trades and adjust with them (subject to the Owners Representative's approval) all questions of interference, right-of-way for piping, etc.
- B. Make all arrangements with various contractors for any special framing, spacing, chases or openings.
- C. Arrange for entering all equipment into building and arranging it at locations indicated.
- D. Accurately locate all openings and provide and set all sleeves in cooperation with Contractors whose work is affected thereby.
- E. Sleeves for ductwork to be 1" larger than outside duct dimensions and of sufficient length to pass through entire floor, wall or roof construction including finish.
- F. Sleeves for ductwork in concrete, masonry and/or plaster walls: 18 ga. galvanized duct extended flush with finished construction.
- G. Sleeves for piping to be 1/2" larger than pipe diameter and of sufficient length to pass through entire floor, wall or roof construction including finish for piping.
- H. Piping sleeves in concrete or masonry walls: standard steel pipe extended flush with finished construction.
- I. In the event any cutting and patching is required to accommodate the heating and air conditioning work during and after building construction, due to this Contractor's failure to install or furnish materials to be built into the structure at the proper time, it must be provided by the specific Contractor that originally did work at the expense of this Contractor.
- J. Make good, repair and pay for without additional cost above contract agreement price, all damage caused by this Contractor's operations to work and equipment in manner approved by the Owners Representative.
- K. Sleeves for ductwork piercing walls that go to underside of structure shall be 18 ga. galvanized ducts flush with finished construction as specified under Sheet Metal Work. If the Heating Contractor does not provide sleeves, he must give the General Contractor the exact size and location of the opening for cutting by the General Contractor. The Heating Contractor is to provide a sheet metal angle around duct to cover opening on both sides and to fill opening around duct with insulation.

PART 12 - ELECTRICAL WORK

12.1 By Heating Contractor:

- A. To furnish starting equipment and disconnects and turn over to the Electrical Contractor with complete instructions and diagrams for installation.
- B. To furnish all equipment to suit voltage available and furnish Electrical Contractor all necessary wiring diagrams and installation instructions.

12.2 By Electrical Contractor:

- A. To furnish and install all line voltage wiring (110 volts and greater) complete from panelboard to motors or junction boxes in factory assembled units except line and low voltage temperature control wiring.
- B. Install starters in cooperation with and under supervision of the Heating Contractor.
- C. Install all disconnect switches in cooperation with and under supervision of the Heating Contractor.
- D. To wire all heating equipment motors as indicated on the heating, ventilating and air conditioning plans.

12.3 Starting Equipment:

- A. Provide all starters. All starters for service above 115 volts shall have 115 volt control circuits with built-in transformers. Minimum starter size of "0".
- B. Starters to be Allen Bradley or Square D unless specified otherwise in the Electrical Spec Division.

PART 13 - LUBRICATION

- 13.1 All equipment must be lubricated in accordance with manufacturer's instructions, before equipment is turned over to the Owners Representative.
- 13.2 Lubrication points that are hard to get at shall have extended fittings to point of easy access; and shall be clearly marked.
- 13.3 Furnish the Owners Representative with a list of equipment to be lubricated stating type of lubrication and interval between lubrication required and date last lubricated.

PART 14 - OPERATING AND MAINTENANCE INSTRUCTIONS

- 14.1 The HVAC Contractor shall furnish to the Owners Representative upon completion of the work but before final acceptance of the system, six (6) bound copies of typewritten instructions covering complete set of drawings marked to show any and all deviations from original layout. This Contractor shall instruct the Owners Representative on the care and operation of all parts of the system.
- 14.2 Maintenance instructions shall include manufacturer's literature on all system equipment components. All maintenance instructions shall be explicit concerning time intervals for all servicing and preventative maintenance, types and grades of oil and/or grease, packing materials, normal and abnormal clearance, methods of equipment adjustments and complete description of replacement parts and materials for wearing items, electrical diagrams, control diagrams, complete parts list, which list by OEM part number and suppliers name, address and telephone number.
- 14.3 Instructions and Manuals

- A Instruct the Owners Representative in the proper operating techniques of all mechanical systems, and inform of the instruction time and equipment demonstration to arrange for attendance. Instruction and demonstration shall consist of two 4 hr. periods approximately a month apart.
- B Prepare and submit to the Owners Representative's office six (6) operating and maintenance manuals. Include the following information:
 - 1. Name, address and phone number of installing contractor and person to be called for repairs.
 - 2. Index of the mechanical sections, with tabs dividing the sections.
 - 3. List of equipment with name of manufacturer, local distributor and phone number.
 - 4. Parts list to the major pieces of mechanical equipment including a list of recommended spare parts.
 - 5. Outline description of operation of the various mechanical systems.

PART 15 - GUARANTEE

- 15.1 All work, materials, equipment and controls to be guaranteed for one (1) year from final acceptance of installation and kept in repair for said period, unless defects are the result of bad management.

PART 16 - VIBRATION AND NOISE CONTROL

- 16.1 The prime contractor for this contract shall provide Consolidated Kinetics, Korfund or Mason Industries vibration isolators and bases for all equipment furnished under this contract.
- 16.2 Springs: All springs shall employ unhoused standing springs with a horizontal to vertical spring stiffness ratio of approximately one. Snubbers to limit extreme horizontal deflections during start and stops shall be used. All spring mounts shall be provided with ribbed or waffled neoprene pads at least 1/4" thick to prevent transmission of high frequency vibrations to the building.
- 16.3 Penetration: Whenever ducts pass through critical partitions, walls and floors, the annular openings should be packed with glass fiber and sealed on both sides with a non-hardening material such as "Tremco" acoustical sealant. The annular openings shall be clearly cut and not over 1/8" wide. For duct openings also provide galvanized steel angles on all sides of duct on both sides of wall, floor or ceiling.
- 16.4 General Vibration Isolation Details: No rigid connections shall be made between spring mounted equipment and the structure. All fans shall be connected to ducts with flexible sleeves at least 6" wide and very slack.
- 16.5 The Heating Contractor will be solely responsible for the quality and type of isolators used for the entire project.

PART 17 - TESTING AND BALANCING

17.1 The Heating Contractor shall provide an independent, certified Testing and Balancing Firm. The firm shall provide complete testing and balancing services and submit 2 copies of final report to the Owners Representative.

17.2 The Heating Contractor shall assume the responsibility for the following:

- A. Purchase and installation of any replacement components of equipment drive assemblies as directed.
- B. Filter replacement and installation.
- C. Equipment lubrication.
- D. Adjustment of vibration isolation devices.
- E. Equipment conformity to sound level requirements.
- F. Leak testing of ductwork.
- G. Installation of volume dampers where shown or specified, or as directed by the testing and balancing firm.
- H. Instructions and training to Owner's personnel on system operation, adjustments and maintenance.
- I. Furnishing of ladders and/or scaffolding, if requested by the testing and balancing firm.
- J. Correct problems identified by the testing and balancing firm.

17.3 The Balancing Contractor shall coordinate all work with the Temperature Control Contractor. The two firms shall work together in setting up the H.V.A.C. SYSTEM.

PART 18 - FINAL REQUIREMENTS

18.1 By Heating Contractor:

- A. Provide all replacement of belts, sheaves, motors, etc. necessary for adjustment of speeds to obtain required air quantities without cost to the Owner.
- B. All motors on all equipment shall be properly lubricated before putting into service.
- C. Equipment shall be cleaned inside and out and new filters installed.
- D. All debris resulting from or caused by this installation shall be removed from the site, or make necessary arrangements with General Contractor to have this done.

PART 19 - USE OF SYSTEM

19.1 The putting of new work or any part thereof into use, even though with the Owner or the Owners Representative's consent, shall not be construed to be an acceptance of the work on the part of the Owner or the Representative, nor shall it be construed to obligate him in any way to accept improper work or defective materials.

END OF SECTION

SECTION 23 05 00

H.V.A.C. BASIC MATERIALS & METHODS

PART 1 - SCOPE

1.1 Work Included:

PART 1 - SCOPE	1
PART 2 - PIPING SYSTEMS	1
PART 3 - WATER & DRAIN PIPING SYSTEMS	1
PART 4 - HOT WATER PIPING SYSTEM.....	2
PART 5 - GLYCOL.....	4

PART 2 - PIPING SYSTEMS

2.1 General:

- A. Plans show the sizes and approximate locations.
- B. All indicated sizes must be maintained.
- C. Cooperate and consult with other trades to avoid any interferences in running of pipes.
- D. Install perfectly plumb and free of depression and pockets.
- E. Suspend from building construction to provide adequate suspension system in accordance with recognized engineering practices.
- F. Vertical runs of piping shall be supported by means of riser clamps.
- G. Suspended piping to be supported on clevis type hangers, or trapeze hangers. Insulation protection saddles as hereinafter specified shall be used at all hangers to protect the insulation.
- H. Space all hangers not more than 10 ft. apart; where concentrated loads, etc. occur, closer spacing may be necessary.
- I. Piping run along walls shall be supported on wall brackets.
- J. Supply and return connections to all equipment shall have ground joint unions with bronze inserts.
- K. Piping to be installed complete with fittings, valves, automatic valves, hangers, expansion shields, anchors, expansion joints, hanger rods as per plans, details and as required.
- L. Install all piping to allow for free expansion.
- M. Vent all high points, drain all low points on water systems.

PART 3 - WATER & DRAIN PIPING SYSTEMS

3.1 Piping:

- A. ASTM Spec. 88 Type L hard temper copper tubing with wrought copper sweat fittings, soldered with 95-5 solder. Do not use acid flux.

3.2 Valves:

- A. Drain Valves (ball valves): Milwaukee BA100/150XH, or Apollo, brass body & chrome plated ball with bronze stem and Teflon packing. Zinc dichromate plated steel handle with plastic protective covering and extension stem.
- B. Ball Valves: Milwaukee BA100/150XH or Apollo. Brass body and chrome plated ball with bronze stem and Teflon packing. Zinc dichromate plated steel handle with plastic protective covering and extension stem.

PART 4 - HOT WATER PIPING SYSTEM

4.1 Piping:

- A. Schedule 40 ASTM Spec. A-120 steel pipe.
- B. ASTM Spec. Malleable iron fitting on screwed construction. Socket welds are acceptable.
- C. ASTM Spec. A-234 class 150 steel fittings on welded construction.
- D. Vent high points as per plans, details and as required for air elimination with vent piping constructed of ASTM Spec. 88 Type L soft temper copper tubing terminating in vent cock accessible from floor.
- E. Install drain valves as indicated and drain plugs at all low points.
- F. At the Contractor's option, all supply and return lines may be type "L" hard drawn copper tubing with wrought copper sweat type fittings jointed to pipe with 95/5 solder.
- G. At the Contractor's option, all hot water supply and return lines may utilize the Victaulic or Press Fit Type connection system.

4.2 Gauges:

- A. Gauges:
 - 1. Trerice or Taylor PT-4 Series pressure gauges where indicated on plans.
 - 2. Complete with cast aluminum case without back flange with chrome plated ring, double strength glass; 4-1/2" diameter dial, vapor or liquid filled bulbs. Accuracy within one scale division.
 - 3. Ranges and intervals suitable for the applications.
- B. Gauge Valves (Ball Valve):
 - 1. Milwaukee BA100/150XH or Apollo Brass body & chrome plated ball with bronze stem and Teflon packing. Zinc dichromate plated steel handle with plastic protective covering and extension stem.

4.3 Valves:

- A. Balancing/Shut Off Valves:
 - 1. Ball Valves: Milwaukee BA100/150XM or Apollo. Brass body and chrome plated ball with raised bronze stem and Teflon packing. Zinc dichromate plated steel handle with plastic protective covering. Extension stem and memory stop.
- B. Drain Valves (Ball Valve):

1. Milwaukee BA100/150 XH or Apollo brass body & chrome plated ball with bronze stem and Teflon packing. Zinc dichromate plated steel handle with plastic protective covering. With extension stem.
- C. Gauge Valves: Same as Drain Valves.
- D. Check Valves:
 1. Milwaukee 1400 Series or Metraflex of sizes indicated.
 2. Wafer-Type, silent operating, non-slam check valve. Open and close at 1 foot differential. 150 psig construction.

4.4 Hot Water Specialties:

- A. Relief Valves:
 1. Bell & Gossett, ASME rated - diaphragm type.
- B. Expansion Tank:
 1. B&G models, ASME construction 125 psig working pressure. Complete with diaphragm and pre-pressurized air cushion.
- C. Automatic Air Eliminator:
 1. B&G models or equal, automatic air eliminator.
- D. Automatic Feed Valves:
 1. Bell & Gossett No. 12. Iron body, brass mechanism, anti-siphon check valve, built-in strainer and adjustable setting.
- E. Manual Air Vents:
 1. Contractor shall furnish and install accessible manual air vents at all high points of the closed chilled and/or hot water system to maintain an air-free system. Equivalent to Dole Series 14.

4.5 Chemical Treatment:

- A. Initial Cleaning:
 1. Water systems shall be cleaned with Nalco 2567 or equal to remove silt, oils, mill scale, grease and preservatives.
 2. Add Nalco closed water system inhibitor or equal to provide immediate protection for chilled water systems.
 3. Nalco Chemical Company or equal shall supervise the cleaning and pre-treatment procedures, and shall provide certification that the system has been properly cleaned and is ready for start-up.
- B. Hot Water Systems:
 1. Allan Engineering Co., Wright Chemical Corp., or Suhm or equal; 2 gal. bypass type feeder with valves as per details.
 2. Heating Contractor shall provide chemical treatment recommended by Nalco Chemical Company or equal.
- C. Chemicals:
 1. The Contractor shall furnish sufficient recommended Nalco, or equivalent, chemicals for one year's usage.
- D. Testing Equipment:

1. The water treatment company shall furnish water testing equipment that shall include:
 - a. Reagents and apparatus for determination of pH and alkalinity
 - b. Reagents and apparatus for determining treatment levels
 - c. Reagents and apparatus for determining proper bleed-off rates
 - d. Any special equipment required for proper control of the chemical treatment
- E. Water Treatment Service Program:
 1. Provide the following water treatment services for one year after start-up of the treatment program:
 - a. Initial water analyses and recommendations
 - b. Initial equipment clean-up chemicals, procedures and certification after clean-up is complete
 - c. Assistance during start-up of the treatment program
 - d. Instructions to operating personnel on proper feeding and control techniques
 - e. Periodic service and consultation meetings
 - f. Any necessary record forms and log sheets
 - g. Any required laboratory and technical assistance
 2. A qualified, full-time representative of Nalco Chemical Company or equivalent manufacturer will perform the above services

PART 5 - GLYCOL

- 5.1 The mechanical contractor shall provide the water system with a 20/80 glycol water solution by weight. Provide inhibitors and monitor every 3 months for the first year. Verify tests with project manager, including freeze rating temperature.
- 5.2 The fluid must be a food grade inhibited propylene glycol equal to Dow Chemical Company's Dowfrost. Specifically excluded are automotive antifreezes or any formulations containing silicates.

END OF SECTION

SECTION 23 07 00

MECHANICAL SYSTEMS INSULATION

PART 1 - SCOPE

- 1.1 All insulating materials and mastics must be rated 25/50 when tested in accordance with ASTM E-84/UL 723.
- 1.2 The latest edition of The Midwest Insulation Contractors Association Commercial and Industrial Insulation Standards Manual has been adopted as a standard for the workmanship under this section.
- 1.3 Work Included:

PART 1 - SCOPE	1
PART 2 - GENERAL	1
PART 3 - DUCTWORK INSULATION - BLANKET.....	2
PART 4 - PIPING INSULATION.....	2
PART 5 - MISCELLANEOUS INSULATION	2

PART 2 - GENERAL

- 2.1 The Insulation Contractor shall be responsible for verifying that all tests and inspections of piping systems or equipment to be insulated under this contract are completed and approved by Owner's Representative before insulation work is started.
- 2.2 All surfaces to be insulated shall be clean, dry and free from surface frost, oil, mortar, and other foreign matter.
- 2.3 Insulation, adhesives, coverings, coatings, etc., shall be applied in accordance with the manufacturer's published recommendations.
- 2.4 No wheat paste or other mold or bacteria breeding or sustaining organic materials shall be used in conjunction with the insulation work.
- 2.5 All piping insulation shall be continuous across racks, and through hangers and sleeves. Rigid insulation shall be provided between pipe and insulation protectors at hangers.
- 2.6 Provide necessary tarpaulins and/or coverings required to protect equipment, machinery, walls, floors, etc., in areas where insulation is being installed. Dirt, refuse and droppings, etc., shall be cleaned up daily.
- 2.7 Fitting covers for lines under 200 degrees F. shall be pre-molded PVC 25/50 rated as made by Schuller International, Inc., Foster or Proto.

PART 3 - DUCTWORK INSULATION - BLANKET

- 3.1 Insulate all ductwork, as called out on plans, with Knauf Fiberglass; or Schuller International, Inc., 0.75 lb/cu. ft. density and faced with FSK foil. It shall be a minimum of 3" thickness. Adhere insulation to duct surfaces with Benjamin Foster 8199 fire retardant adhesive with 100% coverage. All longitudinal and butt joints shall be taped with 3" FSK tape to match facing on the insulation.

PART 4 - PIPING INSULATION

- 4.1 Insulate all piping with heavy density fiberglass pipe insulation, Knauf Fiberglass, Owens Corning Fiberglas, or Schuller International, Inc. Pipe insulation to be jacketed with white fire retardant jacket (ASJ) with self-sealing lap (SSL). Self-sealing longitudinal jacket laps and butt strips must be smoothly secured with an acrylic adhesive self-seal system.
- 4.2 Thicknesses as per the following table:

<u>Thickness</u>	<u>Conductivity Range</u>
1.5" thick	0.24 - 0.28 (Btu•in/(h•ft ³ •°F)

- 4.3 Adhere self-sealing lap by removing release paper after the insulation is installed on pipe, sealing the lap starting in the center of each section, working towards ends. Lap must be pressurized by rubbing with a hard tool such as the back of a knife blade. Install 3" butt strips over joints between sections in the same manner. Apply over clean dry surface with pipe at approximately room temperature, butt adjoining sections firmly together. Seal off ends of insulation with Benjamin Foster 35-00 fire retardant vapor barrier mastic at all flanges, valves and fittings and at intervals of not more than 20 ft. on continuous run of pipe.

PART 5 - MISCELLANEOUS INSULATION

- 5.1 Provide loose fill insulation between ducts or piping and concrete curbs or sleeves through ceiling construction, walls and floors. Owens Corning Fiberglas; Knauf Fiberglass; or equal. Sheet Metal Contractor to provide fine wire mesh attached to duct and concrete. Dow Corning 780 Silicone Sealant caulk to be provided above insulation, minimum depth of 2" and built-up around pipe and ducts.

END OF SECTION

SECTION 23 74 00

HEATING AND AIR CONDITIONING EQUIPMENT

1.1 All motors shall comply with D.I.L.H.R. Energy and Power Factor Requirements.

1.2 Work Included:

PART 1 - HOT WATER BOILER - SEALED COMBUSTION	1
PART 2 - PUMPS (Inline).....	1
PART 3 - ENERGY RECOVERY UNIT.....	2
PART 4 - DUCTLESS SPLIT SYSTEM	2

PART 1 - HOT WATER BOILER - SEALED COMBUSTION

1.1 Furnish as scheduled IBC SL Series G3 sealed combustion condensing boiler of capacity listed on schedules.

1.2 Or Approved Equal

PART 2 - PUMPS (Inline)

2.1 Bell & Gossett PL Series, Taco, Armstrong, or Grunfoss equivalent inline circulator, of sizes and capacity indicated.

2.2 Complete With:

- A. Mechanical seal rated for 220 degrees F.
- B. As scheduled RPM motor, drip-proof and suspended in rubber.
- C. Bronze fittings and steel shaft.
- D. Non-overloading over entire operating range.

2.3 Note:

- A. Submit characteristic operating curves with shop drawings.
- B. Manufacturer to provide start-up service to verify proper wiring, rotation, alignment, lubrication and amperage draw. Service shall include capacity check of each pump, which is to be submitted in writing to the engineer indicating GPM, suction and discharge pressure and actual amperage draw.
- C. Each pump and motor is to be provided with a nameplate giving the manufacturer's name, serial number of pump, capacity in GPM and head in feet at design condition, horsepower, voltage, frequency, speed and full load current.
- D. Manufacturer is to provide replacement of impellers or trimming of impellers to meet capacity requirements indicated on the plans at no additional cost to Owner.

PART 3 - ENERGY RECOVERY UNIT

3.1 General

- A. Renewaire of size and capacity indicated on the schedule.
- B. Provide digital time clock accessory TC7D.

PART 4 – DUCTLESS SPLIT SYSTEM

4.1 General

- A. Mitsubishi of size and capacity indicated on the schedule.
- B. Contractor shall provide refrigerant piping as recommended by manufacturer.
- C. System to come with complete controls by manufacturer.

END OF SECTION

SECTION 23 76 00

VENTILATING SYSTEMS & EQUIPMENT

PART 1 – SCOPE

1.1 All motors shall comply with NEMA MGI, Table 12-6C Efficiency Level 1 Requirements.

1.2 Work Included:

PART 1 – SCOPE.....	1
PART 2 - SHEET METAL WORK.....	1
PART 3 - GRILLES, REGISTERS AND DIFFUSERS	3
PART 4 - SHEET METAL SPECIALTIES	4

PART 2 - SHEET METAL WORK

2.1 Materials: (Low Velocity, Low Pressure & Medium Velocity & Medium Pressure)

- A. Galvanized iron. Exceptions shall be noted on the plans such as: Aluminized Steel, Stainless Steel and Aluminum.
- B. Per the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) Current Edition, H.V.A.C. Duct Construction Standards.

2.2 Construction

- A. Rectangular duct construction and installation shall be as per the Sheet Metal and Air Conditioning Contractor's National Association, Inc. (SMACNA) HVAC Duct Construction Standards, Current Edition.
- B. Construct the following ductwork according to Table 1-5 (2" w.g. + or -) and shall utilize the TDC connection system or Duct-Mate connection system on all ductwork 18" or larger:
 - 1. Ductwork located within the garage and equipment mezzanine.
- C. Duct Joint Construction:
 - 1. TDC connection system or Duct-Mate connection system for all ductwork located within the garage and equipment mezzanine. All other ductwork may utilize a "Slip-n-Drive" connection system.
 - 2. Spacing shall conform to the current SMACNA manuals for spacing between flanges for specific duct pressures and sizes. Minimum static pressure table for 2" shall be used for static pressures less than 2".
- D. Cross break or provide beads at 12" O.C. for all ducts exceeding an 18" dimension.
- E. Traverse joints and longitudinal seams locked air tight as per methods recommended in SMACNA Sheet Metal Duct Manual.

- F. Provide additional angle iron braces or stiffeners as necessary for rigidity.
- G. Turning Vanes:
 - 1. All turns with square corners shall have Acoustic turning vanes as manufactured by Sheet Metal Connectors, Inc.. 24 ga. Galvanized with 1-1/2 lb. Per cu. ft. density fiberglass insulation.
 - 2. Shop fabricated turning vanes are not acceptable.

2.3 Round Ductwork (Sheet Metal)

- A. Lindab "SPIROsafe®"; United Sheet Metal Spiral Uni-Seal duct and acoustic, K-27 type; Semco; or Ajax. Of sizes indicated on plan.
- B. Galvanized steel meeting the following gauges:
 - 1. 26 Ga. up to 8" dia.
 - 2. 24 Ga. up to 9" to 22" dia.
 - 3. 22 Ga. up to 23" to 36" dia.
- C. Supplied in 12 ft. lengths for accurate fit up by field cutting.
- D. All fittings uniform manufactured from galvanized steel of 20 Ga.
- E. Single wall ductwork to be joined with beaded coupling (20 ga) to 36" 1½ x 1½ x 1/8 " angle flange joints over 36".
- F. Seal all joints in duct with sheet metal screws, United Duct Sealer and United Duct Tape. Follow duct manufacturer's installation instructions as listed in "Assembly and Installation Manual". Screws spaced not more than 4" on centers.
- G. Bracing and reinforcement of ductwork to conform to that listed for medium pressure to 6" S.P.. External reinforcement angles to be used.
- H. All joints to be smooth inside for quiet and smooth air flow.
- I. All take-off fittings to be 45 deg. or with conical tee.
- J. At This Contractor's option, he may use the thermofit air conditioning duct sealing band as manufactured by Rayclad Tubes, Inc. for sealing all round or oval ductwork joints. Follow manufacturer's instructions for installation.

2.4 Installation

- A. Fit and secure in place with all necessary hangers, braces and supports required or as directed by the Owner's representative.
- B. Make all necessary changes in cross sections, offsets, etc. to avoid interference with other equipment and supports, whether or not specifically indicated, at no additional cost to the Owner.
- C. Ducts that cannot be run as shown shall be placed between points as directed by the Owner's representative.
- D. Support horizontal ducts with approved iron hangers secured to building construction, spaced not more than 6 ft. apart and closer where necessary.

- E. Support risers by means of galvanized angle iron riveted to sides, resting on floor construction.
- F. Flange ducts for attachment of registers and grilles.
- G. Provide volume dampers (fitted with locking devices) as indicated or required for balancing.

2.5 General

- A. Assemble and erect all sheet metal work in such a manner as to eliminate any vibration or noise transmission by moving air.
- B. Plans show the sizes and approximate locations.
- C. All sizes must be maintained unless as hereinbelow specified.
- D. It is not the intention of the drawings to indicate all necessary offsets, and it shall be This Contractor's responsibility to make the installation in such a manner as to conform to the structure, avoid obstructions whether or not specifically indicated, maintain clearances and provide all offsets as required to produce a neat, workmanship-like arrangement.
- E. Although the location of equipment and ductwork may be shown on the drawings in certain positions, This Contractor shall be guided in the performance of his contract by the structural, sanitary or electrical conditions existing at the job.
- F. Submittal of his bid will indicate This Contractor has examined the drawings and site, and has included all required allowances in his bid. No allowances will be made for any error resulting from This Contractor's failure to thoroughly familiarize himself with all conditions.

PART 3 - GRILLES, REGISTERS AND DIFFUSERS

3.1 Return, Exhaust & Transfer Grilles: (R.G., E.G., T.G.)

- A. Carnes RTDA, Titus 25RL, or Anemostat. Complete with horizontal fixed fin grille core, flanged frame with sponge rubber gaskets and baked aluminum enamel finish.

3.2 Ceiling Exhaust, Ceiling Transfer & Ceiling Return Grilles: (C.E.G., C.T.G., & C.R.G.)

- A. Carnes RAPA, Titus 50F, or Anemostat. Complete with extruded aluminum border with 1/2" x 1/2" fabricated aluminum grid core and flange frame for duct mounting.

3.3 Supply Grille: (S.G.)

- A. Carnes RSDAH, Titus 300 series, or Anemostat. Complete with adjustable horizontal face fin, adjustable vertical fins, flange frame with sponge rubber gaskets and baked aluminum enamel finish.

3.4 Note:

- A. Grilles, diffusers, etc. have been selected in accordance with manufacturer's catalog data. If outlets do not perform with respect to noise and draft, they must be removed and replaced with acceptable outlets at no cost to the Owner.

- B. Manufacturer's shop drawings submittals shall include a complete tabulation showing: 1) architectural plan room number, 2) quantity, size and model for each room, and 3) flow factor coefficients for each device.

PART 4 - SHEET METAL SPECIALTIES

4.1 Manual Dampers:

- A. Vent Products, Co., Inc., Model 5813 opposed blade low leakage dampers or Ruskin CD-36.
- B. Construction:
 - 1. Frame - 14 Ga. galvanized steel with welded corners
 - 2. Blades - 16 Ga. galvanized steel with press formed "V" reinforcements
 - 3. Bearings - 1/2" dia. self-lubricating porous bronze
 - 4. Axles - 1/2" dia. plated steel rods
 - 5. Low Leakage Seals - Dual extruded vinyl seals on blades and stainless steel side seals

4.2 Manual Damper Control:

- A. Young, Farr Trim-Lock; or approved equal. Spring loaded automatic locking type. Model 443 weathertight for externally insulated ducts. Model 403 for uninsulated or internally insulated ducts.

4.3 Weatherproof Louvers

- A. Vent Products 2850, Ruskin or approved equal. 6" drainable aluminum louver with 1/2" mesh screen. Baked enamel finish of color selected by Architect.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 26 00 10.00	SUPPLEMENTAL REQUIREMENTS FOR ELECTRICAL
SECTION 26 00 20.00	TEMPORARY ELECTRICAL
SECTION 26 05 19.00	LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
SECTION 26 05 26.00	GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
SECTION 26 05 29.00	HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
SECTION 26 05 33.00	RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS
SECTION 26 05 44.00	SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING
SECTION 26 05 53.00	IDENTIFICATION FOR ELECTRICAL SYSTEMS
SECTION 26 09 23.00	LIGHTING CONTROL DEVICES
SECTION 26 21 00.00	SERVICE ENTRANCE
SECTION 26 24 16.00	PANELBOARDS
SECTION 26 24 17.00	COMPANY SWITCHES
SECTION 26 27 13.00	ELECTRICITY METERING
SECTION 26 27 26.00	WIRING DEVICES
SECTION 26 28 16.00	ENCLOSED SWITCHES AND CIRCUIT BREAKERS
SECTION 26 43 13.00	SURGE PROTECTIVE DEVICES FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS
SECTION 26 51 19.00	LED INTERIOR LIGHTING
SECTION 26 52 13.00	EMERGENCY AND EXIT LIGHTING

SECTION 26 00 10.00

SUPPLEMENTAL REQUIREMENTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Supplemental requirements applicable to Work specified in Division 26.

1.2 REFERENCES

A. Definitions:

1. Basic Impulse Insulation Level: Reference insulation level expressed in impulse crest voltage with a standard wave not longer than 1.5 times 50 microseconds and 1.5 times 40 microseconds.
2. Direct Buried: Installed underground without encasement in concrete or other protective material.
3. Enclosure: The case or housing of an apparatus, or the fence or wall(s) surrounding an installation, to prevent personnel from accidentally contacting energized parts or to protect the equipment from physical damage. Types of enclosures and enclosure covers include the following:
 - a. Cabinet: An enclosure that is designed for either surface mounting or flush mounting and is provided with a frame, mat, or trim in which a swinging door or doors are or can be hung.
 - b. Concrete Box: A box intended for use in poured concrete.
 - c. Conduit Body: A means for providing access to the interior of a conduit or tubing system through one or more removable covers at a junction or terminal point. In the United States, conduit bodies are listed in accordance with outlet box requirements.
 - d. Conduit Box: A box having threaded openings or knockouts for conduit, EMT, or fittings.
 - e. Cutout Box: An enclosure designed for surface mounting that has swinging doors or covers secured directly to and telescoping with the walls of the enclosure.
 - f. Device Box: A box with provisions for mounting a wiring device directly to the box.

- g. Extension Ring: A ring intended to extend the sides of an outlet box or device box to increase the box depth, volume, or both.
 - h. Junction Box: A box with a blank cover that joins different runs of raceway or cable and provides space for connection and branching of the enclosed conductors.
 - i. Outlet Box: A box that provides access to a wiring system having pryout openings, knockouts, threaded entries, or hubs in either the sides or the back, or both, for the entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting an outlet box cover, but without provisions for mounting a wiring device directly to the box.
 - j. Pull Box: A box with a blank cover that joins different runs of raceway and provides access for pulling or replacing the enclosed cables or conductors.
 - k. Termination Box: An enclosure designed for installation of termination base assemblies consisting of bus bars, terminal strips, or terminal blocks with provision for wire connectors to accommodate incoming or outgoing conductors, or both.
4. Jacket: A continuous nonmetallic outer covering for conductors or cables.
 5. Luminaire: A complete lighting unit consisting of a light source such as a lamp, together with the parts designed to position the light source and connect it to the power supply. It may also include parts to protect the light source or the ballast or to distribute the light.
 6. Plenum: A compartment or chamber to which one or more air ducts are connected and that forms part of the air distribution system.
 7. Receptacle: A fixed connecting device arranged for insertion of a power cord plug. Also called a power jack.
 8. Sheath: A continuous metallic covering for conductors or cables.
 9. Voltage Class: For specified circuits and equipment, voltage classes are defined as follows:
 - a. Control Voltage: Listed and labeled for use in remote-control, signaling, and power-limited circuits supplied by Class 2 or Class 3 power supplies having rated output not greater than 150 V and 5 A, allowing use of alternate wiring methods complying with NFPA 70, Article 725.
 - b. Line Voltage: (1) (controls) Designed to operate using the supplied low-voltage power without transformation, in contrast to control-voltage devices that require or contain transformer power supplies. (2) (transmission lines, transformers, SPDs) The line-to-line voltage of the supplying power system.
 - c. Low Voltage: Listed and labeled for use in circuits supplied by Class 1 or other power supplies having rated output not greater than 1000 V, requiring use of wiring methods complying with NFPA 70, Article 300, Part I.

- d. Medium Voltage: Listed and labeled for use in circuits supplied by a power supply having rated output greater than 1000 V, requiring use of wiring methods complying with NFPA 70, Article 300, Parts I and II.

1.3 PREINSTALLATION MEETINGS

- A. Electrical Preconstruction Conference: Schedule conference with Architect and Owner, not later than 10 days after notice to proceed. Agenda topics include, but are not limited to, the following:
 - 1. Electrical installation schedule.
 - 2. Commissioning activities – Lighting Controls.

1.4 SEQUENCING

- A. Conduct and submit results of power system studies before submitting Product Data and Shop Drawings for electrical equipment.

1.5 INFORMATIONAL SUBMITTALS

- A. Electrical Installation Schedule: At preconstruction meeting, and periodically thereafter as dates change, provide schedule for electrical installation Work to Owner and Architect including, but not limited to, milestone dates for the following activities:
 - 1. Submission of action submittals specified in Division 26.
 - 2. Orders placed for major electrical equipment.
 - 3. Arrival of major electrical equipment on-site.
 - 4. Preinstallation meetings specified in Division 26.
 - 5. Closing of walls and ceilings containing electrical Work.
 - 6. System startup and testing for major electrical equipment.
 - 7. System startup, testing, and commissioning activities for lighting and lighting controls.
 - 8. Requests for special inspections.
 - 9. Requests for inspections by authorities having jurisdiction.

1.6 CLOSEOUT SUBMITTALS

- A. Facility EPM Program Binders:
 - 1. Complete Set: On approved online or cloud solution and USB media that is clearly and permanently labeled with attached placard on lanyard to prevent misplacement.

PART 2 - PRODUCTS

2.1 SUBSTITUTION LIMITATIONS FOR ELECTRICAL EQUIPMENT

- A. Substitution requests for electrical equipment will be entertained under the following conditions:
 - 1. Substitution requests may be submitted for consideration prior to the Electrical Preconstruction Conference if accompanied by value analysis data indicating that substitution will comply with Project performance requirements while significantly increasing value for Owner throughout life of facility.
 - 2. Substitution requests may be submitted for consideration concurrently with submission of power system study reports when those reports indicate that substitution is necessary for safety of maintenance personnel and facility occupants.
 - 3. Contractor is responsible for sequencing and scheduling power system studies and electrical equipment procurement. After the Electrical Preconstruction Conference, insufficient lead time for electrical equipment delivery will not be considered a valid reason for substitution.

PART 3 - EXECUTION

3.1 WORKMANSHIP

- A. The drawings accompanying this specification are essentially diagrammatic in nature and show the general arrangement of all equipment, conduit, services, etc. The contractor shall carefully investigate all structural and finished conditions of all areas where electrical work will occur and shall arrange such work, accordingly, furnishing all fittings, and accessories that may be required to meet such conditions.
- B. The contractor shall carefully investigate all structural, civil, architectural, mechanical, plumbing and fire protection drawings for conditions of all areas where electrical work will occur and shall arrange such work accordingly, furnishing all fittings, and accessories that may be required to meet such conditions.
- C. Workmanship throughout shall be the best standards of practice, and all labor employed must be competent to do the work required. Tool marks will not be permitted on any exposed materials.
- D. Routing shown on drawings is diagrammatic.
- E. Unless indicated to be exposed, raceways shall be concealed wherever possible. Where raceways are exposed, a neat orderly appearance will be mandatory.

3.2 EQUIPMENT AND MOTORS

- A. Refer to mechanical and plumbing drawings for size and location of all motors and equipment. Provide electrical service as required for each item. Verify control requirements of all motors with mechanical, plumbing and temperature control contractors and provide starter and auxiliary contacts as required.

- B. Coordinate exact requirements of motors, roof top units, chillers, cooling towers, pumps and condensers with division 23 contractors, equipment installation documents and equipment nameplates, prior to installing branch circuits, safety switches and conduit. Install the required branch circuit, conduit, over current protection and safety switch required by the equipment selected and being installed.
- C. Coordinate electrical control requirements of 120-volt motors with the temperature control contractor. The temperature control contractor will install a control relay for 120-volt motors. The electrical contractor shall wire the branch circuit serving the motor from the panel to the contacts in the control relay and extend the branch circuit from the control relay to the motor.

3.3 INSTALLATION

- A. In addition to individual specification sections, comply with manufacturer's written instructions and recommendations for installing, calibrating and the startup of products.
- B. Comply with NECA 1.
- C. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- D. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- E. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- F. Right of Way: Give to piping systems installed at a required slope.
- G. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
- H. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."

3.4 EXAMINATION

- A. Existing Conditions: Verify the existence and location of underground and other utilities. Before site work begins by any contractor, investigate, and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
- B. Before construction, verify the location of underground electrical services, and other utilities.
- C. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

- D. Include work to locate and mark existing underground utilities where underground work is indicated, prior to any construction.
- E. Include work to locate and mark existing non-utility underground electrical systems and communication systems where underground work is indicated prior to any construction.
- F. Include all areas that include digging by other trades. Coordinate all digging and excavation with other trades.

3.5 PREPARATION

- A. 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.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

3.6 FIELD QUALITY CONTROL

- A. In addition to individual specification sections, comply with manufacturer's written instructions and recommendations for testing products.

3.7 FIRESTOPPING

- A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly.

END OF SECTION

SECTION 26 00 20.00

TEMPORARY ELECTRICAL

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Contact and make arrangements with Utility Company for extension of temporary service to job site.
- B. Provide and maintain separate temporary power panelboards, transformers (where required), receptacles, fixtures, and lamps.
- C. Temporary Service Rating: Temporary service shall be minimum 200-amp 120/240-volt, single phase. Service shall be solidly grounded.
- D. Provide 120-volt outlets and lighting for all trades to execute their work. Any CONTRACTOR requiring greater than 20-ampere, 1-phase circuits, different voltages or any 3-phase circuits, shall arrange and pay for each special wiring condition.

1.2 REGULATORY REQUIREMENTS

- A. Conform to OSHA regulations in providing temporary power and lighting.
- B. Conform to National Electrical Code, Article 590, Temporary Installations.

1.3 UTILITY CHARGES FOR TEMPORARY SERVICE

- A. Set-Up Charges: Electrical CONTRACTOR shall pay all utility charges associated with the extension and set-up of temporary service to the job site.
- B. Energy Charges: Utility bills for energy consumed from the temporary service shall be paid by the Electrical CONTRACTOR.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Coordinate installation of temporary service with the OWNER, the General CONTRACTOR and the Utility Company.
- B. Verify and coordinate provisions for temporary power with the OWNER and other CONTRACTORS. Avoid obstructing corridors and other areas. Install temporary wiring in a manner not to create hazardous situations.

- C. Provide temporary circuits and outlets, in a timely manner, to allow for the safe use of power by other trades.
- D. Provide temporary lighting, in a timely manner, sufficient to:
 - 1. Enable all trades to safely complete their work.
 - 2. Enable the ENGINEER / ARCHITECT and their On-Site Representative to safely observe all work.
- E. Equip all temporary electrical circuits for construction purposes with combination ground fault circuit interrupter and circuit breakers meeting the requirements of Underwriter's Laboratories (UL) for Class A, Group 1 devices.
- F. Do not energize and use permanent facilities until all system grounding has been properly and permanently installed and tested.

END OF SECTION

SECTION 26 05 19.00

LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper building wire rated 600 V or less.
2. Connectors, splices, and terminations rated 600 V and less.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Product Schedule: Indicate type, use, location, and termination locations.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

A. Description: Flexible, insulated, and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Alpha Wire Company.
2. American Bare Conductor.
3. Belden Inc.
4. Cerro Wire LLC.
5. Encore Wire Corporation.
6. General Cable; Prysmian Group North America.
7. Okonite Company (The).
8. Service Wire Co.
9. Southwire Company.

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.

E. Conductor Insulation:

1. Type THHN and Type THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

2.2 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. 3M Electrical Products.
2. ABB, Electrification Products Division.
3. AFC Cable Systems; Atkore International.
4. Hubbell Incorporated, Power Systems.
5. Ideal Industries, Inc.
6. ILSCO.
7. NSi Industries LLC.
8. O-Z/Gedney; Emerson Electric Co., Automation Solutions, Appleton Group.
9. TE Connectivity Ltd.

C. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.

D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.

1. Material: Copper.

2. Type: One hole with standard barrels.
3. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders:

1. Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

B. Branch Circuits:

1. Copper, Solid for No. 14 AWG and smaller; stranded for No. 12 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type XHHW-2, single conductors in raceway.

B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway.

C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway.

D. Feeders Concealed below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

E. Exposed Branch Circuits, Including in Crawlspace: Type THHN/THWN-2, single conductors in raceway.

F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.

G. Branch Circuits Concealed Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.

B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.

C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inch (150 mm) of slack.
- D. Comply with requirements in Section 284621.11 "Addressable Fire-Alarm Systems" for connecting, terminating, and identifying wires and cables.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 07 84 00 "Firestopping."

END OF SECTION

SECTION 26 05 26.00

GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes grounding and bonding systems and equipment.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans showing dimensioned as-built locations of grounding features specified in "Field Quality Control" Article.
- B. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: In addition to items specified in Section 260010 "Supplemental Requirements for Electrical," include the following:
 - 1. Plans showing as-built, dimensioned locations of system described in "Field Quality Control" Article, including the following:
 - a. Ground rods.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Advanced Lightning Technology, Ltd.
 - 2. Burndy; Hubbell Incorporated, Construction and Energy.
 - 3. ERICO; nVent.

4. Galvan Industries, Inc.; Electrical Products Division, LLC.
5. Harger Lightning & Grounding.
6. ILSCO.
7. O-Z/Gedney; Emerson Electric Co., Automation Solutions, Appleton Group.

2.3 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 1. Solid Conductors: ASTM B3.
 2. Stranded Conductors: ASTM B8.
 3. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 4. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch (41 mm) wide and 1/16 inch (1.6 mm) thick.
- C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inch (6.3 by 100 mm) in cross section, with 9/32-inch (7.14 mm) holes spaced 1-1/8 inch (28 mm) apart. Stand-off insulators for mounting must comply with UL 891 for use in switchboards, 600 V and must be Lexan or PVC, impulse tested at 5000 V.

2.4 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- C. Mechanical-Type Bus-Bar Connectors: Cast silicon bronze, solderless exothermic-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.
- D. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.
- E. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- F. Conduit Hubs: Mechanical type, terminal with threaded hub.
- G. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.
- H. Straps: Solid copper, copper lugs. Rated for 600 A.

- I. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.
- J. Water Pipe Clamps:
 - 1. Mechanical type, two pieces with zinc-plated bolts.
 - a. Material: Tin-plated aluminum.
 - b. Listed for direct burial.
 - 2. U-bolt type with malleable-iron clamp and copper ground connector rated for direct burial.

2.5 GROUNDING ELECTRODES

- A. Ground Rods: Copper-clad steel, sectional type; 3/4 inch by 10 ft. (19 mm by 3 m).

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum.
 - 1. Bury at least 30 inch (750 mm) below grade.
- C. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
 - 1. Install bus horizontally, on insulated spacers 2 inch (50 mm) minimum from wall, 6 inch (150 mm) above finished floor unless otherwise indicated.
 - 2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.
- D. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
 - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
 - 3. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING AT THE SERVICE

- A. Equipment grounding conductors and grounding electrode conductors must be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

- A. Comply with IEEE C2 grounding requirements.
- B. Grounding Handholes: Install a driven ground rod through handhole floor, close to wall, and set rod depth so 4 inch (100 mm) will extend above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inch (50 mm) above to 6 inch (150 mm) below concrete. Seal floor opening with waterproof, nonshrink grout.

3.4 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Feeders and branch circuits.
 - 2. Lighting circuits.
 - 3. Receptacle circuits.
 - 4. Single-phase motor and appliance branch circuits.
 - 5. Three-phase motor and appliance branch circuits.
 - 6. Flexible raceway runs.
 - 7. Armored and metal-clad cable runs.
- B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.

3.5 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Rods: Drive rods until tops are 2 inch (50 mm) below finished floor or final grade unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
- C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- D. Grounding and Bonding for Piping:
1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- E. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install tinned bonding jumper to bond across flexible duct connections to achieve continuity.
- F. Grounding for Steel Building Structure: Install a driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 feet apart.
- G. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate according to NFPA 70; use a minimum of 20 feet of bare copper conductor not smaller than No. 4 AWG.
1. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.
 2. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.

3.6 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at individual ground rods. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.

B. Grounding system will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

D. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10 ohms.
2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
3. Substations and Pad-Mounted Equipment: 5 ohms.

E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION

SECTION 26 05 29.00

HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Steel slotted support systems.
2. Conduit and cable support devices.
3. Support for conductors in vertical conduit.
4. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame Rating: Class 1.
2. Self-extinguishing according to ASTM D635.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32 inch (10 mm) diameter holes at a maximum of 8 inch (200 mm) on center in at least one surface.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. B-line; Eaton, Electrical Sector.
 - b. CADDY; nVent.
 - c. Gripple Inc.
 - d. G-Strut.
 - e. Unistrut; Atkore International.
2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.

3. Material for Channel, Fittings, and Accessories: Galvanized steel.
 4. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 5. Nonmetallic Coatings – Service Building Chemical Room: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 6. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs must have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body must be made of malleable iron.
- D. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.
- E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325 (Grade A325M).
 6. Toggle Bolts: All steel springhead type.
 7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 SELECTION

- A. Comply with the following standards for selection and installation of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 - 1. NECA NEIS 101.
 - 2. NECA NEIS 102.
- B. Comply with requirements in Section 07 84 00 "Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Comply with requirements for raceways and boxes specified in Section 260533 "Raceway and Boxes for Electrical Systems."
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and ERM as required by NFPA 70. Minimum rod size must be 1/4 inch (6 mm) in diameter.
- E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
 - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.
- F. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2 inch (38 mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

3.2 INSTALLATION OF SUPPORTS

- A. Comply with NECA NEIS 101 for installation requirements except as specified in this article.
- B. Raceway Support Methods: In addition to methods described in NECA NEIS 1, EMT and ERM may be supported by openings through structure members, in accordance with NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination must be weight of supported components plus 200 lb (90 kg).
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.

3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 4. To Existing Concrete: Expansion anchor fasteners.
 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inch (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inch (100 mm) thick.
 6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts.
 7. To Light Steel: Sheet metal screws.
 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

END OF SECTION

SECTION 26 05 33.00

RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Type EMT-S raceways and elbows.
2. Type ERMC-S raceways, elbows, couplings, and nipples.
3. Type FMC-S raceways.
4. Type LFMC raceways.
5. Type PVC raceways and fittings.
6. Fittings for conduit, tubing, and cable.
7. Threaded metal joint compound.
8. Solvent cements.
9. Metallic outlet boxes, device boxes, and covers.
10. Cabinets, cutout boxes, junction boxes, and pull boxes.

PART 2 - PRODUCTS

2.1 TYPE EMT-S RACEWAYS AND ELBOWS

A. Steel Electrical Metal Tubing (EMT-S) and Elbows:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit; Atkore International.
 - b. Calconduit; Atkore International.
 - c. Republic Conduit; Nucor Corporation, Nucor Tubular Products.
 - d. Topaz Lighting & Electric.
 - e. Western Tube; Zekelman Industries.

- f. Wheatland Tube; Zekelman Industries.
- 2. Applicable Standards:
 - a. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
 - b. General Characteristics:
 - 1) Reference Standards: UL 797 and UL Category Control Number FJMX.
 - 2) Material: Steel.
 - 3) Exterior Coating: Zinc.
 - 4) Interior Coating: Zinc.
 - c. Options:
 - 1) Minimum Trade Size: 3/4 inch (21 mm).
 - 2) Colors:
 - a) Blue for voice data.
 - b) Purple for security systems, two-way communication system, and door entry intercom video system.
 - c) Red for fire alarm.
 - d) Green for Healthcare Systems such as Nurse Call.

2.2 TYPE ERM-C-S RACEWAYS, ELBOWS, COUPLINGS, AND NIPPLES

- A. Galvanized-Steel Electrical Rigid Metal Conduit (ERM-C-S-G), Elbows, Couplings, and Nipples:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit; Atkore International.
 - b. Calconduit; Atkore International.
 - c. Crouse-Hinds; Eaton, Electrical Sector.
 - d. Killark; Hubbell Incorporated, Construction and Energy.
 - e. Republic Conduit; Nucor Corporation, Nucor Tubular Products.

- f. Topaz Lighting & Electric.
- g. Western Tube; Zekelman Industries.
- h. Wheatland Tube; Zekelman Industries.

2. Applicable Standards:

- a. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
- b. General Characteristics:
 - 1) Reference Standards: UL 6 and UL Category Control Number DYIX.
 - 2) Exterior Coating: Zinc.
 - 3) Interior Coating: Zinc with organic top coating.
- c. Options:
 - 1) Minimum Trade Size: 3/4 inch (21 mm).

2.3 TYPE FMC-S RACEWAYS

A. Steel Flexible Metal Conduit (FMC-S):

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ABB, Electrification Products Division.
 - b. Electri-Flex Company.
 - c. Topaz Lighting & Electric.
- 2. Applicable Standards:
 - a. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
 - b. General Characteristics:
 - 1) Reference Standard: UL 1 and UL Category Control Number DXUZ.
 - 2) Material: Steel.
 - c. Options:
 - 1) Minimum Trade Size: 1/2 inch (16 mm).

2.4 TYPE LFMC RACEWAYS

A. Steel Liquidtight Flexible Metal Conduit (LFMC-S):

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ABB, Electrification Products Division.
 - b. Anaconda Sealtite; Anamet Electrical, Inc.
 - c. Electri-Flex Company.
2. Applicable Standards:
 - a. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
 - b. General Characteristics:
 - 1) Reference Standard: UL 360 and UL Category Control Number DXHR.
 - 2) Material: Steel.
 - c. Options:
 - 1) Minimum Trade Size: 1/2 inch (16 mm).

2.5 TYPE PVC RACEWAYS AND FITTINGS

A. Schedule 40 Rigid PVC Conduit (PVC-40) and Fittings:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ABB, Electrification Products Division.
 - b. Calconduit; Atkore International.
 - c. NAPCO; Westlake Chemical Corp.
 - d. Opti-Com Manufacturing Network, Inc (OMNI).
 - e. Topaz Lighting & Electric.
2. Applicable Standards:
 - a. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

- b. General Characteristics:
 - 1) Reference Standards: UL 651 and UL Category Control Number DZYR.
 - 2) Dimensional Specifications: Schedule 40.
- c. Options:
 - 1) Minimum Trade Size: 1 inch.
 - 2) Markings:
 - a) For use with maximum 90 deg C wire.
 - b) For directional boring applications.

2.6 FITTINGS FOR CONDUIT, TUBING, AND CABLE

A. Fittings for Type ERM C and Type PVC Raceways:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ABB, Electrification Products Division.
 - b. Crouse-Hinds; Eaton, Electrical Sector.
 - c. EGS; Emerson Electric Co., Automation Solutions, Appleton Group.
 - d. Konkore Fittings; Atkore International.
 - e. O-Z/Gedney; Emerson Electric Co., Automation Solutions, Appleton Group.
 - f. Raco Taymac Bell; Hubbell Incorporated, Commercial and Industrial.
 - g. Southwire Company.
 - h. Topaz Lighting & Electric.
2. Applicable Standards:
 - a. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
 - b. General Characteristics:
 - 1) Reference Standards: UL 514B and UL Category Control Number DWTT.
 - 2) Material: Steel or Die cast.

- 3) Coupling Method: Compression coupling and Raintight compression coupling with distinctive color gland nut.

B. Fittings for Type EMT Raceways:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ABB, Electrification Products Division.
 - b. Allied Tube & Conduit; Atkore International.
 - c. Calconduit; Atkore International.
 - d. Crouse-Hinds; Eaton, Electrical Sector.
 - e. EGS; Emerson Electric Co., Automation Solutions, Appleton Group.
 - f. O-Z/Gedney; Emerson Electric Co., Automation Solutions, Appleton Group.
 - g. Raco Taymac Bell; Hubbell Incorporated, Commercial and Industrial.
 - h. Southwire Company.
 - i. Topaz Lighting & Electric.
2. Applicable Standards:
 - a. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
 - b. General Characteristics:
 - 1) Reference Standards: UL 514B and UL Category Control Number FKAV.
 - 2) Material: Steel or Die cast.
 - 3) Coupling Method: Setscrew coupling. Setscrew couplings with only single screw per conduit are unacceptable.

C. Fittings for Type FMC Raceways:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Fittings Corp. (AMFICO).
 - b. Liquid Tight Connector Co.
 - c. Southwire Company.

2. Applicable Standards:
 - a. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
 - b. General Characteristics:
 - 1) Reference Standards: UL 514B and UL Category Control Number ILNR.

D. Fittings for Type LFMC Raceways:

1. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - a. Liquid Tight Connector Co.
2. Applicable Standards:
 - a. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
 - b. General Characteristics:
 - 1) Reference Standards: UL 514B and UL Category Control Number DXAS.

2.7 ELECTRICALLY CONDUCTIVE CORROSION-RESISTANT COMPOUNDS FOR THREADED CONDUIT

A. Applicable Standards:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and approved by authorities having jurisdiction for application to threaded conduit assemblies.
2. General Characteristics:
 - a. Reference Standards: UL 2419 and UL Category Control Number FOIZ.

2.8 SOLVENT CEMENTS

A. Solvent Cements for Type PVC Raceways and Fittings:

1. Applicable Standards:
 - a. General Characteristics:
 - 1) Reference Standards: As recommended by conduit manufacturer in accordance with UL 514B and UL Category Control Number DWTT.

2.9 METALLIC OUTLET BOXES, DEVICE BOXES, AND COVERS

A. Metallic Outlet Boxes:

1. Description: Box having pryout openings, knockouts, threaded entries, or hubs in either the sides of the back, or both, for entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting outlet box cover, but without provisions for mounting wiring device directly to box.
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ABB, Electrification Products Division.
 - b. Arlington Industries, Inc.
 - c. Crouse-Hinds; Eaton, Electrical Sector.
 - d. EGS; Emerson Electric Co., Automation Solutions, Appleton Group.
 - e. Hubbell Premise Wiring; Hubbell Incorporated, Commercial and Industrial.
 - f. Killark; Hubbell Incorporated, Construction and Energy.
 - g. O-Z/Gedney; Emerson Electric Co., Automation Solutions, Appleton Group.
 - h. Pass & Seymour; Legrand North America, LLC.
 - i. Patriot Aluminum Products, LLC.
 - j. Raco Taymac Bell; Hubbell Incorporated, Commercial and Industrial.
 - k. Topaz Lighting & Electric.
 - l. Wiremold; Legrand North America, LLC.
 - m. Wiring Device-Kellems; Hubbell Incorporated, Commercial and Industrial.
3. Applicable Standards:
 - a. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
 - b. General Characteristics:
 - 1) Reference Standards: UL 514A and UL Category Control Number QCIT.
 - c. Options:
 - 1) Material:

- a) Interior Locations: Sheet steel.
 - b) Service Building Chemical Room: Sheet aluminum.
 - c) Exterior Locations: Cast metal.
- 2) Sheet Metal Depth: Minimum 2.5 inch (65 mm).
 - 3) Cast-Metal Depth: Minimum 2.4 inch (60.3 mm).
 - 4) Luminaire Outlet Boxes and Covers: Nonadjustable, listed and labeled for attachment of luminaire weighing up to 50 lb (23 kg).
 - 5) Paddle Fan Outlet Boxes and Covers: Nonadjustable, designed for attachment of paddle fan weighing up to 70 lb (32 kg).

2.10 CABINETS, CUTOOT BOXES, JUNCTION BOXES, AND PULL BOXES

A. Indoor Sheet Metal Junction and Pull Boxes:

- 1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
- 2. Applicable Standards:
 - a. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
 - b. General Characteristics:
 - 1) Reference Standards: UL Category Control Number BGUZ.
 - a) Non-Environmental Characteristics: UL 50.
 - b) Environmental Characteristics: UL 50E.
 - c. Options:
 - 1) Degree of Protection: Type 1.

B. Outdoor Cast-Metal Junction and Pull Boxes:

- 1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
- 2. Applicable Standards:
 - a. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.

- b. General Characteristics:
 - 1) Reference Standards: UL Category Control Number BGUZ.
 - a) Non-Environmental Characteristics: UL 50.
 - b) Environmental Characteristics: UL 50E.
- c. Options:
 - 1) Degree of Protection: Type 4X.

PART 3 - EXECUTION

3.1 SELECTION OF RACEWAYS

- A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of raceways. Consult Architect for resolution of conflicting requirements.
- B. Outdoors:
 - 1. Exposed Conduit: ERM-C-S.
 - 2. Concealed Conduit, Aboveground: ERM-C-S.
 - 3. Direct-Buried Conduit: PVC-40.
 - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
- C. Indoors:
 - 1. Exposed, Not Subject to Physical Damage: EMT.
 - 2. Exposed, Subject to Physical Damage: ERM-C-S.
 - 3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 - 4. Damp or Wet Locations: ERM-C-S.
 - 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC and FMC.
- D. Raceway Fittings: Select fittings in accordance with NEMA FB 2.10 guidelines.
 - 1. ERM-C: Provide threaded type fittings unless otherwise indicated.

3.2 SELECTION OF BOXES AND ENCLOSURES

- A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of boxes and enclosures. Consult Architect for resolution of conflicting requirements.
- B. Degree of Protection:
 - 1. Outdoors:
 - a. Type 4X unless otherwise indicated.
 - 2. Indoors:
 - a. Type 1 unless otherwise indicated.
- C. Exposed Boxes Installed Less Than 6.5 ft. (2 m) Above Floor:
 - 1. Provide cast-metal boxes. Boxes with knockouts or unprotected openings are prohibited.

3.3 INSTALLATION OF RACEWAYS

- A. Installation Standards:
 - 1. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for installation of raceways. Consult Architect for resolution of conflicting requirements.
 - 2. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
 - 3. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
 - 4. Comply with NECA NEIS 101 for installation of steel raceways.
 - 5. Comply with NECA NEIS 111 for installation of nonmetallic raceways.
 - 6. Install raceways square to the enclosure and terminate at enclosures without hubs with locknuts on both sides of enclosure wall. Install locknuts hand tight, plus one-quarter turn more.
 - 7. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4 inch (35 mm) trade size and insulated throat metal bushings on 1-1/2 inch (41 mm) trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
 - 8. Raceway Terminations at Locations Subject to Moisture or Vibration:

- a. Provide insulating bushings to protect conductors, including conductors smaller than No. 4 AWG. Install insulated throat metal grounding bushings on service conduits.

B. General Requirements for Installation of Raceways:

1. Complete raceway installation before starting conductor installation.
2. Provide stub-ups through floors with coupling threaded inside for plugs, set flush with finished floor. Plug coupling until conduit is extended above floor to final destination or a minimum of 2 ft. (0.6 m) above finished floor.
3. Install no more than equivalent of three 90-degree bends in conduit run except for control wiring conduits, for which no more than equivalent of two 90-degree fewer bends are permitted. Support within 12 inch (300 mm) of changes in direction.
4. Make bends in raceway using large-radius preformed ells except for parallel bends. Field bending must be in accordance with NFPA 70 minimum radii requirements. Provide only equipment specifically designed for material and size involved.
5. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
6. Support conduit within 12 inch (300 mm) of enclosures to which attached.
7. Install raceway sealing fittings at accessible locations in accordance with NFPA 70 and fill them with listed sealing compound. For concealed raceways, install fitting in flush steel box with blank cover plate having finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings in accordance with NFPA 70.
8. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal interior of raceways at the following points:
 - a. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - b. Where an underground service raceway enters a building or structure.
 - c. Conduit extending from interior to exterior of building.
 - d. Conduit extending into pressurized duct and equipment.
 - e. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
 - f. Where otherwise required by NFPA 70.
9. Do not install raceways or electrical items on rotating equipment.

10. Do not install conduits within 2 inch (50 mm) of the bottom side of a metal deck roof.
11. Keep raceways at least 6 inch (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
12. Cut conduit perpendicular to the length. For conduits 2 inch (53 mm) trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. Ream inside of conduit to remove burrs.
13. Install pull wires in empty raceways. Provide polypropylene or monofilament plastic line with not less than 200 lb (90 kg) tensile strength. Leave at least 12 inch (300 mm) of slack at both ends of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

C. Requirements for Installation of Specific Raceway Types:

1. Types ERMC:

- a. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound that maintains electrical conductivity to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.

2. Types FMC and LFMC:

- a. Comply with NEMA RV 3. Provide a maximum of 72 inch (1830 mm) of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

3. Type PVC:

- a. Do not install Type PVC conduit where ambient temperature exceeds 122 deg F (50 deg C). Conductor ratings must be limited to 75 deg C except where installed in a trench outside buildings with concrete encasement, where 90 deg C conductors are permitted.
- b. Comply with manufacturer's written instructions for solvent welding and fittings.

D. Stub-ups to Above Recessed Ceilings:

1. Provide EMT for raceways.
2. Provide a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

E. Raceway Fittings: Install fittings in accordance with NEMA FB 2.10 guidelines.

1. EMT: Provide setscrew, steel and cast-metal fittings. Comply with NEMA FB 2.10.

2. Flexible Conduit: Provide only fittings listed for use with flexible conduit type. Comply with NEMA FB 2.20.

F. Expansion-Joint Fittings:

1. Install in runs of aboveground PVC that are located where environmental temperature change may exceed 30 deg F (17 deg C) and that have straight-run length that exceeds 25 ft. (7.6 m). Install in runs of aboveground ERM and EMT conduit that are located where environmental temperature change may exceed 100 deg F (55 deg C) and that have straight-run length that exceeds 100 ft. (30 m).
2. Install type and quantity of fittings that accommodate temperature change listed for the following locations:
 - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
4. Install expansion fittings at locations where conduits cross building or structure expansion joints.
5. Install expansion-joint fitting with position, mounting, and piston setting selected in accordance with manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

G. Raceways Penetrating Rooms or Walls with Acoustical Requirements:

1. Seal raceway openings on both sides of rooms or walls with acoustically rated putty or firestopping.

3.4 INSTALLATION OF BOXES AND ENCLOSURES

- A. Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures.
- B. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- C. Horizontally separate boxes mounted on opposite sides of walls, so they are not in the same vertical channel.
- D. Locate boxes so that cover or plate will not span different building finishes.

- E. Support boxes in recessed ceilings independent of ceiling tiles and ceiling grid.
- F. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for purpose.
- G. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits.
- H. Set metal floor boxes level and flush with finished floor surface.
- I. Do not install aluminum boxes, enclosures, or fittings in contact with concrete or earth.
- J. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to ensure a continuous ground path.
- K. Boxes and Enclosures in Areas or Walls with Acoustical Requirements:
 - 1. Seal openings and knockouts in back and sides of boxes and enclosures with acoustically rated putty.
 - 2. Provide gaskets for wall plates and covers.

3.5 FIRESTOPPING

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 07 84 00 "Firestopping" and Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cables."
- B. Install putty pads at all boxes that are installed in fire-rated wall assemblies.

3.6 PROTECTION

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

3.7 CLEANING

- A. Boxes: Remove construction dust and debris from device boxes, outlet boxes, and floor-mounted enclosures before installing wall plates, covers, and hoods.

END OF SECTION

SECTION 26 05 44.00

SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.
2. Grout.

PART 2 - PRODUCTS

2.1 SLEEVES

A. Wall Sleeves:

1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.

B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

C. Sleeves for Rectangular Openings:

1. Material: Galvanized sheet steel.
2. Minimum Metal Thickness:
 - a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and with no side larger than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
 - b. For sleeve cross-section rectangle perimeter 50 inches (1270 mm) or more and one or more sides larger than 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.2 GROUT

A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.

- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- C. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS

- A. Coordinate sleeve selection and application with selection and application of firestopping.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 3 inches above finished floor level.
- G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed.
- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.
- I. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials.

3.2 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS

- A. Comply with NECA 1.
- B. Comply with NEMA VE 2 for cable tray and cable penetrations.
- C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
 - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
 - a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.

- b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall, so no voids remain. Tool exposed surfaces smooth; protect material while curing.
 - 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed.
 - 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
 - 5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level. Install sleeves during erection of floors.
- D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
- 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
 - 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using cast-iron pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- 3.3 FIRESTOPPING
- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 07 84 00 "Firestopping."

END OF SECTION

SECTION 26 05 53.00

IDENTIFICATION FOR ELECTRICAL SYSTEMS

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. Color and legend requirements for raceways, conductors, and warning labels and signs.
2. Labels.
3. Tapes and stencils.
4. Signs.
5. Cable ties.
6. Fasteners for labels and signs.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with NFPA 70.
- B. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- C. Comply with ANSI Z535.4 for safety signs and labels.
- D. Comply with NFPA 70E and Section 26 05 73.19 "Arc-Flash Hazard Analysis" requirements for arc-flash warning labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 COLOR AND LEGEND REQUIREMENTS

A. Raceways and Cables Carrying Circuits at 600 V or Less:

1. Black letters on an orange field.
2. Legend: Indicate voltage.

B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.

1. Color shall be factory applied or field applied for sizes larger than No. 8 AWG if authorities having jurisdiction permit.
2. Colors for 240/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
3. Color for Neutral: White.
4. Color for Equipment Grounds: Green.

C. Warning Label Colors:

1. Identify system voltage with black letters on an orange background.

D. Warning labels and signs shall include, but are not limited to, the following legends:

1. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES (915 MM)."
2. Arc Flash warning labels.

E. Equipment Identification Labels:

1. Black letters on a white field.

2.3 LABELS

A. Self-Adhesive Wraparound Labels: Write-on, 3-mil- (0.08-mm-) thick, vinyl flexible label with acrylic pressure-sensitive adhesive.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Ideal Industries, Inc.

- c. Panduit Corp.
- 2. Marker for Labels: Permanent, waterproof, black ink marker recommended by tag manufacturer.

2.4 TAPES AND STENCILS

- A. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide; compounded for outdoor use.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Carlton Industries, LP.
 - c. emedco.
 - d. Marking Services, Inc.

- B. Underground-Line Warning Tape:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Ideal Industries, Inc.
 - c. Marking Services, Inc.
 - d. Seton Identification Products; a Brady Corporation company.
- 2. Tape:
 - a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
 - b. Printing on tape shall be permanent and shall not be damaged by burial operations.
 - c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
- 3. Color and Printing:
 - a. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, ANSI Z535.4, and ANSI Z535.5.

- b. Inscriptions for Red-Colored Tapes: "ELECTRIC LINE, HIGH VOLTAGE".
- c. Inscriptions for Orange-Colored Tapes: "TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE".

2.5 CABLE TIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Ideal Industries, Inc.
 - 2. Panduit Corp.
- B. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.
 - 1. Minimum Width: 3/16 inch (5 mm).
 - 2. Tensile Strength at 73 Deg F (23 Deg C) according to ASTM D 638: 7000 psi (48.2 MPa).
 - 3. UL 94 Flame Rating: 94V-0.
 - 4. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
 - 5. Color: Black.

2.6 SIGNS

- A. Laminated Acrylic or Melamine Plastic Signs:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Carlton Industries, LP.
 - c. Marking Services, Inc.
 - 2. Engraved legend.
 - 3. Thickness:
 - a. For signs up to 20 sq. in. (129 sq. cm), minimum 1/16 inch (1.6 mm) thick.
 - b. For signs larger than 20 sq. in. (129 sq. cm), 1/8 inch (3.2 mm) thick.
 - c. Engraved legend with black letters on white face.

- d. Punched or drilled for mechanical fasteners with 1/4-inch (6.4-mm) grommets in corners for mounting or Self-adhesive.
- e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.7 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.
- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- G. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.
- H. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- I. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- J. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
- K. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage. Paragraphs below specify requirements unique to identification products.

- L. Vinyl Wraparound Labels:
1. Secure tight to surface at a location with high visibility and accessibility.
 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
- M. Snap-around Labels: Secure tight to surface at a location with high visibility and accessibility.
- N. Self-Adhesive Wraparound Labels: Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
- O. Self-Adhesive Labels:
1. On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
 2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
- P. Snap-around Color-Coding Bands: Secure tight to surface at a location with high visibility and accessibility.
- Q. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.
- R. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.
1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.
- S. Underground Line Warning Tape:
1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches (400 mm) overall.
 2. Limit use of underground-line warning tape to direct-buried cables.
 3. Install underground-line warning tape for direct-buried cables and cables in raceways.
- T. Laminated Acrylic or Melamine Plastic Signs:
1. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on minimum 1-1/2-inch- (38-mm-) high sign; where two lines of text are required, use signs minimum 2 inches (50 mm) high.

U. Cable Ties: General purpose, for attaching tags, except as listed below:

1. In Spaces Handling Environmental Air: Plenum rated.

3.2 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive vinyl tape applied in bands.
 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- D. Accessible Fittings for Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive labels containing the wiring system legend and system voltage.
- E. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, and handholes, use self-adhesive wraparound labels to identify the phase.
 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- F. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.
- G. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.
- H. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.
- I. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive equipment labels.
 1. Apply to exterior of door, cover, or other access.
- J. Arc Flash Warning Labeling: Self-adhesive labels.

- K. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

- a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with ½-inch high letters on 1 ½-inch high label; where two lines of text are required, use labels 2-inches high.
- b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
- c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
- d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
- e. For all labeled electrical equipment, provide voltage identification, emergency power system branch, and upstream equipment identification in addition to equipment identification.

2. Equipment to be Labeled:

- a. Panelboards:
 - 1) Typewritten directory of circuits in the location provided by panelboard manufacturer.
 - 2) Panelboard identification shall be self-adhesive, engraved, laminated acrylic or melamine label.
- b. Enclosures and electrical cabinets.
- c. Access doors and panels for concealed electrical items.
- d. Enclosed switches and circuit breakers.
- e. Disconnect Switches.
- f. Variable Frequency Drives.

END OF SECTION

SECTION 26 09 23.00

LIGHTING CONTROL DEVICES

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. Digital Lighting Controls.
2. Commissioning of lighting control devices.

B. Related Requirements:

1. Division 26 Section "Interior Lighting" for integrated wireless controls for luminaires.
2. Light Fixture Schedule, Control Device Schedule and Lighting Control Narrative located on plan drawings.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Plan drawing showing device coverage and necessary interconnection details.
- C. Manufacturer shall substantiate conformance to this specification by supplying the necessary documents, performance data and wiring diagrams. Any deviations to this specification must be clearly stated by letter and submitted.
- D. Alternate manufacturers must show equivalency of system performance. If additional devices are required for equivalent performance, it is the responsibility of the alternate manufacturer to include in their bid.

1.4 INFORMATIONAL SUBMITTALS

- A. Field quality-control / commissioning reports.
- B. Functional test report to be submitted prior to substantial completion inspection.
- C. Final commissioning report.
- D. Certification documents.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of lighting control device to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 DIGITAL LIGHTING CONTROLS

- A. Refer to Lighting Control Device Schedule and Lighting Control Narrative on plan drawings for model numbers and other information.
- B. Lighting controls shall be networked together (other than restroom / storage room fixtures with integral sensors). Provide SensorView software for remote configuration and monitoring.

PART 3 - EXECUTION

3.1 PRE-INSTALLATION COORDINATION

- A. Arrange a pre-installation meeting with manufacturer's factory authorized representative, at the project, to verify installation criteria for all lighting controls, cabling, conduit, system settings and programming.

3.2 SENSOR INSTALLATION

- A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression systems, and partition assemblies.
- B. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.
- C. Locate and aim sensors in the correct location required for complete and proper volumetric coverage within the range of coverage(s) of controlled areas per the manufacturer's recommendations. Rooms shall have ninety (90) to one hundred (100) percent coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the room(s). The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms which are to be provided with sensors. The contractor shall provide additional sensors if required to properly and completely cover the respective room.
- D. Proper judgment must be exercised in executing the installation so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components. The contractor shall also provide, at the

owner's facility, the training necessary to familiarize the owner's personnel with the operation, use, adjustment, and problem solving diagnosis of the occupancy sensing devices and systems.

3.3 IDENTIFICATION

- A. Identify components and power and control wiring according to Section 26 05 53 "Identification for Electrical Systems."
 - 1. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.
- B. Label time switches and contactors with a unique designation.

3.4 FIELD QUALITY CONTROL / COMMISSIONING

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Factory Startup:
 - 1. It shall be the manufacturer's responsibility to verify all proper adjustments and train owner's personnel to ensure owner's satisfaction with the occupancy system.
 - 2. Upon completion of the installation, the system shall be completely commissioned by the manufacturer's factory authorized technician who will verify all adjustments and sensor placement to ensure a trouble-free occupancy-based lighting control system.
 - 3. Functional test report to be submitted prior to substantial completion inspection.
 - 4. Final commissioning report.
 - 5. The electrical contractor shall provide both the manufacturer and the electrical engineer with ten working days written notice of the scheduled commissioning date. Upon completion of the system fine tuning the factory authorized technician shall provide the proper training to the owner's personnel in the adjustment and maintenance of the sensors.
- C. Functional testing:
 - 1. Perform the functional tests and inspections with the assistance of a factory-authorized service representative.
 - 2. Include all lighting control devices, integral controls for interior luminaires and integral controls for exterior luminaires.
 - 3. After installing lighting controls, and after electrical circuitry has been energized, start units to confirm proper unit operation.
 - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

5. Provide evidence that the lighting control systems have been tested to ensure that control hardware and software are calibrated, adjusted, programmed and in proper working condition in accordance with the construction documents and manufacturer's instructions.
6. Occupant sensor controls. Where occupant sensor controls are provided, the following procedures shall be performed:
 - a. Certify that the occupant sensor has been located and aimed in accordance with manufacturer recommendations.
 - b. All occupant sensor controls shall be tested per manufacturer instructions and verify the following:
 - 1) Where occupant sensor controls include status indicators, verify correct operation.
 - 2) The controlled lights turn off or down to the permitted level within the required time.
 - 3) For auto-on occupant sensor controls, the lights turn on to the permitted level when an occupant enters the space.
 - 4) For manual-on occupant sensor controls, the lights turn on only when manually activated.
 - 5) The lights are not incorrectly turned on by movement in adjacent areas or by HVAC operation.
 - c. All daylight responsive controls shall be tested per manufacturer instructions and the following shall be verified:
 - 1) Control devices have been properly located, field calibrated and set for accurate set points and threshold light levels.
 - 2) Daylight controlled lighting loads adjust to light level set points in response to available daylight.
 - 3) The locations of calibration adjustment equipment are readily accessible only to authorized personnel.
 - d. All switches, low voltage switches, wall stations, dimmers and low voltage dimmers shall be tested per manufacturer instructions and verify the following:
 - 1) Low voltage switches, wall stations and dimmers are programmed and functioning per the zoning on the drawings.
 - 2) All lights can be turned on and off by their respective area control switch.
 - 3) Lights on dimmers can be dimmed by their respective area control switch.

- e. All load controllers, switch packs, relays, contactors and zone controllers shall be tested per manufacturer instructions and verify the following:
 - 1) All loads are turned on and off by their respective device.
 - 2) Zones that are to be dimmed can be dimmed.
- f. All accessories shall be tested per manufacturer instructions and verify the following:
 - 1) All accessories are functioning as specified.
- D. Lighting control devices will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.
 - 1. Functional test report to be submitted prior to substantial completion inspection.
 - 2. Final commissioning report documents certifying that the installed lighting controls meet documented performance criteria are to be provided to the building owner within 90 days from the date of receipt of the certificate of occupancy.

3.5 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting sensors to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.
 - 1. For occupancy and motion sensors, verify operation at outer limits of detector range. Set time delay to suit Owner's operations.
 - 2. For daylighting controls, adjust set points and deadband controls to suit Owner's operations.

3.6 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices and software.

END OF SECTION

SECTION 26 21 00.00

SERVICE ENTRANCE

PART 1 - GENERAL

1.1. SYSTEM DESCRIPTION

- A. Electric Utility Company: WPS.
- B. System Characteristics: 120/240-volts, 1-phase.
- C. The Owner will order the electrical service directly from Electric Utility Company and coordinate with the Contractor. The Owner will pay for the electric service outside of the construction contract.

1.2. SUBMITTALS

- A. Submit Electric Utility Company prepared Drawings.

1.3. QUALITY ASSURANCE

- A. Perform work in accordance with Electric Utility Company written requirements.
- B. Maintain one (1) copy of document on site.

1.4. PRE-INSTALLATION CONFERENCE

- A. Convene 1-week prior to commencing work of this Section.

1.5. FIELD MEASUREMENTS

- A. Verify that field measurements are as indicated on Drawings.

PART 2 - PRODUCTS

2.1. UTILITY FURNISHED PRODUCTS

- A. The following products will be furnished by the Electric Utility Company.
 - 1. Pad-mounted transformer and associated concrete pad.
 - 2. Service lateral.

2.2. SERVICE EQUIPMENT

- A. Electrical CONTRACTOR shall furnish and install all items listed as furnished by 'customer' as printed in the most recent edition of Electric Utility Company manuals.

- B. Equipment furnished and installed by the Electrical CONTRACTOR shall include (but not be limited to) the following:
 - 1. Meter / Main Circuit Breaker Pedestal, see Section 26 27 13 Electricity Metering for further information.
 - 2. Service lateral conduit (stub to 90° sweep elbow).
 - 3. Service entrance conduit.
 - 4. Service entrance conductors.
- B. All service equipment shall be of Electric Utility Company approved Manufacturer and model.

PART 3 - EXECUTION

3.1. EXAMINATION

- A. Verify that service equipment is ready to be connected and energized.

3.2. PREPARATION

- A. Make arrangements with Electric Utility Company to obtain permanent electric service to the project.
- B. Coordinate location of Electric Utility Company's facilities to ensure proper access is available.

END OF SECTION

SECTION 26 24 16.00

PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Lighting and appliance branch-circuit panelboards.

1.2 DEFINITIONS

A. MCCB: Molded-case circuit breaker.

B. SPD: Surge protective device.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of panelboard.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details.
2. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
3. Detail bus configuration, current, and voltage ratings.
4. Short-circuit current rating of panelboards and overcurrent protective devices.
5. Include evidence of NRTL listing for SPD as installed in panelboard.
6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
7. Include wiring diagrams for power, signal, and control wiring.
8. Key interlock scheme drawing and sequence of operations.

1.4 INFORMATIONAL SUBMITTALS

A. Panelboard schedules for installation in panelboards.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.

1.6 FIELD CONDITIONS

A. Service Conditions: NEMA PB 1, usual service conditions, as follows:

1. Ambient temperatures within limits specified.
2. Altitude not exceeding 6600 feet (2000 m).

PART 2 - PRODUCTS

2.1 PANELBOARDS COMMON REQUIREMENTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Square D; Schneider Electric USA.
2. Cutler Hammer.
3. Siemens.
4. General Electric.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Comply with NEMA PB 1.

D. Comply with NFPA 70.

E. Enclosures: Flush and Surface-mounted, dead-front cabinets.

1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
2. Height: 84 inches (2.13 m) maximum.
3. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims shall cover all live parts and shall have no exposed hardware.

F. Incoming Mains Location: Convertible between top and bottom.

G. Phase, Neutral, and Ground Buses: Tin-plated aluminum.

H. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn copper, 98 percent conductivity.

2. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.
3. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.
- I. NRTL Label: Panelboards shall be labeled by an NRTL acceptable to authority having jurisdiction for use as service equipment with one or more main service disconnecting and overcurrent protective devices. Panelboards shall have meter enclosures, wiring, connections, and other provisions for utility metering. Coordinate with utility company for exact requirements.
- J. Future Devices: Panelboards shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
- K. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.

2.2 PERFORMANCE REQUIREMENTS

- A. Surge Suppression: Factory installed as an integral part of indicated panelboards, complying with UL 1449 SPD Type 2.

2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.
- B. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.
- C. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.4 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.
 1. Thermal-Magnetic Circuit Breakers:
 - a. Inverse time-current element for low-level overloads.
 - b. Instantaneous magnetic trip element for short circuits.
 - c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
 2. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6-mA trip).
 3. MCCB Features and Accessories:
 - a. Standard frame sizes, trip ratings, and number of poles.

- b. Breaker handle indicates tripped status.
- c. UL listed for reverse connection without restrictive line or load ratings.
- d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
- e. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
- f. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.
- g. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.

2.5 IDENTIFICATION

- A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.
- B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.
- C. Circuit Directory: Directory card inside panelboard door, mounted in transparent card holder.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.
- B. Install panelboards and accessories according to NECA 407.
- C. Mount top of trim 90 inches (2286 mm) above finished floor unless otherwise indicated.
- D. Mount panelboard cabinet plumb and rigid without distortion of box.
- E. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- F. Install overcurrent protective devices and controllers not already factory installed.
- G. Install filler plates in unused spaces.
- H. Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits into raised floor space or below slab not on grade.
- I. Arrange conductors in gutters into groups and bundle and wrap with wire ties.

3.2 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.
- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- D. Device Nameplates: Label each branch circuit device in power panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- E. Install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems" identifying source of remote circuit.

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- C. Tests and Inspections:
 - 1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers stated in NETA ATS. Certify compliance with test parameters.
 - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- D. Panelboards will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results, with comparisons of the two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION

SECTION 26 24 17.00

COMPANY SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Company Switches

1.2 ACTION SUBMITTALS

A. Product Data:

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data:

1. Certified as-built General Arrangement drawings and Wiring Diagram.
2. Materials / Component List including part numbers.
3. Maintenance and service requirements.
4. Certificate of Compliance and hi-pot test data.

1.4 QUALITY ASSURANCE

- A. Company switch shall be UL Listed and labeled under the UL 891 standard.
- B. Company switch manufacturer shall provide a complete factory assembled, wired and tested company switch.
- C. Company switch shall be factory hi-pot tested for a period of not less than 60 seconds.
- D. Company switch installation shall meet all applicable NEC standards.

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace Company Switches that fail(s) in materials or workmanship within specified warranty period.
 1. Warranty Period: One year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. ESL Power Systems
- B. Trystar

2.2 DESCRIPTION

- A. Company switch enclosures shall be NEMA Type 1, Type 3R or Type 3RX as indicated in the drawings, constructed of continuous seam-welded, powder coated 14-gauge steel. The main access shall be through an interlocked, hinged door that extends the full height of the enclosure. The enclosure shall have a provision for locking. Each phase shall have color-coded cam-style receptacles within the enclosure; the receptacles shall be factory-wired to a molded case main circuit breaker. The breaker shall be interlocked to the main access door. Access for portable cables with male cam-style plugs shall be via cable entry openings in the bottom of enclosure. The terminals for the feeder conductors shall be as required to accommodate conductor sizes as shown on the drawings. Enclosures shall be powder coated after fabrication, matte wrinkle black for Type 1 enclosures and wrinkle gray (RAL 7038) for Type 3R and Type 3RX enclosures.
- B. Company switch safety-interlocking mechanism shall be integrated with the access door, preventing the cam-style receptacles from being energized unless the access door is closed. The access door interlock mechanism shall allow manual de-energizing but must also automatically de-energize the company switch if an attempt is made to partially or fully open the access door while the company switch is energized. The handle of the safety-interlock mechanism shall be recessed into the access door and shall not protrude at all beyond the face of the access door.
- C. Pilot lights for each phase shall be located behind a clear window in the access door. Pilot lights shall illuminate only when voltage is present at each phase. Pilot lights shall be red colored LEDs. All Pilot lights shall be visible when the access door is closed.
- D. Cam-style receptacles for each phase, neutral (if required), and ground shall be single pole, color-coded separable connectors, UL Listed and rated 400 amps at 600VAC. Unless specified as isolated ground, the ground cam-style receptacle shall be bonded to the enclosure, and a ground lug shall be provided for connection of the facility ground conductor. The neutral cam-style receptacle, if required, shall be factory wired to a power distribution block. None of the cam-style receptacles shall be accessible unless the molded case circuit breaker is in the "OFF" position and the main access door is open.
- E. Mechanical lugs for portable cable direct wire connection shall be provided for each, phase, neutral (if required), and ground cables. Mechanical lugs shall accept wire sizes from #6AWG to 250MCM and shall be located in the portable cable connection area behind the company switch safety-interlocked door. None of the direct wire lugs shall be accessible unless the molded case circuit breaker is in the "OFF" position and the main access door is open. A non-conductive clamp shall be provided to secure direct wire portable cables in place and minimize mechanical tension at the connection points.
- F. Molded case circuit breaker shall be UL Listed and the short circuit interrupt rating shall be a minimum of 65kAIC at 240VAC and 35kAIC at 480VAC. Trip rating of the molded case circuit breaker shall be as shown on the drawings. The molded case circuit breaker shall include a UL Listed door-mounted operating mechanism, preventing the opening of the main access door unless breaker is in the "OFF" position. The molded case circuit breaker shall be mounted behind

a deadfront panel. The load-side of the molded case circuit breaker shall not be energizable unless the main access door is closed and the molded case circuit breaker is in the "ON" position.

- G. Company switch shall be configured to allow for conduit entry at the top, back or upper sides of the enclosure.
- H. Company switch shall include a UL Listed 1/4 DIN Volt-Amp meter with LED display showing 3 rows of 3 digits. Meter accuracy class shall be +/- .5% of full-scale value for voltage and +/- 2 digits for current. Meter shall be located behind a clear window in the access door, and shall be factory-programmed to display current in all (3) phases simultaneously by default.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Prior to installation of the company switch, Contractor shall examine the areas and conditions under which the company switch is to be installed and notify the Engineer in writing if unsatisfactory conditions exist.

3.2 INSTALLATION

- A. Company switch shall be installed as shown on the drawings and per the manufacturer's written instructions. In addition, the installation shall meet the requirements of local codes, the National Electrical Code and National Electrical Contractors Association's "Standard of Installation".
- B. For outdoor installations, conduit entry into the company switch shall be by Contractor; Contractor shall furnish and install listed conduit hubs, as manufactured by MYERS, T&B or equal for each conduit entry on the company switch. The hub size shall match the conduit size for feeders and ground as shown on the drawings. Hubs shall be properly installed and tightened to maintain Type 3R integrity of the company switch enclosure.
- C. Contractor shall terminate feeder conductors, load conductors and ground per the manufacturer's instructions. Use copper wire only for all conductors and grounds. All field wiring terminations shall be torqued as required per the instructions on the company switch's power distribution block, circuit breaker & ground lug.

3.3 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.4 FIELD QUALITY CONTROL

- A. Tests and Inspections:
 - 1. Verify mounting and connections are complete and secure.
 - 2. Verify internal components and wiring are secure.
 - 3. Perform continuity check of all circuits.

4. Perform 1,000 VDC megger test on feeder, load and ground cables.
5. Verify deadfront is secure.
6. With the company switch deadfront in place and the main access door closed and properly latched, actuate the Operator Mechanism and verify that the circuit breaker can be turned “ON” and “OFF” and can be reset.
7. Confirm operation of the company switch ground receptacle by attaching a plug to the company switch ground receptacle and then verify that the plug is grounded to the facility ground.
8. Once utility power has been applied, confirm operation of the company switch by attaching the proper plugs to each of the company switch phase receptacles and verifying that the correct voltage is present once the circuit breaker is energized.

B. Prepare test and inspection reports.

3.5 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain Company Switches.

END OF SECTION

SECTION 26 27 13.00
ELECTRICITY METERING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes electricity metering.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.5 COORDINATION

- A. Electrical Service Connections: Coordinate with utility companies and utility-furnished components.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 916.

2.2 UTILITY METERING INFRASTRUCTURE

- A. Install metering accessories furnished by the utility company, complying with its requirements.
- B. Meter Sockets:
 - 1. Comply with requirements of electrical-power utility company.
 - 2. Meter Sockets: Steady-state and short-circuit current ratings shall meet indicated circuit ratings.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with equipment installation requirements in NECA 1.
- B. Install meters furnished by utility company. Install raceways and equipment according to utility company's written instructions. Provide empty conduits for metering leads and extend grounding connections as required by utility company.
- C. Wiring Method:
 - 1. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- D. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

END OF SECTION

SECTION 26 27 26.00

WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General-use switches.
2. Single straight-blade receptacles.
3. Duplex straight-blade receptacles.
4. Receptacles with ground-fault protective devices.

1.2 ACTION SUBMITTALS

A. Product Data.

B. Field Quality-Control Submittals:

1. Field quality-control reports.

PART 2 - PRODUCTS

2.1 GENERAL-USE SWITCHES

A. Toggle Switch:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
 - b. Leviton Manufacturing Co., Inc.
 - c. Pass & Seymour; Legrand North America, LLC.
 - d. Wiring Device-Kellems; Hubbell Incorporated, Commercial, and Industrial.
2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.
3. General Characteristics:

- a. Reference Standards: UL CCN WMUZ and UL 20.
- 4. Options:
 - a. Device Color: White.
 - b. Configuration:
 - 1) Specification grade heavy-duty, 120-277 V, 20 A, single pole.
- 5. Accessories:
 - a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
 - b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.2 SINGLE STRAIGHT-BLADE RECEPTACLES

A. Single Straight-Blade Receptacle:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
 - b. Leviton Manufacturing Co., Inc.
 - c. Pass & Seymour; Legrand North America, LLC.
 - d. Wiring Device-Kellems; Hubbell Incorporated, Commercial, and Industrial.
- 2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.
- 3. General Characteristics:
 - a. Reference Standards: UL CCN RTRT and UL 498.
- 4. Options:
 - a. Device Color: White.
 - b. Configuration:

- 1) Specification Grade Heavy-duty, NEMA 5-20R, or other NEMA configuration noted on plans.

5. Accessories:

- a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
- b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.3 DUPLEX STRAIGHT-BLADE RECEPTACLES

A. Duplex Straight-Blade Receptacle:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
 - b. Leviton Manufacturing Co., Inc.
 - c. Pass & Seymour; Legrand North America, LLC.
 - d. Wiring Device-Kellems; Hubbell Incorporated, Commercial, and Industrial.
2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.
3. General Characteristics:
 - a. Reference Standards: UL CCN RTRT and UL 498.
4. Options:
 - a. Device Color: White.
 - b. Configuration:
 - 1) Specification Grade Heavy-duty, NEMA 5-20R, or other NEMA configuration noted on plans.
5. Accessories:
 - a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.

- b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.4 RECEPTACLES WITH GROUND-FAULT PROTECTIVE DEVICES

A. Duplex Straight-Blade Receptacle with GFCI Device: “GFI”

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
 - b. Leviton Manufacturing Co., Inc.
 - c. Pass & Seymour; Legrand North America, LLC.
 - d. Wiring Device-Kellems; Hubbell Incorporated, Commercial and Industrial.
2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.
3. General Characteristics:
 - a. Reference Standards: UL CCN KCXS, UL 498, and UL 943.
4. Options:
 - a. Device Color: White.
 - b. Configuration: Specification grade Heavy-duty, NEMA 5-20R.
5. Accessories:
 - a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
 - b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

B. Weather-Resistant, Tamper-Resistant Duplex Straight-Blade Receptacle with GFCI Device: “WP GFI”

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Arrow Hart, Wiring Devices; Eaton, Electrical Sector.
 - b. Leviton Manufacturing Co., Inc.

- c. Pass & Seymour; Legrand North America, LLC.
 - d. Wiring Device-Kellems; Hubbell Incorporated, Commercial, and Industrial.
- 2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.
- 3. General Characteristics:
 - a. Reference Standards: UL CCN KCXS, UL 498, and UL 943.
- 4. Options:
 - a. Device Color: White.
 - b. Configuration: Specification grade Heavy-duty, NEMA 5-20R.
- 5. Accessories:
 - a. Weatherproof Metallic While-In-Use Cover:
 - 1) Heavy duty die-cast aluminum with gray lid.
 - 2) For vertical mounted devices, use vertical mounting box.
 - 3) For horizontal mounted devices, use horizontal mounting box.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receptacles:

- 1. Verify that receptacles to be procured and installed for Owner-furnished equipment are compatible with mating attachment plugs on equipment.

3.2 INSTALLATION OF SWITCHES

A. Comply with manufacturer's instructions.

B. Reference Standards:

- 1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
- 2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.

3. Consult Architect for resolution of conflicting requirements.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 260553 "Identification for Electrical Systems."
 - a. Mark cover or cover plate using self-adhesive labels.
 - b. Healthcare Facilities: Distinctively identify covers or cover plates of device boxes and outlet boxes that are supplied from life safety and critical branch power supplies following facility's standard practice.

3.3 INSTALLATION OF STRAIGHT-BLADE RECEPTACLES

A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
3. Receptacle Orientation: Unless otherwise indicated in Contract Documents, orient receptacle to match configuration diagram in NEMA WD 6.
4. Consult Architect for resolution of conflicting requirements.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 260553 "Identification for Electrical Systems."
 - a. Mark cover or cover plate using self-adhesive labels.
 - b. Healthcare Facilities: Distinctively identify covers or cover plates of device boxes and outlet boxes that are supplied from life safety and critical branch power supplies following facility's standard practice.

3.4 INSTALLATION OF LOCKING RECEPTACLES

A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.

2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
3. Receptacle Orientation: Unless otherwise indicated in Contract Documents, orient receptacle to match configuration diagram in NEMA WD 6.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 260553 "Identification for Electrical Systems."
 - a. Mark cover or cover plate using self-adhesive labels.
 - b. Healthcare Facilities: Distinctively identify covers or cover plates of device boxes and outlet boxes that are supplied from life safety and critical branch power supplies following facility's standard practice.

3.5 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Insert and remove test plug to verify that device is securely mounted.
2. Verify polarity of hot and neutral pins.
3. Measure line voltage.
4. Measure percent voltage drop.
5. Measure grounding circuit continuity; impedance must be not greater than 2 ohms.
6. Perform additional installation and maintenance inspections and diagnostic tests in accordance with NECA NEIS 130 and manufacturers' instructions.

B. Nonconforming Work:

1. Device will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

C. Assemble and submit test and inspection reports.

3.6 PROTECTION

A. Devices:

1. Schedule and sequence installation to minimize risk of contamination of wires and cables, devices, device boxes, outlet boxes, covers, and cover plates by plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other materials.

2. After installation, protect wires and cables, devices, device boxes, outlet boxes, covers, and cover plates from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION

SECTION 26 28 16.00

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Nonfusible switches.
 - 2. Enclosures.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
- B. Shop Drawings: For enclosed switches and circuit breakers.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Include wiring diagrams for power, signal, and control wiring.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Square D; Schneider Electric USA.
 - 2. Cutler Hammer.
 - 3. Siemens.
 - 4. General Electric.
- B. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.

- C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- E. Comply with NFPA 70.

2.2 NONFUSIBLE SWITCHES

- A. Type HD, Heavy Duty, Single-Pole or Three-Pole (see plans), Single Throw, 240 and 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- B. Accessories:
 - 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
 - 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.

2.3 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
- B. Enclosure Finish:
 - 1. The enclosure shall be gray baked enamel paint, electrodeposited on cleaned, phosphatized steel (NEMA 250 Type 1).
 - 2. The enclosure shall be gray baked enamel paint, electrodeposited on cleaned, phosphatized galvanized steel (NEMA 250 Types 3R, 12).
 - 3. The enclosure shall be a brush finish on Type 304 stainless steel (NEMA 250 Type 4-4X stainless steel).
- C. Conduit Entry: NEMA 250 Types 4, 4X, and 12 enclosures shall contain no knockouts.
- D. Operating Mechanism: The circuit-breaker operating handle shall be directly operable through the front cover of the enclosure (NEMA 250 Type 1) and directly operable through the dead front trim of the enclosure (NEMA 250 Type 3R). The cover interlock mechanism shall have an externally operated override. The override shall not permanently disable the interlock mechanism, which shall return to the locked position once the override is released. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.

PART 3 - EXECUTION

3.1 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

- A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.
 - 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 - 2. Outdoor Locations: NEMA 250, Type 3R.
 - 3. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4X, stainless steel.

3.2 INSTALLATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- C. Comply with NFPA 70 and NECA 1.

3.3 IDENTIFICATION

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.4 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Tests and Inspections for Switches:
 - 1. Visual and Mechanical Inspection:
 - a. Inspect physical and mechanical condition.
 - b. Inspect anchorage, alignment, grounding, and clearances.
 - c. Verify that the unit is clean.
 - d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
 - e. Verify that fuse sizes and types match the Specifications and Drawings.

- f. Verify that each fuse has adequate mechanical support and contact integrity.
 - g. Inspect bolted electrical connections for high resistance using one of the two following methods:
 - 1) Use a low-resistance ohmmeter.
 - a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.
 - a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.
 - h. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.
 - i. Verify correct phase barrier installation.
 - j. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.
2. Electrical Tests:
- a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
 - b. Measure contact resistance across each switchblade fuseholder. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
 - c. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole. Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.
 - d. Measure fuse resistance. Investigate fuse-resistance values that deviate from each other by more than 15 percent.
 - e. Perform ground fault test according to NETA ATS 7.14 "Ground Fault Protection Systems, Low-Voltage."

- C. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports.
 - 1. Test procedures used.
 - 2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
 - 3. List deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION

SECTION 26 43 13.00

SURGE PROTECTIVE DEVICES FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Type 2 surge protective devices.
 - 2. Enclosures.

1.2 DEFINITIONS

- A. I_n : Nominal discharge current.
- B. Voltage Protection Rating (VPR): A rating selected from UL 1449 list of preferred values assigned to each mode of protection.

1.3 ACTION SUBMITTALS

- A. Product Data:
 - 1. For each type of product.
 - a. Include electrical characteristics, specialties, and accessories for SPDs.
 - b. Certification of compliance with UL 1449 by qualified electrical testing laboratory recognized by authorities having jurisdiction including the following information:
 - 1) Tested values for VPRs.
 - 2) I_n ratings.
 - 3) MCOV, type designations.
 - 4) OCPD requirements.
 - 5) Manufacturer's model number.
 - 6) System voltage.
 - 7) Modes of protection.
- B. Field quality-control reports.

PART 2 - PRODUCTS

2.1 TYPE 2 SURGE PROTECTIVE DEVICES (SPDs)

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Liebert; Vertiv Holdings Co.
 - 2. Mersen USA.
 - 3. Schneider Electric USA, Inc.
- B. Source Limitations: Obtain devices from single source from single manufacturer.
- C. General Characteristics:
 - 1. Reference Standards: UL 1449, Type 2; UL 1283.
 - 2. MCOV: Not less than 125 percent of nominal system voltage for 120/240 V power systems.
 - 3. Peak Surge Current Rating: Minimum single-pulse surge current withstand rating per phase must not be less than kA rating listed below. Peak surge current rating must be arithmetic sum of the ratings of individual MOVs in a given mode.
 - a. 208V Distribution Panels: 240 kA
 - 4. SCCR: Equal or exceed 100 kA.
 - 5. I_n Rating: 20 kA.
- D. Options:
 - 1. Include LED indicator lights for power and protection status.
 - 2. Include internal thermal protection that disconnects the SPD before damaging internal suppressor components.
 - 3. Include NEMA ICS 5, dry Form C contacts rated at 2 A and 24 V(ac) for remote monitoring of protection status.
 - 4. Include surge counter.

2.2 ENCLOSURES

- A. Indoor Enclosures: Type 1.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Provide OCPD and disconnect for installation of SPD in accordance with UL 1449 and manufacturer's instructions.

3.2 FIELD QUALITY CONTROL

- A. Tests and Inspections:

1. Compare equipment nameplate data for compliance with Drawings and the Specifications.
2. Inspect anchorage, alignment, grounding, and clearances.
3. Verify that electrical wiring installation complies with manufacturer's installation requirements.

- B. Nonconforming Work:

1. SPDs that do not pass tests and inspections will be considered defective.
2. Remove and replace defective units and retest.

- C. Prepare test and inspection reports.

3.3 STARTUP SERVICE

- A. Complete startup checks in accordance with manufacturer's instructions.
- B. Do not perform insulation-resistance tests of the distribution wiring equipment with SPDs installed. Disconnect SPDs before conducting insulation-resistance tests; reconnect them immediately after the testing is over.
- C. Energize SPDs after power system has been energized, stabilized, and tested.

END OF SECTION

SECTION 26 51 19.00
LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.2 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

1.3 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
 - 1. Label shall include the following lamp characteristics:
 - a. "USE ONLY" and include specific lamp type.
 - b. Lamp diameter, shape, size, wattage, and coating.
 - c. CCT and CRI.

- C. Recessed luminaires shall comply with NEMA LE 4.

2.2 LUMINAIRE SUPPORT

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Wires: ASTM A641/A641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).

- D. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Supports:
 - 1. Sized and rated for luminaire weight.
 - 2. Able to maintain luminaire position after cleaning and relamping.
 - 3. Provide support for luminaire without causing deflection of ceiling or wall.
 - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- E. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

3.2 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 - 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to emergency power and retransfer to normal. For Residence Halls, coordinate testing with generator and transfer switch testing.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

3.4 STARTUP SERVICE

- A. Comply with requirements for startup and commissioning specified in Section 260923" Lighting Control Devices."

END OF SECTION

SECTION 26 52 13.00

EMERGENCY AND EXIT LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Exit signs.
 - 2. Luminaire support components.

1.2 ACTION SUBMITTALS

- A. Product Data for each specified fixture.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR EMERGENCY LIGHTING

- A. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70 and UL 924, by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.
- B. Comply with NFPA 101.
- C. Comply with NEMA LE 4 for recessed luminaires.

2.2 EXIT SIGNS

- A. General Characteristics: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.
- B. Internally Lighted Sign:
 - 1. Options:
 - a. Lamps for AC Operation:
 - 1) LEDs; 50,000 hours minimum rated lamp life.

2.3 LUMINAIRE SUPPORT COMPONENTS

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- B. Supports:
 - 1. Sized and rated for luminaire weight.
 - 2. Able to maintain luminaire position when testing emergency power unit.
 - 3. Provide support for luminaire and emergency power unit without causing deflection of ceiling or wall.
 - 4. Luminaire-mounting devices must be capable of supporting a horizontal force of 100 percent of luminaire and emergency power unit weight and vertical force of 400 percent of luminaire weight.
- C. Wall-Mounted Luminaire Support:
 - 1. Do not attach luminaires directly to gypsum board.
- D. Suspended Luminaire Support:
 - 1. Pendants and Rods: Where longer than 48 inch (1200 mm), brace to limit swinging.
 - 2. Stem-Mounted, Single-Unit Luminaires: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
 - 3. Do not use ceiling grid as support for pendant luminaires. Connect support wires or rods to building structure.
- E. Ceiling Grid Mounted Luminaires:
 - 1. Secure to outlet box, if provided.
 - 2. Secure emergency power unit using approved fasteners in a minimum of four locations, spaced near corners of emergency power unit.

3.2 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.3 FIELD QUALITY CONTROL

- A. Tests and Inspections:

1. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.

B. Nonconforming Work:

1. Luminaire will be considered defective if it does not pass operation tests and inspections.
2. Remove and replace defective units and retest.

C. Prepare test and inspection reports.

3.4 PROTECTION

- A. Remove and replace luminaires and exit signs that are damaged or caused to be unfit for use by construction activities.

END OF SECTION

NELSON FAMILY PAVILION

CITY OF DE PERE

100 WILLIAM ST, DE PERE, WI 54115



NO.	DATE	REVISION

NELSON FAMILY PAVILION

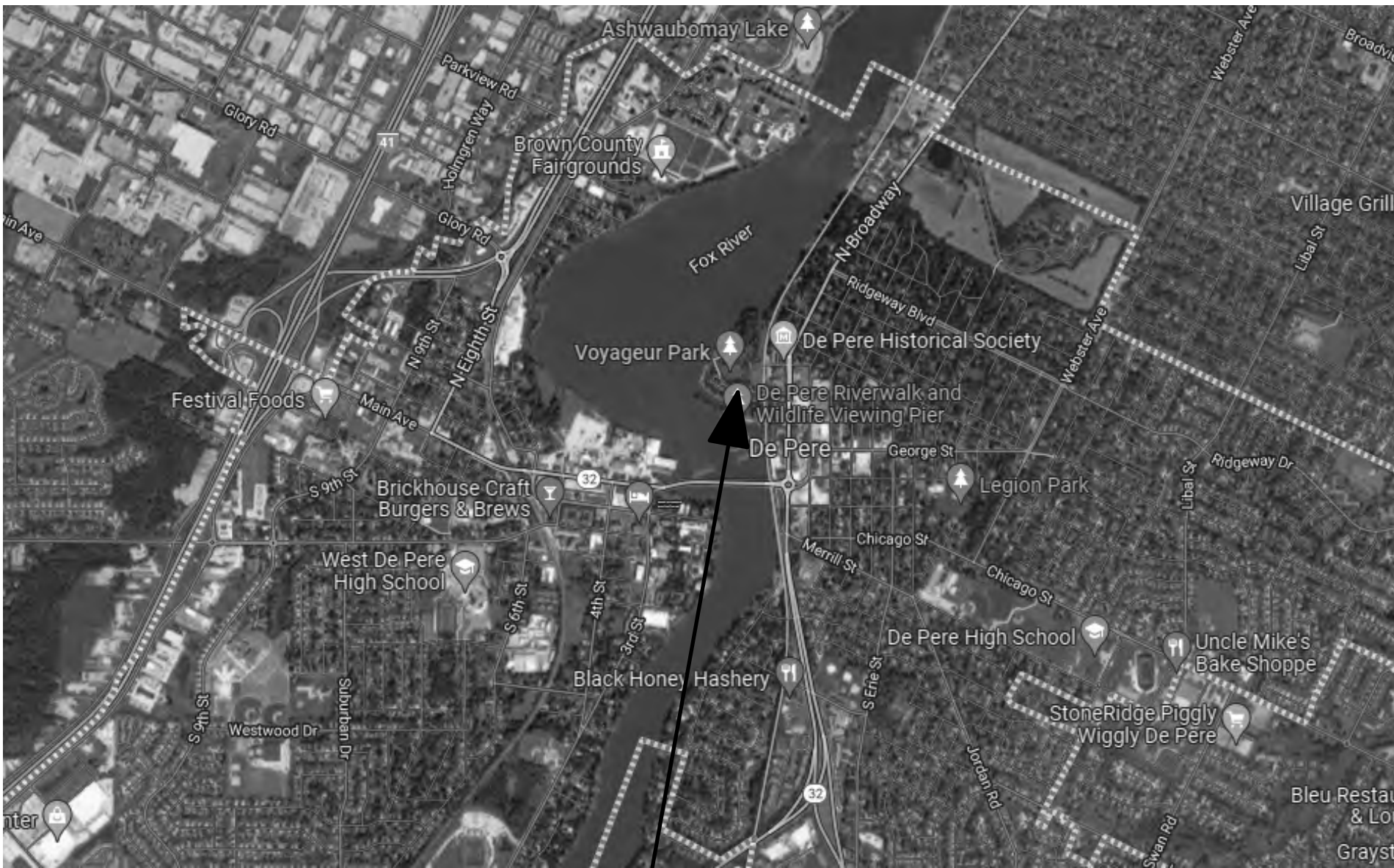
CITY OF DE PERE

100 WILLIAM ST, DE PERE, WI 54115

SHEET INDEX

SHEET NO.	SHEET DESCRIPTION	ISSUED FOR BIDDING AND DSPS REVIEW MARCH 10, 2023				
GENERAL						
A001	COVER SHEET	X				
A002	TITLE SHEET	X				
A011	LIFE SAFETY PLAN	X				
A012	ARCHITECTURAL SITE PLAN	X				
CIVIL						
C101	ABBREVIATIONS, SYMBOLS & NOTES	X				
C102	EXISTING SITE & SURVEY CONTROL	X				
C103	SITE REMOVALS AND DEMOLITION PLAN	X				
C104	PROPOSED SITE PLAN	X				
C105	MISCELLANEOUS DETAILS	X				
C106	MISCELLANEOUS DETAILS	X				
ARCHITECTURAL						
A111	FIRST FLOOR DEMOLITION PLAN	X				
A211	FIRST FLOOR PLAN	X				
A231	ROOF PLAN	X				
A241	FINISH AND FURNITURE PLAN	X				
A271	REFLECTED CEILING PLAN	X				
A291	DOOR SCHEDULE: DOOR & WINDOW ELEVATIONS	X				
A301	EXTERIOR ELEVATIONS	X				
A302	EXTERIOR ELEVATIONS	X				
A311	BUILDING SECTIONS	X				
A312	BUILDING SECTIONS	X				
A351	WALL SECTIONS	X				
A411	ENLARGED RESTROOM PLANS & ELEVATIONS	X				
A811	EXTERIOR DETAILS	X				
A812	EXTERIOR DETAILS	X				
STRUCTURAL						
S101	STRUCTURAL SPECIFICATIONS	X				
S102	STRUCTURAL SPECIFICATIONS	X				
S103	STRUCTURAL SCHEDULES	X				
S104	SNOW DRIFT PLAN	X				
S201	FOUNDATION PLAN	X				
S202	LOW ROOF FRAMING PLAN	X				
S203	HIGH ROOF FRAMING PLAN	X				
S301	FOUNDATION DETAILS					
S302	FOUNDATION DETAILS	X				
S401	MASONRY DETAILS	X				
S501	FRAMING DETAILS	X				
S502	FRAMING DETAILS	X				
PLUMBING						
P001	PLUMBING TITLE SHEET	X				
P102	PLUMBING FLOOR PLANS	X				
P901	RISER DIAGRAMS	X				
HVAC						
H001	HVAC TITLE SHEET	X				
H201	HVAC FIRST FLOOR PLAN	X				
H202	HVAC UNDERGROUND PIPING PLAN	X				
H203	HVAC PIPING PLAN	X				
H231	ROOF HVAC PLAN	X				
H301	HVAC SCHEMATIC	X				
H501	HVAC SCHEDULES	X				
H601	HVAC DETAILS	X				
ELECTRICAL						
E001	ELECTRICAL NOTES	X				
E002	ELECTRICAL SYMBOLS AND ABBREVIATIONS	X				
E101	ELECTRICAL SITE PLAN	X				
E201	FIRST FLOOR POWER PLAN	X				
E211	FIRST FLOOR LIGHTING PLAN	X				
E221	FIRST FLOOR SPECIAL SYSTEMS PLAN	X				
E301	ELECTRICAL DETAILS	X				
E401	ELECTRICAL SCHEDULES	X				
E411	LIGHTING SCHEDULES	X				
E501	ELECTRICAL DETAILS	X				

PROJECT LOCATION MAP



PROJECT LOCATION

DESIGN TEAM

ARCHITECTURAL

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E-MAIL: JFitzsimons@mcmgrp.com

IMPORTANT NOTICE: THE DRAWINGS AND THE SPECIFICATIONS TOGETHER REPRESENT THE CONSTRUCTION DOCUMENTS, AND AS SUCH, MUST BE USED TOGETHER AS THE BASIS OF DESIGN. THE CONTRACTOR IS SPECIFICALLY INSTRUCTED NOT TO LIMIT THEIR UNDERSTANDING OF THE SCOPE OF THIS PROJECT BASED UPON THE SPECIFICATIONS INDEX. THE CONTRACTOR IS RESPONSIBLE TO REVIEW ALL INFORMATION IN BOTH THE DRAWINGS AND SPECIFICATIONS, AND IS THEREFORE, REQUIRED TO PROVIDE ALL DEFINED, AND REASONABLY IMPLIED, SCOPE OF WORK NO MATTER WHERE IT APPEARS IN THE CONSTRUCTION DOCUMENTS. IN ADDITION, THE CONTRACTOR IS TO REVIEW ANY FORMALLY PROVIDED MODIFICATIONS, CLARIFICATIONS, ADDENDUMS AND/OR OTHER INFORMATION AND INCORPORATE THAT INFORMATION INTO THE CONTRACTOR'S UNDERSTANDING OF THE SCOPE OF THE PROJECT.

DESIGN	DATE	BY

NELSON FAMILY PAVILION

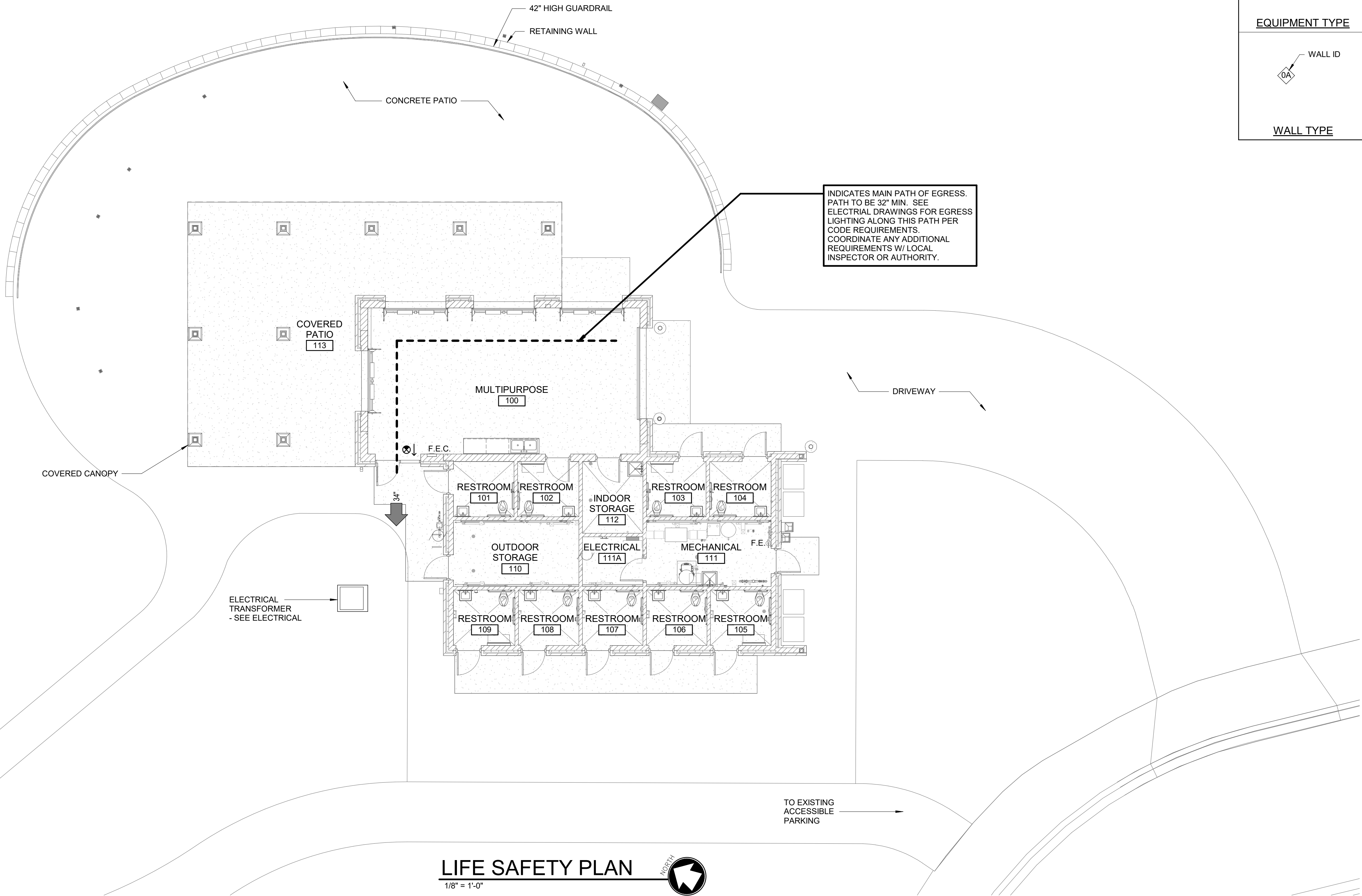
CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115

TITLE SHEET

DESIGNED	DRAWN
KJC	CAW
PROJECT NO. D0005 06-22-00146	
DATE MARCH 10, 2023	
SHEET NO. A002	

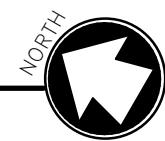
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ABBREVIATIONS					
@	AT	CTR	FND	FL	OSB
ACT	ACOUSTICAL TILE	DF	FLOOR	FOUNDATION	PC
ADA	AMERICANS W/ DISABILITIES ACT	DIA / Ø	FUT	FUTURE	PLAM
ADDL	ADDITIONAL	DIM	GALV	GALVANIZED	PR
ADJ	ADJUSTABLE	DS	GC	GENERAL CONTRACTOR	QT
AFF	ABOVE FINISHED FLOOR	DTL	GYP BD	GYPSPUM BOARD	R
ALT	ALTERNATE / ALTERNATIVE	DW	HB	HOSE BIB	RD
ALUM	ALUMINUM	EW	HD	HANDICAP	REINF
BLDG	BUILDING	EA	HM	HOLLOW METAL	REQ
BLKG	BLOCKING	EF	HR	HOUR	RO
BOT	BOTTOM	ELEC	ID	INSIDE DIAMETER	SC
BRG	BEARING	ELEV	IMP	INSULATED METAL PANEL	SCHED
CL / ☐	CENTERLINE	ENCL	INT	INSULATION	SF
CAB	CABINET	EQ	LAV	LAVATORY	SIM
CJ	CONTROL JOINT	EQUIP	MAX	MAXIMUM	SPEC
CLG	CEILING	EW	MECH	MECHANICAL	SS
CLO	CLOSET	EWC	MISC	MISCELLANEOUS	STL
CLR	CLEAR	EXTG	MFG	MANUFACTURER	STRUCT
CMU	CONCRETE MASONRY UNIT	EXH	MIN	MINIMUM	T&B
COL	COLUMN	EXT	MO	MASONRY OPENING	T&G
CONC	CONCRETE	F	NIC	NOT IN CONTRACT	TBD
CONST	CONSTRUCTION	FD	NTS	NOT TO SCALE	TYP
CONT	CONTINUOUS	FE	OC	ON CENTER	UNO
COORD	COORDINATE	FEC	OD	OUTSIDE DIAMETER	W/O
CORR	CORRIDOR	FIN			WD



LIFE SAFETY PLAN

1/8" = 1'-0"



SYMBOL KEY

<p>DIRECTION SECTION IS CUT</p> <p>SECTION NUMBER</p> <p>SHEET SECTION APPEARS ON</p>	<p>ELEVATION NUMBER</p> <p>SHEET ELEVATION APPEARS ON</p>	<p>DESCRIPTION</p> <p>FIRST FLOOR</p> <p>ELEVATION</p>	<p>GRID DESIGNATION</p>
<p>SECTION</p>	<p>ELEVATION</p>	<p>ELEVATION DATUM</p>	<p>COLUMN GRID</p>
<p>DIRECTION DETAIL IS CUT</p> <p>DETAIL NUMBER</p> <p>SHEET DETAIL APPEARS ON</p>	<p>DIRECTION OF ELEVATION</p> <p>ELEVATION NUMBER</p> <p>SHEET ELEVATION APPEARS ON</p>	<p>ROOM NAME</p> <p>ROOM NUMBER</p>	<p>CEILING TYPE</p> <p>CEILING HEIGHT</p>
<p>DETAIL</p>	<p>INTERIOR ELEVATION</p>	<p>ROOM NAME & NUMBER</p>	<p>CEILING KEY</p>
<p>EQUIPMENT TYPE</p>	<p>WINDOW TYPE</p>	<p>PLAN KEYNOTE</p>	<p>REVISION CLOUD AROUND REVISED ITEMS</p>
<p>EQUIPMENT TYPE</p>	<p>WINDOW TYPE</p>	<p>PLAN KEYNOTE</p>	<p>REVISION</p>
<p>WALL ID</p>	<p>DOOR NUMBER</p>	<p>ACCESSORY KEYNOTE</p>	<p>DEMOLITION KEYNOTE</p>
<p>WALL TYPE</p>	<p>DOOR TYPE</p>	<p>ACCESSORY KEYNOTE</p>	<p>DEMOLITION KEYNOTE</p>

CODE KEY

	EMERGENCY EXIT PATH OF TRAVEL
	FIRE EXTINGUISHER CABINET (SEMI-RECESSED)
	WALL MOUNTED FIRE EXTINGUISHER
	EXIT DISCHARGE PROVIDED (CLEAR WIDTH IN INCHES)
	EXIT SIGN

BUILDING CODE INFORMATION

THE DRAWINGS HAVE BEEN PREPARED IN ACCORDANCE WITH THE FOLLOWING CODES - NOTIFY THE ARCHITECT OF ANY CONFLICTS

CODES:
2015 INTERNATIONAL BUILDING CODE
2015 INTERNATIONAL MECHANICAL CODE
WISCONSIN DSPS PLUMBING CODE
2017 NATIONAL ELECTRICAL CODE
2015 INTERNATIONAL FIRE CODE
2015 INTERNATIONAL FUEL GAS CODE
2009 ICC/ANSI 117.1-2009 ACCESSIBILITY CODE

BUILDING AREA:	1,740 S.F.
OPEN PAVILION AREA:	1,114 S.F.
TOTAL:	2,854 S.F.
NUMBER OF STORIES:	(1) STORY
ALLOWABLE AREA PER TABLE 503:	(2) STORIES - 9,000 SF
BUILDING HEIGHT:	17'-0" AT HIGH POINT (40' ALLOWABLE FOR TYPE VB)
OCCUPANCY CLASSIFICATION:	"A-3" - ASSEMBLY
CONSTRUCTION CLASSIFICATION:	VB
AUTOMATIC SPRINKLER PROTECTION:	NONE
OCCUPANCY BY CALCULATION (15 NET):	1740/15 = 116 OCCUPANTS (OPEN PAVILION)

McMAHON
ENGINEERS ARCHITECTS
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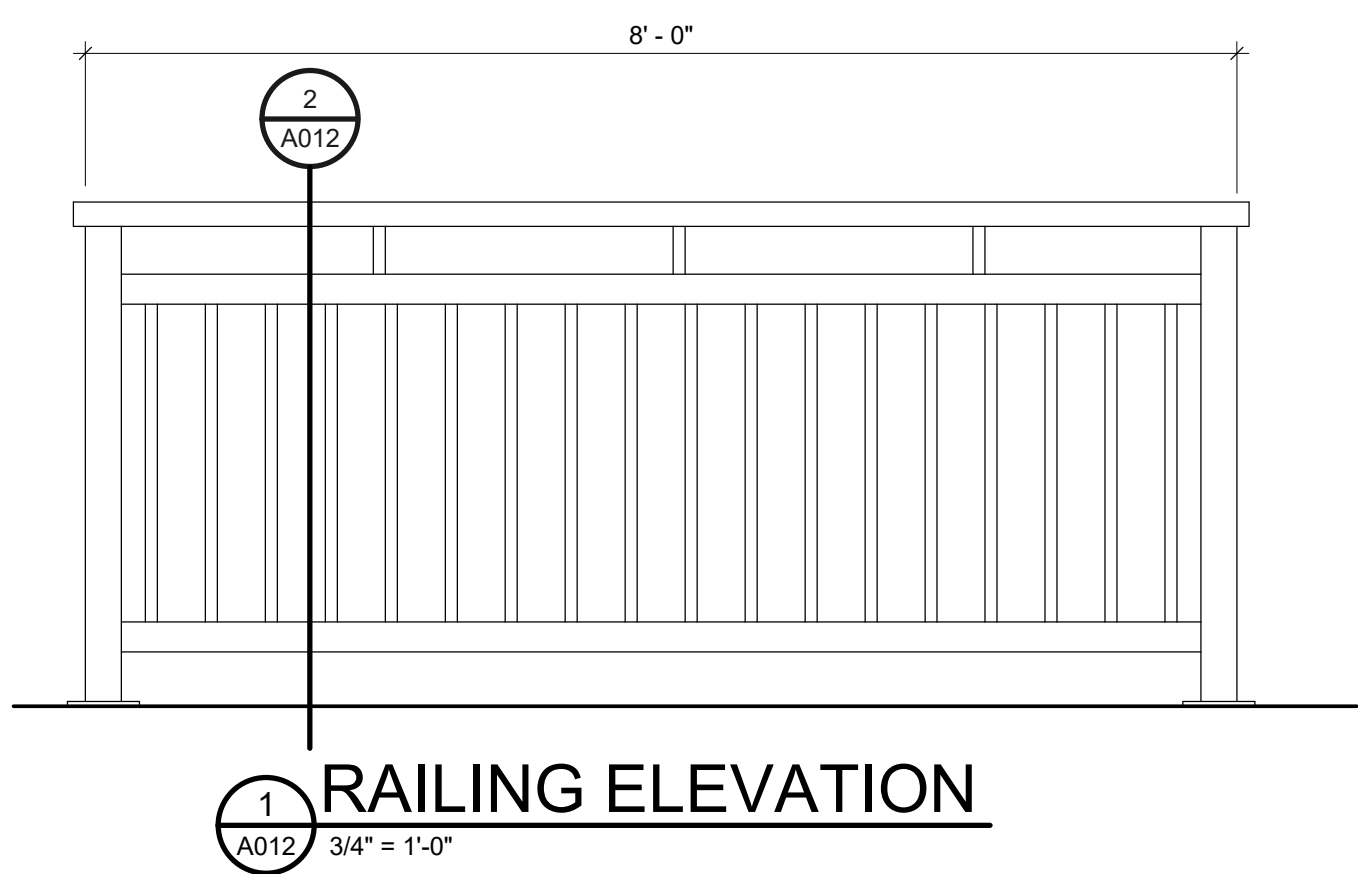
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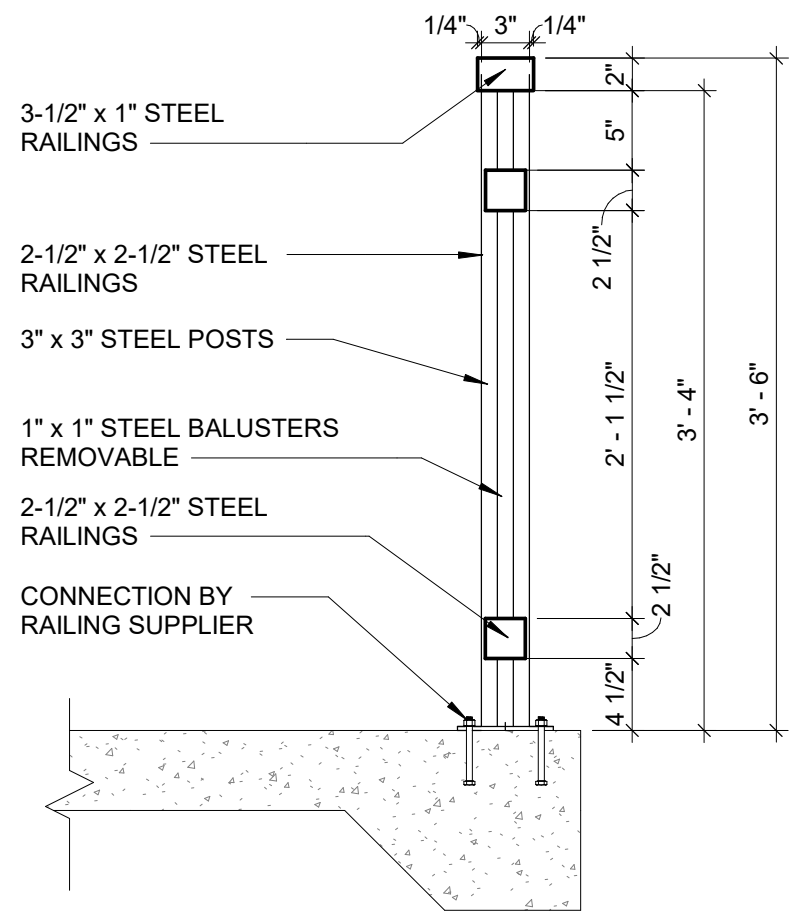
NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115
LIFE SAFETY PLAN

DESIGNED	DRAWN
KJC	CAW
PROJECT NO.	
D0005 06-22-00146	
DATE	
MARCH 10, 2023	
SHEET NO.	

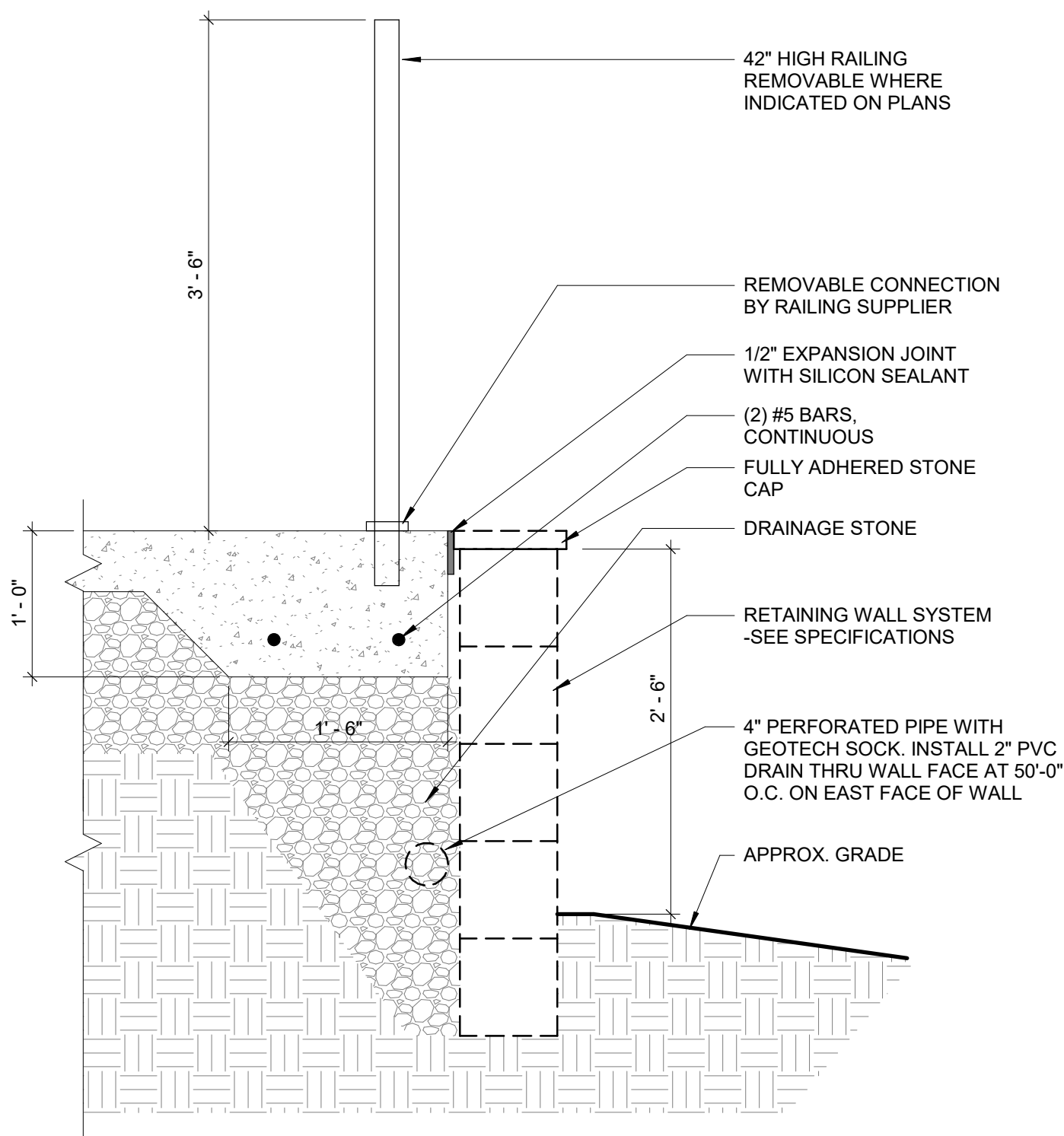
A011



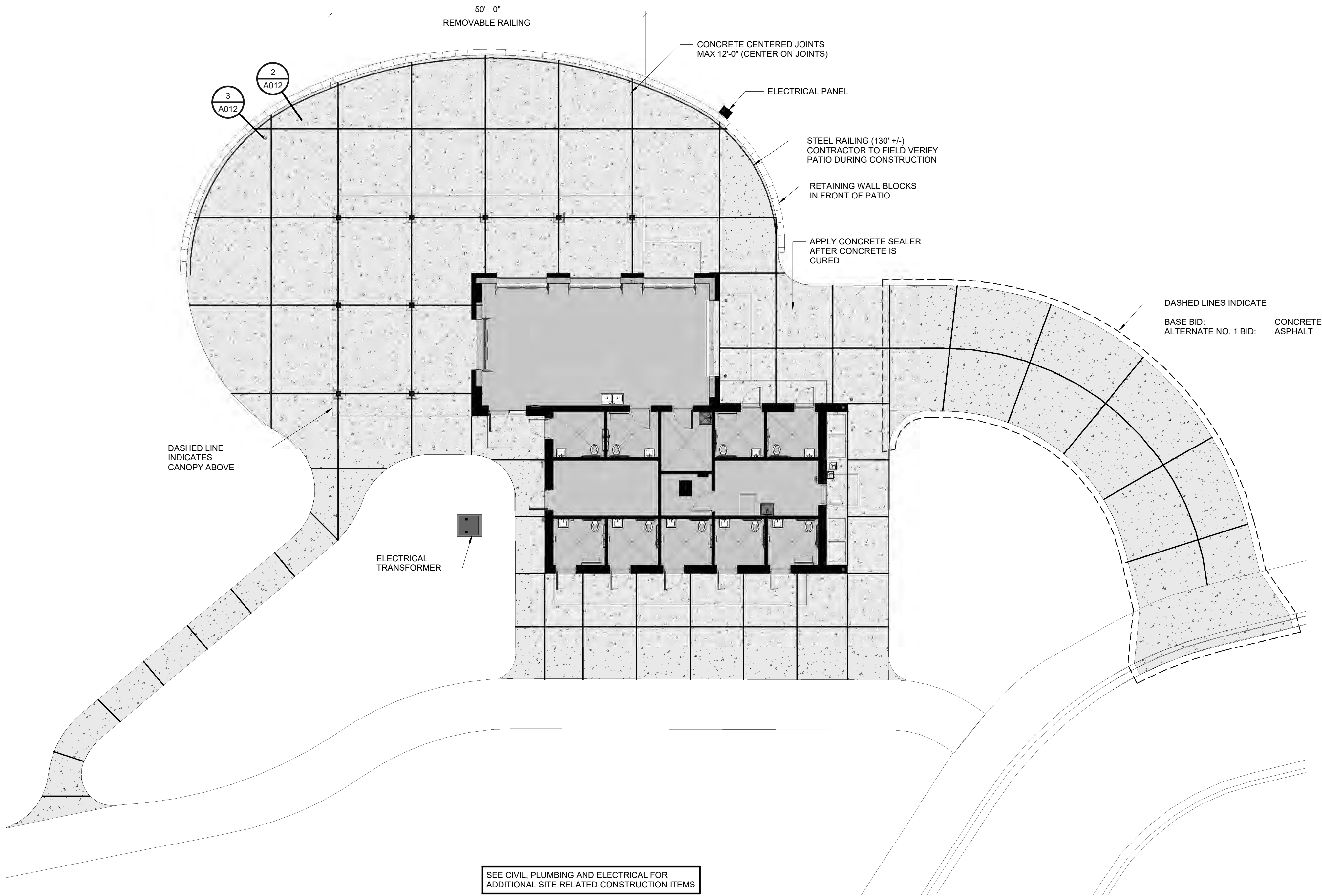
1 RAILING ELEVATION



2 RAILING SECTION



3 RETAINING WALL



ARCHITECTURAL SITE PLAN

1" = 10'-0"



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REVISION	DATE	BY

DESIGNED KJC	DRAWN KJC
PROJECT NO. D0005 06-22-00146	
DATE MARCH 10, 2023	
SHEET NO.	

A012

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STANDARD ABBREVIATIONS

AC	ACRE	LT	LEFT
AGG	AGGREGATE	LVC	LENGTH OF VERTICAL CURVE
AH	AHEAD	MAINT	MAINTENANCE
ASPH	ASPHALT PAVEMENT	MAT'L	MATERIAL
AVG	AVERAGE	MAX	MAXIMUM
B-B	BACK TO BACK	MIN	MINIMUM
BEG	BEGIN	MH	MANHOLE
BIT	BITUMINOUS	MP	MILE POST
BK	BACK	NB	NORTHBOUND
B/L	BASE LINE	NO	NUMBER
BLDG	BUILDING	NOR	NORMAL
BM	BENCH MARK	OD	OUTSIDE DIAMETER
BOC	BACK OF CURB	OBLIT	OBLITERATE
BRG	BEARING	PAVT	PAVEMENT
C-C	CENTER TO CENTER	PC	POINT OF CURVATURE
CY	CUBIC YARD	PCC	PORTLAND CEMENT CONCRETE OR POINT OF COMPOUND CURVATURE
C&G	CURB AND GUTTER	PE	PRIVATE ENTRANCE
CB	CATCH BASIN	PED	PEDESTAL
CE	COMMERCIAL ENTRANCE	POL	PROFILE GRADE LINE
CHD	CHORD	PI	POINT OF INTERSECTION
C/L	CENTER LINE	P/L	PROPERTY LINE
CL	CLASS (FOR CONC PIPE)	PLE	PERMANENT LIMITED EASEMENT
CMP	CORRUGATED METAL PIPE	PP	POWER POLE
CO	CLEAN OUT	PRC	POINT OF REVERSE CURVATURE
CONC	CONCRETE	PROP	PROPOSED
CORR	CORRUGATED	PSD	PASSING SIGHT DISTANCE
CP	CONTROL POINT	PSI	POUNDS PER SQUARE INCH
CR	CRUSHED	PT	POINT OF TANGENCY
CS	CURB STOP	PVC	POLYVINYL CHLORIDE OR POINT OF VERTICAL CURVATURE
CSW	CONCRETE SIDEWALK	PVI	POINT OF VERTICAL INTERSECTION
CTH	COUNTY TRUNK HIGHWAY	PVT	POINT OF VERTICAL TANGENCY
CULV	CULVERT	R	RADIUS
D	DEPTH OR DELTA	RCP	REINFORCED CONCRETE PIPE
DI	DUCTILE IRON	RD	ROAD
DIA	DIAMETER	REBAR	REINFORCEMENT ROD
DIS	DISCHARGE	REM	REMOVE
EA	EACH	RECON	RECONSTRUCT
EB	EASTBOUND	REQ'D	REQUIRED
EBS	EXCAVATION BELOW SUBGRADE	R/L	REFERENCE LINE
EG	EDGE OF GRAVEL	RP	RADIUS POINT
ELEV	ELEVATION	RR	RAILROAD
ELEC	ELECTRIC	RT	RIGHT
EMB	EMBANKMENT	R/W	RIGHT-OF-WAY
EMAT	EROSION MAT	SB	SOUTHBOUND
ENT	ENTRANCE	SE	SUPERELEVATION
EOR	END OF RADIUS	SF	SQUARE FEET
EP	EDGE OF PAVEMENT	SI	SLOPE INTERCEPT
EXC	EXCAVATION	STH	STATE TRUNK HIGHWAY
EX	EXISTING	SY	SQUARE YARD
EW	ENDWALL	SALV	SALVAGED
F-F	FACE TO FACE	SAN	SANITARY
FDN	FOUNDATION	SEC	SECTION
FE	FIELD ENTRANCE	SHLDR	SHOULDER
FERT	FERTILIZER	S/L	SURVEY LINE
FG	FINISHED GRADE	SQ	SQUARE
F/L	FLOW LINE	STA	STATION
FT	FOOT	STD	STANDARD
FTG	FOOTING	STO	STORM
GRAV	GRAVEL	SW	SIDEWALK
GN	GRID NORTH	TC	TOP OF CURB
GV	GAS VALVE	TEL	TELEPHONE
HDPE	HIGH DENSITY POLYETHYLENE	TEMP	TEMPORARY
HE	HIGHWAY EASEMENT	TLE	TEMPORARY LIMITED EASEMENT
HMA	HOT MIX ASPHALT	TV	TELEVISION
HP	HIGH POINT	TYP	TYPICAL
HT	HEIGHT	UG	UNDERGROUND
HYD	HYDRANT	USH	U.S. HIGHWAY
ID	INSIDE DIAMETER	VAR	VARIES
IN	INCH	VC	VERTICAL CURVE
INL	INLET	VERT	VERTICAL
INV	INVERT	WB	WESTBOUND
IP	IRON PIPE	WM	WATER MAIN
JCT	JUNCTION	WV	WATER VALVE
LB	POUND		
LF	LINEAR FOOT		
LP	LIGHT POLE		

GENERAL NOTES

- THE UTILITIES SHOWN IN PLAN AND PROFILE ARE INDICATED IN ACCORDANCE WITH AVAILABLE RECORDS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING EXACT LOCATIONS AND ELEVATIONS OF ALL UTILITIES, INCLUDING ANY PRIVATE UTILITIES, FROM THE OWNERS OF THE RESPECTIVE UTILITIES. ALL UTILITIES SHALL BE NOTIFIED 72 HRS. PRIOR TO EXCAVATION.
- PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY PROPOSED SITE GRADES BY FIELD CHECKING TWO (2) BENCHMARKS AND A MINIMUM OF ONE (1) SITE FEATURE AS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY MCMAHON OF ANY VERTICAL DISCREPANCY.
- THE PROPERTY LINES, RIGHT-OF-WAY LINES AND OTHER PROPERTY INFORMATION ON THIS DRAWING WERE DEVELOPED OR OBTAINED AS PART OF THE COUNTY GEOGRAPHIC INFORMATION SYSTEM OR THROUGH THE COUNTY PROPERTY TAX MAPPING FUNCTION. MCMAHON DOES NOT GUARANTEE THIS INFORMATION TO BE CORRECT, CURRENT OR COMPLETE. THE PROPERTY AND RIGHT-OF-WAY INFORMATION ARE INTENDED FOR USE AS A GENERAL REFERENCE AND ARE NOT INTENDED OR SUITABLE FOR SITE-SPECIFIC USES. ANY USE TO THE CONTRARY OF THE ABOVE STATED USES IS THE RESPONSIBILITY OF THE USER AND SUCH USE IS AT THE USER'S OWN RISK.
- NO TREES OR SHRUBS ARE TO BE REMOVED WITHOUT PRIOR APPROVAL FROM THE OWNER.
- A SAWED JOINT IS REQUIRED WHERE NEW HMA PAVEMENT MATCHES EXISTING ASPHALTIC CONCRETE SURFACE.
- ALL CURB RADII SHOWN ON THE PLAN SHEETS ARE TO THE BACK OF CURB UNLESS OTHERWISE NOTED.
- DIMENSIONS ARE TO THE BACK OF CURB UNLESS OTHERWISE NOTED.

STANDARD SYMBOLS (PLAN VIEW ONLY)

	2" IRON PIPE FOUND		TELEPHONE CABLE - BURIED
	1 1/4" REBAR FOUND		ELECTRIC CABLE - BURIED
	1 1/4" x 30" IRON REBAR WEIGHING 4.30 LB/LF SET		UTILITIES - OVERHEAD
	1" (1.315 OD) IRON PIPE FOUND		FIBER OPTIC CABLE - BURIED
	1" IRON PIPE SET		GAS MAIN
	3/4" IRON REBAR FOUND		CABLE TELEVISION - BURIED
	3/4" IRON PIPE FOUND		DITCH LINE
	3/4"x 24" IRON REBAR WEIGHING 1.5 LB/LF SET		STREET C/L OR R/L
	MAG NAIL FOUND		PROPERTY LINE
	MAG NAIL SET		RIGHT-OF-WAY LINE
	MAG SPIKE FOUND		SECTION LINE
	MAG SPIKE SET		EXISTING CONTOURS
	CHISEL CROSS FOUND		PROPOSED CONTOURS
	CHISEL CROSS SET		EXISTING FORCEMAIN SEWER
	COUNTY MONUMENT		EXISTING SANITARY SEWER
	CONCRETE MONUMENT FOUND		PROPOSED SANITARY SEWER
	CONTROL POINT HORIZONTAL		EXISTING WATER MAIN
	VERTICAL BENCHMARK		PROPOSED WATER MAIN
	SOIL BORING or MONITORING WELL		EXISTING STORM SEWER
	POWER POLE		PROPOSED STORM SEWER
	POWER POLE W/GUY WIRE		EXISTING CURB & GUTTER
	MAILBOX		PROPOSED CURB & GUTTER
	SIGN		PROPOSED REJECT CURB & GUTTER
	RAILROAD CROSS BUCK		EXISTING CULVERT WITH END SECTIONS
	RAILROAD GATE ARM		PROPOSED CULVERT WITH END SECTIONS
	RAILROAD TRACKS		BUILDING OUTLINE
	LIGHT POLE		FENCE LINE
	WOOD POLE		SAW CUT REQ'D
	TRAFFIC SIGNAL		SILT FENCE
	TRAFFIC SIGNAL MAST ARM		GUARD RAIL
	CONIFEROUS TREE		DITCH CHECK
	DECIDUOUS TREE		INLET PROTECTION
	TREE OR BRUSH LINE		TRACKING PAD
	BED ROCK (IN PROFILE VIEW)		TURBIDITY BARRIER OR SHEET PILING
	HANDICAPPED PARKING STALL		SANDBAG COFFERDAM
	EXISTING SPOT ELEVATION		SLOPE INTERCEPT
	PROPOSED SPOT ELEVATION		LIMITS OF DISTURBANCE
	DRAINAGE HIGH POINT		EXISTING ASPHALT PAVEMENT
	DRAINAGE DIRECTION		PROPOSED ASPHALT PAVEMENT
	EXISTING MANHOLE		CONCRETE SIDEWALK/DRIVEWAY
	PROPOSED MANHOLE		EXISTING GRAVEL
	EXISTING INLET		PROPOSED GRAVEL
	PROPOSED INLET		RIP-RAP (SIZE AS SPECIFIED)
	EXISTING YARD DRAIN		BRICK/PAVERS
	PROPOSED YARD DRAIN		PROPOSED EROSION MAT
	EXISTING CLEAN OUT		PROPOSED ASPHALTIC DRIVEWAY
	PROPOSED CLEAN OUT		
	EXISTING DOWNSPOUT		
	PROPOSED DOWNSPOUT		
	EXISTING WATER VALVE		
	PROPOSED WATER VALVE		
	EXISTING CURB STOP		
	PROPOSED CURB STOP		
	EXISTING FIRE HYDRANT		
	PROPOSED FIRE HYDRANT		
	PROPOSED WATER FITTING		
	PROPOSED WATER REDUCER		
	PROPOSED ENDCAP		
	GAS VALVE		

EROSION & SEDIMENT CONTROL PLAN

BEST MANAGEMENT PRACTICES:

THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING, INSTALLING, MAINTAINING AND REMOVING BEST MANAGEMENT PRACTICES IN ACCORDANCE WITH WISCONSIN DEPARTMENT OF NATURAL RESOURCES (DNR) TECHNICAL STANDARDS. THESE STANDARDS MAY BE FOUND ON THE DNR WEBSITE AT <http://www.dnr.wi.gov/runoff/stormwater/techstds.htm>. RIP-RAP SHALL BE IN ACCORDANCE WITH SECTION 606, WS-DOT STANDARD SPECIFICATIONS FOR HIGHWAY AND STRUCTURE CONSTRUCTION, LATEST EDITION, UNTIL TECHNICAL STANDARD 1065 IS COMPLETED BY THE DNR. THE MINIMUM BEST MANAGEMENT PRACTICES SPECIFIED FOR THIS PROJECT ARE AS FOLLOWS:

<input type="checkbox"/> LAND APPLICATION OF ADDITIVES (1050)	<input type="checkbox"/> DE-WATERING (1061)
<input type="checkbox"/> WATER APPLICATION OF ADDITIVES (1051)	<input type="checkbox"/> DITCH CHECK (1062)
<input checked="" type="checkbox"/> NON-CHANNEL EROSION MAT (1052)	<input type="checkbox"/> SEDIMENT TRAP (1063)
<input type="checkbox"/> CHANNEL EROSION MAT (1053)	<input type="checkbox"/> SEDIMENT BASIN (1064)
<input checked="" type="checkbox"/> VEGETATIVE BUFFER (1054)	<input type="checkbox"/> RIP-RAP (1065)
<input type="checkbox"/> SEDIMENT BALE BARRIER (1055)	<input type="checkbox"/> CONSTRUCTION DIVERSION (1066)
<input checked="" type="checkbox"/> PERIMETER SEDIMENT CONTROL (1056)	<input checked="" type="checkbox"/> TEMPORARY GRADING PRACTICES (1067)
<input checked="" type="checkbox"/> TRACKOUT CONTROL (1057)	<input checked="" type="checkbox"/> DUST CONTROL (1068)
<input checked="" type="checkbox"/> MULCHING (1058)	<input type="checkbox"/> TURBIDITY BARRIER (1069)
<input checked="" type="checkbox"/> SEEDING (1059)	<input type="checkbox"/> SILT CURTAIN (1070)
<input checked="" type="checkbox"/> STORM DRAIN INLET PROTECTION (1060)	<input type="checkbox"/> HORIZONTAL DIRECTIONAL DRILLING (1072)

THE CONTRACTOR SHALL COORDINATE CONSTRUCTION ACTIVITIES AND IMPLEMENT BEST MANAGEMENT PRACTICES TO PREVENT OR REDUCE ALL OF THE FOLLOWING IN RUNOFF:

- DEPOSITION OR TRACKING OF SOIL ONTO STREETS BY VEHICLES.
- DISCHARGE OF SEDIMENT INTO STORM WATER INLETS.
- DISCHARGE OF SEDIMENT INTO ADJACENT STREAMS, RIVERS, LAKES AND WETLANDS.
- DISCHARGE OF SEDIMENT FROM DITCHES AND STORM SEWERS THAT FLOW OFFSITE.
- DISCHARGE OF SEDIMENT FROM DEWATERING ACTIVITIES.
- DISCHARGE OF SEDIMENT FROM SOIL STOCKPILES EXISTING FOR 7 DAYS OR MORE.
- DISCHARGE OF SEDIMENT FROM EROSION OUTLET FLOWS.
- DISCHARGE OF CHEMICALS, CEMENT AND BUILDING MATERIALS.
- DISCHARGE OF UNTREATED VEHICLE AND WHEEL WASH WATER.

THE CONTRACTOR SHALL IMPLEMENT THE FOLLOWING PREVENTATIVE MEASURES:

- PRESERVE EXISTING VEGETATION WHENEVER POSSIBLE.
- MINIMIZE SOIL COMPACTION AND PRESERVE TOPSOIL.
- MINIMIZE LAND DISTURBANCES ON SLOPES OF 20% OR MORE.
- MINIMIZE THE AMOUNT OF SOIL EXPOSED AT ANY ONE TIME.
- DIVERT CLEAR WATER AWAY FROM EXPOSED SOILS.
- TEMPORARILY STABILIZE EXPOSED SOILS THAT WILL NOT BE ACTIVE FOR 14 DAYS OR MORE. USE MULCHING, SEEDING, POLYACRYLAMIDE OR GRAVELING TO STABILIZE.
- PERMANENTLY STABILIZE EXPOSED SOILS AS SOON AS POSSIBLE.
- CONTRACTOR SHALL EDUCATE ITS EMPLOYEES AND SUBCONTRACTORS ABOUT PROPER SPILL PREVENTION AND RESPONSE PROCEDURES. IF A SPILL OCCURS, THE CONTRACTOR SHALL EVACUATE THE AREA AND IMMEDIATELY NOTIFY THE LOCAL MUNICIPALITY, FIRE DEPARTMENT OR 911 EMERGENCY SYSTEM. IF NO FIRE, EXPLOSION OR LIFE / HEALTH SAFETY HAZARD EXISTS, THE NEXT STEP IS TO CONTAIN THE SPILL AND PERFORM CLEANUP. USE DRY CLEANUP METHODS, NOT WET.

THE CONTRACTOR IS RESPONSIBLE FOR REPAIRING OR REPLACING BEST MANAGEMENT PRACTICES DESTROYED AS A RESULT OF CONSTRUCTION ACTIVITIES BY THE END OF THE WORK DAY. THE CONTRACTOR IS RESPONSIBLE FOR REPLACING BEST MANAGEMENT PRACTICES TEMPORARILY REMOVED FOR CONSTRUCTION ACTIVITY AS SOON AS THOSE ACTIVITIES ARE COMPLETED. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING AND DISPOSING OF TEMPORARY BEST MANAGEMENT PRACTICES AFTER CONSTRUCTION IS COMPLETE AND PERMANENT VEGETATION IS ESTABLISHED.

INSPECTION & MAINTENANCE:

THE CONTRACTOR IS RESPONSIBLE FOR INSPECTING BEST MANAGEMENT PRACTICES WEEKLY, AND WITHIN 24 HOURS FOLLOWING A RAINFALL OF 0.5 INCHES OR GREATER. WRITTEN DOCUMENTATION OF EACH INSPECTION SHALL BE KEPT AT THE CONSTRUCTION SITE AND SHALL INCLUDE THE FOLLOWING INFORMATION: DATE, TIME, AND LOCATION OF INSPECTION; NAME OF INDIVIDUAL WHO PERFORMED THE INSPECTION; AN ASSESSMENT OF THE CONDITION OF BEST MANAGEMENT PRACTICES; A DESCRIPTION OF ANY BEST MANAGEMENT PRACTICE IMPLEMENTATION AND MAINTENANCE PERFORMED; AND A DESCRIPTION OF THE PRESENT PHASE OF CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING, REPAIRING, OR REPLACING BEST MANAGEMENT PRACTICES AS NECESSARY WITHIN 24 HOURS OF AN INSPECTION OR NOTIFICATION. THE CONTRACTOR IS RESPONSIBLE FOR INSPECTING, MAINTAINING, REPAIRING, OR REPLACING BEST MANAGEMENT PRACTICES UNTIL ALL LAND DISTURBING CONSTRUCTION ACTIVITY IS COMPLETED AND A UNIFORM PERENNIAL VEGETATIVE COVER IS ESTABLISHED WITH A DENSITY OF AT LEAST 70%.

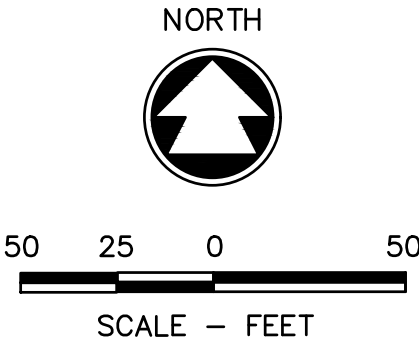
THE CONTRACTOR IS RESPONSIBLE FOR POSTING THE PERMIT IN A CONSPICUOUS LOCATION ON THE CONSTRUCTION SITE. THE CONTRACTOR IS RESPONSIBLE FOR KEEPING A COPY OF THE APPROVED REPORTS, PLANS, AMENDMENTS, INSPECTION REPORTS, AND PERMITS AT THE CONSTRUCTION SITE AT ALL TIMES UNTIL ALL LAND DISTURBING CONSTRUCTION ACTIVITY IS COMPLETED AND A UNIFORM PERENNIAL VEGETATIVE COVER IS ESTABLISHED WITH A DENSITY OF AT LEAST 70%. THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING THE OWNER WHEN THE VEGETATIVE DENSITY REACHES AT LEAST 70%. THE OWNER IS RESPONSIBLE FOR TERMINATING DNR PERMIT COVERAGE.

AMENDMENTS:

THE CONTRACTOR IS RESPONSIBLE FOR AMENDING THE EROSION & SEDIMENT CONTROL PLAN IF: THERE IS A CHANGE IN CONSTRUCTION, OPERATION OR MAINTENANCE AT THE SITE WHICH HAS THE REASONABLE POTENTIAL FOR THE DISCHARGE OF POLLUTANTS; THE ACTIONS REQUIRED BY THE PLAN FAIL TO REDUCE THE IMPACTS OF POLLUTANTS CARRIED BY CONSTRUCTION SITE RUNOFF; OR IF THE DNR NOTIFIES THE APPLICANT OF CHANGES NEEDED IN THE PLAN. THE DNR AND OWNER SHALL BE NOTIFIED 5 WORKING DAYS PRIOR TO MAKING CHANGES TO THE PLAN.

NO.	DATE	REVISION

schmechel, WA PROJECTS\00005\062200146\ CADD\ Civil3D\Plan Sheets\C102 Existing Site & Survey Control.dwg, c102 existing site & survey control, Plot Date: 3/8/2023 3:08 PM, xrefs: (x-aerial-voyageurpark, x-all points voyageur park depere, x-exist shade voyageur park depere



VERTICAL BENCHMARK CONTROL		
POINT #	ELEVATION	DESCRIPTION
1	592.74	DISK IN WALL OF LOCK – NGS POINT PN0624
5	596.43	CHISELED X ON FLANGE BOLT
6	594.61	"X" ON CONCRETE FLOOR AT WOMENS BATHROOM DOOR

HORIZONTAL CONTROL POINTS			
POINT #	NORTHING	EASTING	DESCRIPTION
2	544426.58	87236.88	MAG NAIL
8	544217.35	86957.07	MAG NAIL

NOTE:
PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL VERIFY PROPOSED SITE GRADES BY FIELD CHECKING TWO (2) BENCHMARKS AND A MINIMUM OF ONE (1) SITE FEATURE AS SHOWN ON THESE PLANS. THE CONTRACTOR SHALL ALSO VERIFY HORIZONTAL CONTROL BY FIELD CHECKING SEVERAL CONTROL POINTS AND SHALL IMMEDIATELY NOTIFY MCMAHON OF ANY DISCREPANCIES.

VERTICAL DATUM:
ELEVATIONS ARE REFERENCED TO NGS DATA:
CONTROL POINT NAME: 7CED
POINT ID: PN0624 NAVD 88 DATUM
BY GPS OBSERVATION TO ELEVATION = 592.74 (1991 ADJUSTMENT)
LEVEL LOOP PER FIELD BOOK 1550 PAGE 2

HORIZONTAL DATUM:
COORDINATES ARE REFERENCED TO THE WISCONSIN COUNTY COORDINATE SYSTEM AS PUBLISHED FOR BROWN COUNTY WISCRS NAD83 (91)

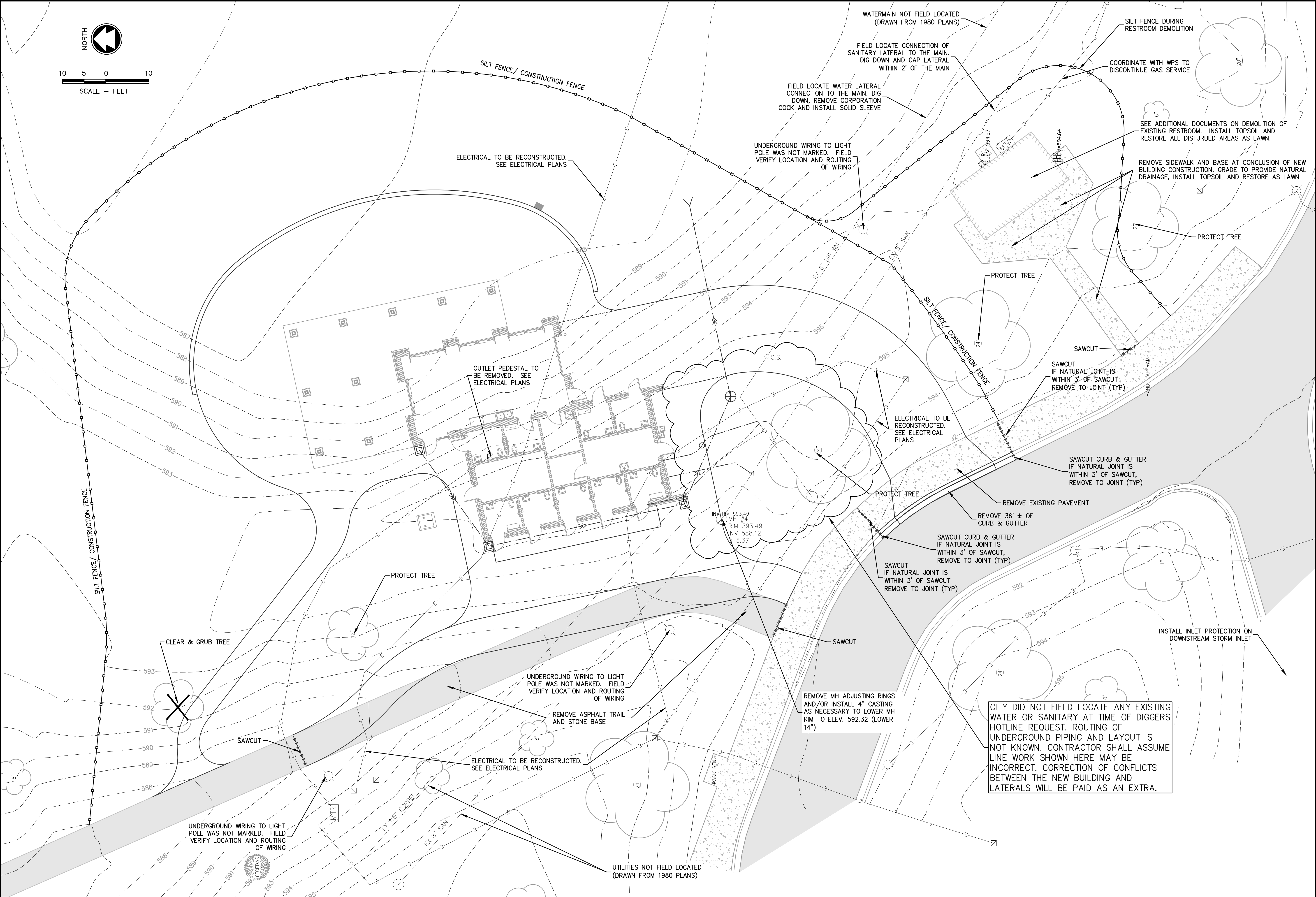
NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115
EXISTING SITE & SURVEY CONTROL

DESIGNED RJW	DRAWN RRS
PROJECT NO. D0005-06-22-00146	
DATE MARCH 10, 2023	
SHEET NO. C102	

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rschmichel, WI, PROJECTS\00005\062200146\CADD\Civil3D\Plan Sheets\C103 SITE REMOVALS AND DEMOLITION PLAN.dwg, c103 site removals and demolition plan, Plot Date: 3/8/2023 3:08 PM, xrefs: (x-exist topo voyagueur park depere, x-dll points voyagueur park depere, x-all points voyagueur park depere, x-exist shade voyagueur park depere, 062200146 nelson pavilion plumb 2022.rvt--architectural overall site plan, x-aerial-voyagueurpark, x-prop info park depere)



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NO.	DATE	REVISION

DESIGNED

RJW

DRAWN

RRS

PROJECT NO.

D0005-06-22-00146

DATE

MARCH 10, 2023

SHEET NO.

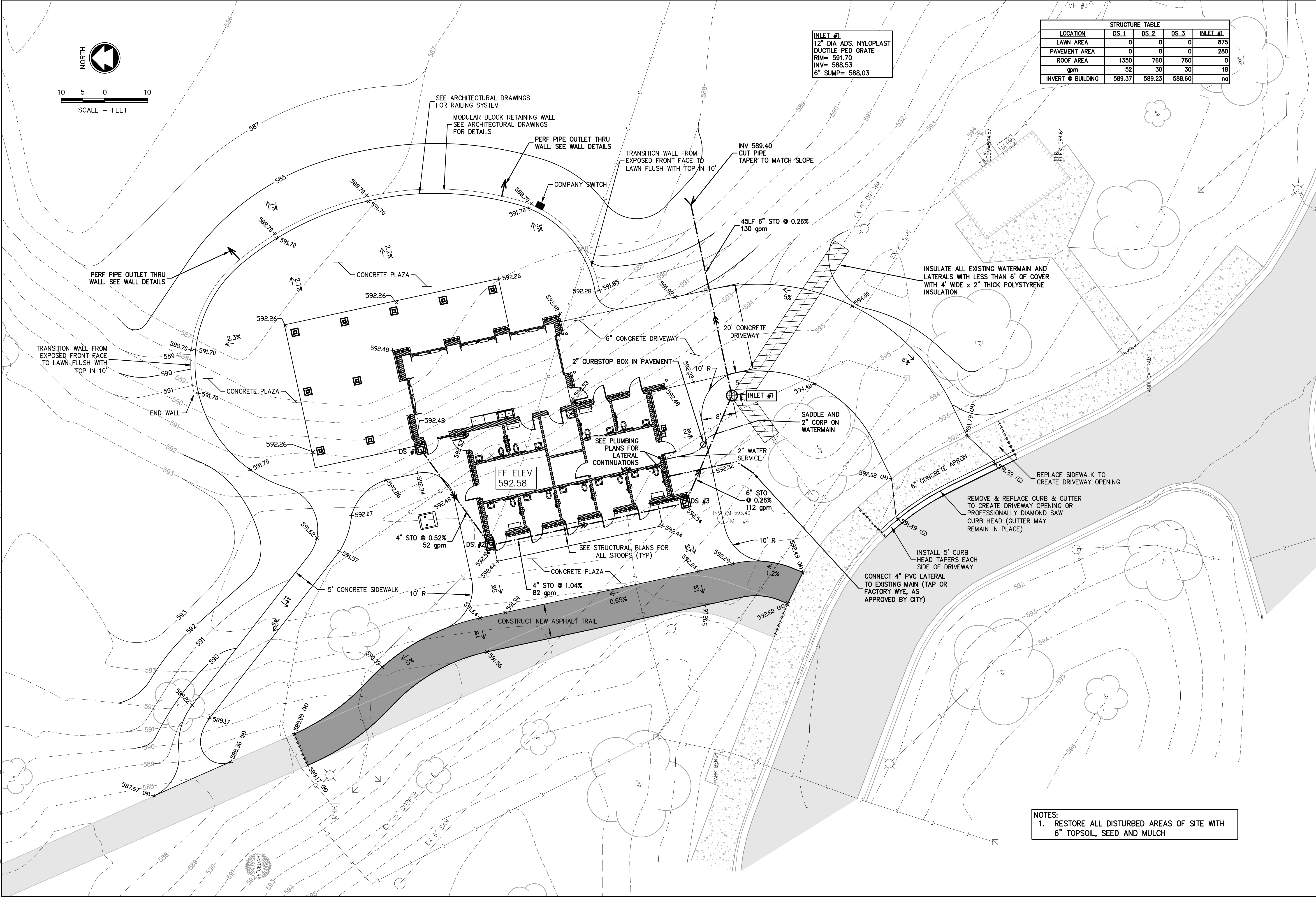
C103

NELSON FAMILY PAVILION

CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115

SITE REMOVALS AND DEMOLITION PLAN

rschmichel, WI, PROJECTS\00005\062200146\0400\Civil\3D\Plan Sheets\C104 Proposed Site Plan.dwg, c104 proposed site plan, Plot Date: 3/8/2023 3:08 PM, xrefs: (x-exist topo voyageur park depere, x-all points voyageur park depere, x-exist shade voyageur park depere, 06/22/0146 nelson pavilion_plumb_2022_rvt-1-architectural overall site plan, x-aerial-voyageurpark, x-prop info park depere, x-prop shade park depere)



STRUCTURE TABLE				
LOCATION	DS 1	DS 2	DS 3	INLET #1
LAWN AREA	0	0	0	875
PAVEMENT AREA	0	0	0	280
ROOF AREA	1350	760	760	0
gpm	52	30	30	18
INVERT @ BUILDING	589.37	589.23	588.60	na

NOTES:
1. RESTORE ALL DISTURBED AREAS OF SITE WITH 6" TOPSOIL, SEED AND MULCH

NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115
PROPOSED SITE PLAN

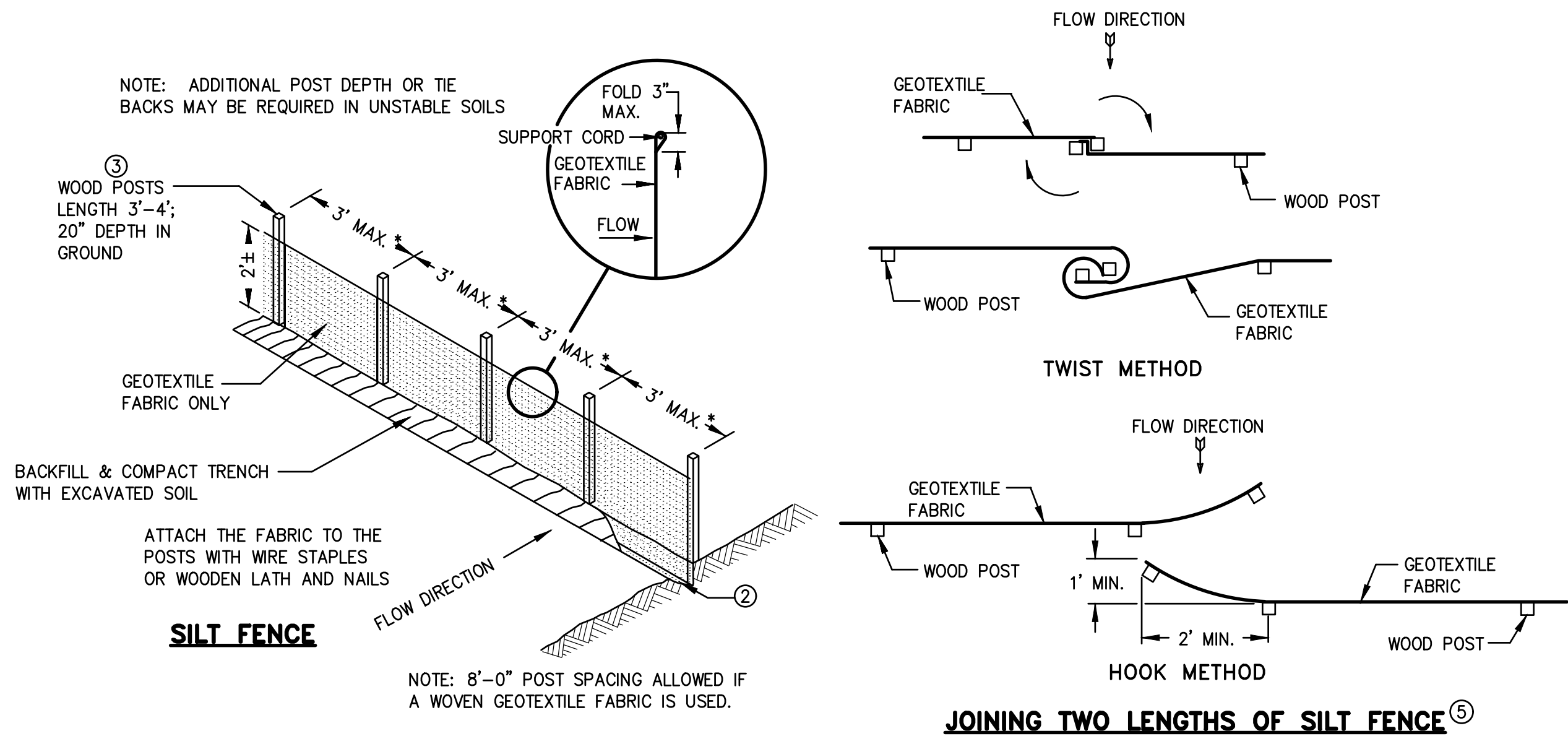
DESIGNED R.J.W.	DRAWN R.R.S.
PROJECT NO. D0005 06-22-00146	
DATE MARCH 10, 2023	
SHEET NO. C104	

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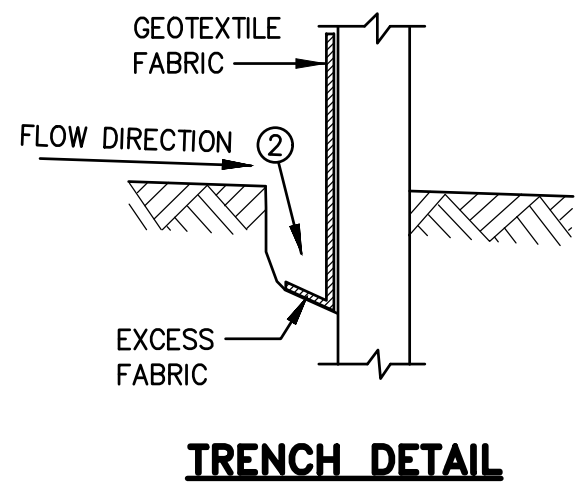
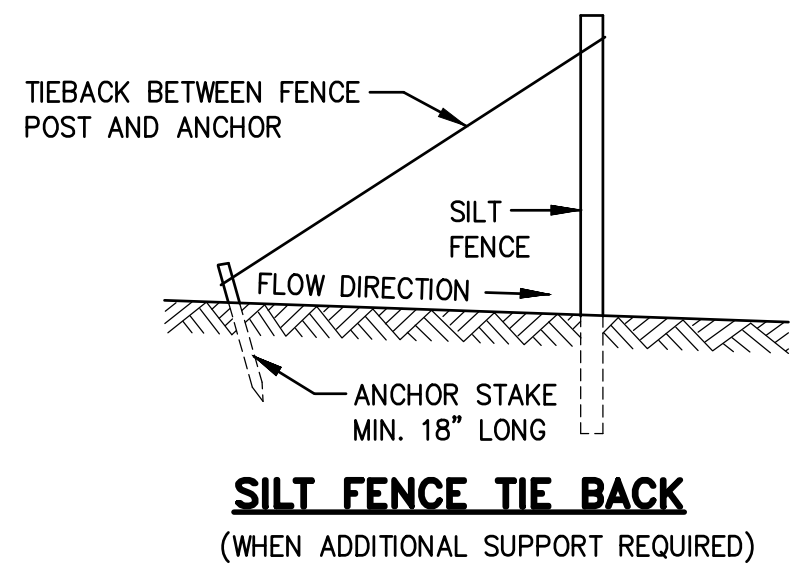
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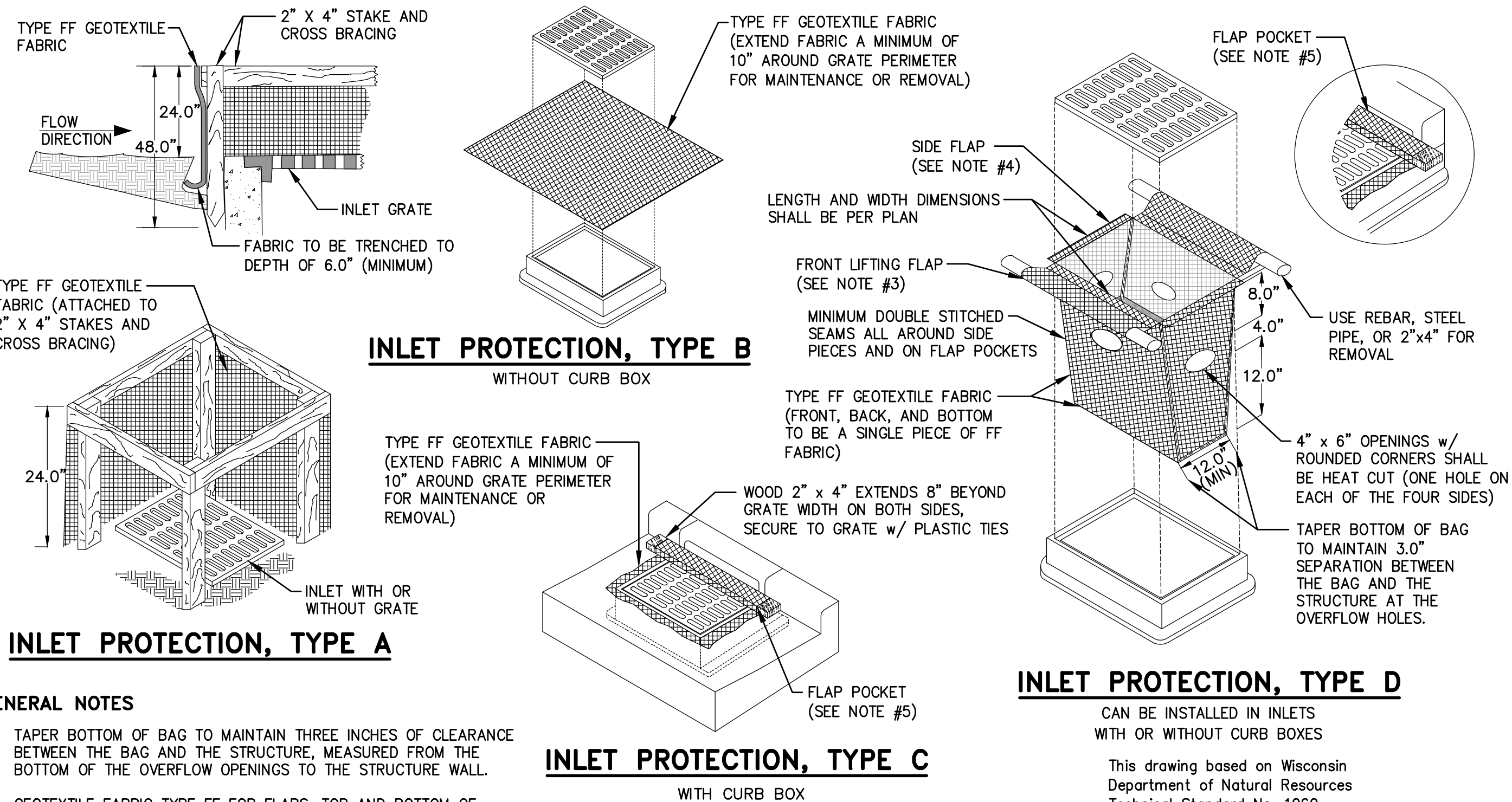
This drawing based on Wisconsin Department of Transportation Standard Detail Drawing 8 E 9-6.



SILT FENCE DETAIL

GENERAL NOTES

- ① HORIZONTAL BRACE REQUIRED WITH 2" X 4" WOODEN FRAME OR EQUIVALENT AT TOP OF POSTS.
- ② TRENCH SHALL BE A MINIMUM OF 4" WIDE & 6" DEEP TO BURY AND ANCHOR THE GEOTEXTILE FABRIC. FOLD MATERIAL TO FIT TRENCH AND BACKFILL & COMPACT TRENCH WITH EXCAVATED SOIL.
- ③ WOOD POSTS SHALL BE A MINIMUM SIZE OF 1 1/8" X 1 1/8" OF OAK OR HICKORY
- ④ SILT FENCE TO EXTEND ACROSS THE TOP OF THE PIPE.
- ⑤ CONSTRUCT SILT FENCE FROM A CONTINUOUS ROLL IF POSSIBLE BY CUTTING LENGTHS TO AVOID JOINTS. IF A JOINT IS NECESSARY USE ONE OF THE FOLLOWING TWO METHODS; A) OVERLAP THE END POSTS AND TWIST, OR ROTATE, AT LEAST 180 DEGREES, B) HOOK THE END OF EACH SILT FENCE LENGTH.

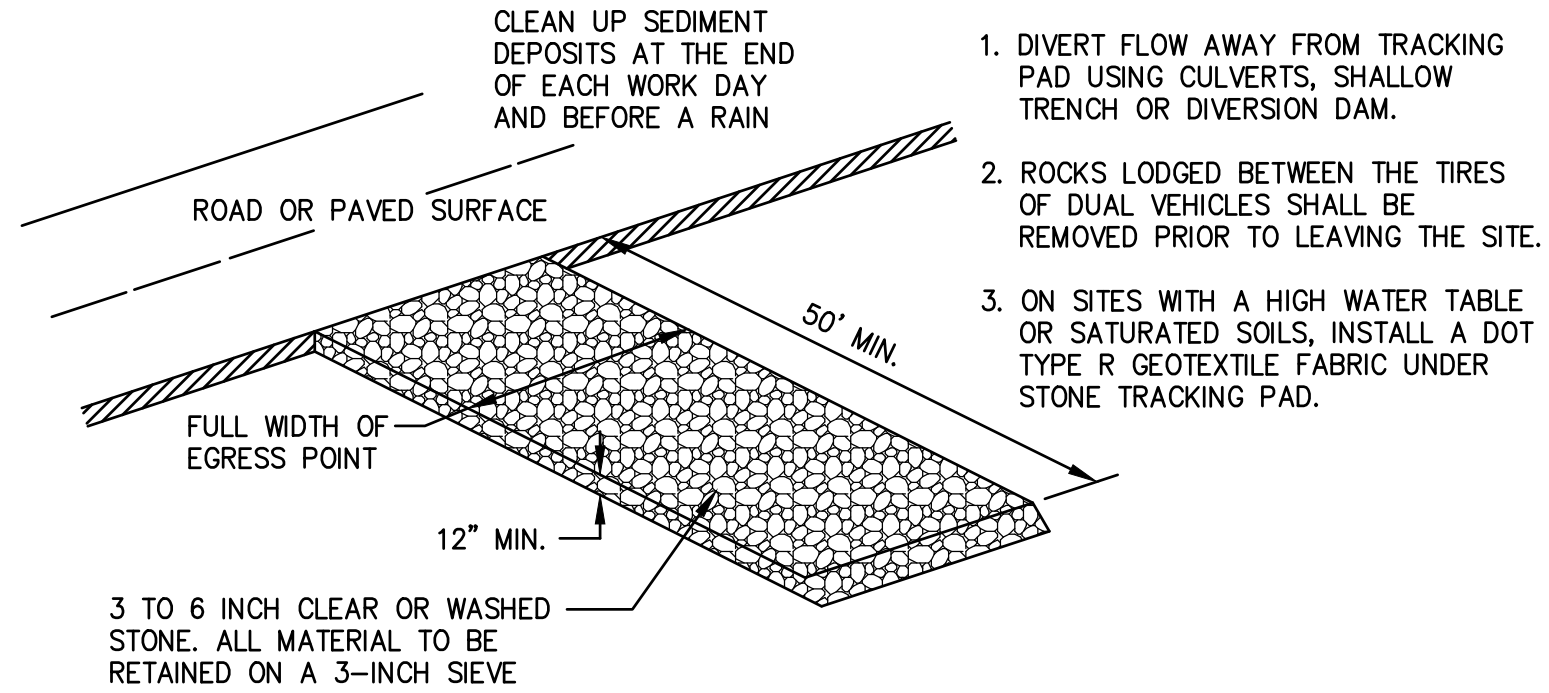


GENERAL NOTES

1. TAPER BOTTOM OF BAG TO MAINTAIN THREE INCHES OF CLEARANCE BETWEEN THE BAG AND THE STRUCTURE, MEASURED FROM THE BOTTOM OF THE OVERFLOW OPENINGS TO THE STRUCTURE WALL.
2. GEOTEXTILE FABRIC TYPE FF FOR FLAPS, TOP AND BOTTOM OF OUTSIDE OF FILTER BAG. FRONT, BACK, AND BOTTOM OF FILTER BAG BEING ONE PIECE.
3. FRONT LIFTING FLAP IS TO BE USED WHEN REMOVING AND MAINTAINING FILTER BAG.
4. SIDE FLAPS SHALL BE A MAXIMUM OF TWO INCHES LONG. FOLD THE FABRIC OVER AND REINFORCE WITH MULTIPLE STITCHES.
5. FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2" x 4". THE REBAR, STEEL PIPE, OR WOOD SHALL BE INSTALLED IN THE REAR FLAP AND SHALL NOT BLOCK THE TOP HALF OF THE CURB FACE OPENING.

MAINTENANCE NOTES

1. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED IN THE FABRIC DOES NOT FALL INTO THE STRUCTURE. MATERIAL THAT HAS FALLEN INTO THE INLET SHALL BE IMMEDIATELY REMOVED.



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CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115
MISCELLANEOUS DETAILS



PHOTO 1



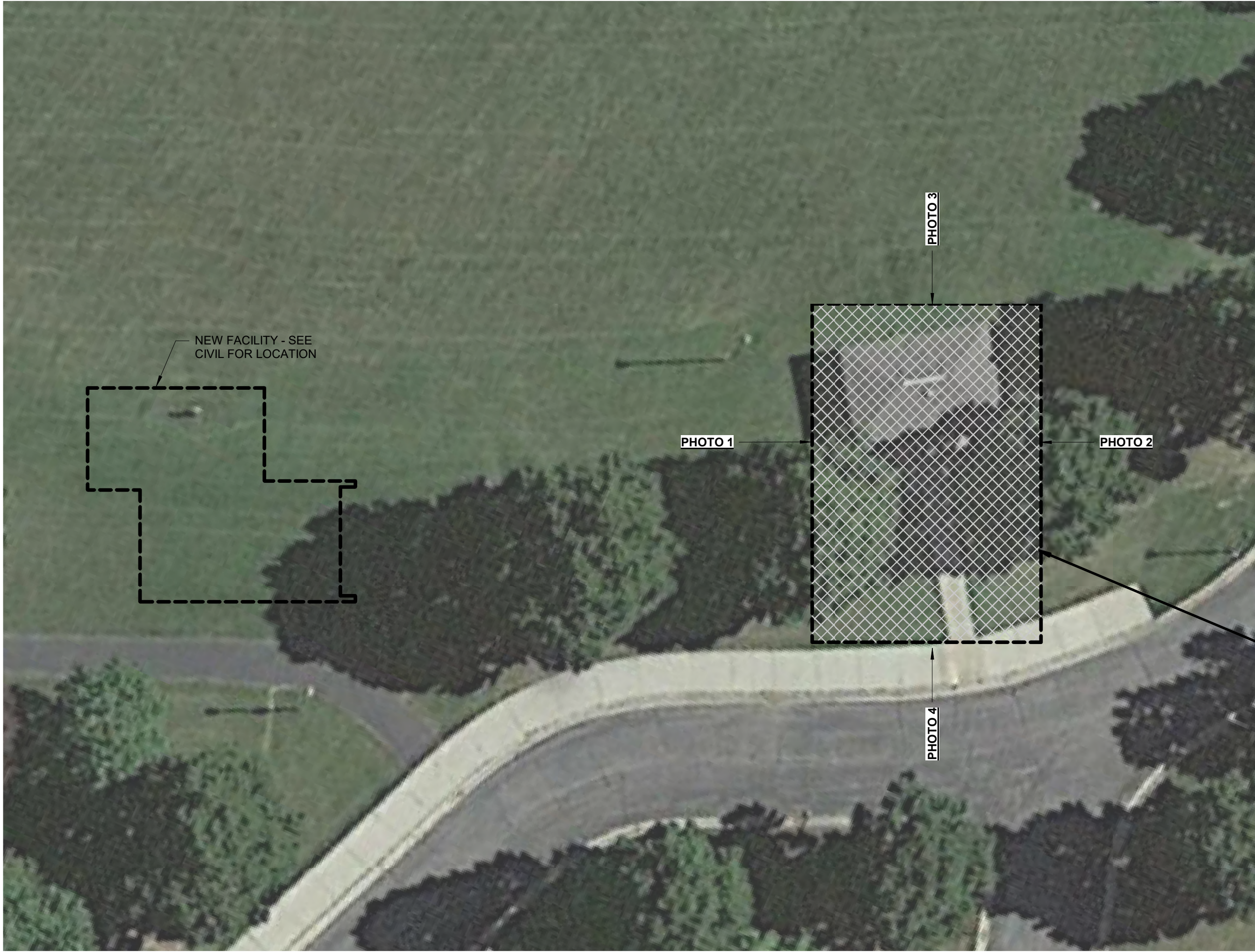
PHOTO 2



PHOTO 3



PHOTO 4



HATCHED AREA INDICATES APPROXIMATE EXTERIORS OF DEMOLITION FOR THE EXISTING RESTROOM BUILDING.

EXISTING RESTROOM BUILDING DEMOLITION PLAN

1" = 20'-0"



GENERAL DEMOLITION NOTES

- EXISTING BUILDING HAS BEEN SHOWN ACCORDING TO ORIGINAL BUILDING PLANS, FIELD NOTES AND MEASUREMENTS. EXISTING CONDITIONS AND DIMENSIONS SHALL BE FIELD VERIFIED BY CONTRACTORS AND DISCREPANCIES REPORTED TO THE ARCHITECT.
- THE OWNER SHALL HAVE FIRST RIGHT OF REFUSAL ON ALL DOORS, HARDWARE, FIXTURES AND EQUIPMENT BEING REMOVED DURING DEMOLITION. COORDINATE WITH OWNER ALL EQUIPMENT TO BE SALVAGED AND/OR REUSED ON THE PROJECT.
- MAINTAIN AND PROTECT EXISTING UTILITY SERVICES TO REMAIN AND/OR TO BE OPERATIONAL DURING DEMOLITION AND CONSTRUCTION.
- ALL FIELD VERIFICATION FOR PLUMBING, MECHANICAL & ELECTRICAL DEMOLITION IS THE CONTRACTORS RESPONSIBILITY.
- SCOPE OF DEMOLITION AND REMOVAL WORK SHALL NOT BE LIMITED BY THESE DRAWINGS BUT SHALL INCLUDE ANY AND ALL WORK NECESSARY TO FACILITATE NEW CONSTRUCTION.
- CONTRACTOR TO PROTECT AREAS ADJACENT TO DEMOLITION DURING CONSTRUCTION.
- ALL SHUTDOWNS OF MECHANICAL AND/OR ELECTRICAL SYSTEMS ALL BE COORDINATED WITH OWNER.
- SEE OTHER DISCIPLINES' DRAWINGS FOR EXTENT OF ITEMS TO BE REMOVED AND SALVAGED FOR RE-USE.

DEMOLITION SCOPE OF WORK

- SEE OTHER DISCIPLINES FOR ADDITIONAL DEMOLITION WORK INCLUDING CAPPING EXISTING UTILITIES
- REMOVE AND SITE CLEAR ALL BUILDING ELEMENTS RELATED TO THE EXISTING RESTROOM BUILDING INCLUDING BUT NOT LIMITED TO: WALLS, CEILINGS, ROOF, DOORS, WIRING, LIGHTING, PLUMBING FIXTURES, SIDEWALK
- PREP AREA FOR NEW SEED. SEE CIVIL DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION

NOTE: EXISTING RESTROOM TO REMAIN OPEN UNTIL OCTOBER 1ST, 2023

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FIRST FLOOR DEMOLITION PLAN

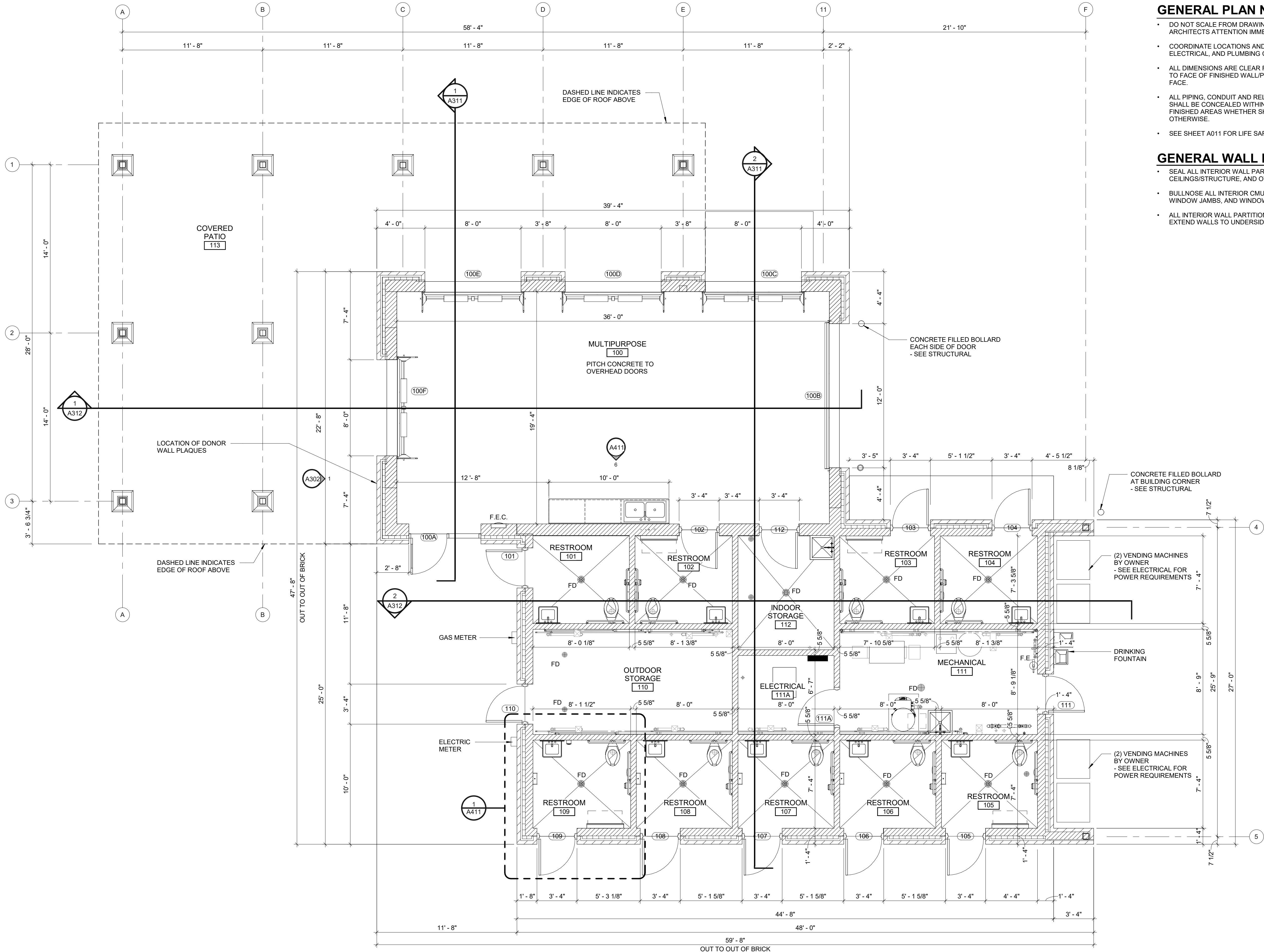
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KJC

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CAW

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DATE
MARCH 10, 2023

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A111



FIRST FLOOR PLAN

1/4" = 1'-0"



GENERAL PLAN NOTES

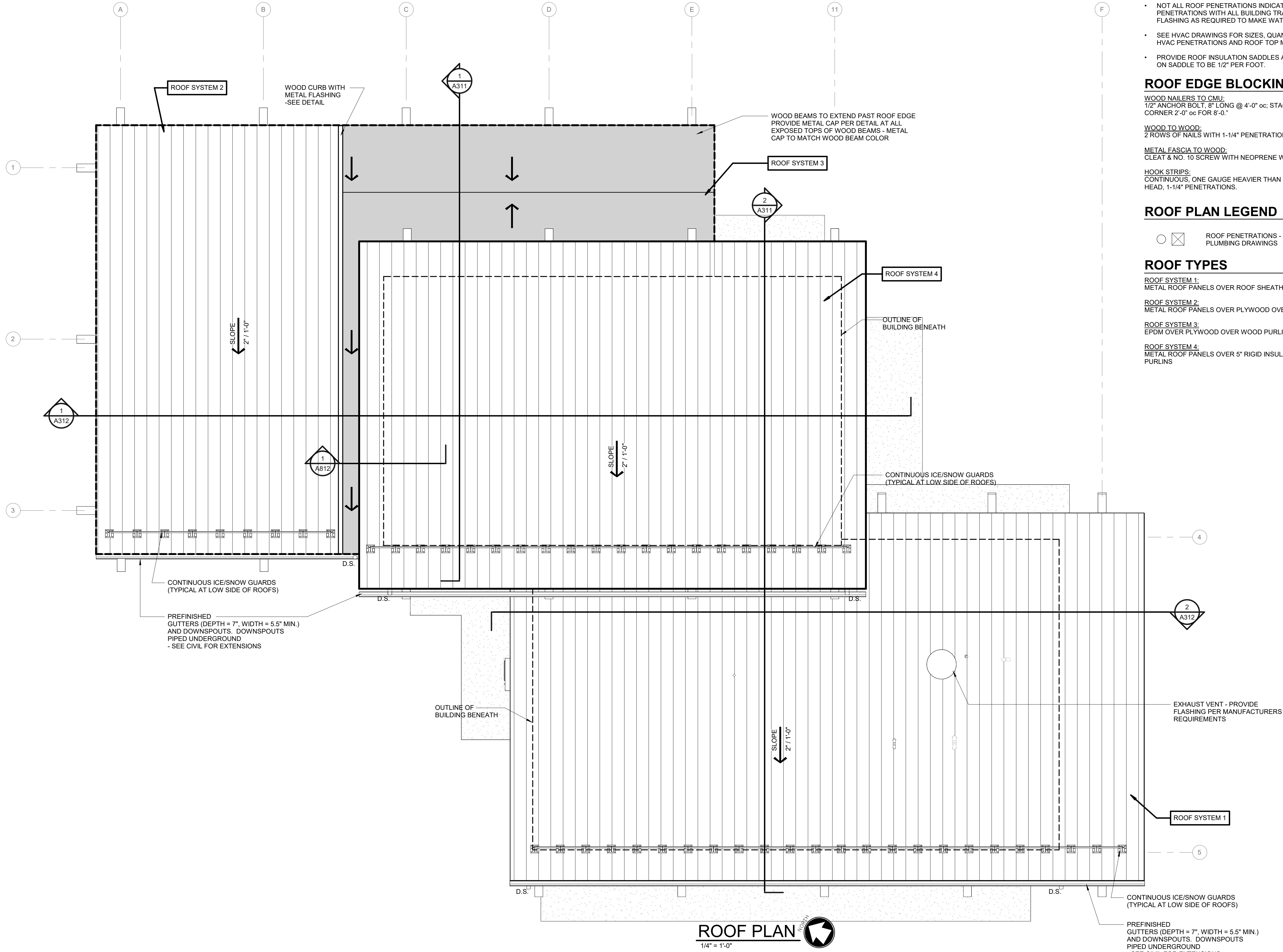
- DO NOT SCALE FROM DRAWINGS. BRING ANY DISCREPANCIES TO THE ARCHITECTS ATTENTION IMMEDIATELY.
- COORDINATE LOCATIONS AND QUANTITY OF WORK WITH MECHANICAL, ELECTRICAL, AND PLUMBING CONTRACTORS.
- ALL DIMENSIONS ARE CLEAR FROM THE FACE OF FINISHED WALL/PARTITION TO FACE OF FINISHED WALL/PARTITION OR FACE OF EXISTING WALLS ACTUAL FACE.
- ALL PIPING, CONDUIT AND RELATED MECHANICAL AND ELECTRICAL ITEMS SHALL BE CONCEALED WITHIN GYPSUM BOARD FURRING AS REQUIRED IN FINISHED AREAS WHETHER SHOWN ON DRAWINGS OR NOT, UNLESS NOTED OTHERWISE.
- SEE SHEET A011 FOR LIFE SAFETY PLAN.

GENERAL WALL NOTES

- SEAL ALL INTERIOR WALL PARTITION INTERSECTIONS AT FLOORS, CEILINGS/STRUCTURE, AND OTHER WALLS WITH SEALANT.
- BULLNOSE ALL INTERIOR CMU WALLS AT OUTSIDE CORNERS, WALL ENDS, WINDOW JAMBS, AND WINDOW SILLS WHERE NO OTHER SILL IS SCHEDULED.
- ALL INTERIOR WALL PARTITIONS TO BE 6" CMU, UNLESS NOTED OTHERWISE. EXTEND WALLS TO UNDERSIDE OF STRUCTURE.

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ROOF PLAN
1/4" = 1'-0"

GENERAL ROOF PLAN NOTES

- SLOPE TAPERED INSULATION MINIMUM 1/4" PER FOOT, 2" MINIMUM THICKNESS AT DRAINS. AVERAGE ROOF INSULATION MIN. 4"
- NOT ALL ROOF PENETRATIONS INDICATED. ROOFING CONTRACTOR TO VERIFY PENETRATIONS WITH ALL BUILDING TRADES. PROVIDE APPROPRIATE FLASHING AS REQUIRED TO MAKE WATERTIGHT.
- SEE HVAC DRAWINGS FOR SIZES, QUANTITIES LOCATIONS AND TYPES OF HVAC PENETRATIONS AND ROOF TOP MOUNTED EQUIPMENT.
- PROVIDE ROOF INSULATION SADDLES AT ANY ROOF INTERFERENCES. SLOPE ON SADDLE TO BE 1/2" PER FOOT.

ROOF EDGE BLOCKING ATTACHMENT

WOOD NAILERS TO CMU:
1/2" ANCHOR BOLT, 8" LONG @ 4'-0" oc; STAGGER IF OVER 6" WIDE; AT OUTSIDE CORNER 2'-0" oc FOR 8'-0."

WOOD TO WOOD:
2 ROWS OF NAILS WITH 1-1/4" PENETRATION @ 24" oc WITH 12" oc AT CORNERS.

METAL FASCIA TO WOOD:
CLEAT & NO. 10 SCREW WITH NEOPRENE WASHER AT BACK LEG.

HOOK STRIPS:
CONTINUOUS, ONE GAUGE HEAVIER THAN FASCIA. FASTENERS; NAILS WITH 3/16" HEAD, 1-1/4" PENETRATIONS.

ROOF PLAN LEGEND

- □ ROOF PENETRATIONS - SEE MECHANICAL & PLUMBING DRAWINGS

ROOF TYPES

ROOF SYSTEM 1:
METAL ROOF PANELS OVER ROOF SHEATHING OVER WOOD ROOF TRUSS

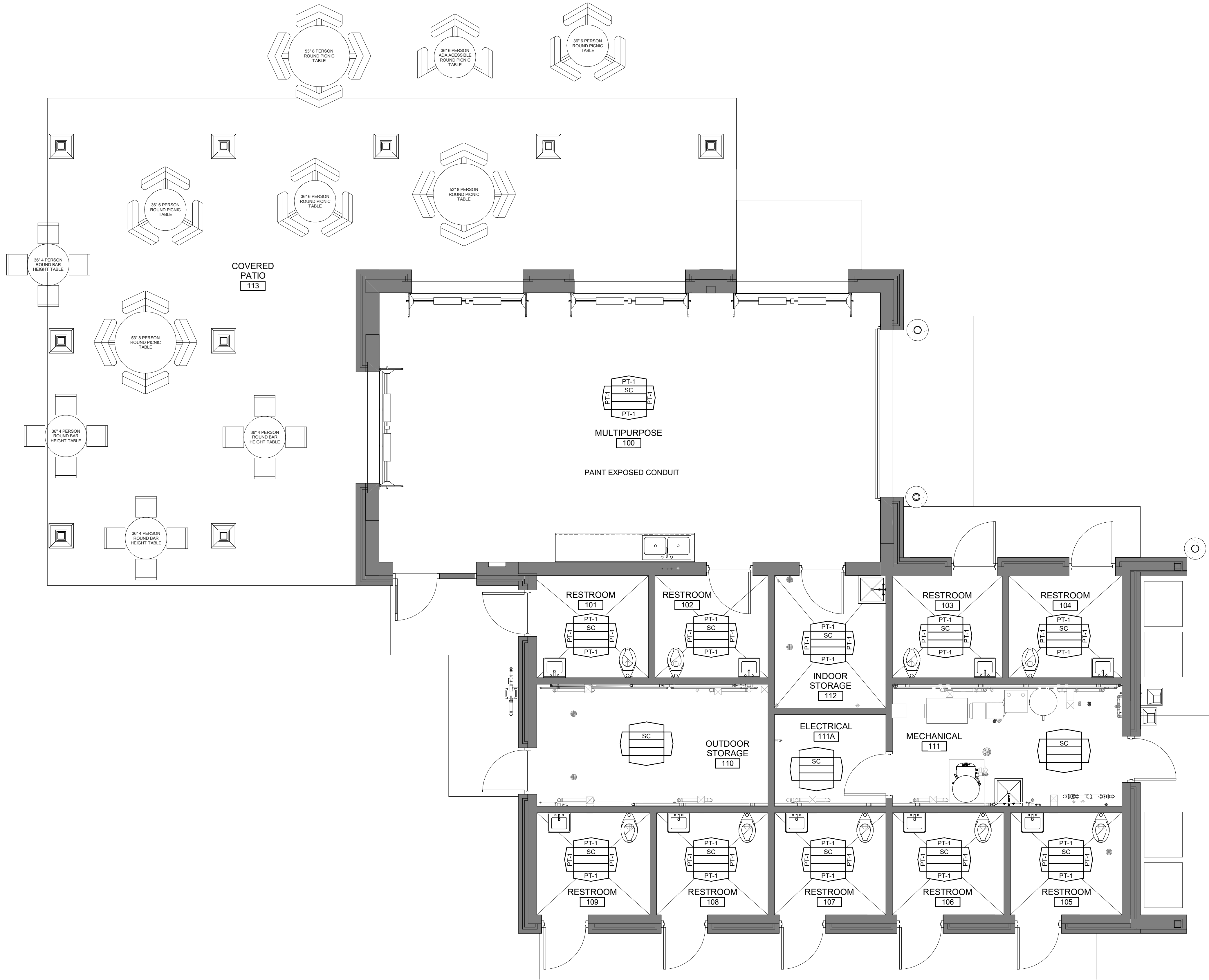
ROOF SYSTEM 2:
METAL ROOF PANELS OVER PLYWOOD OVER WOOD PURLINS

ROOF SYSTEM 3:
EPDM OVER PLYWOOD OVER WOOD PURLINS

ROOF SYSTEM 4:
METAL ROOF PANELS OVER 5" RIGID INSULATION OVER PLYWOOD OVER WOOD PURLINS

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FIRST FLOOR FINISH PLAN

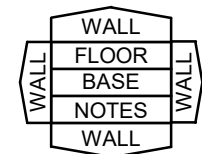
1/4" = 1'-0"



GENERAL FINISH NOTES

- SEE SPECIFICATIONS FOR SPECIFIC FINISH INFORMATION.
- PAINT ALL EXPOSED STEEL.
- SEE REFLECTED CEILING PLAN FOR CEILING FINISHES.

FINISH PLAN LEGEND



MATERIAL ABBREVIATIONS - SEE ABBREVIATIONS LIST AND SPECIFICATIONS FOR ADDITIONAL INFORMATION

ROOM FINISH ABBREVIATIONS

FLOORS

SC SEALED CONCRETE

WALLS

PT-1 PAINT: EPOXY

CABINETRY

PL1 PLASTIC LAMINATE:
PL2 PLASTIC LAMINATE:

GENERAL FURNITURE NOTES

- MADE FROM RECYCLED/PLASTIC
- FASTENERS TO BE STAINLESS STEEL
- TABLE TOPS TO BE ROUND
- COLOR TO BE DETERMINED. DESIGN INTENT IS TO MATCH THE BUILDING (BRICK COLOR). IF THIS IS NOT PART OF STANDARD COLORS CONTRACTOR TO INDICATE THIS IS NOT STANDARD.

FURNITURE TYPE AND QUANTITIES

- ROUND PICNIC TABLE (SIMILAR AS SHOWN):
 - 6 PERSON TABLE (3 TOTAL)
 - 8 PERSON TABLE (3 TOTAL)
 - 6 PERSON TABLE - ACCESSIBLE (1 TOTAL)



- ROUND BAR HEIGHT TABLES (SIMILAR AS SHOWN BELOW):
 - 4 PERSON TABLE (4 TOTAL)



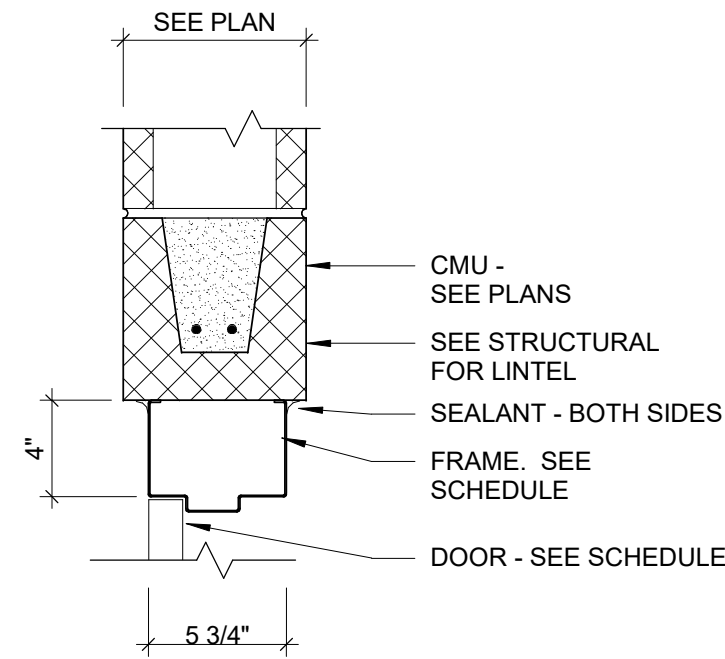
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DESIGNED KJC	DRAWN CAW
PROJECT NO. D0005 06-22-00146	
DATE MARCH 10, 2023	
SHEET NO.	

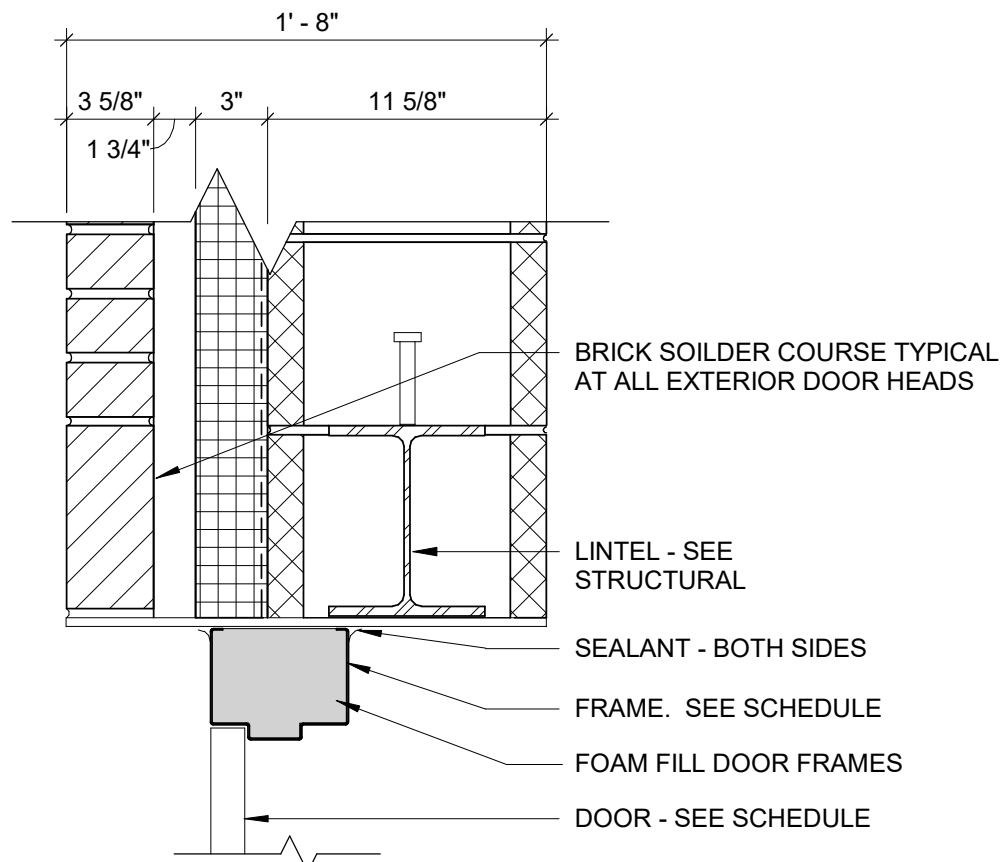


PLASTIC PVC INTERLOCKING CEILING PANELS -SEE SPECIFICATIONS

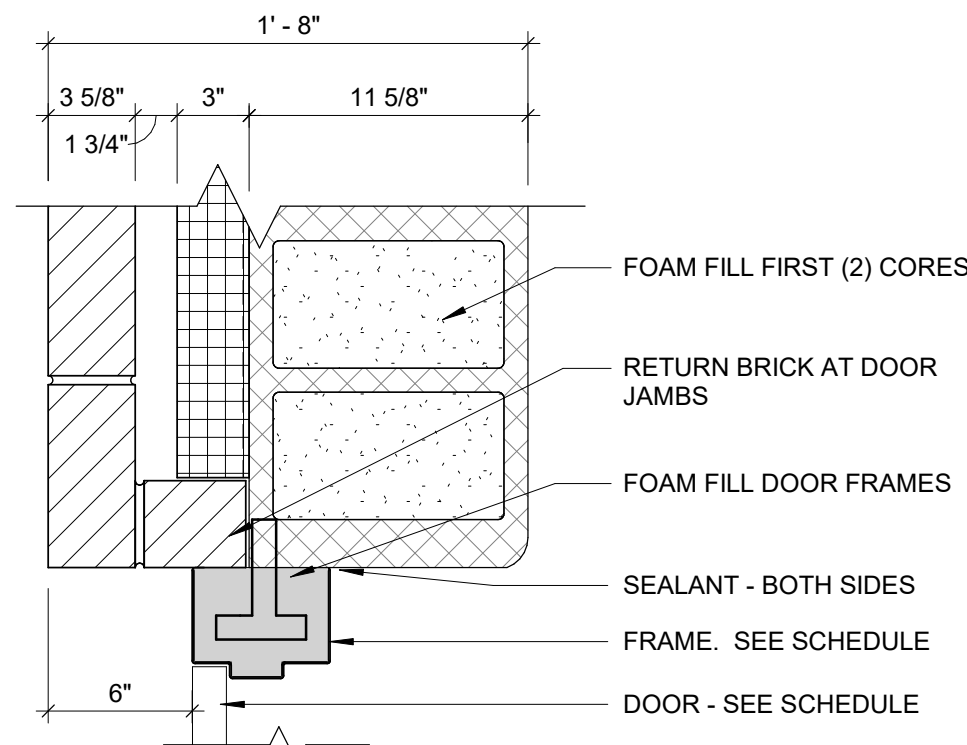
A271



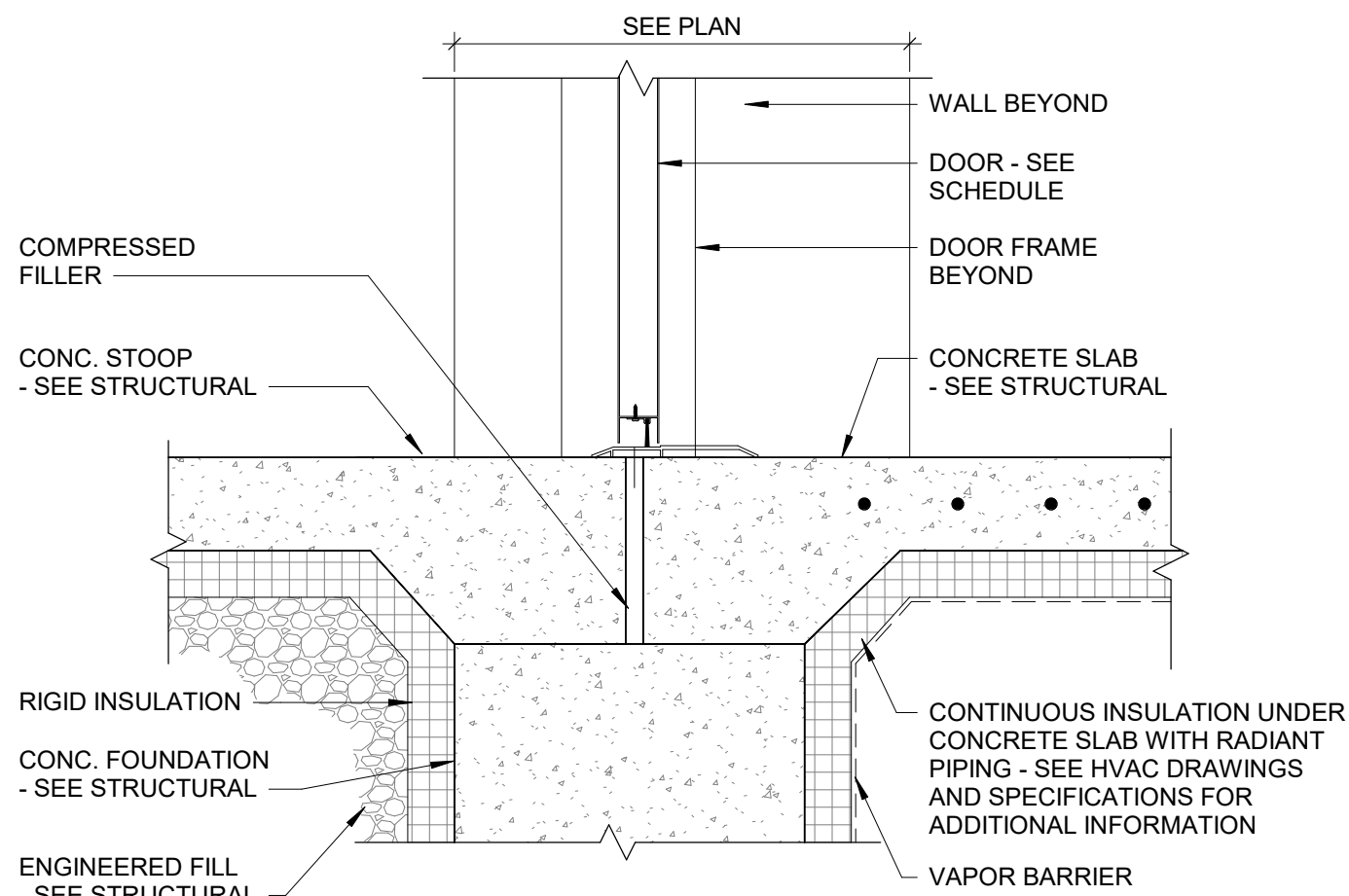
4 DOOR HEAD AT CMU (JAMB SIM.)
A291 1 1/2" = 1'-0"



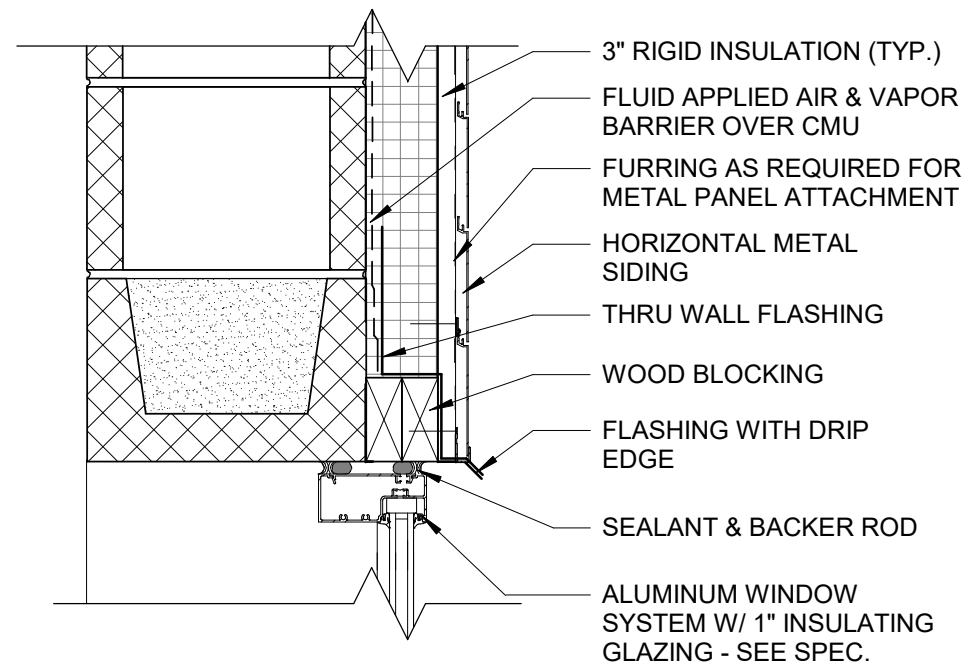
3 DOOR HEAD
A291 1 1/2" = 1'-0"



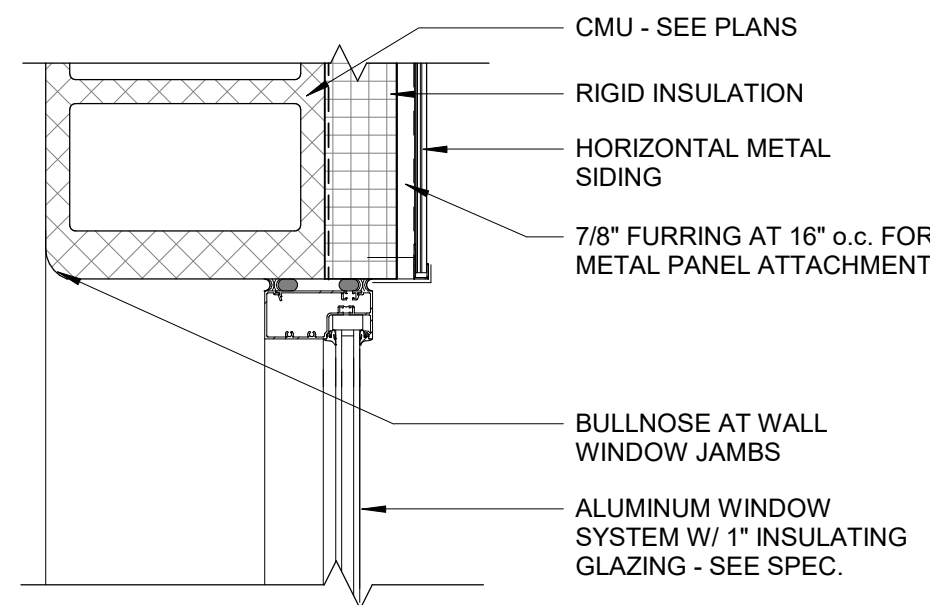
2 DOOR JAMB
A291 1 1/2" = 1'-0"



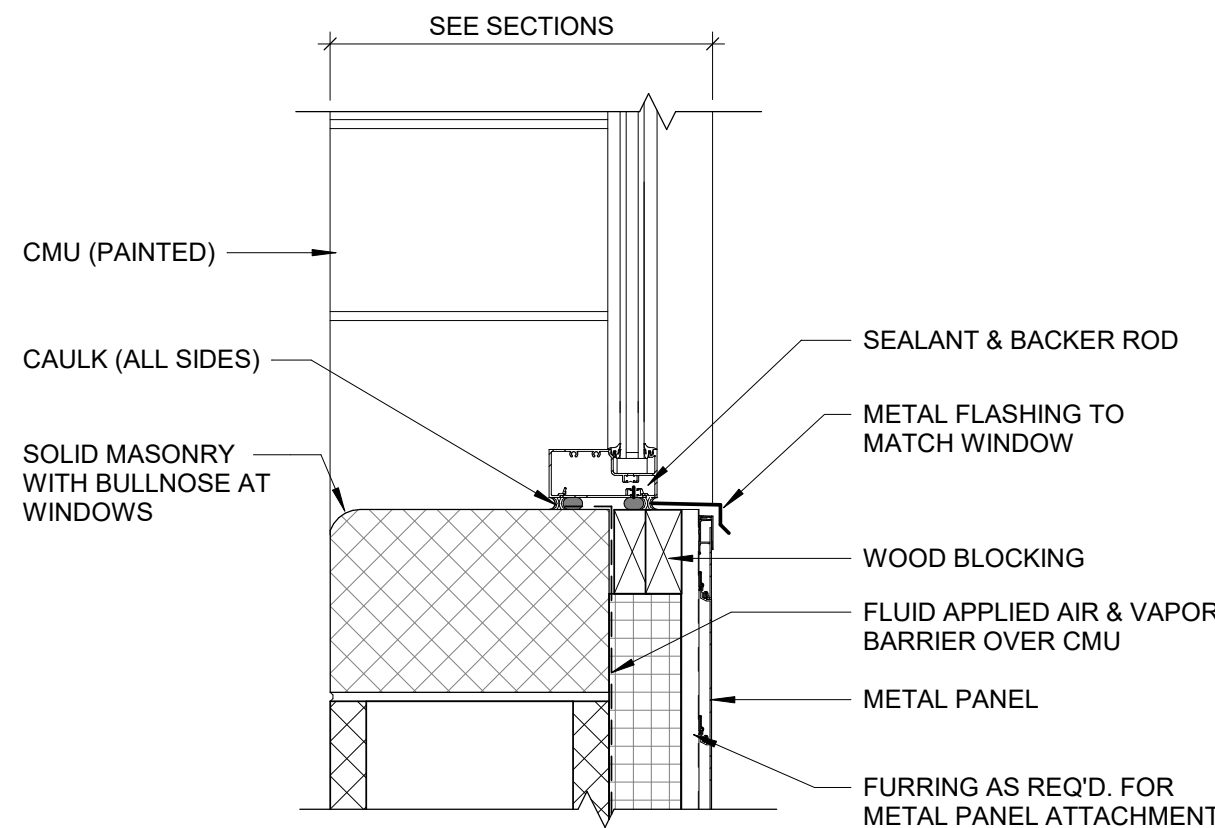
1 DOOR THRESHOLD
A291 1 1/2" = 1'-0"



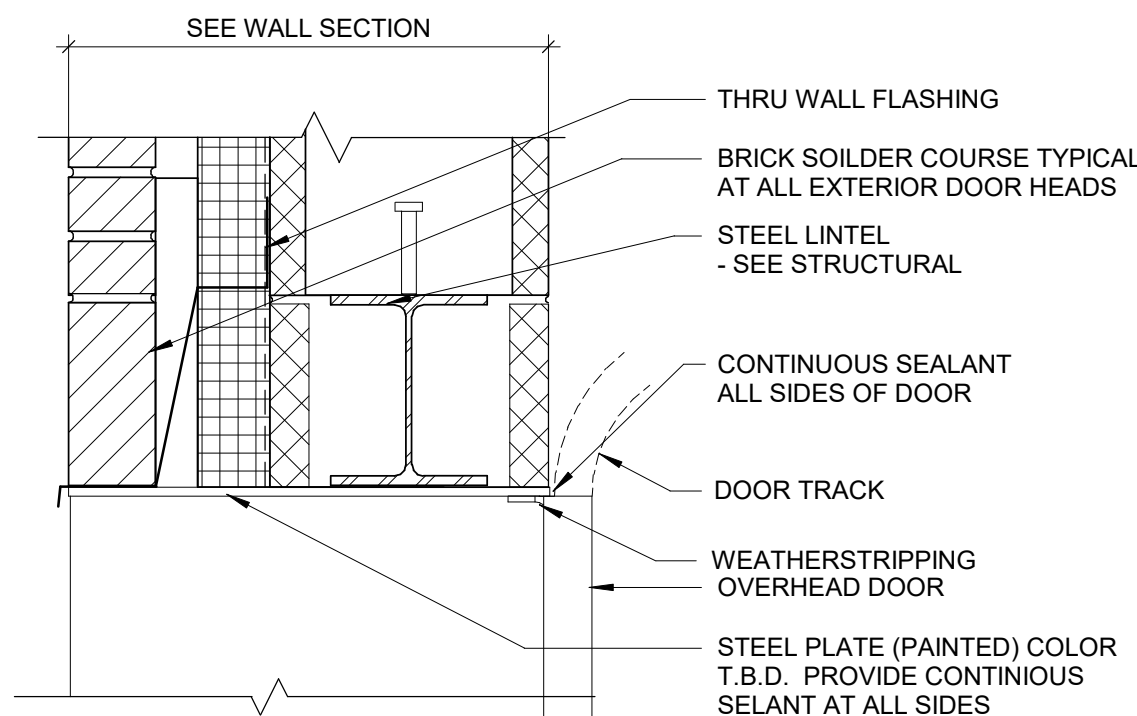
7 WINDOW HEAD
A291 1 1/2" = 1'-0"



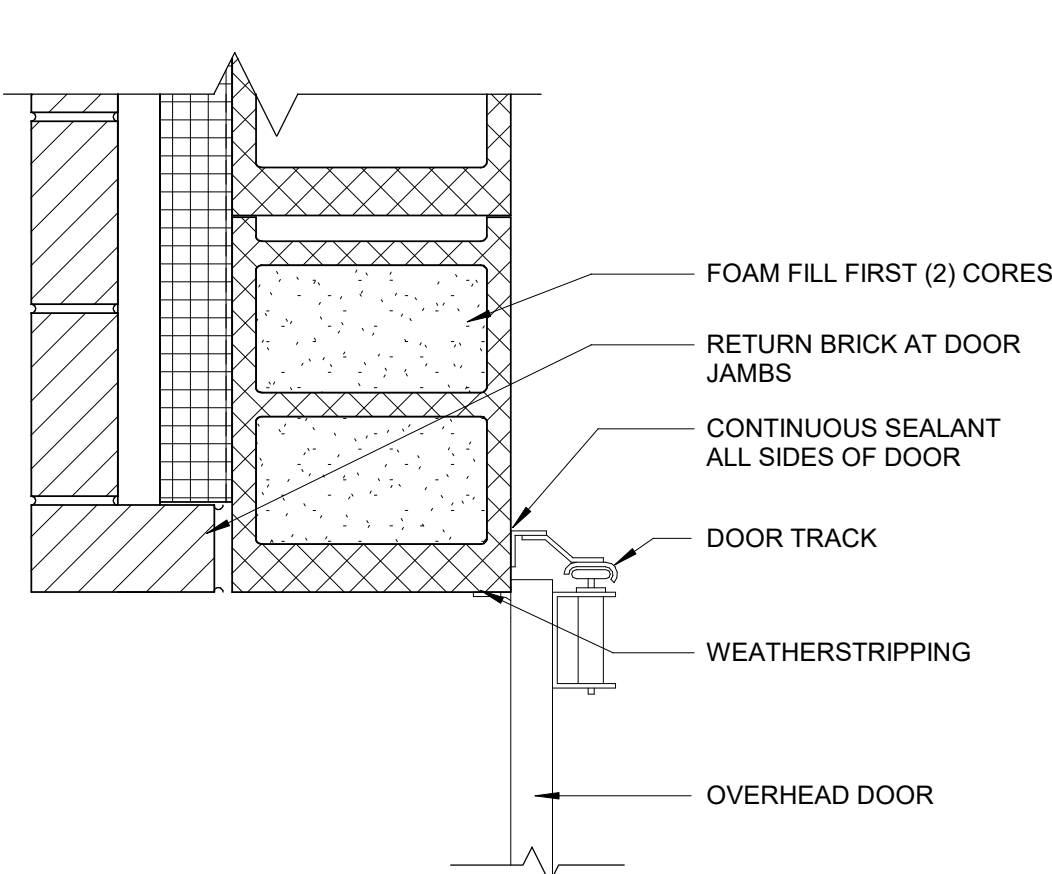
6 WINDOW JAMB
A291 1 1/2" = 1'-0"



5 WINDOW SILL
A291 1 1/2" = 1'-0"

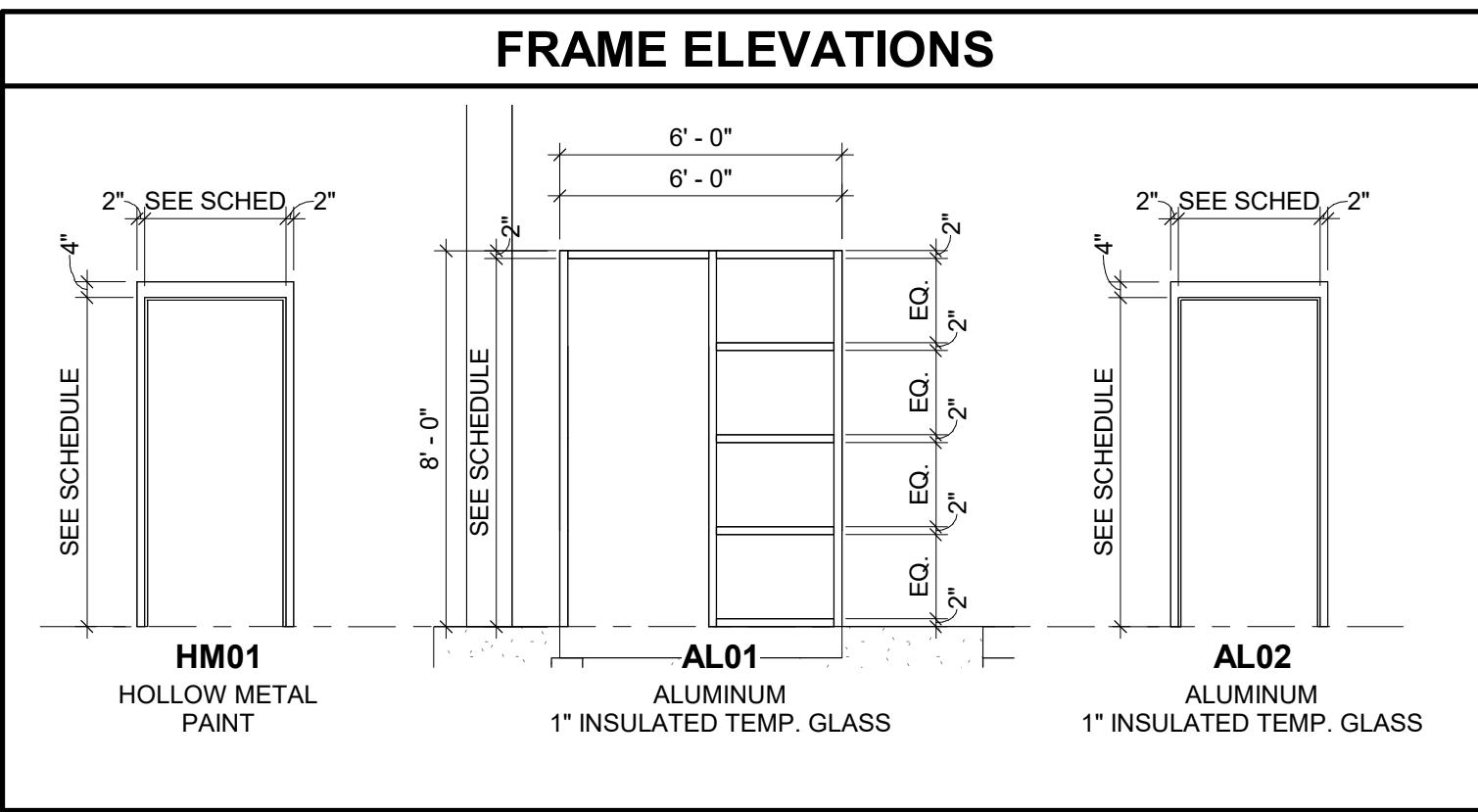
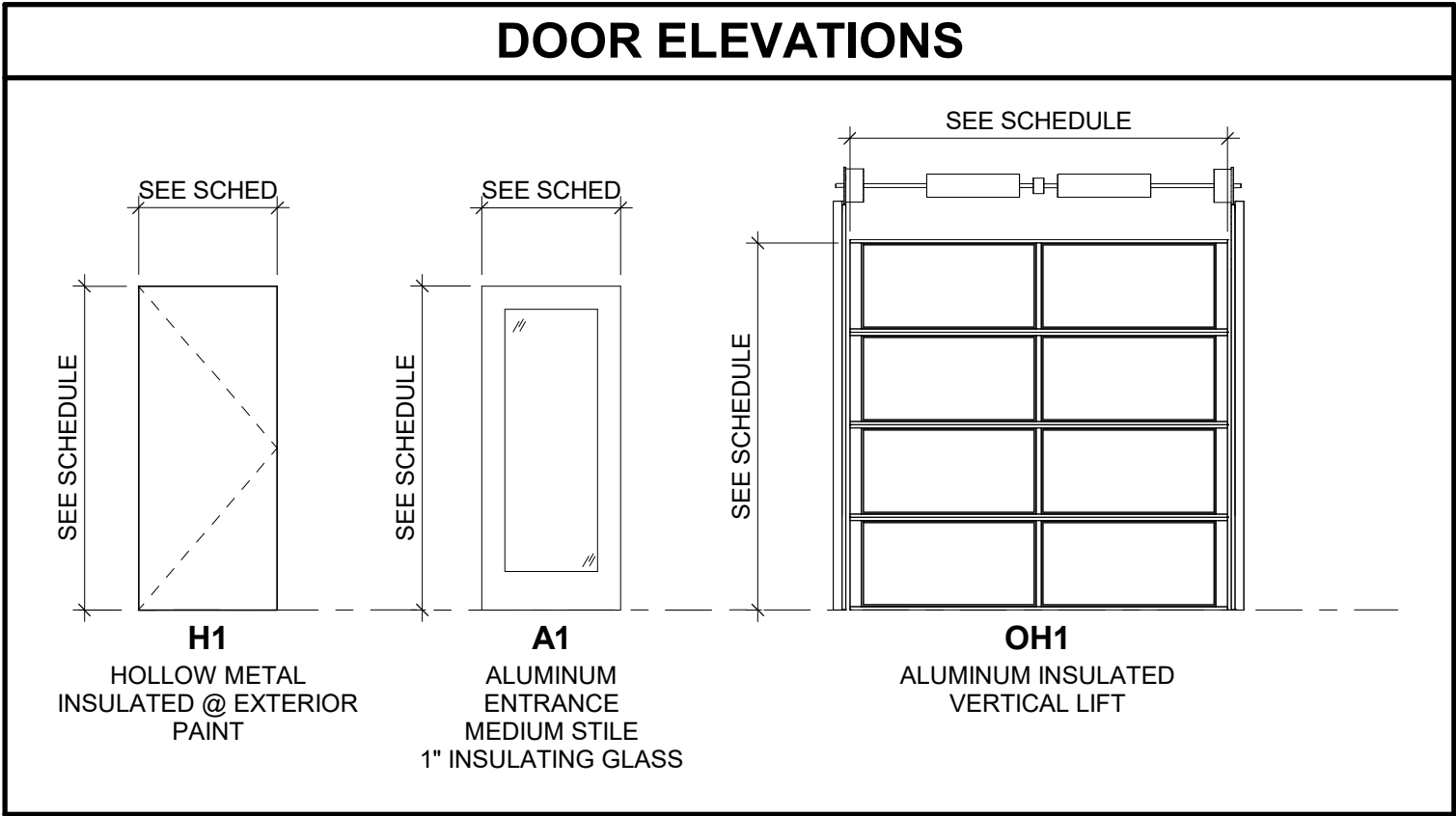


9 SECTIONAL HEAD AT CMU
A291 1 1/2" = 1'-0"



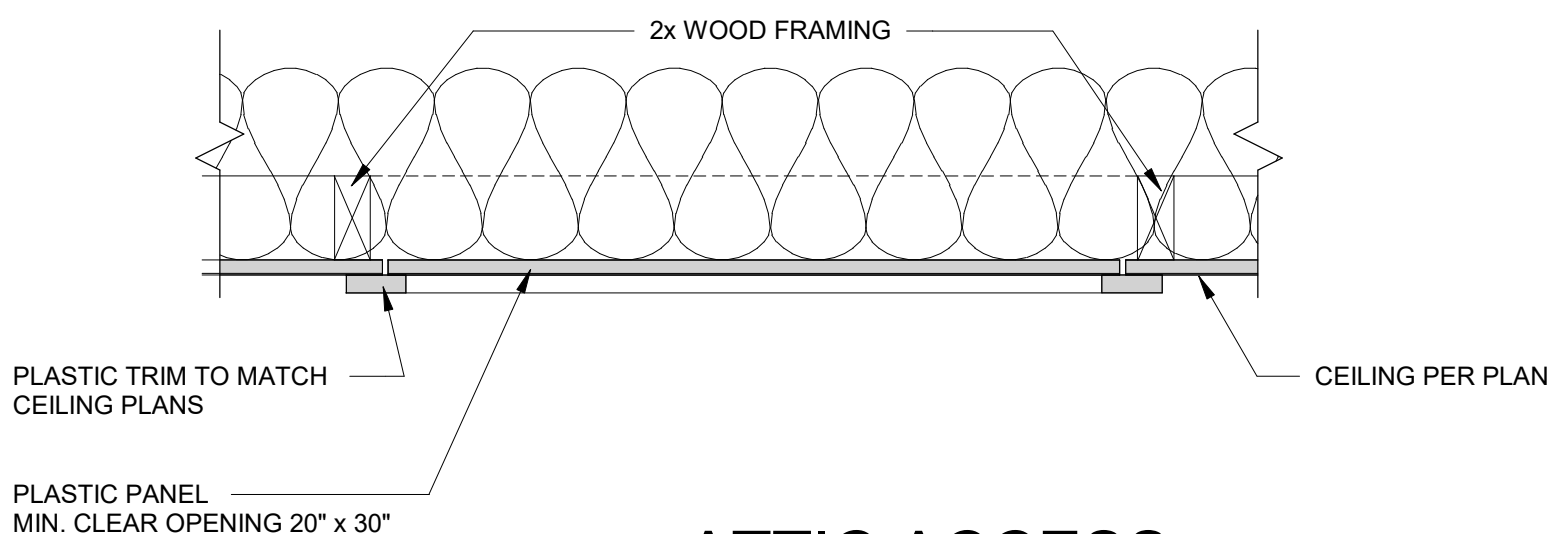
8 SECTIONAL JAMB AT CMU
A291 1 1/2" = 1'-0"

DOOR SCHEDULE							
DOOR NUMBER	OPENING SIZE			DOOR TYPE	FRAME TYPE	FIRE RATING	DETAILS (A291)
	WIDTH	DOOR HEIGHT	THICKNESS				
100A	3'-0"	7'-10"	1 3/4"	A1	AL02	-	1, 2, 3 (SIM)
100B	12'-0"	10'-0"	2"	OH1	-	-	8, 9
100C	8'-0"	8'-0"	2 1/8"	OH1	-	-	8, 9
100D	8'-0"	8'-0"	2 1/8"	OH1	-	-	8, 9
100E	8'-0"	8'-0"	2 1/8"	OH1	-	-	8, 9
100F	8'-0"	8'-0"	2 1/8"	OH1	-	-	8, 9
101	3'-0"	7'-0"	1 3/4"	H1	HM01	-	1, 2, 3
102	3'-0"	7'-0"	1 3/4"	H1	HM01	-	4
103	3'-0"	7'-0"	1 3/4"	H1	HM01	-	1, 2, 3
104	3'-0"	7'-0"	1 3/4"	H1	HM01	-	1, 2, 3
105	3'-0"	7'-0"	1 3/4"	H1	HM01	-	1, 2, 3
106	3'-0"	7'-0"	1 3/4"	H1	HM01	-	1, 2, 3
107	3'-0"	7'-0"	1 3/4"	H1	HM01	-	1, 2, 3
108	3'-0"	7'-0"	1 3/4"	H1	HM01	-	1, 2, 3
109	3'-0"	7'-0"	1 3/4"	H1	HM01	-	1, 2, 3
110	3'-0"	7'-0"	1 3/4"	H1	HM01	-	1, 2, 3
111	3'-0"	7'-0"	1 3/4"	H1	HM01	-	1, 2, 3
111A	3'-0"	7'-0"	1 3/4"	H1	HM01	-	4
112	3'-0"	7'-0"	1 3/4"	H1	HM01	-	4

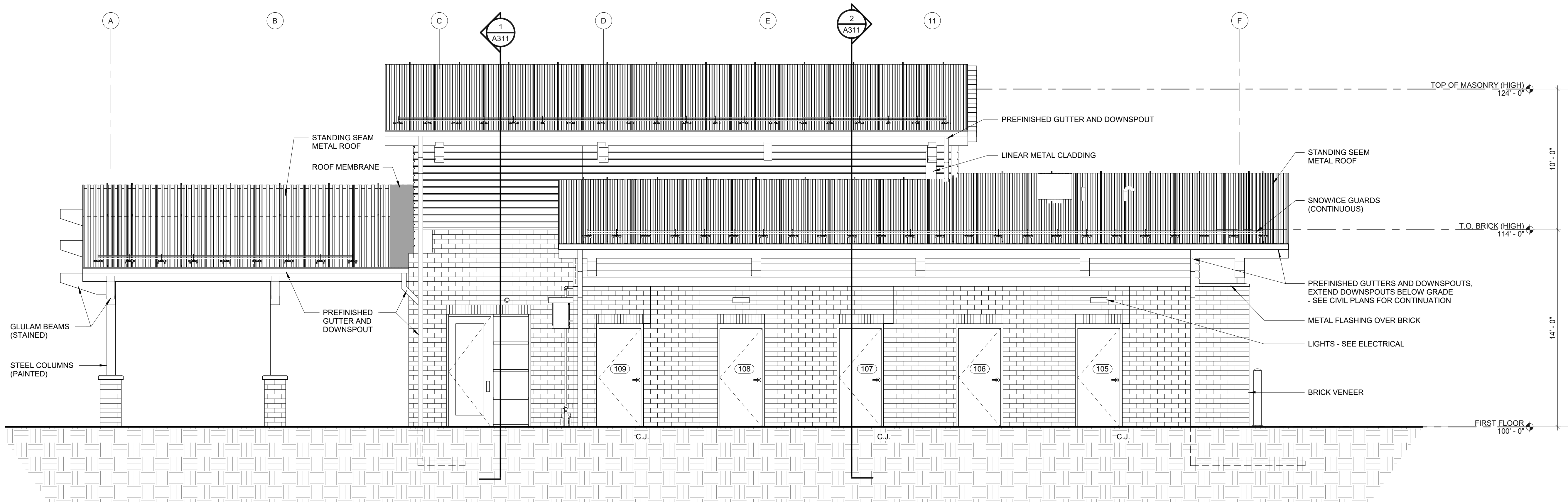


GENERAL DOOR & HARDWARE NOTES

- ALL DOOR HARDWARE SHALL BE CAPABLE OF OPERATION W/ THE USE OF ONE (1) HAND & SHALL NOT REQUIRE TIGHT PINCHING OR TWISTING OF THE WRIST TO OPERATE. THUMBTURN DEADBOLTS ARE PROHIBITED. LEVER OR PADDLE DEADBOLT RELEASES ARE ACCEPTABLE. DOOR THRESHOLD SHALL NOT EXCEED ONE-HALF INCH IN HEIGHT & SHALL HAVE 1/2 BEVEL. DOOR CLOSERS SHALL MEET THE FORCE & SWEEP PERIOD REQUIREMENTS.
- PROVIDE LEVER TYPE HANDLES ON LOCKETS
- SEE HARDWARE SETS FOR DOORS WITH ELECTRONIC, KEYPADS, ALARMS, ETC.

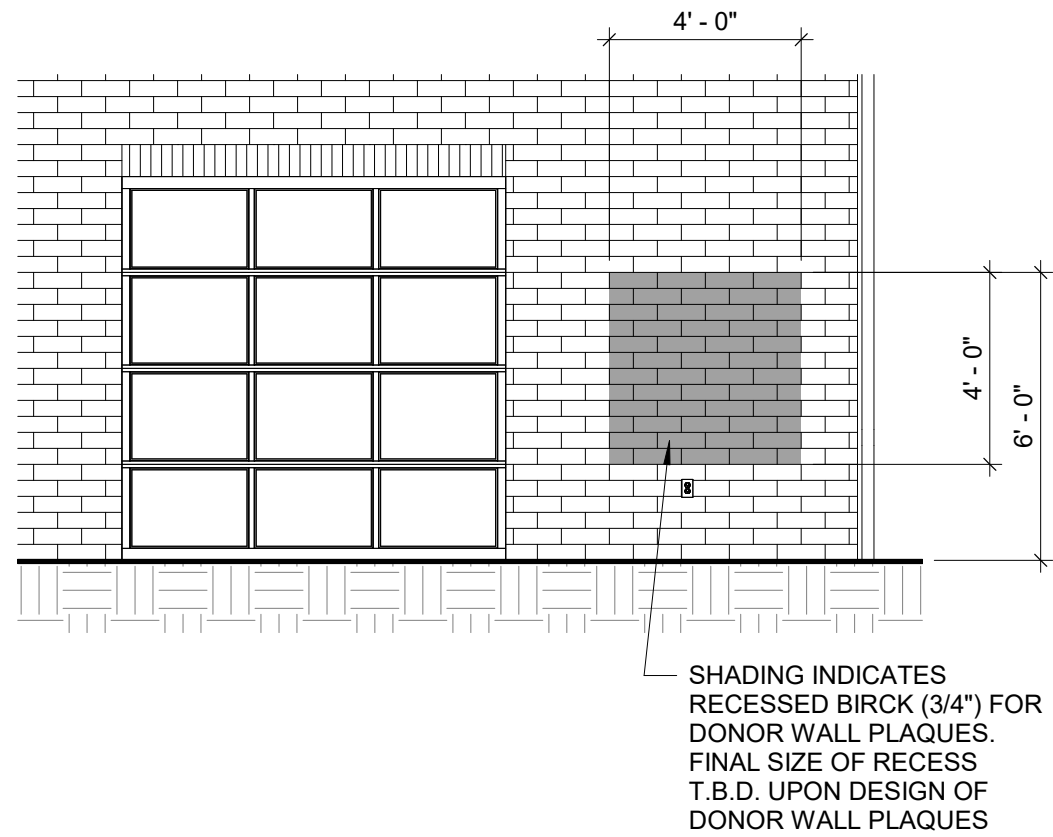


10 ATTIC ACCESS
A291 1 1/2" = 1'-0"



SOUTH ELEVATION

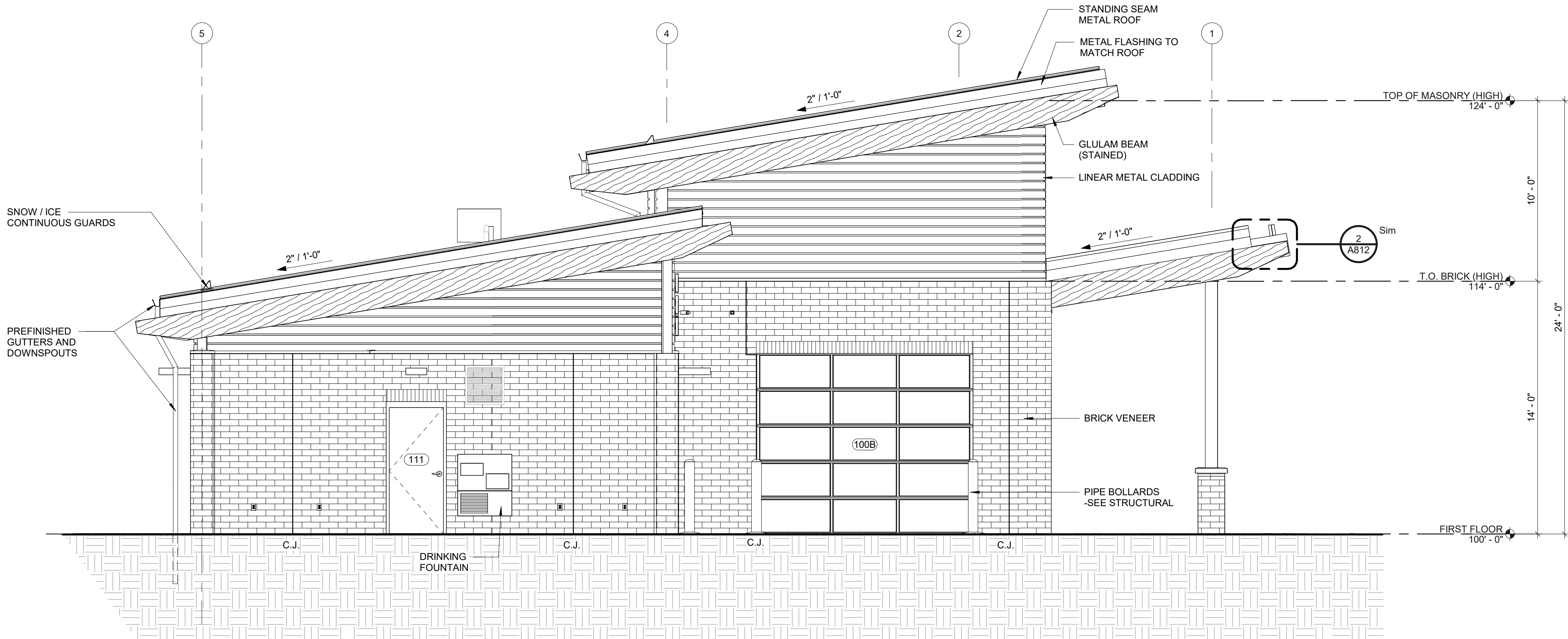
A301



1
A302

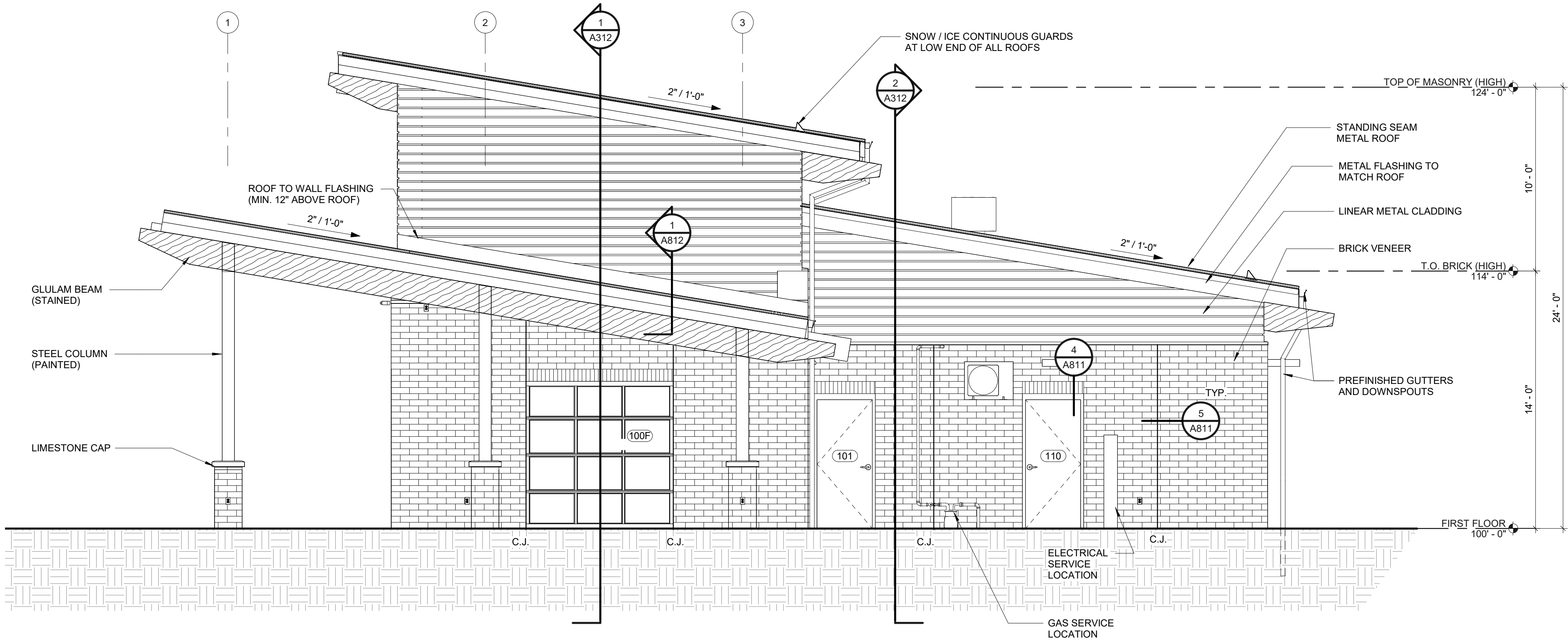
DONOR WALL

1/4" = 1'-0"



EAST ELEVATION

1/4" = 1'-0"

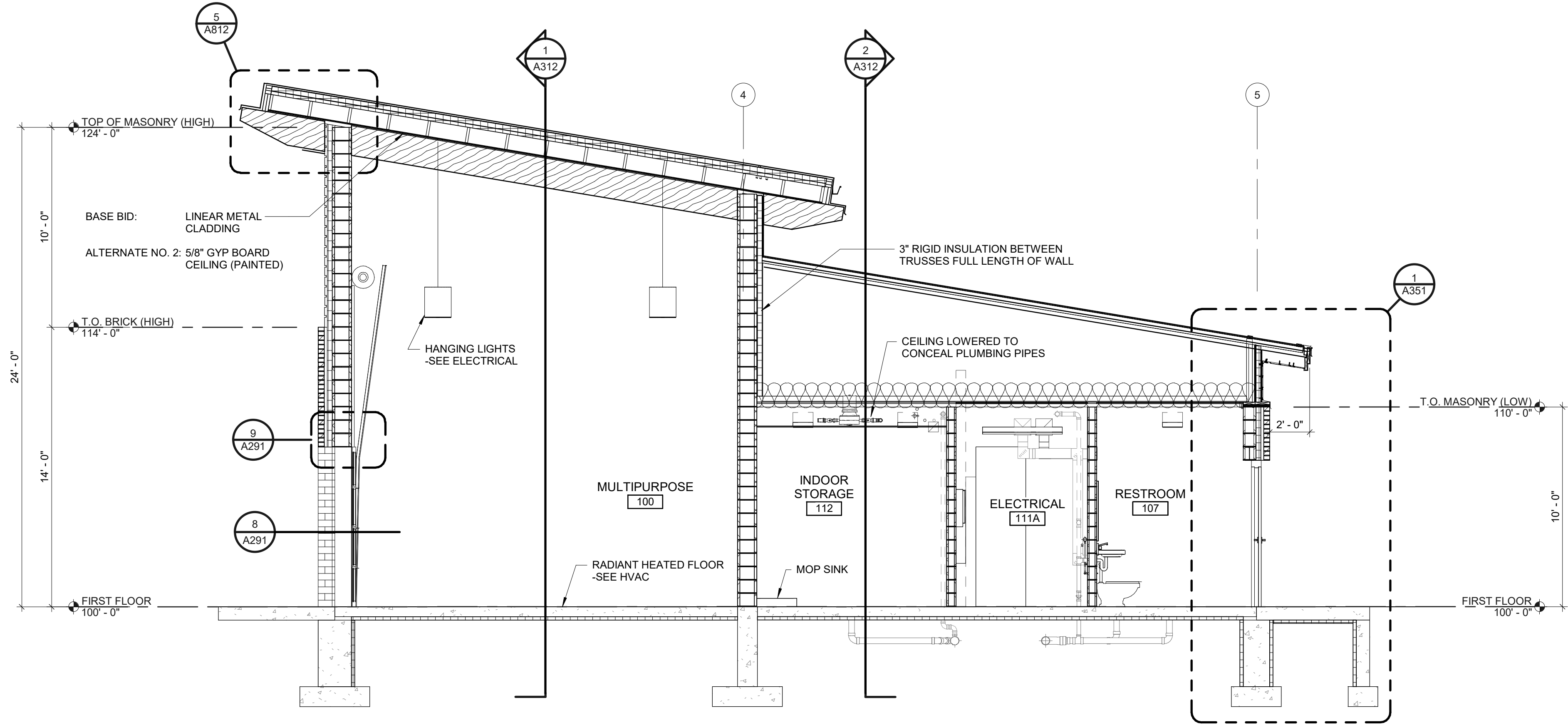


WEST ELEVATION

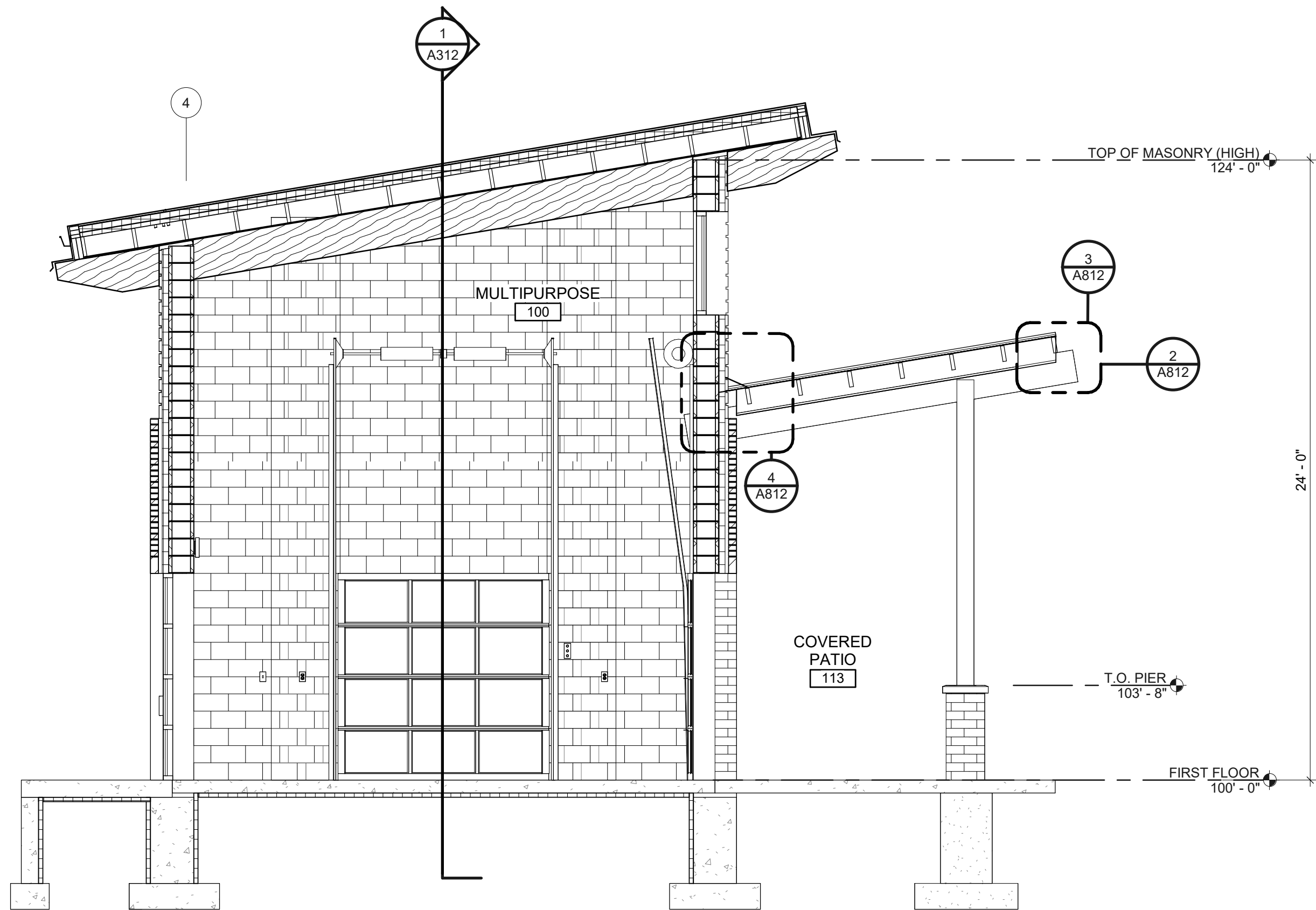
1/4" = 1'-0"

REVISION	DATE	BY

DESIGNED KJC	DRAWN CAW
PROJECT NO. D0005 06-22-00146	
DATE MARCH 10, 2023	
SHEET NO.	



2 BUILDING SECTION AT RESTROOMS
A311 1/4" = 1'-0"



1 BUILDING SECTION AT COVERED AREA
A311 1/4" = 1'-0"

SECTIONS ARE FOR GENERAL
BUILDING INFORMATION
- SEE DETAILS FOR ADDITIONAL
INFORMATION

DESIGNED

KJC

DRAWN

KJC

PROJECT NO.

D0005 06-22-00146

DATE

MARCH 10, 2023

SHEET NO.

A311

CITY OF DE PERE

NELSON FAMILY PAVILION

100 WILLIAM ST, DE PERE, WI 54115

BUILDING SECTIONS

McMAHON

ENGINEERS ARCHITECTS

McMAHON ASSOCIATES, INC.

1445 McMAHON DRIVE NEENAH, WI 54956

Phone: (920) 751-4200 Fax: (920) 751-4284

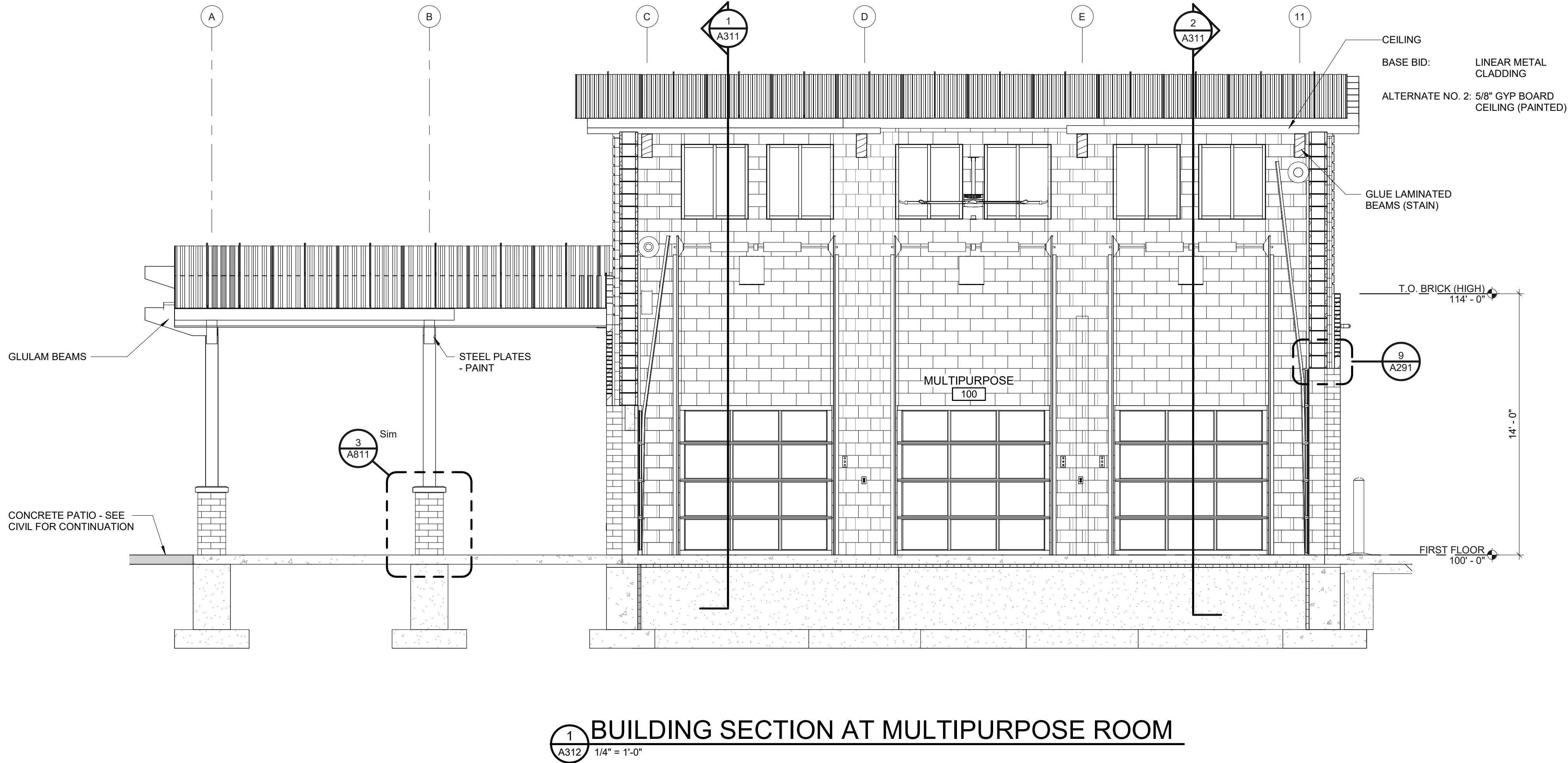
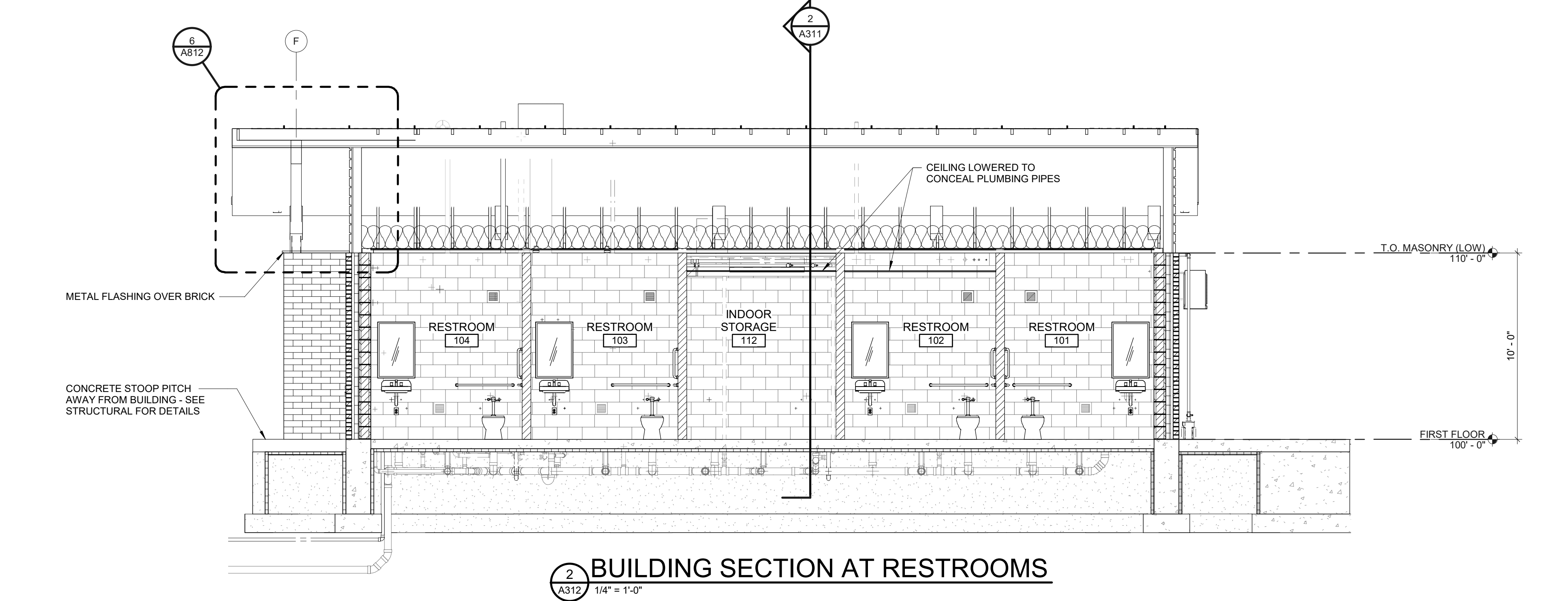
www.mcmgrp.com

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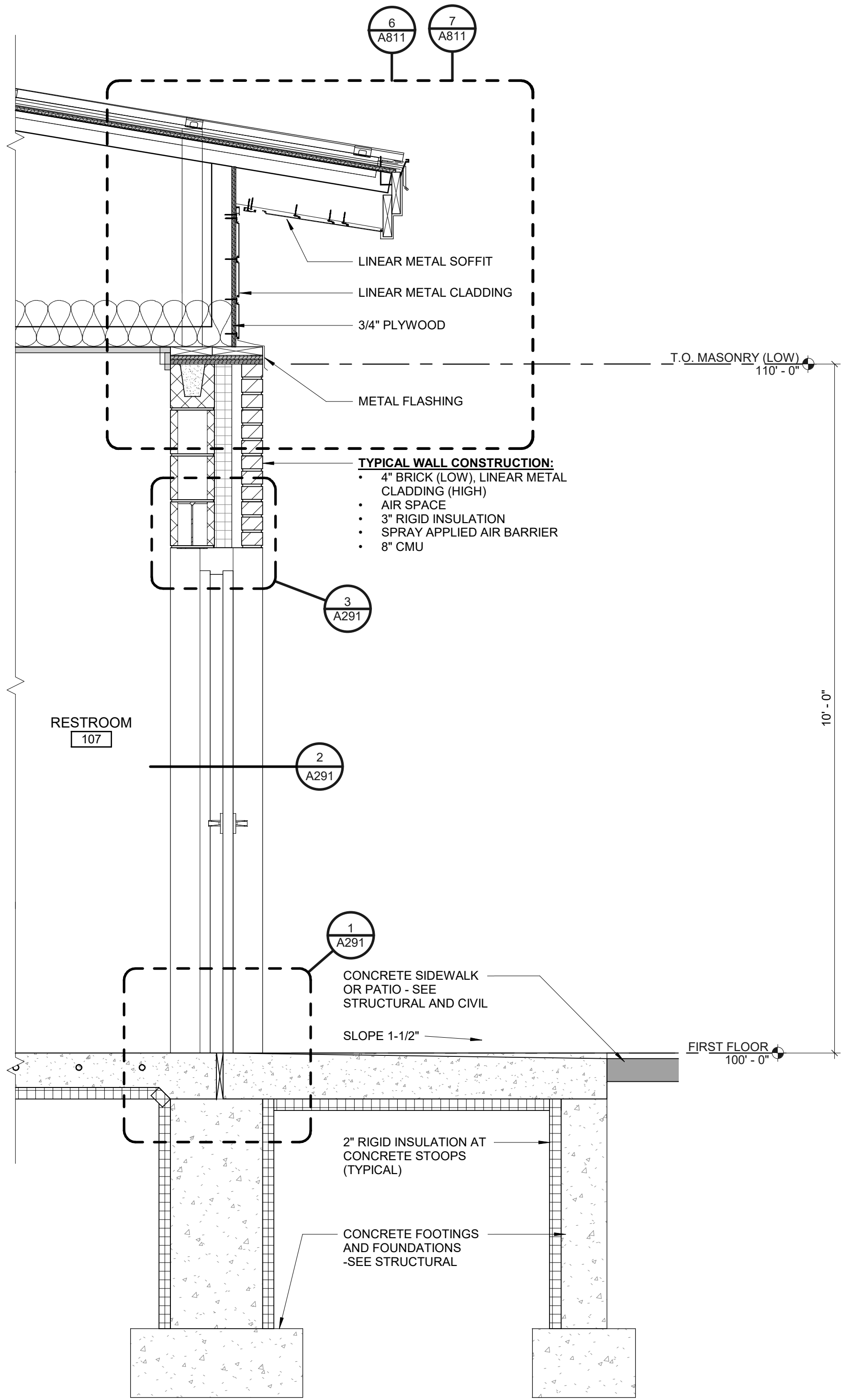
DATE

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- SEE DETAILS FOR ADDITIONAL
INFORMATION

McMAHON ENGINEERS ARCHITECTS McMAHON ASSOCIATES, INC. 1445 McMAHON DRIVE NEENAH, WI 54956 Main: (920) 751-4200 Fax: (920) 751-4284 www.mcngrp.com	
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DESIGN	DATE
NO.	
NELSON FAMILY PAVILION CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115 BUILDING SECTIONS	
DESIGNED KJC	DRAWN BKB
PROJECT NO. D0005 06-22-00146	
DATE MARCH 10, 2023	
SHEET NO. A312	



1
A351 3/4" = 1'-0"

WALL SECTION AT RESTROOMS

DESIGNED
KJC

DRAWN
CAW

PROJECT NO.
D0005 06-22-00146

DATE
MARCH 10, 2023

SHEET NO.
A351

NELSON FAMILY PAVILION

CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115

WALL SECTIONS

McMAHON

ENGINEERS ARCHITECTS

McMAHON ASSOCIATES, INC.

1445 McMAHON DRIVE NEENAH, WI 54956

Phone: (920) 751-4200 Fax: (920) 751-4284

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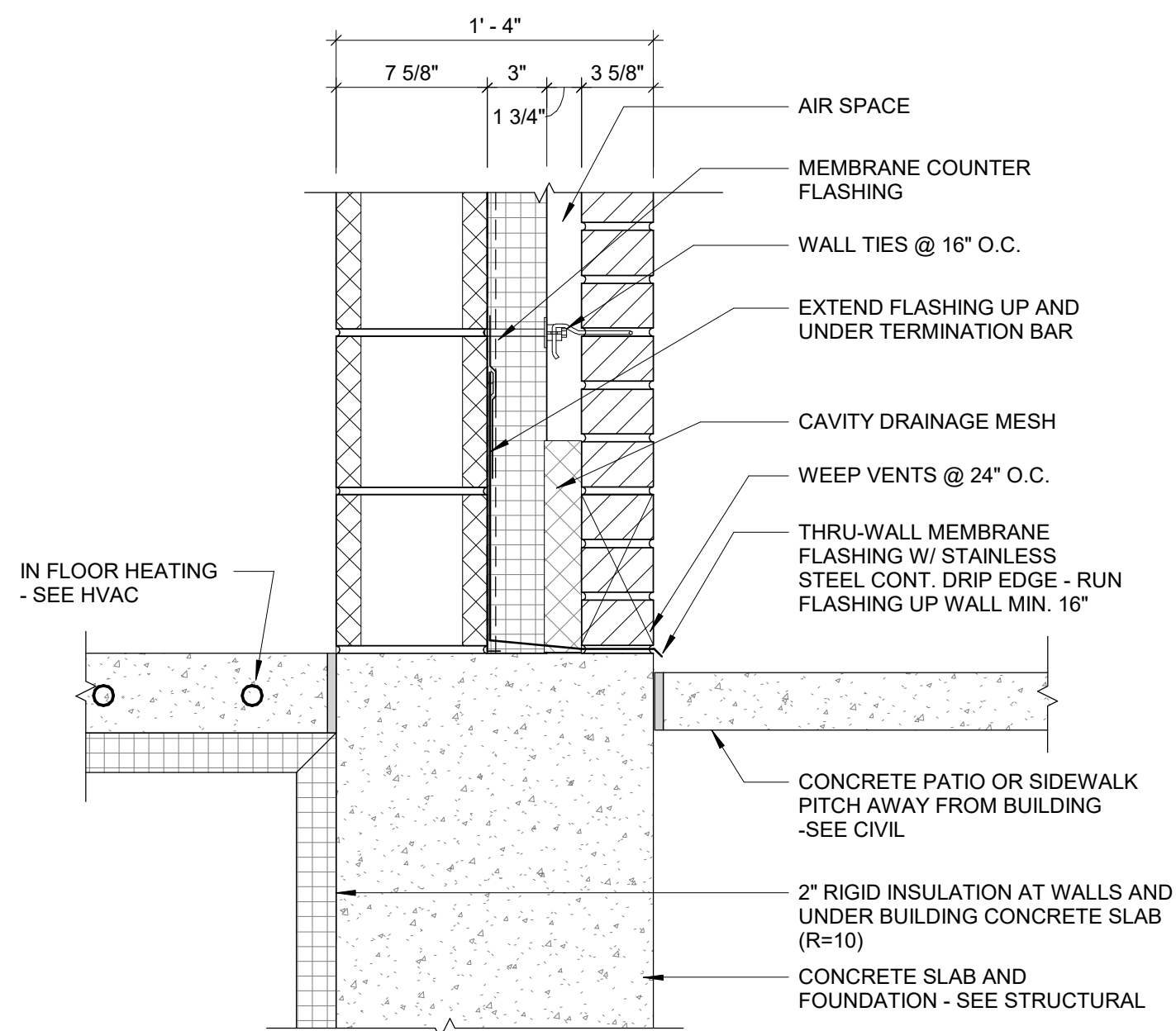
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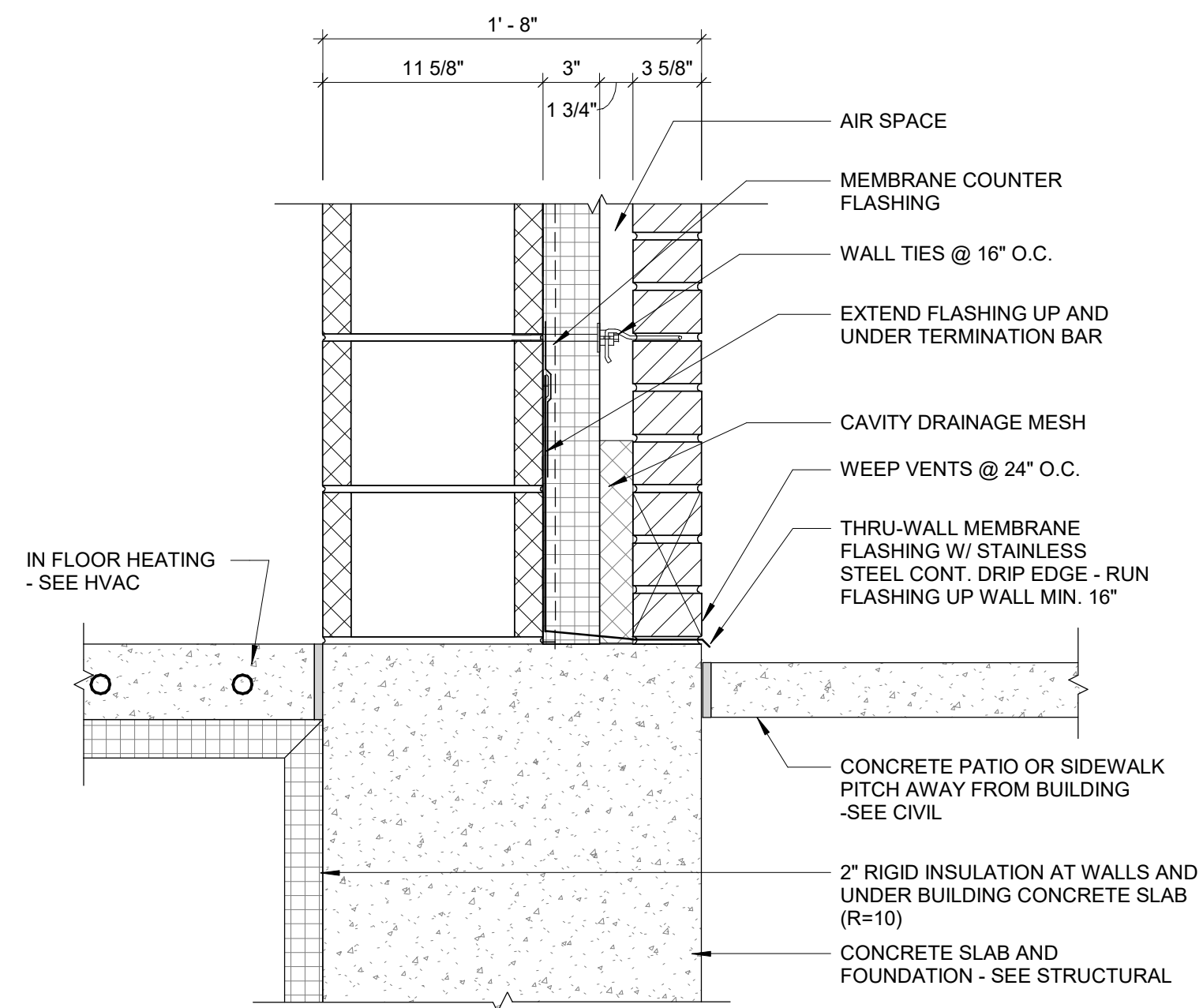
DATE

BY

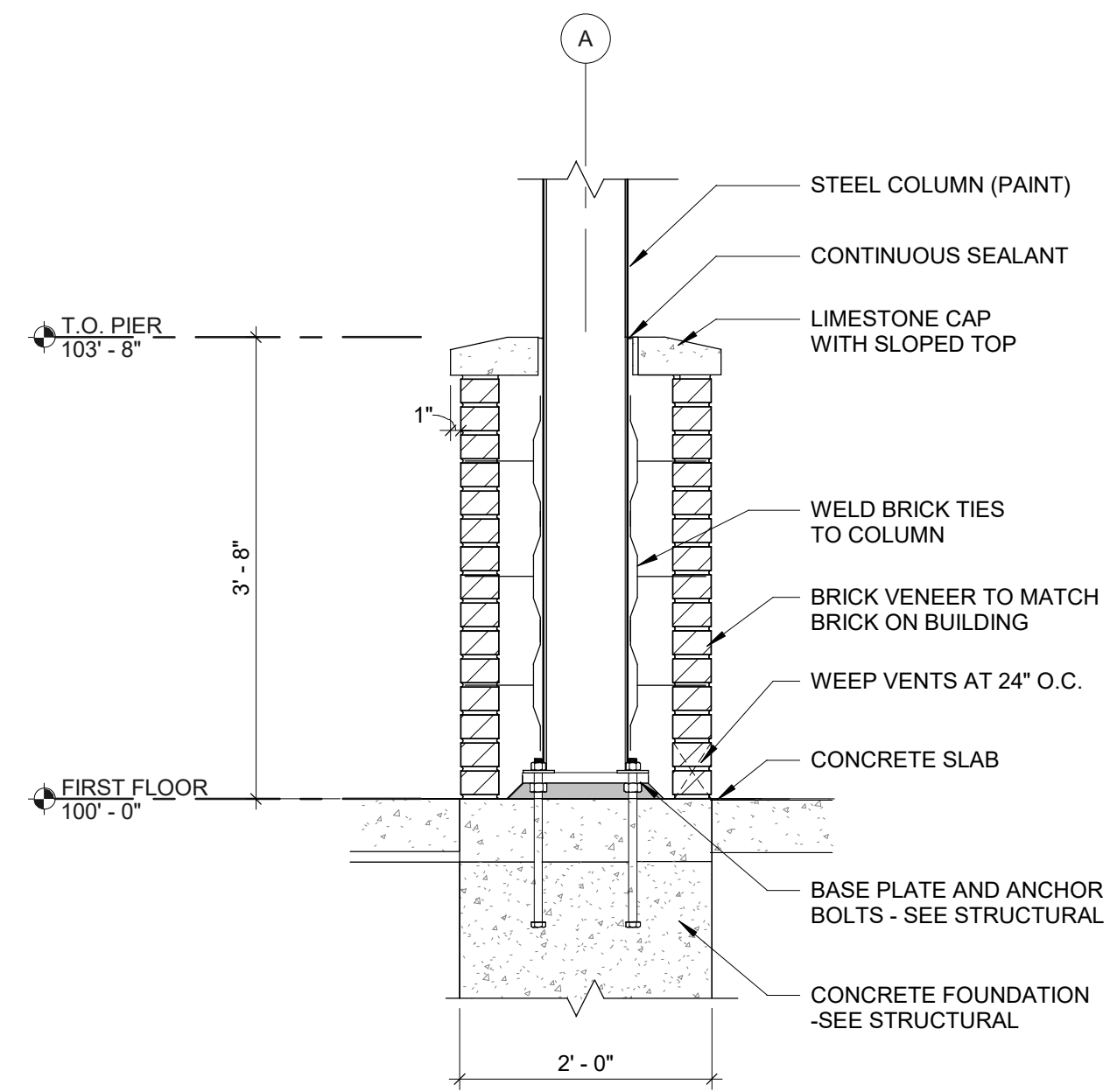
A411



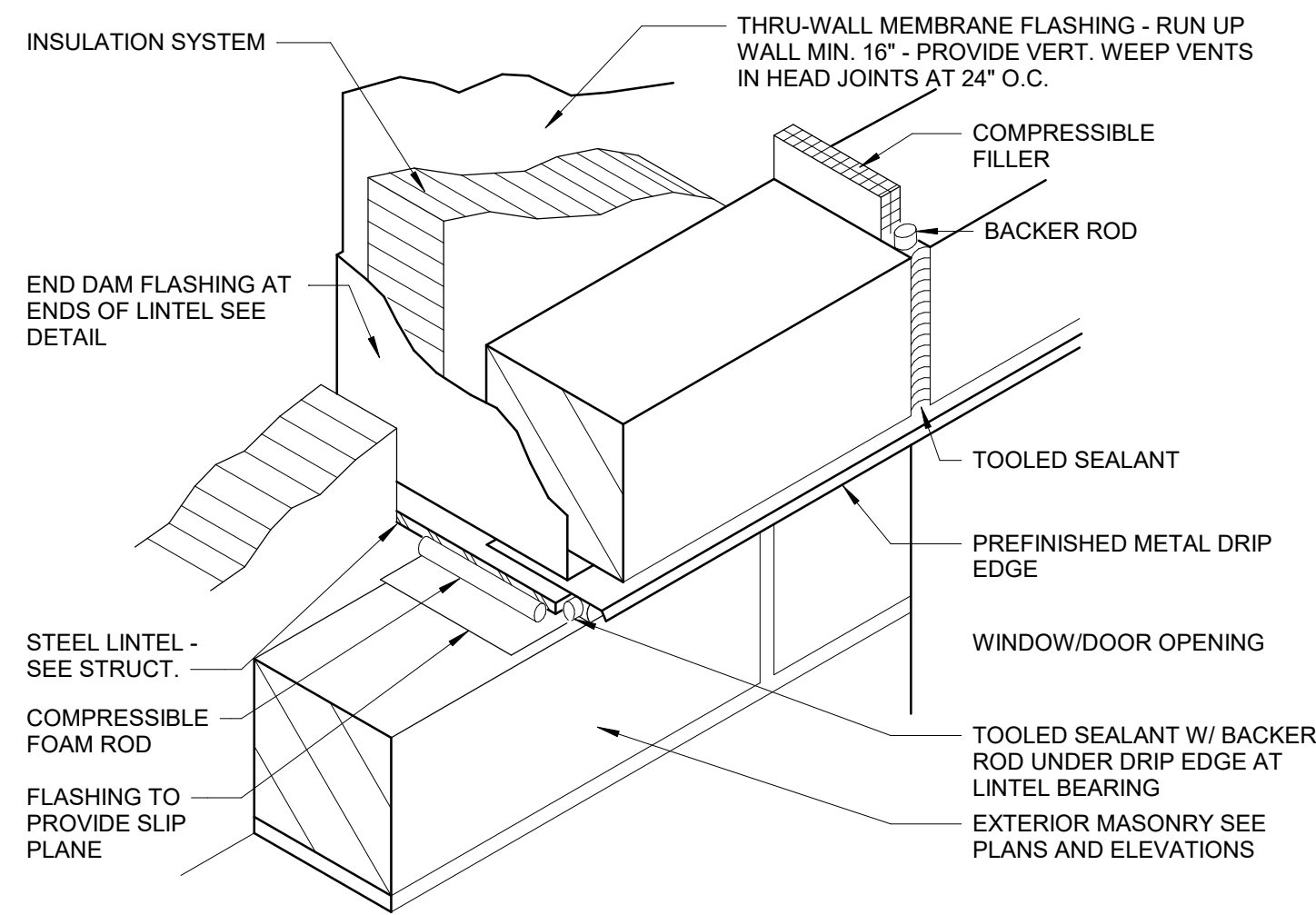
1 TYPICAL FOUNDATION AT RESTROOMS
A811 1 1/2" = 1'-0"



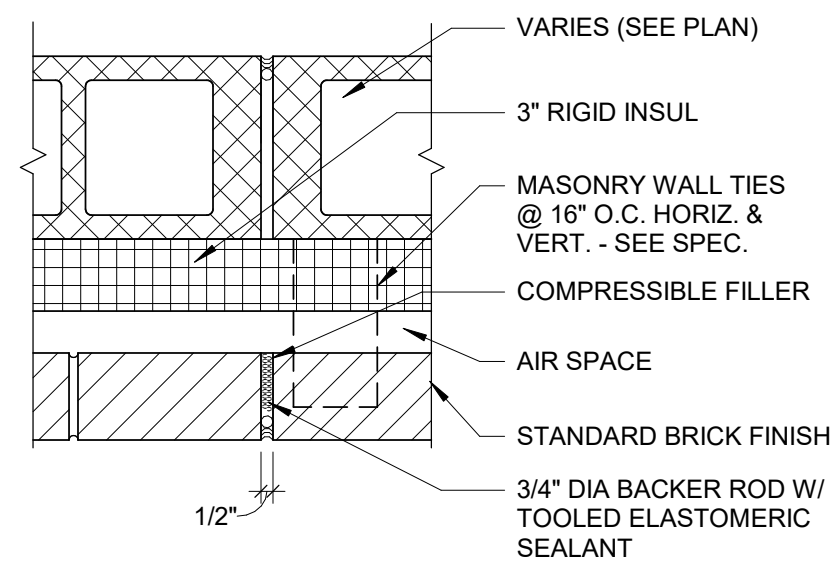
2 TYPICAL FOUNDATION AT MULTIPURPOSE
A811 1 1/2" = 1'-0"



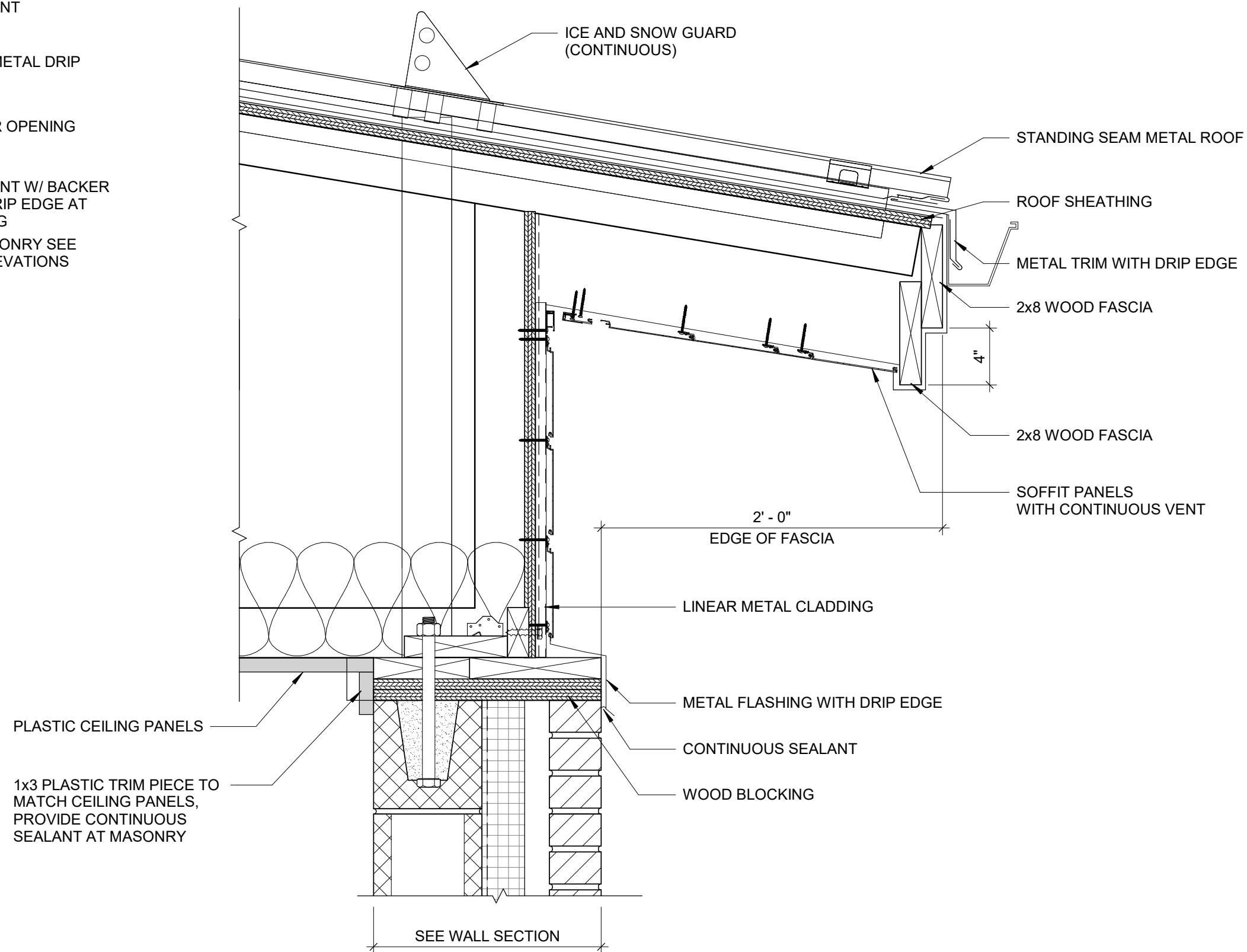
3 PIER SECTION
A811 3/4" = 1'-0"



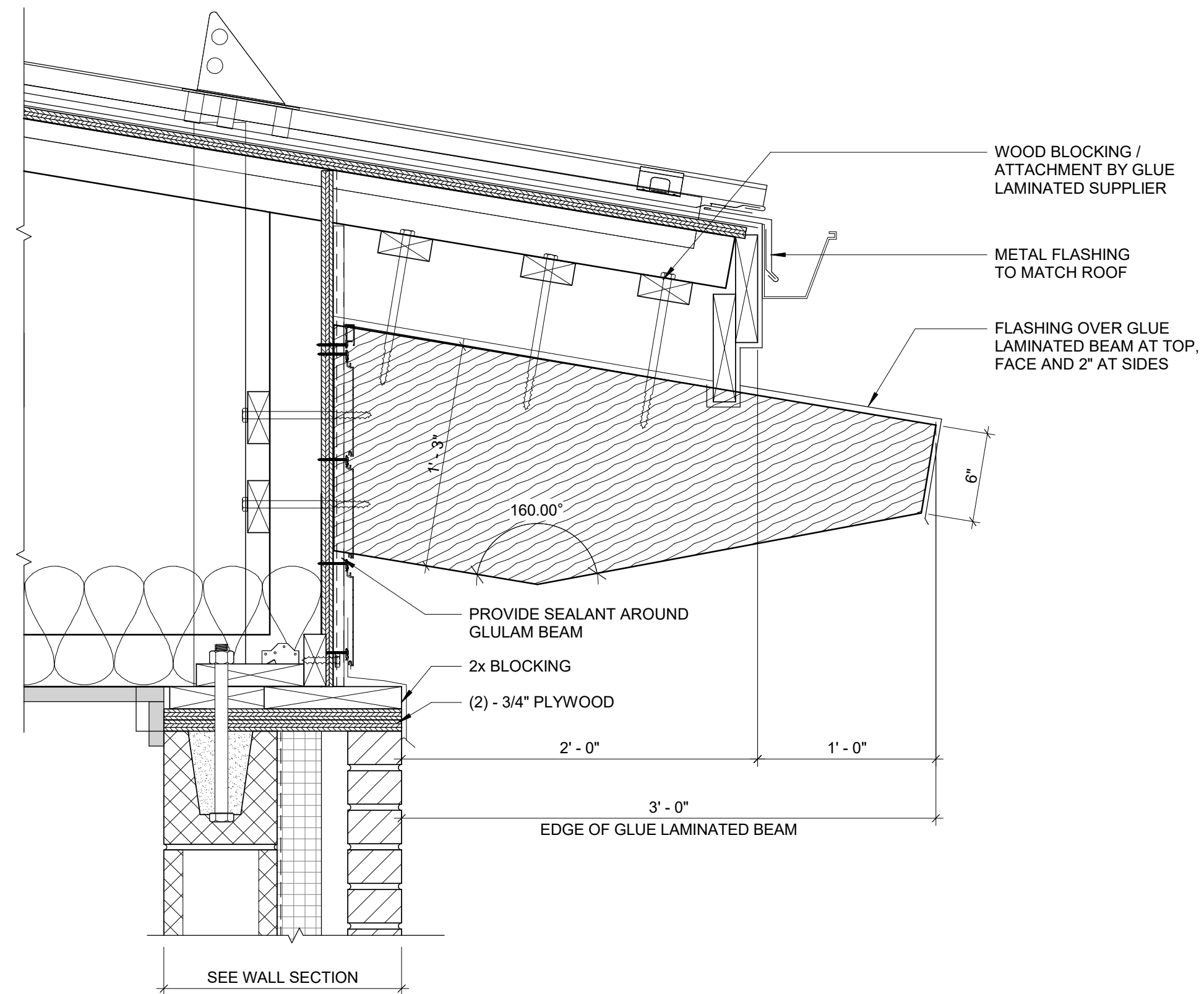
4 CMU CONTROL JOINT
A811 1" = 1'-0"



5 CMU CONTROL JOINT PLAN
A811 1 1/2" = 1'-0"



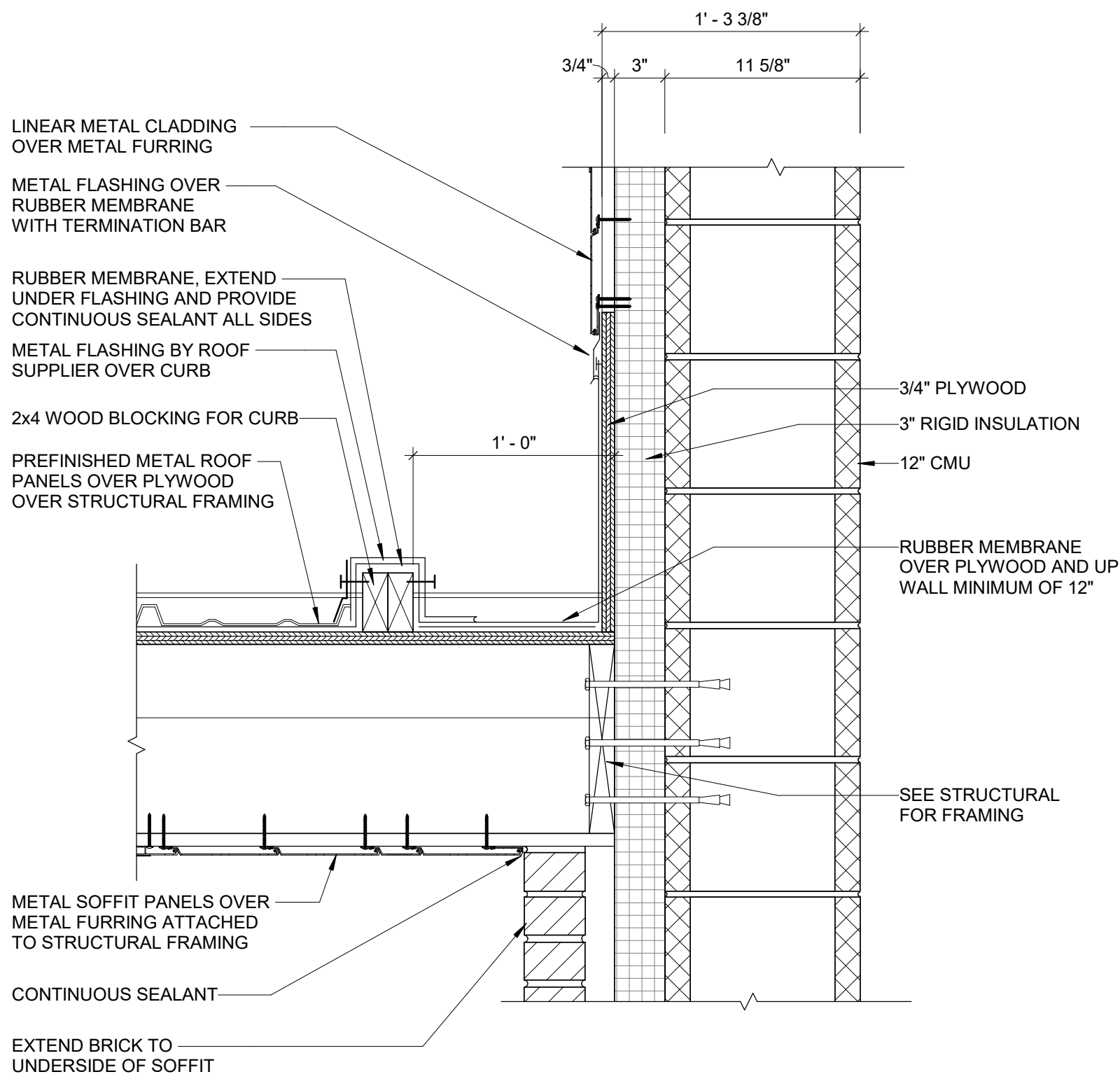
6 ROOF OVERHANG AT RESTROOMS
A811 1 1/2" = 1'-0"



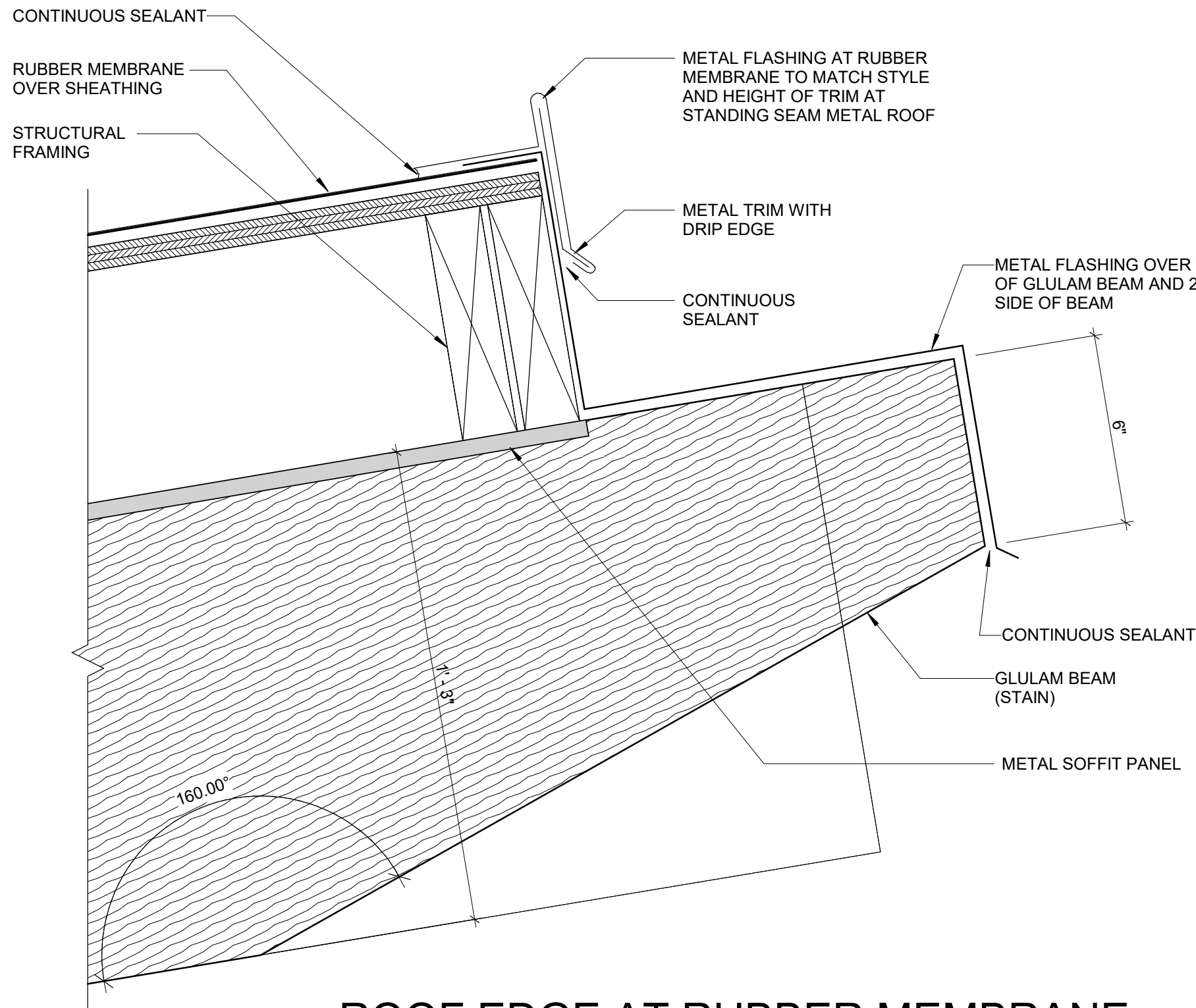
7 ROOF OVERHANG GLUELAM ATTACHEMENT
A811 1 1/2" = 1'-0"

REVISION	DATE	BY

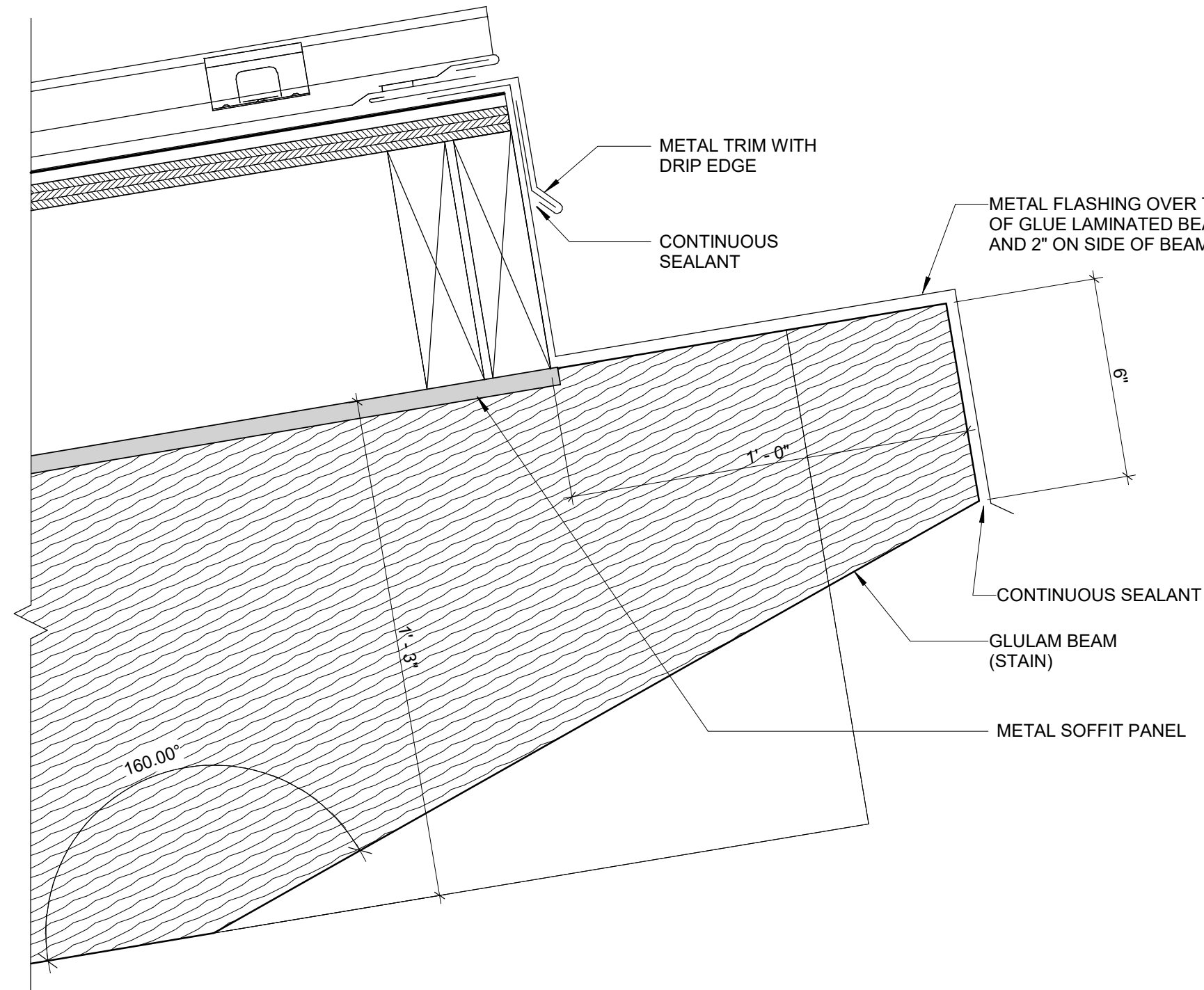
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PROJECT NO. D0005 06-22-00146	
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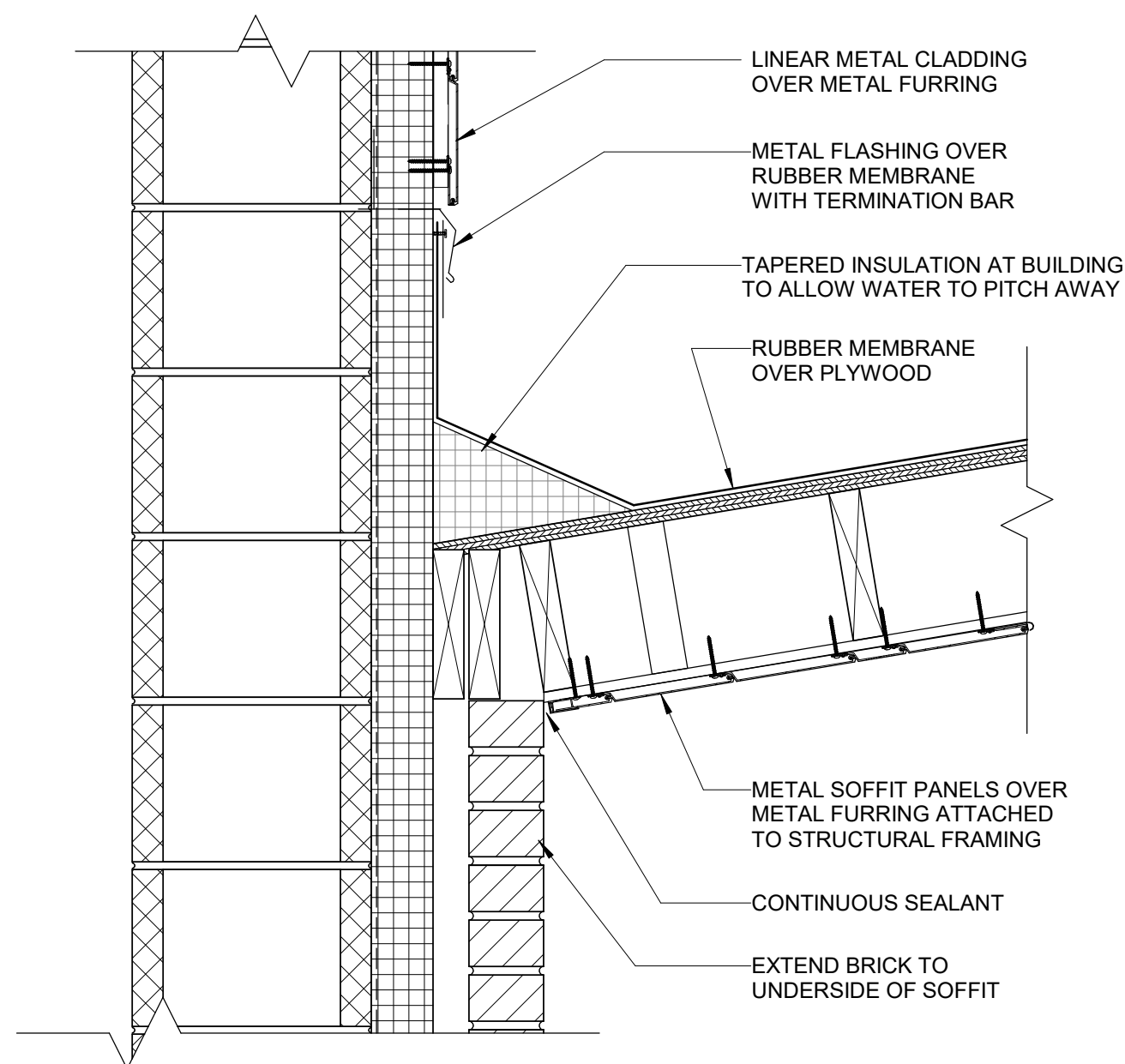
1 ROOF TO WALL AT MEMBRANE
A812 1 1/2" = 1'-0"



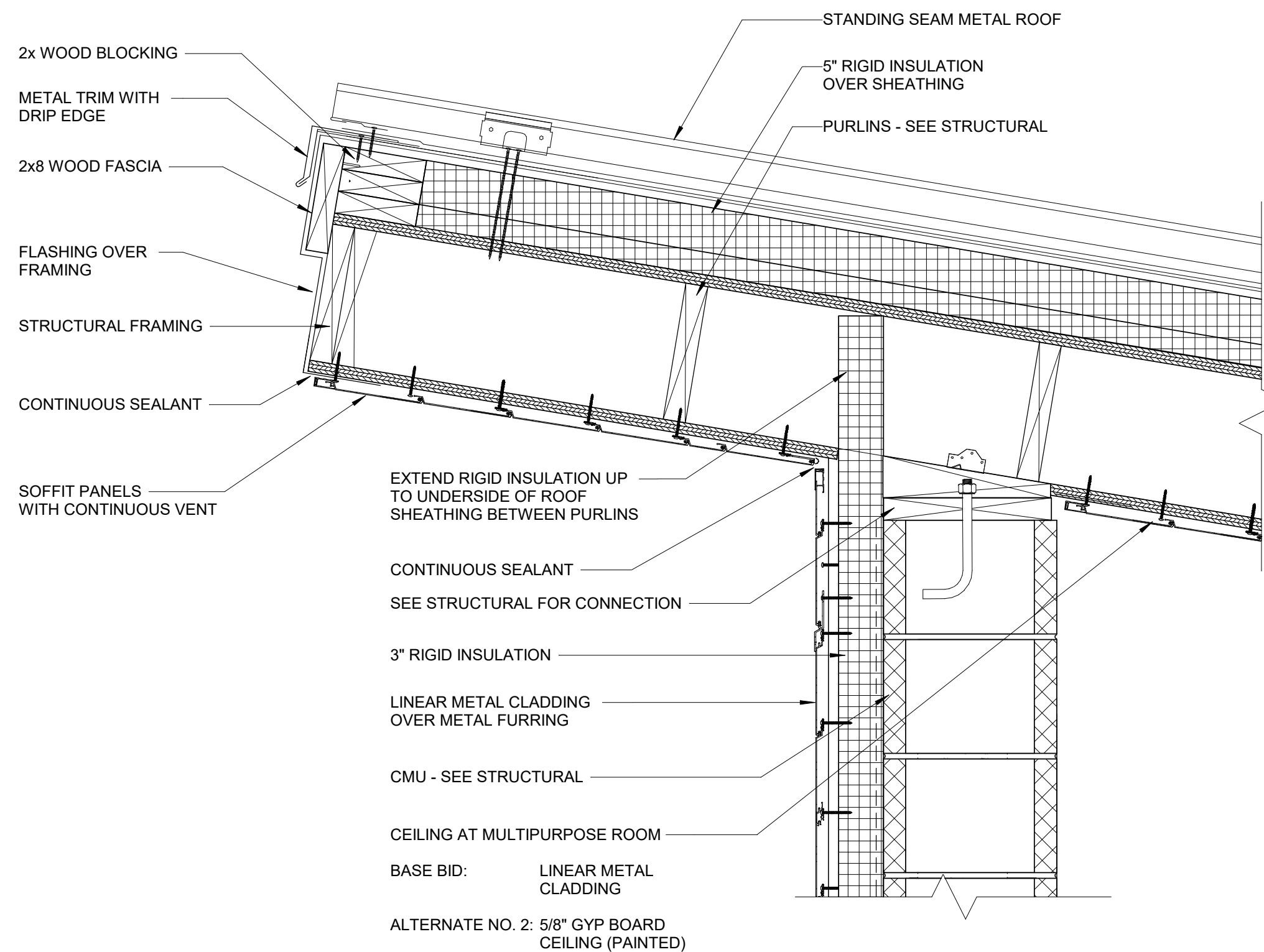
2 ROOF EDGE AT RUBBER MEMBRANE
A812 3" = 1'-0"



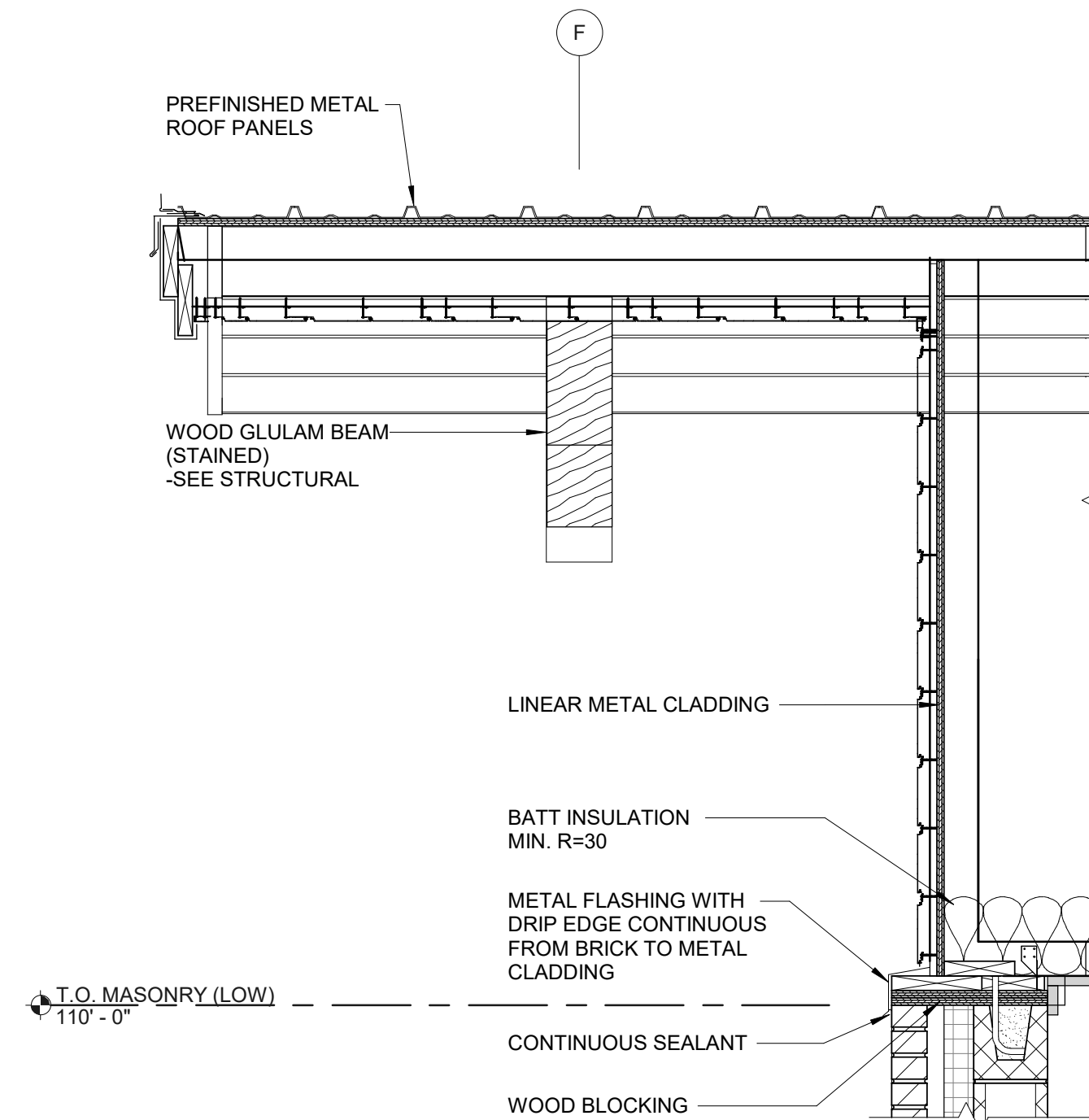
3 ROOF EDGE AT METAL ROOF
A812 3" = 1'-0"



4 ROOF TO WALL FLASHING
A812 1 1/2" = 1'-0"



5 ROOF EDGE AT MULTIPURPOSE
A812 1 1/2" = 1'-0"



6 OVERHANG AT RESTROOM
A812 3/4" = 1'-0"

REVISION	DATE	BY

DESIGNED KJC	DRAWN CAW
PROJECT NO. D0005 06-22-00146	
DATE MARCH 10, 2023	
SHEET NO. A812	

STRUCTURAL SPECIFICATIONS

DESIGN CODE:

- 1. COMPLY WITH THE FOLLOWING CODES:
 - ASCE 7-10
 - IBC 2015
 - WISCONSIN BUILDING CODE, LATEST EDITION

DESIGN LOADS:

- 1. DEAD LOAD:
 - ROOF - 20 PSF
- 2. LIVE LOAD:
 - ROOF - 20 PSF
- 3. SNOW LOAD:
 - GROUND SNOW LOAD (Pg) - 40 PSF
 - UNIFORM SNOW LOAD TYPICAL (Ps) - 31 PSF
 - ROOF SLOPE FACTOR (Cs) - 1.00
 - SNOW EXPOSURE FACTOR (Ce) - 1.00
 - ROOF THERMAL FACTOR (Ci) - 1.10
 - IMPORTANCE FACTOR (I) - 1.00
 - UNIFORM SNOW LOAD CANOPY (Ps) - 34 PSF
 - ROOF SLOPE FACTOR (Cs) - 1.00
 - SNOW EXPOSURE FACTOR (Ce) - 1.00
 - ROOF THERMAL FACTOR (Ci) - 1.20
 - IMPORTANCE FACTOR (I) - 1.00
 - NON-UNIFORM LOADS - SEE SNOW DRIFT PLAN
- 4. WIND:
 - DESIGN WIND SPEED - 115 MPH
 - WIND EXPOSURE - C
 - INTERNAL PRESSURE COEFFICIENT (GCpi) - 0.00 (OPEN STRUCTURE) CANOPY
 - 0.18 (ENCLOSED STRUCTURE) LOW ROOF BLDG
 - 0.55 (PARTIALLY ENCLOSED) HIGH ROOF BLDG
 - COMPONENT DESIGN - LOW ROOF CONOPY
 - VELOCITY PRESSURE (qz) - ALLOWABLE - 15.5 PSF
 - EFFECTIVE AREA - 10 FT²
 - ROOF CENTER - 18.4 PSF
 - ROOF EDGE - 18.4 PSF
 - ROOF CORNER - 18.4 PSF
 - *a" DISTANCE - 3.0 FT
 - COMPONENT DESIGN - LOW ROOF BLDG
 - VELOCITY PRESSURE (qz) - ALLOWABLE - 15.5 PSF
 - EFFECTIVE AREA - 10 FT²
 - WALL CENTER - 19.8 PSF
 - WALL CORNER - 24.5 PSF
 - ROOF CENTER - 16.7 PSF
 - ROOF EDGE - 29.1 PSF
 - ROOF CORNER - 43.0 PSF
 - *a" DISTANCE - 3.0 FT
 - COMPONENT DESIGN - HIGH ROOF BLDG
 - VELOCITY PRESSURE (qz) - ALLOWABLE - 16.9 PSF
 - EFFECTIVE AREA - 10 FT²
 - WALL CENTER - 27.8 PSF
 - WALL CORNER - 32.9 PSF
 - ROOF CENTER - 24.4 PSF
 - ROOF EDGE - 37.9 PSF
 - ROOF CORNER - 53.1 PSF
 - *a" DISTANCE - 3.0 FT
 - NOTE: COMPONENT WIND LOADS ARE ALLOWABLE/UNFACTORED LOADS.
- 5. SEISMIC:
 - MAPPED SPECTRAL RESPONSE:
 - Ss - 0.053
 - S1 - 0.034
 - IMPORTANCE FACTOR (I) - 1.00
 - SITE CLASS - D

GENERAL:

- 1. VERIFY ALL DIMENSIONS, ELEVATIONS, SECTIONS AND DETAILS BETWEEN THE ARCHITECTURAL AND STRUCTURAL PLANS PRIOR TO STARTING WORK. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES OR INCONSISTENCIES.
- 2. VERIFY SIZE, LOCATION, AND NUMBER OF WALL, FLOOR, AND ROOF OPENINGS WITH THE STRUCTURAL, ARCHITECTURAL, MECHANICAL, AND ELECTRICAL PLANS. PROVIDE ALL OPENINGS AND SUPPORT FRAMING.
- 3. CONTRACTOR SHALL COORDINATE LOCATIONS OF ALL ARCHITECTURAL AND MECHANICAL ATTACHMENTS TO STRUCTURAL FRAMING.
- 4. PROVIDE ALL NECESSARY TEMPORARY BRACING, SHORING, GUYING, OR OTHER MEANS TO AVOID EXCESSIVE STRESSES AND TO HOLD STRUCTURAL ELEMENTS IN PLACE DURING CONSTRUCTION.
- 5. SUBMIT SHOP DRAWINGS FOR ALL PRE-FABRICATED ITEMS SUCH AS REINFORCING STEEL AND ACCESSORIES, STRUCTURAL STEEL, WOOD GLUE LAMINATED BEAMS, WOOD TRUSSES, AND CONCRETE MIX DESIGNS. CONTRACTOR SHALL REVIEW SHOP DRAWINGS BEFORE SUBMITTING TO ENGINEER. FABRICATE ITEMS AFTER REVIEW BY ENGINEER.
- 6. JOBSITE SAFETY IS THE CONTRACTOR'S RESPONSIBILITY.
- 7. CONTRACTOR SHALL CONFORM WITH ALL OSHA REGULATIONS.
- 8. THE ENGINEER/ARCHITECT IS NOT RESPONSIBLE FOR THE MEANS AND METHODS OF CONSTRUCTION OR THE SAFETY OF THE JOB SITE. THESE RESPONSIBILITIES ARE INTENDED TO REMAIN SOLELY THOSE OF THE CONTRACTOR.
- 9. ALL MATERIAL INSTALLATIONS SHALL BE INSTALLED PER THE MANUFACTURER'S RECOMMENDATIONS.
- 10. THE STRUCTURAL PLANS AND DETAILS HAVE NOT BEEN INVESTIGATED FOR POTENTIAL ERECTION AND CONSTRUCTION LOADS. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY INVESTIGATION OF THE STRUCTURAL FRAMING FOR ERECTION OR CONSTRUCTION LOADS.
- 11. WHEN REFERENCED IN THE PLANS AND DETAILS, THE FOLLOWING POST-INSTALLED ANCHORS SHALL BE PERMISSIBLE. CONTRACTOR SHALL SUBMIT SUBSTITUTION REQUEST FOR ANY ALTERNATE POST-INSTALLED ANCHORS.
 - A. ADHESIVE/EPOXY ANCHORS
 - 1. HILTI: HY 200, HY 150 MAX
 - B. EXPANSION ANCHORS
 - 1. HILTI: KWIK BOLT TZ
 - 2. POWERS: POWER-STUD+ SD2

FOUNDATION:

- 1. ASSUMED SOIL BEARING - 2,000 P.S.F. CONTRACTOR SHALL EMPLOY A CERTIFIED GEOTECHNICAL CONSULTANT DURING CONSTRUCTION TO TEST AND VERIFY ASSUMED SOIL CONDITIONS AND REPORT FINDINGS TO ARCHITECT/ENGINEER.
- 2. CONTRACTOR SHALL OBTAIN A GEOTECHNICAL ENGINEER TO INSPECT SUB-GRADE AFTER EXCAVATION TO VERIFY SOIL BEARING PRESSURES. AT THE DIRECTION OF THE GEOTECHNICAL ENGINEER, REMOVE UNSATISFACTORY SOILS TO AN ELEVATION WHERE SATISFACTORY SOIL IS ENCOUNTERED. REPLACE UNSATISFACTORY SOIL w/ EITHER COMPACTED STRUCTURAL FILL OR CONCRETE SLURRY.
- 3. PLACE FOUNDATION CONCRETE ON CLEAN FIRM BEARING SOILS MATERIAL.
- 4. WALL FOOTINGS ARE CENTERED ON WALLS (U.N.O.) COLUMN FOOTINGS ARE CENTERED ON COLUMNS (U.N.O.)
- 5. MINIMUM DEPTH TO ALL EXTERIOR FOOTINGS SHALL BE 4'-0" BELOW GRADE.
- 6. INSTALL 2" THICK RIGID INSULATION VERTICALLY AT ALL EXTERIOR FOUNDATION LOCATIONS. USE EXTRUDED POLYSTYRENE INSULATION WITH R=10. SEE ARCHITECTURAL PLANS FOR LOCATIONS OF INSULATION.
- 7. CONTRACTOR TO CONSULT WITH LOCAL AUTHORITIES PRIOR TO EXCAVATION TO LOCATE UNDERGROUND GAS, SEWER, WATER, AND ELECTRICAL OBSTACLES.
- 8. STRUCTURAL FILL
 - LOCATION: ALL BACKFILL WITHIN 5'-0" OF THE BUILDING LINES, BELOW STRUCTURAL FOUNDATIONS, AND BEHIND RETAINING WALLS WITHIN A WEDGE EXTENDING UPWARDS 45 DEGREES FROM THE BACK FACE OF RETAINING WALL FOOTINGS.
 - TYPE: PREDOMINANTLY WELL GRADED GRANULAR MATERIAL. UNLESS MORE STRINGENT REQUIREMENTS ARE SPECIFIED BY THE PROJECT GEOTECHNICAL ENGINEER, PROVIDE MATERIAL WITH 100% PASSING THE 3" SIEVE, 70-100% PASSING THE #4 SIEVE AND LESS THAN 15% PASSING THE #200 SIEVE.
 - COMPACTION: UNLESS MORE STRINGENT REQUIREMENTS ARE SPECIFIED BY THE PROJECT GEOTECHNICAL ENGINEER, COMPACT TO 95% MODIFIED PROCTOR (ASTM: D1557) PLACED IN LIFTS NOT TO EXCEED 8".
- 9. IN AREAS OF COMPACTED FILL WITHIN THE BUILDING LINES, BACKFILLING AGAINST BOTH SIDES OF WALLS SHALL BE DONE AT THE SAME RATE TO PREVENT STRESS AND OVERTURNING OF FOUNDATION WALLS.
- 10. ALL EARTHWORK WITH ON-SITE MATERIALS SHOULD BE PERFORMED WHEN TEMPERATURES ARE ABOVE FREEZING. FROZEN SOIL SHOULD NOT BE USED BENEATH STRUCTURES. ALL FOUNDATION EXCAVATION MUST BE INSULATED AGAINST FREEZING UNTIL CONSTRUCTION OF FOUNDATION IS COMPLETE.
- 11. SOILS THAT BECOME RUTTED OR DISTURBED BY CONSTRUCTION VEHICLES WILL BE UNSUITABLE FOR SUPPORTING FOUNDATION AND CONCRETE SLABS. THE SOILS SHALL BE REMOVED AND REPLACED WITH COMPACTED STRUCTURAL FILL.
- 12. NO SOIL DISTURBANCES, HOLES, OR TRENCHES ARE PERMITTED BELOW FOOTINGS, WITHIN A WEDGE EXTENDING DOWNWARDS 45 DEGREES FROM THE BOTTOM EDGE OF THE FOOTING. FOOTINGS SHALL BE STEPPED DOWN AS REQUIRED TO AVOID SUCH DISTURBANCES.

SLAB ON GRADE:

- 1. CONTRACTOR SHALL OBTAIN A GEOTECHNICAL ENGINEER TO INSPECT SLAB SUB-GRADE AFTER EXCAVATION TO VERIFY EXISTING SOIL CONDITIONS. AT THE DIRECTION OF THE GEOTECHNICAL ENGINEER, REMOVE UNSATISFACTORY SOILS TO AN ELEVATION WHERE SATISFACTORY SOIL IS ENCOUNTERED. REPLACE UNSATISFACTORY SOIL w/ COMPACTED STRUCTURAL FILL.
- 2. PROVIDE 8" MINIMUM OF SLAB BASE MATERIAL BELOW ALL CAST-IN-PLACE CONCRETE ON GRADE.
- 3. SLAB BASE MATERIAL
 - LOCATION: BELOW SLAB ON GRADE.
 - TYPE: GRANULAR FILL. UNLESS MORE STRINGENT REQUIREMENTS ARE SPECIFIED BY THE PROJECT GEOTECHNICAL ENGINEER, PROVIDE MATERIAL SUCH AS MANUFACTURED SAND OR 3/4" CRUSHED LIMESTONE BASE COURSE WITH 100% PASSING THE 1" SIEVE, 40-100% PASSING THE #4 SIEVE, 15-30% PASSING THE #40 SIEVE, AND LESS THAN 10% PASSING THE #200 SIEVE.
 - COMPACTION: UNLESS MORE STRINGENT REQUIREMENTS ARE SPECIFIED BY THE PROJECT GEOTECHNICAL ENGINEER, COMPACT TO 95% MODIFIED PROCTOR (ASTM: D1557) PLACED IN LIFTS NOT TO EXCEED 8".
- 4. PROVIDE 10 MIL. THICK CLEAR POLYETHYLENE FILM VAPOR BARRIER BELOW ALL CAST-IN-PLACE CONCRETE ON GRADE INSIDE BUILDING. SEE ARCHITECTURAL PLANS FOR APPLICABLE LOCATIONS, WHERE FINISHED FLOORS OCCUR.
- 5. PROVIDE CONSTRUCTION JOINTS (C.J.) AND SAWCUT JOINTS (S.J.) AS NECESSARY TO ADEQUATELY CONTROL SHRINKAGE CRACKING. SAWED JOINTS IN SLAB SHALL BE MADE WITHIN 18 HOURS OF FINAL SLAB FINISHING, OR EARLIER IF CONCRETE STRENGTH PERMITS.
- 6. SLAB JOINTS SHALL GENERALLY BE LOCATED AT COLUMN CENTERLINES, WHEN POSSIBLE. UNLESS OTHERWISE NOTED ON PLANS, THE MAXIMUM JOINT SPACING SHALL COMPLY WITH THE FOLLOWING:
 - A. 4" SLAB - 10'-0"o.c.
 - B. 5" SLAB - 12'-0"o.c.
 - C. 6" SLAB - 15'-0"o.c.
 - D. 8" SLAB - 20'-0"o.c.
- 7. SEE PLUMBING PLANS FOR ALL PIPING LOCATIONS AND PENETRATIONS THROUGH FLOOR SLAB.
- 8. SLABS SHALL BE PITCHED TO FLOW TO FLOOR DRAINS WHERE THEY OCCUR 1/8" PER FOOT MINIMUM PITCH.
- 9. INTERIOR FLOOR SLABS SHALL BE PROTECTED FROM COLD WEATHER IN ACCORDANCE WITH ACI 318.
- 10. PROVIDE 30# FELT BOND BREAK BETWEEN CONCRETE SLAB EDGE & VERTICAL CONCRETE AND/OR MASONRY SURFACES AT INSIDE OF BUILDING.
- 11. AT A MINIMUM, PROVIDE 1/2" THICK EXPANSION JOINT MATERIAL WHERE CONCRETE SLAB ABUTS VERTICAL SURFACES AT BUILDING EXTERIOR. SEE ARCHITECTURAL PLANS FOR ADDITIONAL INSULATION REQUIREMENTS AT EDGE OF CONCRETE SLAB.
- 12. AT CONTRACTORS OPTION, CONCRETE CAN BE NON-AIR ENTRAINED FOR INTERIOR SLABS, PROVIDED CONCRETE IS PROTECTED FROM COLD WEATHER.

CAST-IN-PLACE CONCRETE:

- 1. CONCRETE AND ITS PLACEMENT SHALL BE IN ACCORDANCE WITH ACI 318, ACI 301, AND THE PROJECT SPECIFICATIONS, EXCEPT AS MODIFIED BELOW. PROTECT ALL CONCRETE IN ACCORDANCE WITH ACI STANDARDS FOR HOT & COLD WEATHER CONCRETING.
 - 2. STANDARD WEIGHT CONCRETE SHALL COMPLY WITH THE FOLLOWING:
 - A. MINIMUM COMPRESSIVE STRENGTH (AT 28 DAYS) - 4,000 PSI
 - B. MAXIMUM WATER/CEMENT RATIO - .45 (AIR ENTRAINED)
 - .52 (NON-AIR ENTRAINED)
 - C. MAXIMUM AGGREGATE SIZE - 3/4" (TYPICAL)
 - 1 1/2" (FOOTINGS GREATER THAN 12" THICK)
 - 6%±1 1/2% (3/4" AGGREGATE)
 - 5%±1 1/2% (1 1/2" AGGREGATE)
 - 3" (TYPICAL)
 - 4" (FLOOR SLAB)
 - D. TOTAL AIR CONTENT - 4" (TYPICAL)
 - E. MAX SLUMP - 3" (TYPICAL)
 - F. REINFORCING BARS: PROVIDE DEFORMED BARS COMPLYING WITH ASTM A615 GRADE 60.
 - G. WELDED WIRE FABRIC: ASTM A185, COLD DRAWN STEEL PLAIN.
 - H. NO ADMIXTURES WITHOUT REVIEW FROM ENGINEER. ADMIXTURES CONTAINING CHLORIDES SHALL NOT BE USED.
 - 3. ALL CONCRETE SHALL BE AIR ENTRAINED (U.N.O.). FOOTINGS BELOW THE FROST DEPTH LINE AND INTERIOR CONCRETE PROTECTED FROM FREEZING & ENVIRONMENTAL EFFECTS MAY BE NON-AIR ENTRAINED, AT CONTRACTOR'S OPTION.
 - 4. CONCRETE COVERAGE FOR REINFORCING (U.N.O.):
 - A. UNFORMED CONCRETE IN CONTACT WITH EARTH = 3"
 - B. FORMED CONCRETE IN CONTACT WITH EARTH = 2"
 - C. OTHER CONCRETE = 1 1/2"
 - 5. LAP SPLICES SHALL BE THE FOLLOWING BAR DIAMETERS UNLESS NOTED OTHERWISE ON DRAWINGS. LOCATE SPLICES AT POINT OF MINIMUM STRESS. WELDED SPLICES ARE NOT PERMITTED.
 - A. ALL REINF. EXCEPT FOR THAT NOTED IN 4B.
- | REINFORCEMENT | LAP LENGTH IN BAR DIAMETERS |
|----------------|-----------------------------|
| #3 THROUGH #6 | 38 |
| #7 THROUGH #11 | 48 |
- B. HORIZONTAL REINFORCEMENT SO PLACED THAT MORE THAN 12 INCH OF CONCRETE IS CAST BELOW THE REINFORCEMENT (I.E. HORIZONTAL WALL REINFORCEMENT AND TOP BEAM REINFORCEMENT)
- | REINFORCEMENT | LAP LENGTH IN BAR DIAMETERS |
|----------------|-----------------------------|
| #3 THROUGH #6 | 50 |
| #7 THROUGH #11 | 62 |
- C. WELDED WIRE FABRIC - MESH SPACE +2".

- 6. COMPLY WITH ACI 301. POSITION, SUPPORT AND SECURE REINFORCEMENT AGAINST DISPLACEMENT, LOCATE AND SUPPORT WITH METAL CHAIRS, RUNNERS, BOLSTERS, SPACERS, AND HANGERS, AS REQUIRED. SET WIRE TIES SO ENDS ARE DIRECTED INTO CONCRETE, NOT TOWARD EXPOSED CONCRETE SURFACES.
- 7. RE-ENTRANT CORNERS: AT ALL RE-ENTRANT CORNERS IN SLABS, WALLS AND TOPPING, THE CONTRACTOR SHALL INSTALL TWO (2) #3x3'-0" LONG, EACH MAT, AT 3-INCH O.C.
- 8. PROVIDE BENT CORNER BARS TO MATCH AND LAP HORIZONTAL BARS AT CORNERS AND INTERSECTIONS OF WALLS AND FOOTING.
- 9. PROVIDE DOWELS OF SAME SIZE AND SPACING AS VERTICAL WALL REINFORCING, WITH STANDARD HOOKS, AT THE FOUNDATION (U.N.O.).
- 10. MAXIMUM FREE DROP OF ALL CONCRETE = 2'-0".
- 11. CONCRETE CAN ONLY BE PLACED ON A FROST-FREE SUBGRADE
- 12. MECHANICALLY VIBRATE ALL CONCRETE.
- 13. PROVIDE A 3/4"x3/4" CHAMFER ON ALL EXPOSED CORNERS OF CONCRETE.
- 14. ALL CAST-IN-PLACE CONCRETE SHALL BE PROTECTED AGAINST RAPID DRYING AND MUST BE KEPT MOIST FOR A MINIMUM OF (7) DAYS FOR NOMINAL CONCRETE.
- 15. AT LEAST 24 HOURS SHALL PASS BETWEEN POURING ADJACENT CONCRETE SECTIONS BETWEEN CONSTRUCTION JOINTS.
- 16. CONSTRUCTION JOINTS SHALL BE PROVIDED AT A MAXIMUM OF 40'-0"o.c. (U.N.O.).
- 17. CONCRETE FIELD TESTS FOR SLUMP, AIR CONTENT, YIELD AND STRENGTH SHALL BE CONDUCTED BY A CERTIFIED CONCRETE TECHNICIAN IN ACCORDANCE WITH ACI 301. TESTS SHALL BE SUBMITTED TO ENGINEER FOR REVIEW.

CONCRETE MASONRY UNITS:

- 1. COMPLY WITH RECOMMENDATIONS OF BRICK INSTITUTE OF AMERICA (BIA), NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA), AND ACI 530. PROTECT ALL MASONRY IN ACCORDANCE WITH ACI STANDARDS FOR HOT & COLD WEATHER CONSTRUCTION.
- 2. MASONRY SHALL COMPLY WITH THE FOLLOWING MINIMUM REQUIREMENTS:
 - A. BLOCK COMPRESSIVE STRENGTH - 3,000 PSI
 - B. GROUT - 2,000 PSI
 - C. MORTAR - TYPE S = 2,000 PSI ABOVE GRADE
 - D. MORTAR - TYPE M = 2,000 PSI BELOW GRADE
 - E. REINFORCING BARS - ASTM A615 GRADE 60
 - F. ASSEMBLY COMPRESSIVE STRENGTH - 2,000 PSI (f'm)
- 3. ADMIXTURES CONTAINING CHLORIDES SHALL NOT BE USED.
- 4. SPECIAL SHAPES: PROVIDE SPECIAL BLOCK TYPES WHERE REQUIRED FOR CORNERS, CONTROL JOINTS, HEADERS, LINTELS AND OTHER SPECIAL CONDITIONS.
- 5. ALL MASONRY SHALL BE LAID PLUMB, TRUE TO LINE, AND WITH LEVEL COURSES. LAY IN RUNNING BOND, OVERLAY CORNER BLOCK UNITS.
- 6. CONTRACTOR SHALL DESIGN TEMPORARY BRACING AS REQUIRED TO STABILIZE MASONRY WALLS UNTIL PERMANENT SUPPORTS ARE INSTALLED.
- 7. SEE PLANS FOR VERTICAL MASONRY CONTROL JOINT LOCATIONS. GUIDELINES:
 - LOCATE FIRST JOINT 10'-0" FROM EACH CORNER AND 24'-0" MAX. SPACING ON CENTER BETWEEN JOINTS. DO NOT LOCATE JOINTS WITHIN 1'-4" OF WINDOWS OR DOORS.
- 8. MAXIMUM GROUT LIFT WITHOUT CLEAN-OUTS = 4'-0". MAXIMUM GROUT LIFT WITH CLEAN-OUTS = 8'-0".
- 9. FULL MORTAR BED JOINTS ARE REQUIRED, TYPICAL.
- 10. ALL VERTICAL REINFORCING SHALL BE CONTINUOUSLY GROUTED IN CELLS.
- 11. PLACE HOOKED DOWELS AT ALL VERTICAL MASONRY REINFORCING LOCATIONS INTO FOUNDATION SYSTEM.
- 12. DOOR AND WINDOW JAMBS SHALL BE SOLID GROUTED 8" MINIMUM WIDTH (U.N.O.).
- 13. BOND BEAMS AND PILASTERS SHALL HAVE REINFORCEMENT AS INDICATED ON DRAWINGS, AND SHALL BE SOLID GROUTED.
- 14. BELOW STEEL BEAM BEARING LOCATIONS, MASONRY SHALL BE SOLID GROUTED TO A MINIMUM OF 16" DEEP BY 32" WIDE (U.N.O.).
- 15. LAP SPLICES IN MASONRY 48 BAR DIAMETERS.
- 16. JOINT REINFORCEMENT - NEW MASONRY WALLS TO BE REINFORCED WITH 9 GAUGE DUR-O-WAL EVERY OTHER BLOCK COURSE.
- 17. ON EXTERIOR WALLS, PROVIDE WEEP HOLES TO THE EXTERIOR ABOVE LINTELS AND AT BOTTOM OF WALL.
- 18. SEE ARCHITECTURAL PLANS FOR REQUIRED FIRE RATINGS.
- 19. SEE ELECTRICAL PLANS TO LOCATE ANY ELECTRICAL CONDUIT TO BE INSTALLED IN MASONRY CORE.

BRICK MASONRY:

- 1. ALL BRICK WORK SHALL BE LAID IN CEMENT AND LIME MORTAR, WITH ALL BRICKS WELL BEDDED INTO PLACE, HAVING BOTH VERTICAL AND HORIZONTAL JOINTS ON STRAIGHT LINES.
- 2. BRICKS SHALL BE TIED TO 22 U.S. GAUGE GALVANIZED CORRUGATED METAL TIES, 7/8" WIDE SPACED TO 16" O.C. VERTICALLY AND 24" O.C. HORIZONTALLY (NOT TO EXCEED 2 S.F.).

STRUCTURAL ABBREVIATIONS

ALT	ALTERNATE	LBS	POUNDS
ARCH	ARCHITECTURAL	LLH	LONG LEG HORIZONTAL
BRG	BEARING	LLV	LONG LEG VERTICAL
BOT	BOTTOM	MANUF	MANUFACTURER
CJ	CONTROL JOINT	MAX	MAXIMUM
CLR	CLEAR	MIN	MINIMUM
CMU	CONCRETE MASONRY UNIT	PBE	PRECAST BEARING ELEVATION
CONC	CONCRETE	REINF	REINFORCEMENT
CONN	CONNECTION	REQD	REQUIRED
CONT	CONTINUOUS	SCH	SCHEDULE
DBE	DECK BEARING ELEVATION	SF	STEP FOOTING
DBL	DOUBLE	SJ	SAWCUT JOINT
DET	DETAIL	STD	STANDARD
DIA	DIAMETER	STRUC	STRUCTURAL
EA	EACH	TBE	TOP OF BEAM ELEVATION
ELEV	ELEVATION	TCE	TOP OF CONCRETE ELEVATION
EOS	EDGE OF STRUCTURE	TFE	TOP OF FOOTING ELEVATION
EX	EXISTING	TLE	TOP OF LEDGE ELEVATION
EXP	EXPANSION	TPE	TOP OF PIER ELEVATION
FND	FOUNDATION	TSE	TOP OF STEEL ELEVATION
FT	FEET	TWE	TOP OF WALL ELEVATION
FTG	FOOTING	TYP	TYPICAL
GA	GAGE	UNO	UNLESS NOTED OTHERWISE
GALV	GALVANIZED	VERT	VERTICAL
HORIZ	HORIZONTAL	WP	WORKING POINT
IMP	INSULATED METAL PANEL	WWF	WELDED WIRE FABRIC
JBE	JOIST BEARING ELEVATION		

NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAMS ST, DE PERE, WI 54115

STRUCTURAL SPECIFICATIONS

DESIGNED STK	DRAWN GYV
PROJECT NO. D0005-06-22-00146	
DATE MARCH 10, 2023	
SHEET NO.	

S101

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REVISION	DATE	NO.

STRUCTURAL STEEL:

- ALL DETAILING, FABRICATION AND ERECTION SHALL CONFORM TO ANSI/AISC 360 AND AISC 303.
- STRUCTURAL STEEL SHALL MEET THE FOLLOWING MINIMUM YIELD STRENGTHS AND SPECIFICATIONS.

STEEL SHAPES	ASTM A992
ANGLES & RODS	ASTM A36
BARs & PLATES	ASTM A36
STRUCTURAL TUBES	ASTM A500 GRADE B
ANCHOR BOLTS	F1554 GRADE 36
STRUCTURAL BOLTS	ASTM A325 TYPE N
WELDS	E70 XX
GROUT	ASTM C1107, GRADE B, PREMIXED NON-SHRINK, NON-METALLIC CEMENTITIOUS GROUT. MINIMUM COMPRESSIVE STRENGTH 7000 PSI.
- ALL WELDING SHALL BE PERFORMED BY A CERTIFIED WELDER IN ACCORDANCE WITH A.W.S. CODE FOR WELDING IN BUILDING CONSTRUCTION. SURFACES FOR FIELD WELDED MATERIAL SHALL BE PROPERLY PREPARED PRIOR TO BEING WELDED TO ASSURE A GOOD QUALITY WELD. REMOVE PAINT, GREASE, DIRT, ETC.
- PROVIDE DOUBLE NUTS AND WASHERS FOR ALL STEEL COLUMN ANCHOR BOLTS TO ALLOW FOR ADJUSTMENT IN BASE PLATE ELEVATION. PROVIDE 1 1/2" OF NON-SHRINK GROUT UNDER PLATE AFTER ERECTION.
- SET COLUMN BASES AT CORRECT ELEVATION ON FULL BED OF NON-SHRINK GROUT.
- THE FABRICATOR SHALL BE RESPONSIBLE FOR THE DESIGN AND ADEQUACY OF ALL CONNECTIONS THAT ARE NOT DESIGNED AND FULLY DETAILED ON THE CONTRACT DOCUMENTS. CONNECTIONS SHALL BE DESIGNED AND DETAILED IN ACCORDANCE WITH ANSI/AISC 360. BEAM CONNECTIONS SHALL BE "SIMPLE FRAMING" TYPE N (UNLESS NOTED OTHERWISE).
- ERECTION: COMPLY WITH AISC CODE AND SPECIFICATIONS. THE ERECTOR SHALL FURNISH AND INSTALL TEMPORARY SUPPORTS TO SECURE ANY ELEMENT OR ELEMENTS OF THE STEEL FRAMING UNTIL THEY ARE MADE STABLE WITHOUT EXTERNAL SUPPORT.
- PROVIDE ALL LOOSE LINTELS AND MISCELLANEOUS STRUCTURAL STEEL AS SHOWN ON DRAWINGS.
- SEE ARCHITECTURAL PLANS FOR LOCATIONS OF ADDITIONAL MISCELLANEOUS STEEL MEMBERS.
- DO NOT PRIME SURFACES THAT WILL BE FIELD WELDED.
- AS A MINIMUM, THE FABRICATOR SHALL PREPARE STEEL SURFACES TO MEET THE REQUIREMENTS OF SSPC-SP2 (HAND TOOL CLEANING). SHOP PRIME STRUCTURAL STEEL MEMBERS WITH STANDARD SHOP PRIMER.
- TOUCH-UP PRIME PAINT AFTER ERECTION. USE SAME SURFACE PREPARATION AND PRIMER AS USED IN SHOP.
- ALL EXTERIOR EXPOSED STEEL, INCLUDING MASONRY SHELF ANGLES, SHALL BE GALVANIZED. MINIMUM THICKNESS OF GALVANIZING SHALL BE G90 PER ASTM A653.

WOOD TRUSSES:

- CODES AND STANDARDS: PROVIDE TRUSSES AS SPECIFIED HEREIN AND COMPLYING WITH THE FOLLOWING:

TPI-85, "DESIGN SPECIFICATION FOR METAL PLATE CONNECTED WOOD TRUSSES";
TPI-80, "DESIGN SPECIFICATION FOR METAL PLATE CONNECTED PARALLEL CHORD WOOD TRUSSES";
TPI-89, "QUALITY STANDARD FOR METAL PLATE CONNECTED WOOD TRUSSES";
- PREFABRICATED WOOD TRUSSES SHALL BE DESIGNED FOR THE SUPERIMPOSED LOADS SHOWN UNDER DESIGN LOADS (TRUSS WEIGHT IS NOT INCLUDED).

MAX DEFLECTION	ROOF:	TL L/240
	LL	L/360
- TRUSS MANUFACTURER SHALL BE RESPONSIBLE FOR THE COMPLETE DESIGN, DETAILING AND FABRICATION OF ALL TRUSSES (INCLUDING THEIR CONNECTIONS AND BRACING) IN ACCORDANCE WITH THE NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION AND DESIGN SPECIFICATIONS FOR METAL PLATE CONNECTION WOOD TRUSSES-LATEST EDITION.
- TRUSS SHOP DRAWINGS, INCLUDING CALCULATIONS AND TRUSS LAYOUT DIAGRAM, SHALL BE STAMPED BY A LICENSED ENGINEER IN THE STATE OF THIS PROJECT.
- INSPECT TRUSSES FOR DAMAGE AND LOOSENING OF CONNECTOR PLATES BEFORE INSTALLATION. REPLACE DAMAGED TRUSSES, AND TRUSSES WITH LOOSE PLATES, WITH NEW UNITS. DO NOT ATTEMPT TO REINSTALL LOOSENED PLATES OR TO REPLACE DAMAGED MEMBERS AT THE PROJECT SITE.
- ALL TRUSSES SHALL BE INSTALLED, BRACED, AND ANCHORED PER MANUFACTURER'S SPECIFICATIONS.
- ALL ROOF TRUSSES SHALL BE DESIGNED FOR UPLIFT AS APPLICABLE & ANCHORED W/(1) SIMPSON H2.5A or (2) H2.3 (U.N.O.). CONTRACTOR TO REVIEW TRUSS CALCULATIONS AND PROVIDE ADDITIONAL H2.5A or (2) H2.3 HOLD DOWNS IF REQ'D.
- INSTALL PERMANENT BRIDGING, BRACING, AND ANCHORS TO MAINTAIN TRUSSES STRAIGHT AND IN CORRECT POSITION BEFORE INSTALLING SUPPORTED CONSTRUCTION OR SUPERIMPOSING LOADS.
- FIELD CUTTING OF TRUSS MEMBERS NOT ALLOWED.
- COORDINATE INSTALLATION OF FRAMING TO BE ATTACHED TO OR SUPPORTED BY TRUSSES. VERIFY THAT CONCENTRATED LOADS WILL OCCUR ONLY AT LOCATIONS INCORPORATED INTO THE DESIGN OF THE TRUSSES.

WOOD FRAMING:

- CODES AND STANDARDS: COMPLY WITH NIST PS20 AND APPROVED GRADING RULES AND INSPECTION AGENCIES.
- DIMENSION LUMBER:

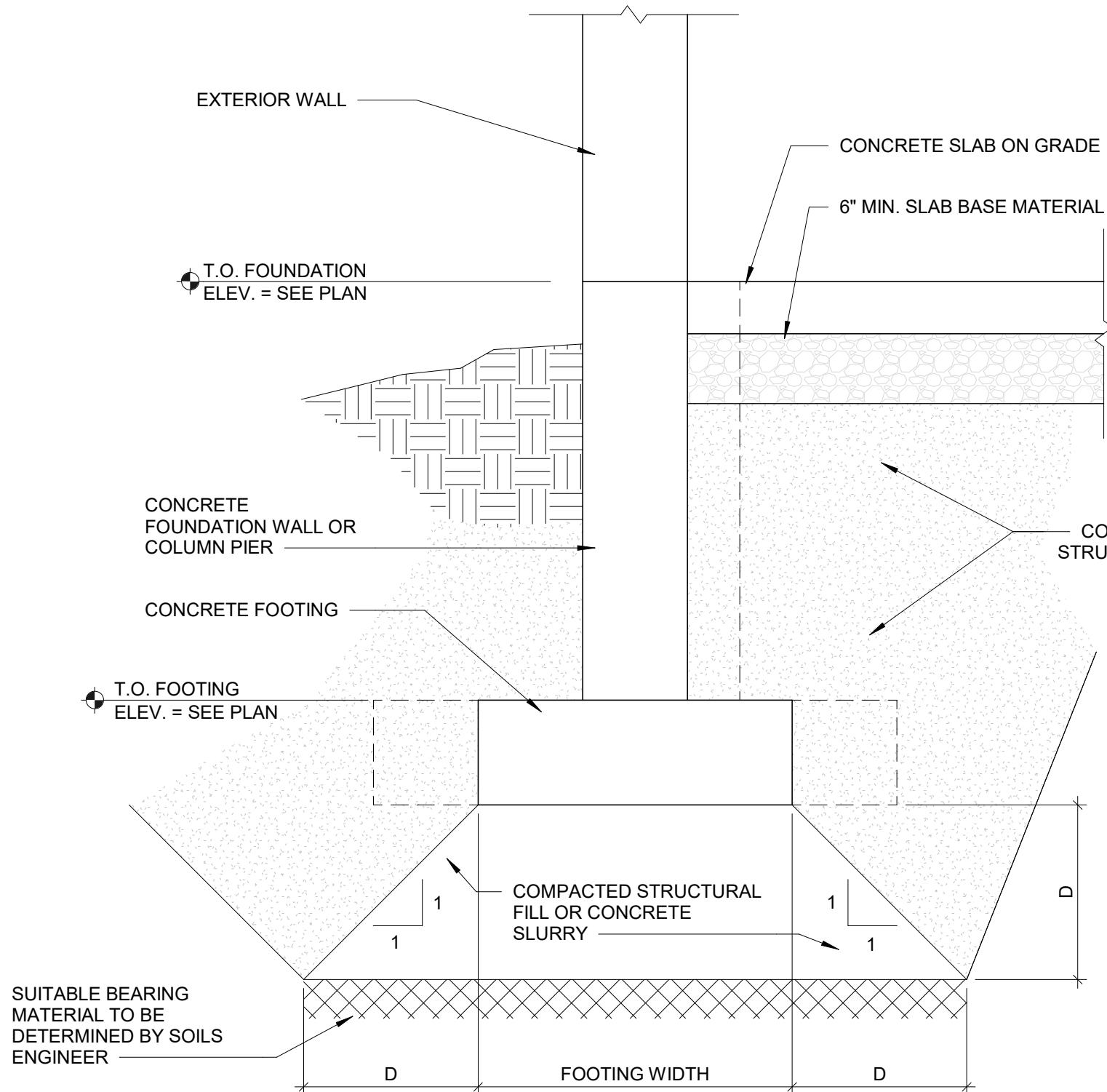
A. GENERAL: MANUFACTURED LUMBER, S4S AND GRADESTAMPED TO COMPLY WITH NIST PS20. LUMBER SHALL HAVE A MOISTURE CONTENT OF S-DRY OR MC19.	
B. ALL LUMBER SHALL MEET OR EXCEED THE FOLLOWING DESIGN VALUES:	
WALL STUDS & PLATES	- SPF STUD OR BETTER (U.N.O.)
PURLINS OR HEADERS	- SPF NO. 2 OR BETTER (U.N.O.)
MISC. 2x SAWN LUMBER	- SPF STUD OR BETTER
- SHEATHING:

ROOF	- 15/32" OSB
WALLS	- 7/16" OSB
- FASTENERS: PROVIDE AS REQUIRED BY APPLICABLE CODES. PROVIDE FASTENERS WITH HOT-DIP ZINC COATING (ASTM A153) FOR TREATED LUMBER AND WHERE WOOD IS IN GROUND CONTACT, SUBJECTED TO HIGH RELATIVE HUMIDITY, OR EXPOSED TO WEATHER.
- FRAMING CONNECTORS AND SUPPORTS: PREFABRICATED, FORMED STEEL UNITS; HOT-DIP GALVANIZED FINISH UNLESS OTHERWISE INDICATED; TYPE AND SIZE REQUIRED; APPROVED BY APPLICABLE CODES.
- USE TREATED LUMBER FOR ALL WOOD IN CONTACT WITH CONCRETE OR MASONRY.
- COMPLY WITH SIZES, SPACING, AND CONFIGURATIONS INDICATED. WHERE NOT SPECIFICALLY INDICATED, COMPLY WITH APPLICABLE CODES AND NFPA "MANUAL FOR WOOD FRAME CONSTRUCTION." SPLICE MEMBERS ONLY WHERE SPECIFICALLY INDICATED OR APPROVED.
- SPACE FASTENERS AS INDICATED. WHERE NOT SPECIFICALLY INDICATED, COMPLY WITH APPLICABLE CODES AND THE "RECOMMENDED NAILING SCHEDULE" OF NFPA "MANUAL FOR WOOD FRAME CONSTRUCTION" AND "NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION."
- FIELD DRILL BOLT HOLES FOR PROPER ALIGNMENT.
- PROVIDE CUT WASHERS AT BOLTS IN WOOD.
- ALL WOOD FASTENERS OR ANCHORS SHALL BE FASTENED WITH THE MAXIMUM AMOUNT OF NAILS OR BOLTS AS SPECIFIED BY THE FASTENER MANUFACTURER.
- PROVIDE MISCELLANEOUS BLOCKING, NAILERS, GROUNDS, AND FRAMING AS SHOWN AND AS REQUIRED FOR SUPPORT OF FACING MATERIALS, FIXTURES, SPECIALTY ITEMS, AND TRIM. CUT AND SHAPE TO THE REQUIRED SIZE. PROVIDE IN LOCATIONS REQUIRED BY OTHER WORK.

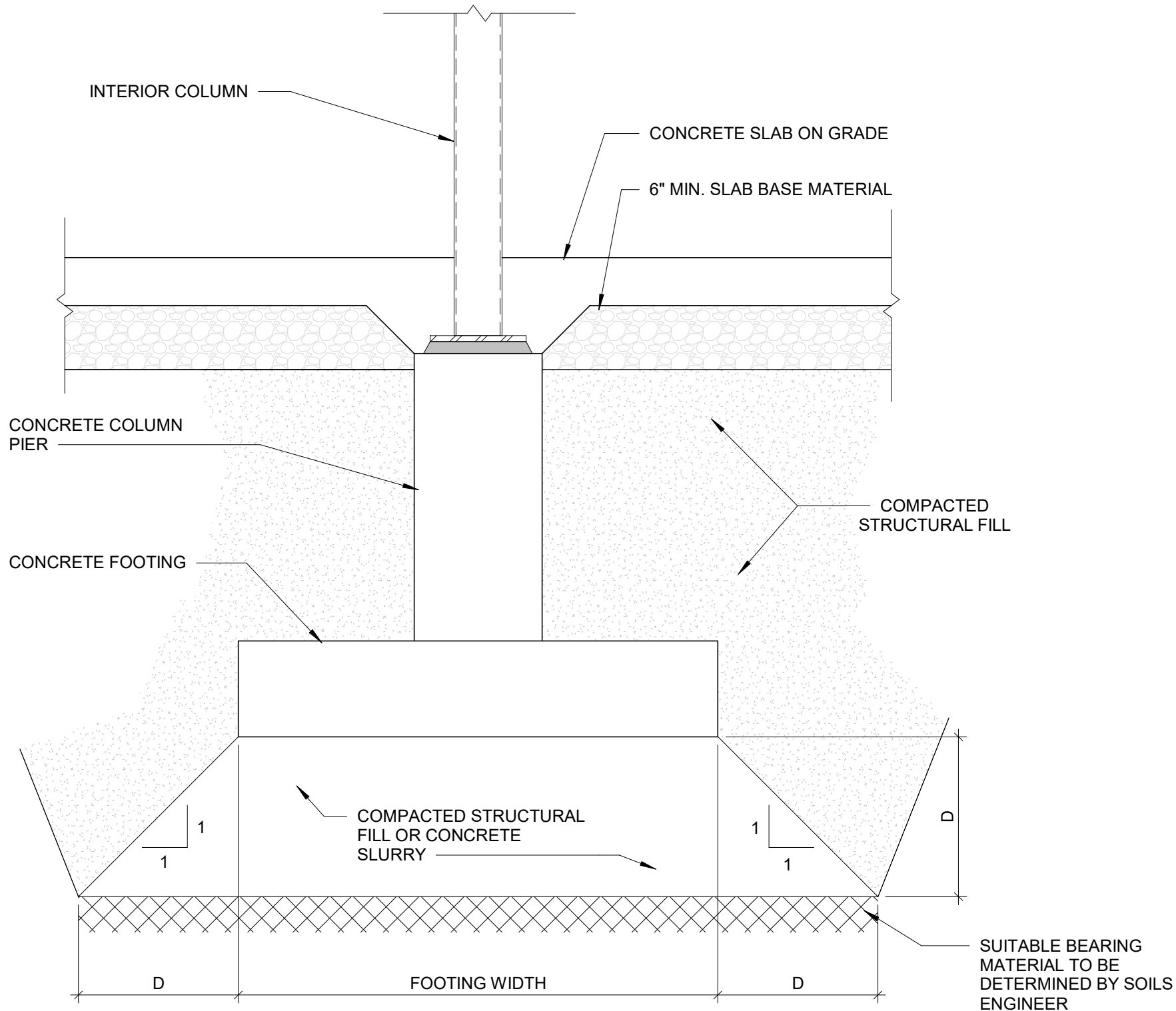
GLUE-LAMINATED WOOD BEAM:

- CODES AND STANDARDS: COMPLY WITH NIST PS20 AND APPROVED GRADING ROLLS AND INSPECTION AGENCIES.
- DIMENSION LUMBER

A. GENERAL: MANUFACTURER LUMBER, S4S TO COMPLY WITH NIST PS20. LUMBER SHALL HAVE A MOISTURE CONTENT OF S-DRY OR MC19.
B. GLUE-LAMINATED BEAMS SHALL COMPLY WITH THE FOLLOWING REQUIREMENTS:
WOOD GRADE - DOUGLAS FIR/WESTERNSERIES
Fb = 2,400 PSI
Fv = 210 PSI
Fbrg = 560 PSI
E = 1,700,000 PSI
- ALL WOOD BEAMS SHALL BE MANUFACTURED IN ACCORDANCE WITH AITC STANDARDS.
- INSPECT WOOD BEAMS FOR DAMAGE BEFORE INSTALLATION. CONTACT ENGINEER IF BEAMS ARE DAMAGED.
- FIELD CUTTING OF MEMBERS NOT ALLOWED.
- FASTENERS: PROVIDE AS REQUIRED BY APPLICABLE CODES. PROVIDE FASTENERS WITH HOT-DIP ZINC COATING (ASTM A 153) FOR TREATED LUMBER AND WHERE WOOD IS IN GROUND CONTACT, SUBJECTED TO HIGH RELATIVE HUMIDITY, OR EXPOSED TO WEATHER.
- FRAMING CONNECTORS AND SUPPORTS: PREFABRICATED, FORMED STEEL UNITS; HOT-DIP GALVANIZED FINISH UNLESS OTHERWISE INDICATED; TYPE AND SIZE REQUIRED; APPROVED BY APPLICABLE CODES.
- COMPLY WITH SIZES, SPACING, AND CONFIGURATIONS INDICATED. WHERE NOT SPECIFICALLY INDICATED, COMPLY WITH APPLICABLE CODES AND NFPA "MANUAL FOR WOOD FRAME CONSTRUCTION." SPLICE MEMBERS ONLY WHERE SPECIFICALLY INDICATED OR APPROVED.
- SPACE FASTENERS AS INDICATED. WHERE NOT SPECIFICALLY INDICATED, COMPLY WITH APPLICABLE CODES AND THE "RECOMMENDED NAILING SCHEDULE" OF NFPA "MANUAL FOR WOOD FRAME CONSTRUCTION" AND "NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION."
- FIELD DRILL BOLT HOLES FOR PROPER ALIGNMENT.
- PROVIDE CUT WASHERS AT BOLTS IN WOOD.



EXTERIOR FOUNDATION



INTERIOR FOUNDATION

- NOTES:
- VAPOR BARRIER SHALL BE PLACED WHERE INDICATED ON ARCHITECTURAL PLANS. VAPOR BARRIER SHALL BE LOCATED ON TOP OF SLAB BASE MATERIAL.
 - CONTRACTOR SHALL OBTAIN A GEOTECHNICAL ENGINEER TO INSPECT SUB-GRADE AFTER EXCAVATION TO VERIFY SOIL BEARING PRESSURES. AT THE DIRECTION OF THE GEOTECHNICAL ENGINEER, REMOVE UNSATISFACTORY SOILS TO AN ELEVATION WHERE SATISFACTORY SOIL IS ENCOUNTERED. REPLACE UNSATISFACTORY SOIL W/ EITHER COMPACTED STRUCTURAL FILL OR CONCRETE SLURRY.

SUBGRADE PREP

NOT TO SCALE

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NO.	DATE	REVISION

NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAMS ST, DE PERE, WI 54115
STRUCTURAL SPECIFICATIONS

DESIGNED STK	DRAWN GYV
PROJECT NO. D0005-06-22-00146	
DATE MARCH 10, 2023	
SHEET NO. S102	

FOOTING SCHEDULE					
MARK	FOOTING SIZE			TOP REINFORCEMENT	BOTTOM REINFORCEMENT
	LENGTH	WIDTH	THICKNESS		
F3.0	3' - 0"	3' - 0"	12"	-	(3) #5 EACH WAY
F4.0	4' - 0"	4' - 0"	12"	-	(4) #5 EACH WAY
F6.0	6' - 0"	6' - 0"	12"	-	(6) #5 EACH WAY

STRIP FOOTING SCHEDULE				
MARK	FOOTING SIZE		TRANSVERSE	CONTINUOUS
	WIDTH	THICKNESS		
SF2.5	2' - 6"	12"	#4 @ 12"o.c.	(3) #5
SF3.5	3' - 6"	12"	#4 @ 12"o.c.	(4) #5
SF4.5	4' - 6"	12"	#4 @ 12"o.c.	(5) #5

BASE PLATE SCHEDULE										
MARK	TYPE	THICKNESS	PLATE DIMENSIONS			ANCHOR BOLTS	EMBEDMENT	WASHER PLATE	END PLATE	GROUT THICKNESS
			L	W	E					
BP1	I	3/4"	8"	12"	1 1/2"	(4) 3/4" DIA.	12"	1/4"x2"x2"	1/4"x2"x2"	1 1/2"
BP2	I	3/4"	12"	12"	1 1/2"	(4) 3/4" DIA.	12"	1/4"x2"x2"	1/4"x2"x2"	1 1/2"

TYPE I

TYP. BASE PLATE SECTION

WOOD BEAM SCHEDULE				
MARK	MAXIMUM SPAN	MEMBER WIDTH	MEMBER DEPTH	WOOD GRADE
GL-1	14'-0"	6 3/4"	18"	24F-1.7E
GL-2	20'-0"	6 3/4"	18"	24F-1.7E
GL-3	26'-0"	6 3/4"	18"	24F-1.7E

STEEL LINTEL SCHEDULE					
MARK	MEMBER	BEARING PLATE			HEADED STUDS
		THICKNESS	WIDTH	LENGTH	
SL-1	W8X18	3/8"	9"	7"	(2) 5/8" DIA. x 6"
SL-2	W8X18	3/8"	9"	7"	(2) 5/8" DIA. x 6"
SL-3	W8X18	3/8"	9"	7"	(2) 5/8" DIA. x 6"
SL-4	W8X24	1/2"	9"	7"	(2) 5/8" DIA. x 6"

STRUCTURAL CMU VERT. REINF. SCHEDULE			
MARK	WALL THICKNESS	WALL HEIGHT	REINFORCEMENT
R-1	8"	SEE PLAN	#5 @ 48"o.c.
R-2	12"	SEE PLAN	#6 @ 48"o.c.
R-3	8"	SEE PLAN	#4 @ 72"o.c.
NOTE: SEE PLANS FOR LOCATIONS OF HORIZONTAL BOND BEAMS WITHIN TALL WALL SEGMENTS.			

MASONRY PILASTER SCHEDULE			
MARK	PILASTER DEPTH	PILASTER WIDTH	VERT. REINF.
MP12x32	12"	32"	(4) #6
MP12x40	12"	40"	(5) #6
SEE DETAIL 11/S401 FOR PILASTER DETAIL.			

MASONRY LINTEL SCHEDULE				
MARK	OPENING WIDTH	LINTEL DEPTH	LINTEL REINF.	BRICK ANGLE SIZE
ML-1	0' - 0" - 4' - 0"	8"	(2) #5	L4x3 1/2x1/4
ML-2	4' - 0" - 8' - 0"	16"	(2) #5	L5x3 1/2x5/16
ML-3	8' - 0" - 12' - 0"	24"	(2) #6	L6x3 1/2x3/8
SEE DETAIL 8/S401 FOR LINTEL DETAIL.				

PIER SCHEDULE						
MARK	WIDTH	LENGTH	REINFORCEMENT			T.O. PIER ELEV. (U.N.O.)
			VERT.	TIES	TYPE	
P16	16"	16"	(4) #5	#3 @ 12"o.c.	I	SEE PLAN
P24	24"	24"	(8) #6	#3 @ 12"o.c.	II	SEE PLAN
P20x32	20"	32"	(10) #6	#3 @ 12"o.c.	III	SEE PLAN
P20x40	20"	40"	(10) #6	#3 @ 12"o.c.	III	SEE PLAN
P20x44	20"	44"	(10) #6	#3 @ 12"o.c.	III	SEE PLAN

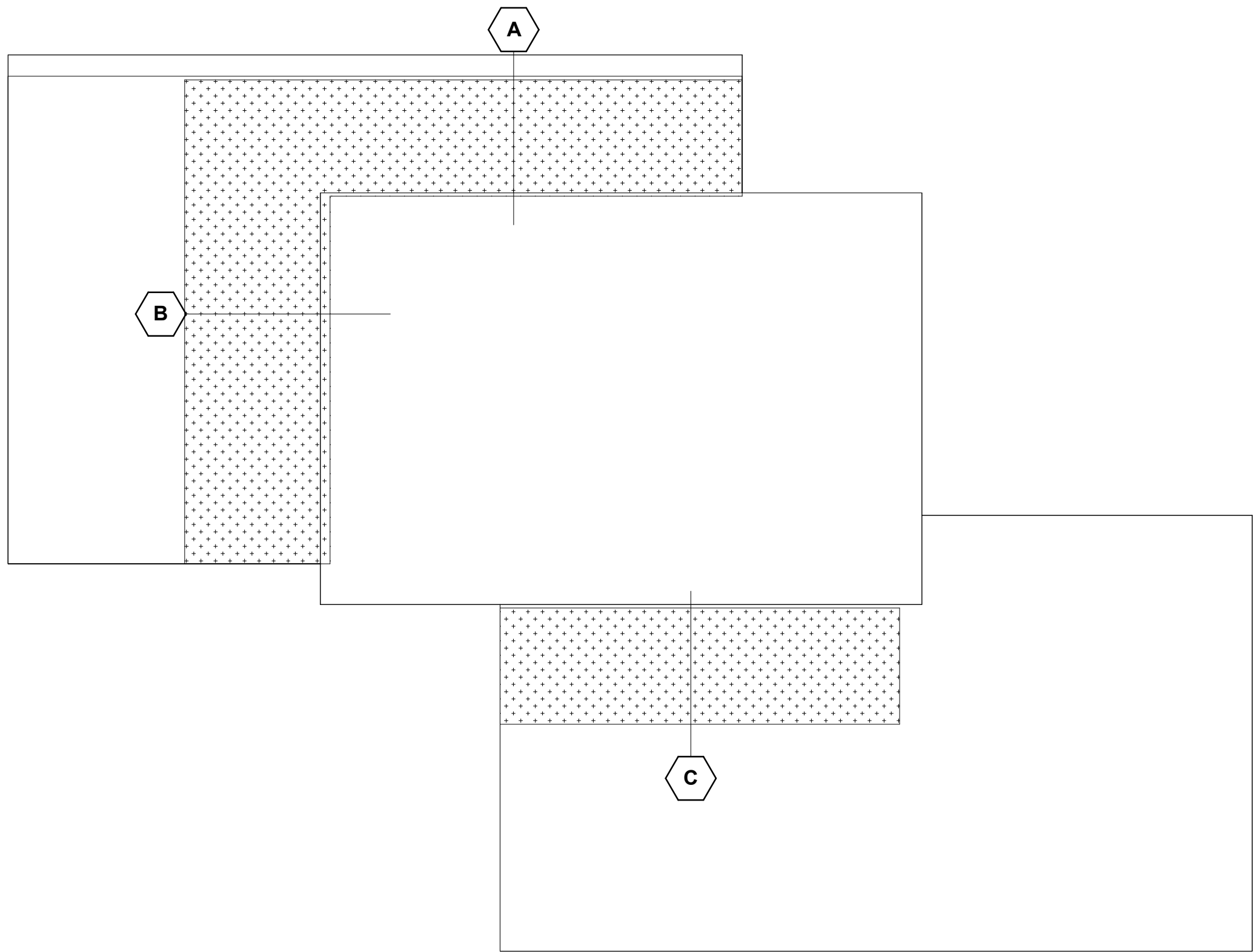
TYPE I **TYPE II** **TYPE III**

TYPICAL PIER DIAGRAM

NOTES:

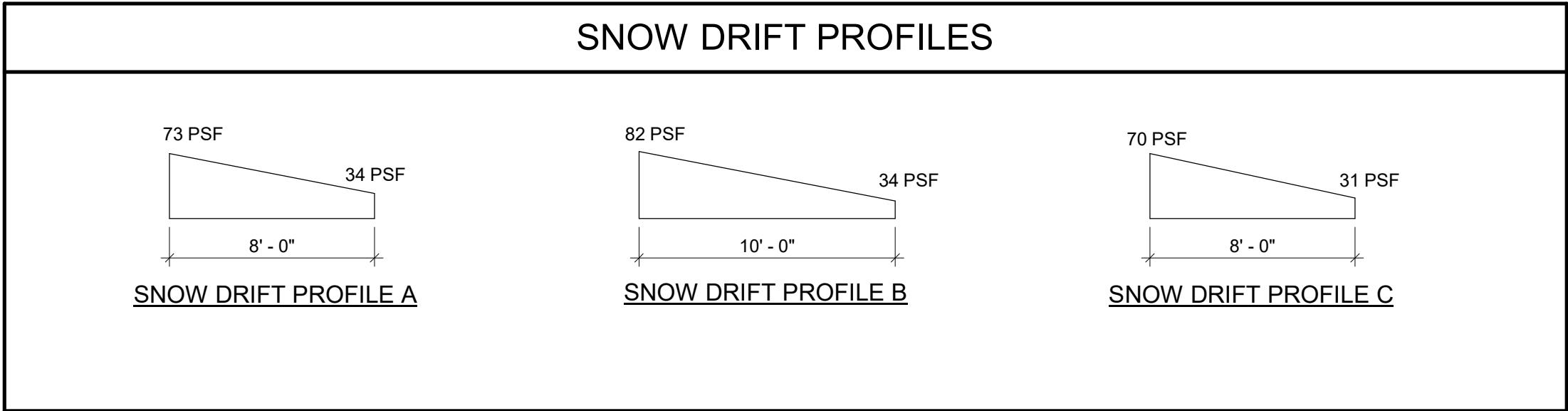
1. AT CONTRACTORS OPTION, ELIMINATE SPLICE AND PROVIDE CONTINUOUS VERTICALS WITH STD. HOOK AT BOTTOM TO FOOTING.

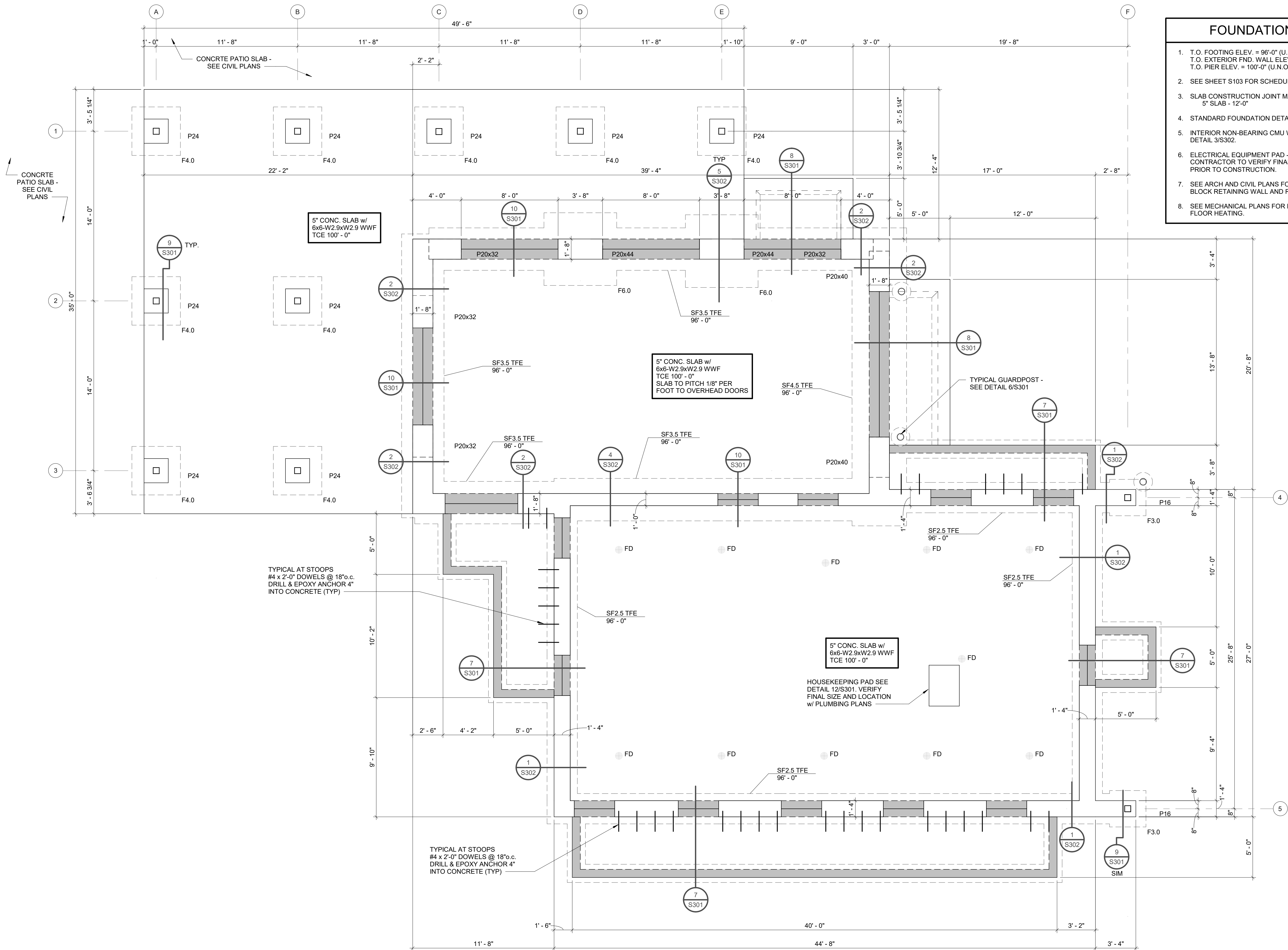
NO.	DATE	REVISION



SNOW DRIFT PLAN

NOT TO SCALE

[illegible]



- FOUNDATION NOTES**
1. T.O. FOOTING ELEV. = 96'-0" (U.N.O.)
T.O. EXTERIOR FND. WALL ELEV. = 100'-0" (U.N.O.)
T.O. PIER ELEV. = 100'-0" (U.N.O.)
 2. SEE SHEET S103 FOR SCHEDULED INFORMATION
 3. SLAB CONSTRUCTION JOINT MAX. SPACING
5" SLAB - 12'-0"
 4. STANDARD FOUNDATION DETAILS - SHEET S301.
 5. INTERIOR NON-BEARING CMU WALLS TO SLAB - SEE
DETAIL 3/S302.
 6. ELECTRICAL EQUIPMENT PAD - SEE DETAIL 11/S301.
CONTRACTOR TO VERIFY FINAL SIZE AND LOCATION
PRIOR TO CONSTRUCTION.
 7. SEE ARCH AND CIVIL PLANS FOR CONCRETE PATIO SLAB,
BLOCK RETAINING WALL AND RAILING INFORMATION.
 8. SEE MECHANICAL PLANS FOR LOCATIONS OF SLABS w/ IN
FLOOR HEATING.

TYPICAL AT STOOPS
#4 x 2'-0" DOWELS @ 18" o.c.
DRILL & EPOXY ANCHOR 4"
INTO CONCRETE (TYP)

TYPICAL AT STOOPS
#4 x 2'-0" DOWELS @ 18" o.c.
DRILL & EPOXY ANCHOR 4"
INTO CONCRETE (TYP)

FOUNDATION PLAN

1/4" = 1'-0"



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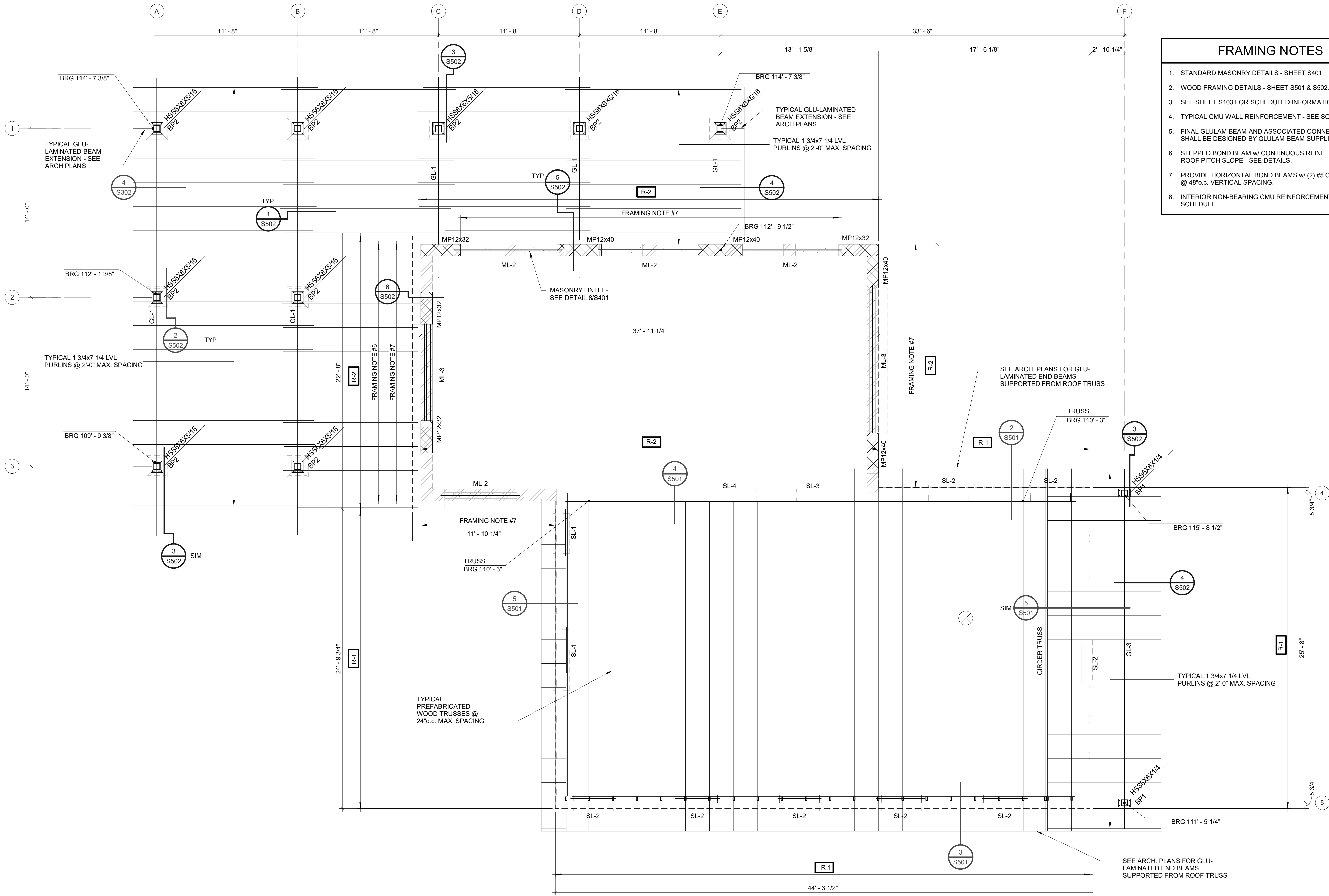
McMAHON ASSOCIATES, INC.
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NO.	DATE	REVISION

NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAMS ST, DE PERE, WI 54115
FOUNDATION PLAN

DESIGNED STK	DRAWN GYV
PROJECT NO. D0005-06-22-00146	
DATE MARCH 10, 2023	
SHEET NO. S201	



- FRAMING NOTES
1. STANDARD MASONRY DETAILS - SHEET S401.

2. WOOD FRAMING DETAILS - SHEET S501 & S502.

3. SEE SHEET S103 FOR SCHEDULED INFORMATION.

4. TYPICAL CMU WALL REINFORCEMENT - SEE SCHEDULE.

5. FINAL GLULAM BEAM AND ASSOCIATED CONNECTIONS SHALL BE DESIGNED BY GLULAM BEAM SUPPLIER.

6. STEPPED BOND BEAM w/ CONTINUOUS REINF. TO MATCH ROOF PITCH SLOPE - SEE DETAILS.

7. PROVIDE HORIZONTAL BOND BEAMS w/ (2) #5 CONTINUOUS @ 48"o.c. VERTICAL SPACING.

8. INTERIOR NON-BEARING CMU REINFORCEMENT R-3 - SEE SCHEDULE.

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NELSON FAMILY PAVILION

CITY OF DE PERE 100 WILLIAMS ST, DE PERE, WI 54115

LOW ROOF FRAMING PLAN

DESIGNED
STK

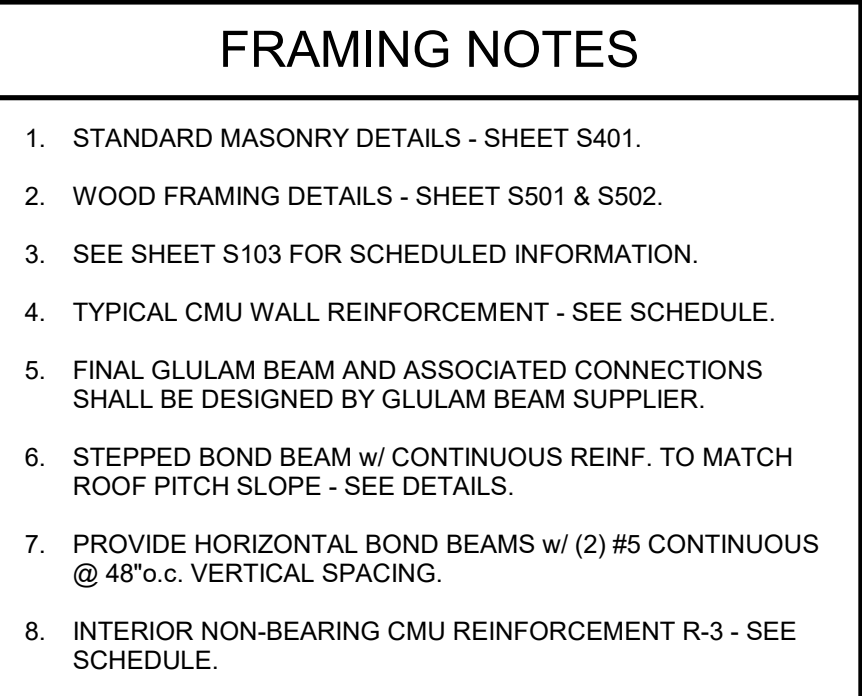
DRAWN
GYV

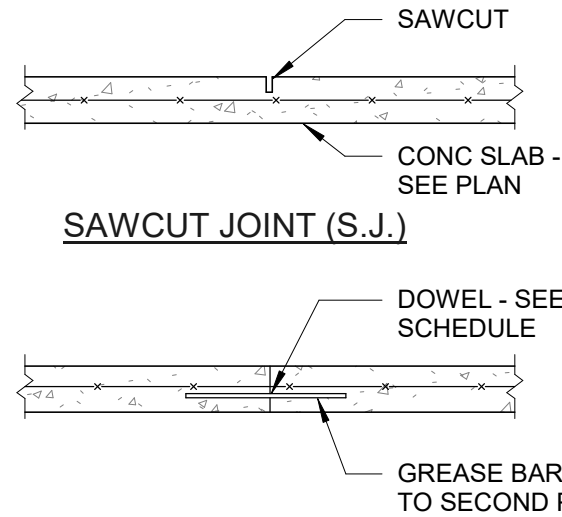
PROJECT NO.
D0005-06-22-00146

DATE
MARCH 10, 2023

SHEET NO.

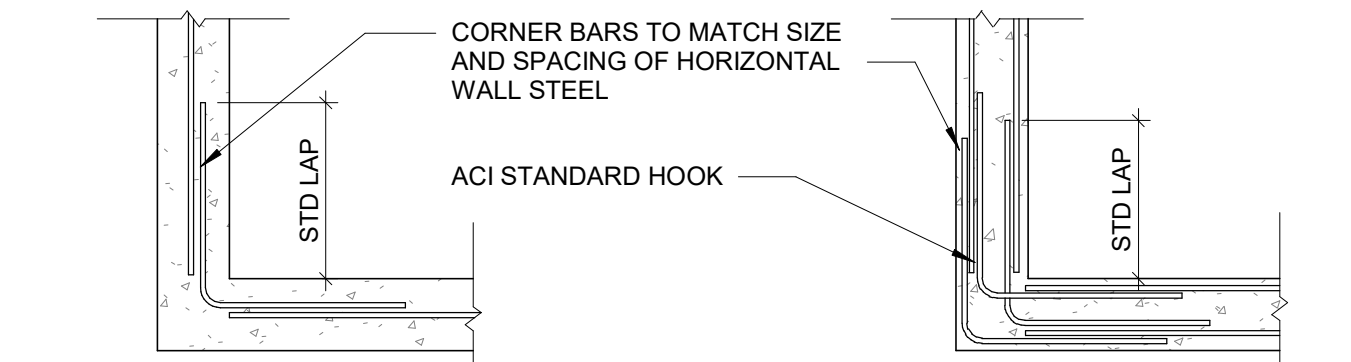
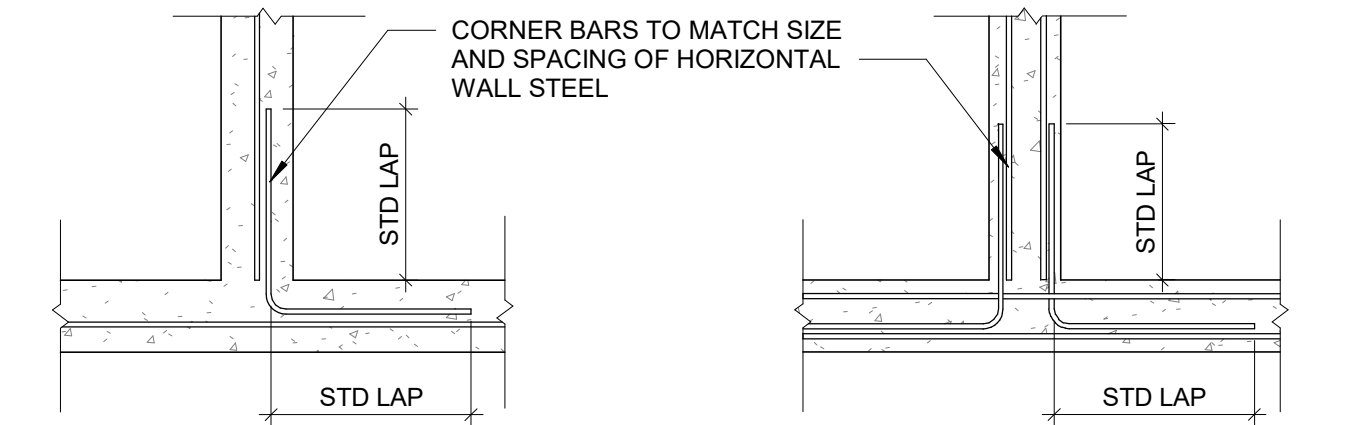
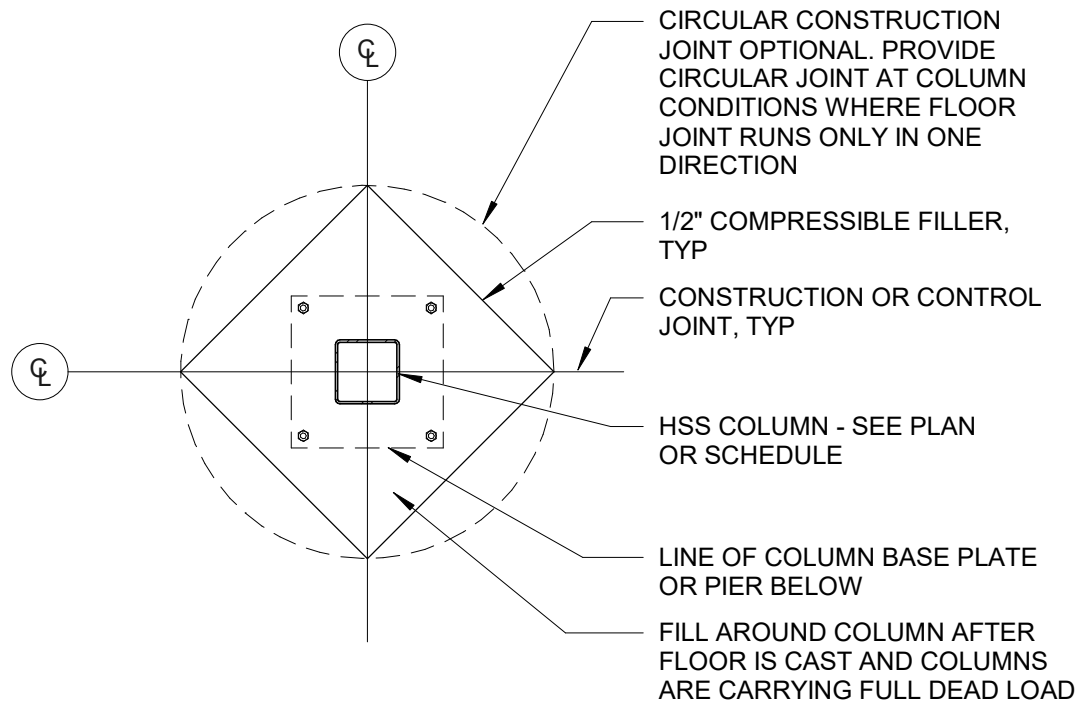
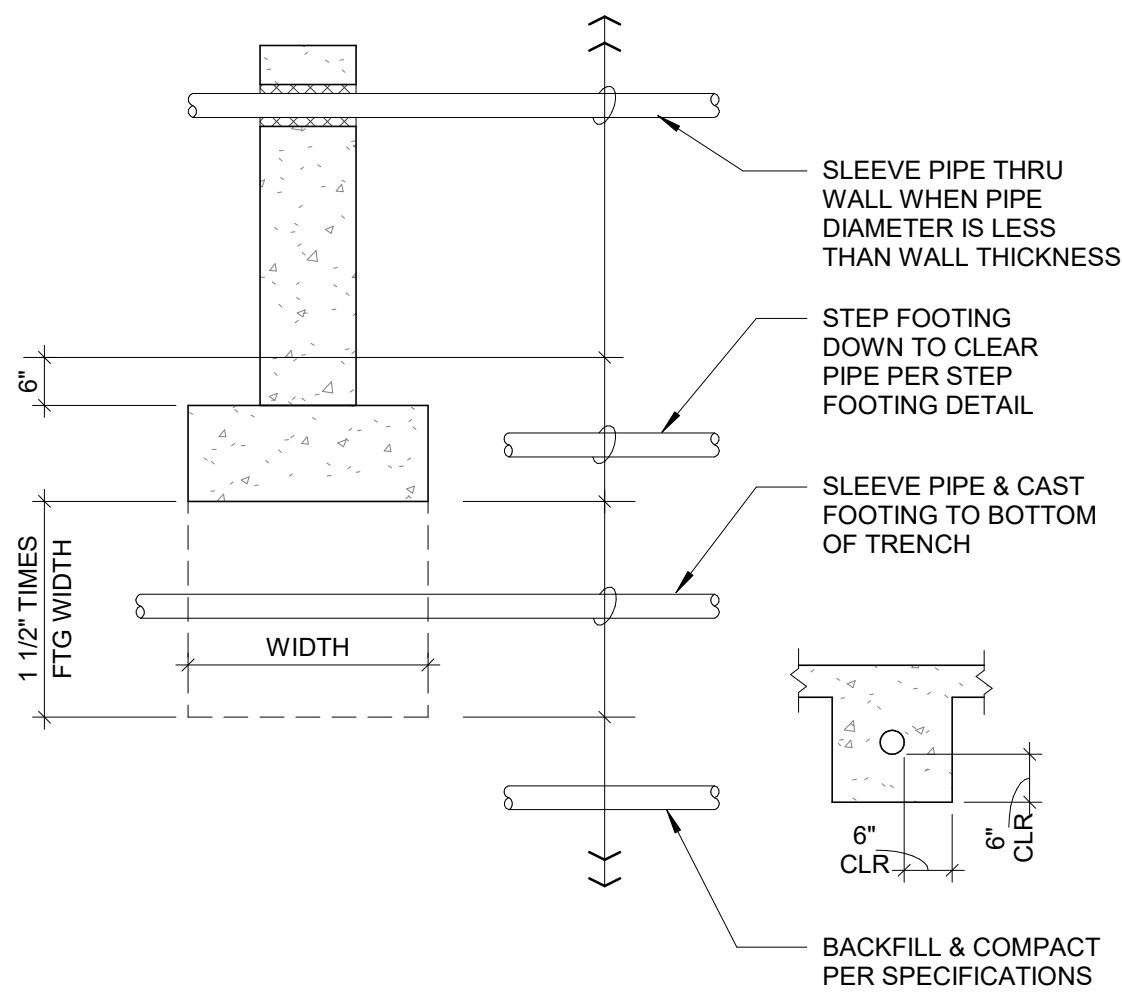
S202





SLAB THICKNESS	DOWEL DIAMETER	MINIMUM EMBEDMENT	DOWEL LENGTH	SPACING
4" & 5"	5/8"	5"	12"	12"o.c.
6"	3/4"	6"	14"	12"o.c.
8"	7/8"	8"	18"	12"o.c.

NOTE:
CUT FRESH CONCRETE FOR AGGREGATE SEPARATION 1/4 OF SLAB DEPTH. DO NOT CUT SLAB REINFORCEMENT.



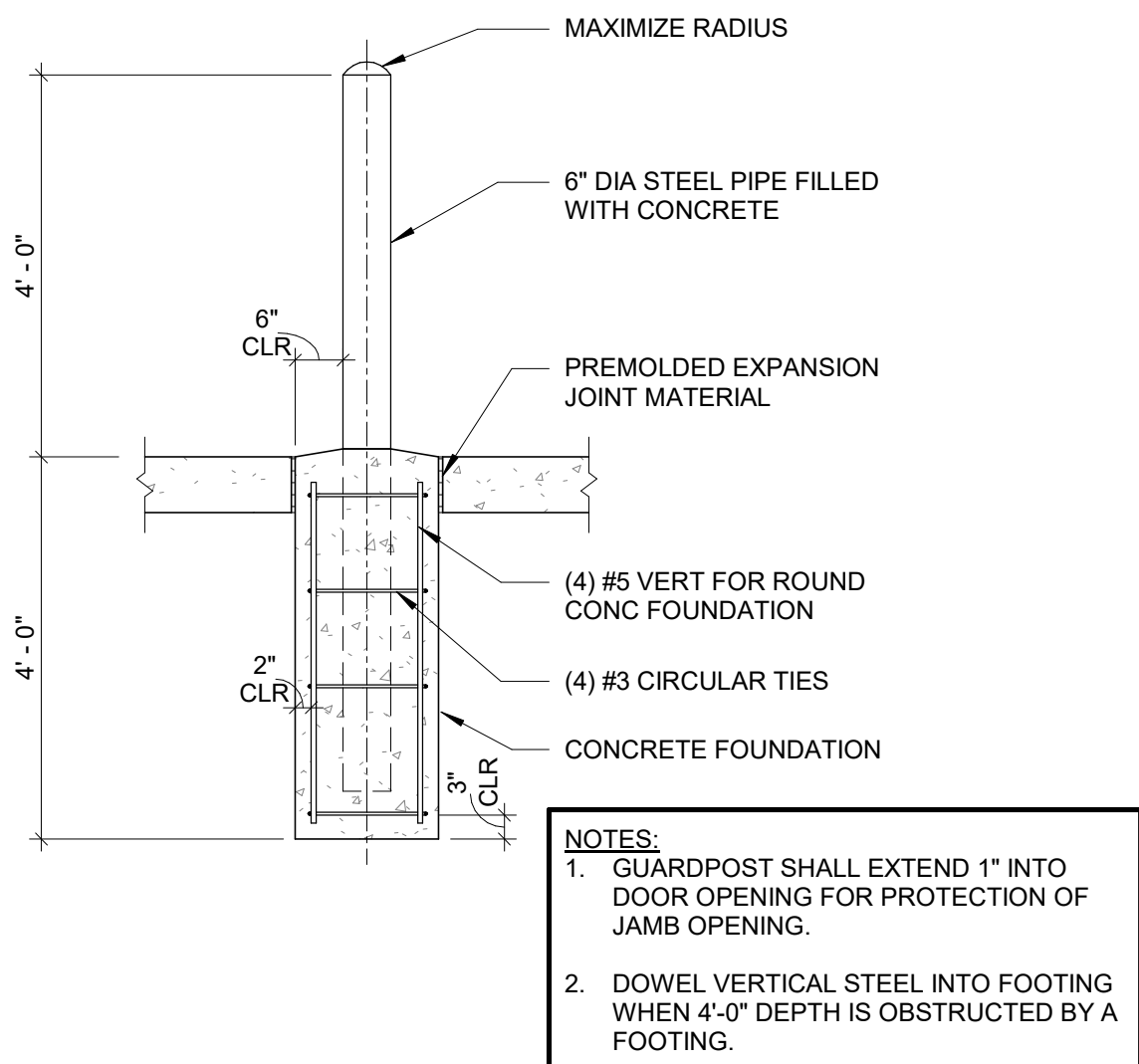
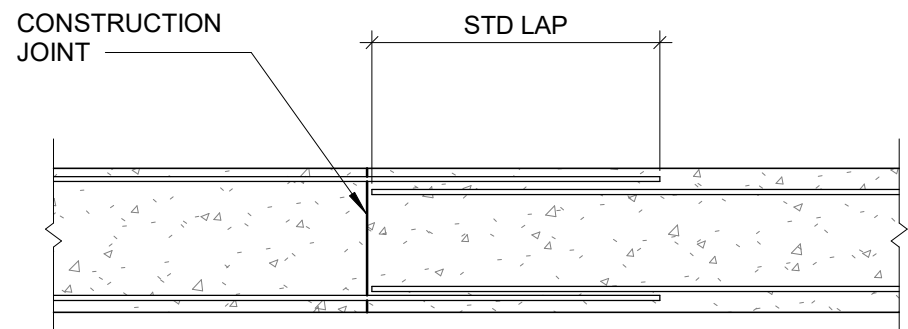
NOTE:
TYPICAL REINFORCING AT CORNERS UNLESS SHOWN OTHERWISE ON STRUCTURAL DRAWINGS.

1 TYP. JOINTS IN SLAB ON GRADE
S301 1/2" = 1'-0"

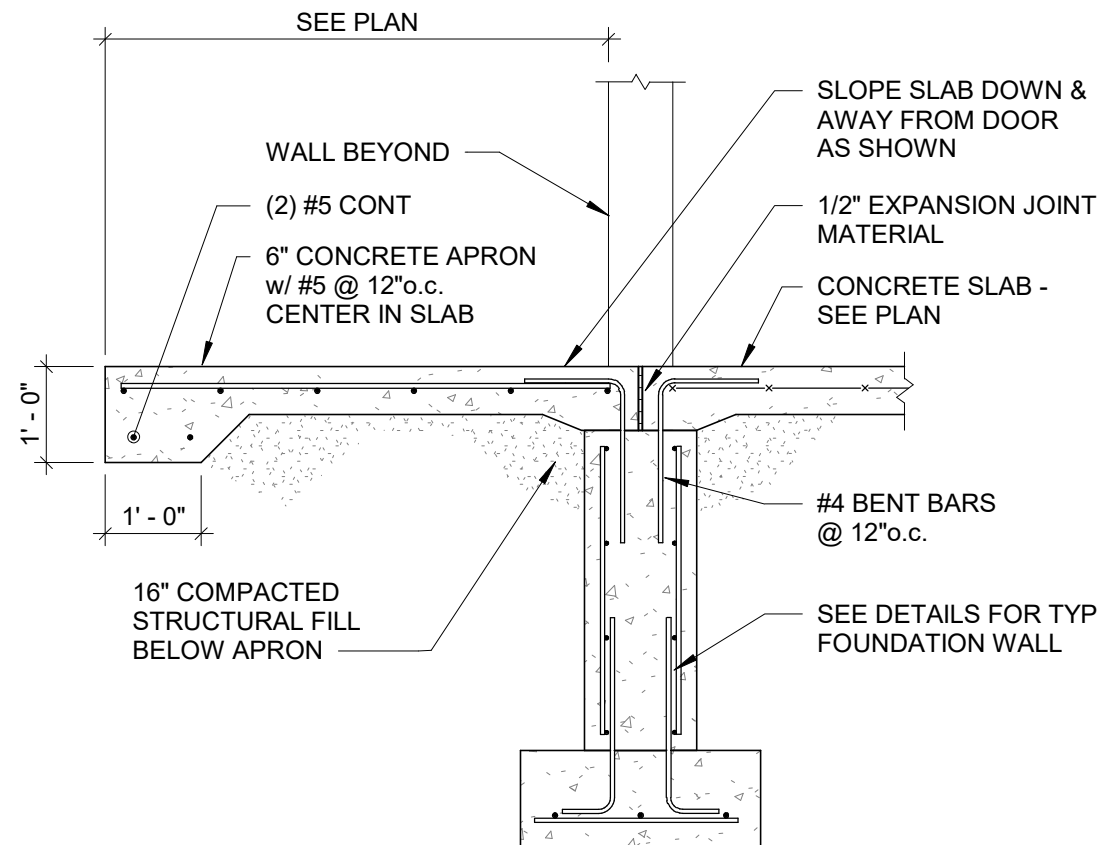
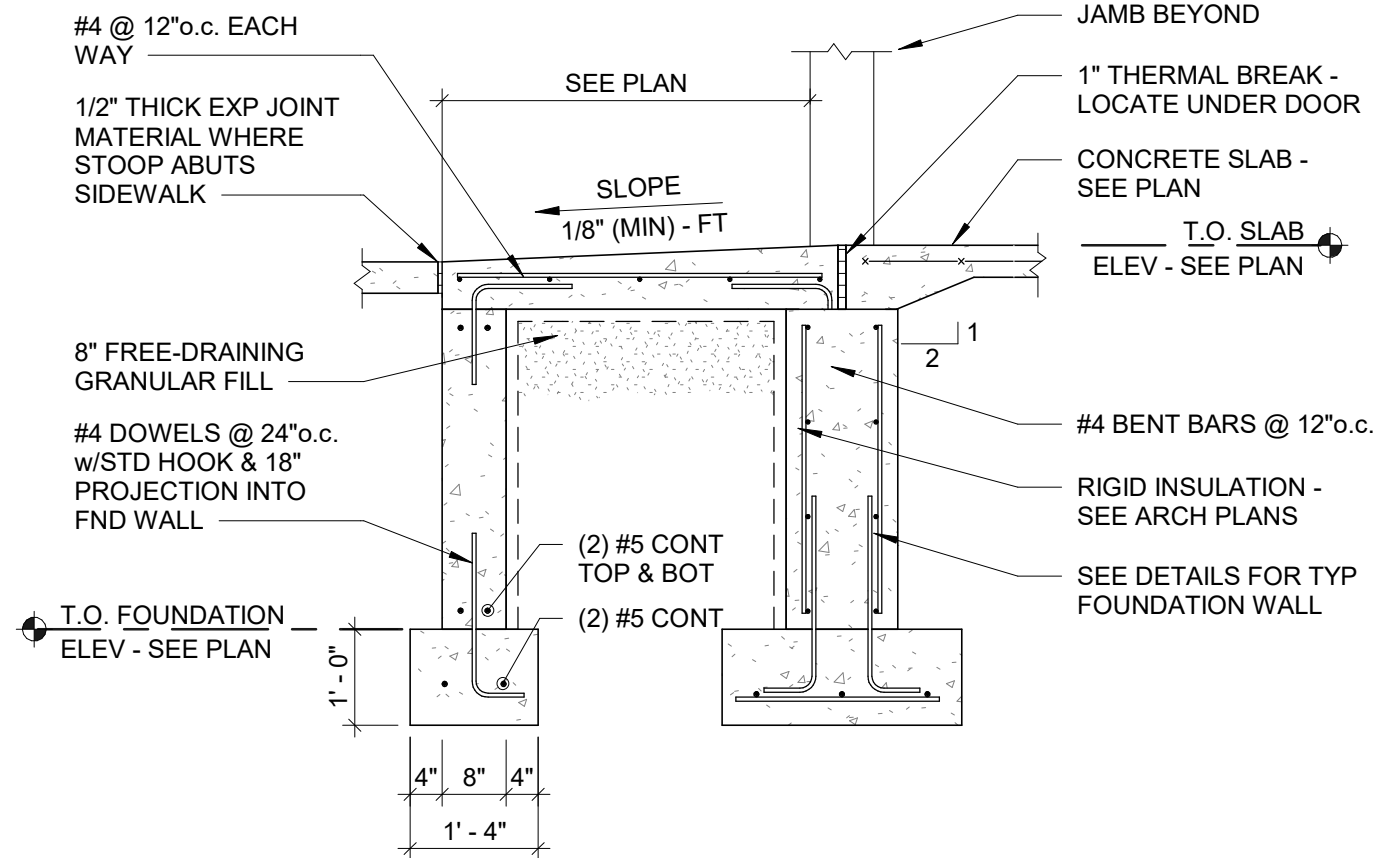
2 TYPICAL PIPE AT FOOTING
S301 1/2" = 1'-0"

3 TYPICAL SLAB AT GRADE BLOCKOUT AT COLUMN
S301 1/2" = 1'-0"

4 TYP CONCRETE CORNER DETAILS
S301 1/2" = 1'-0"



NOTES:
1. GUARDPOST SHALL EXTEND 1" INTO DOOR OPENING FOR PROTECTION OF JAMB OPENING.
2. DOWEL VERTICAL STEEL INTO FOOTING WHEN 4'-0" DEPTH IS OBSTRUCTED BY A FOOTING.

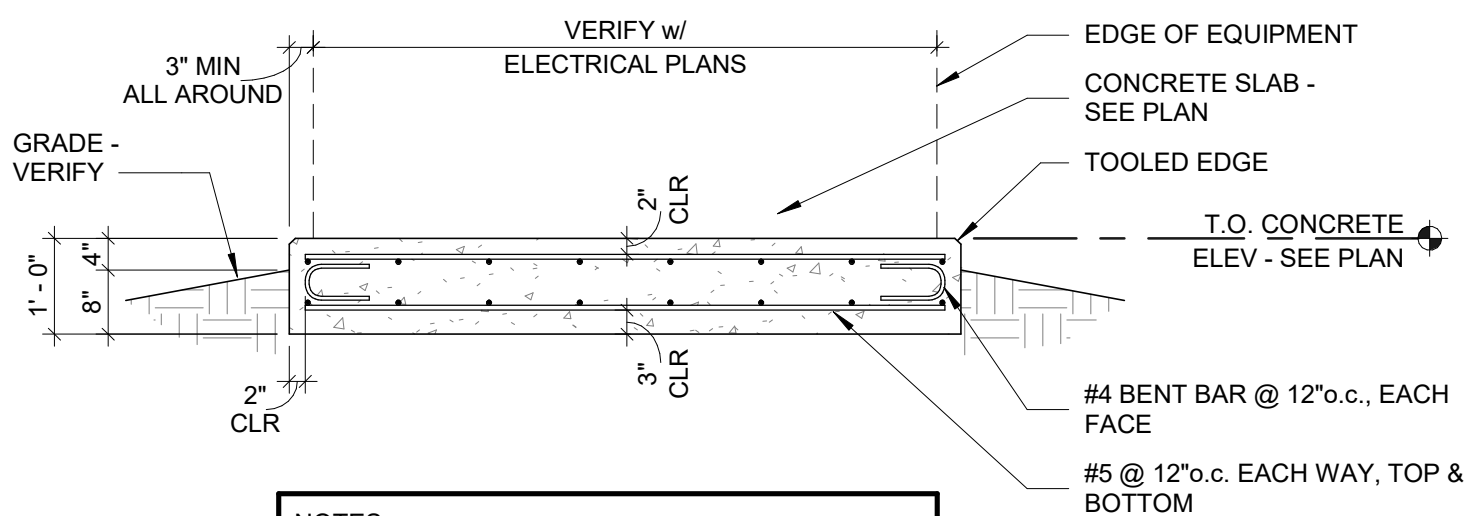
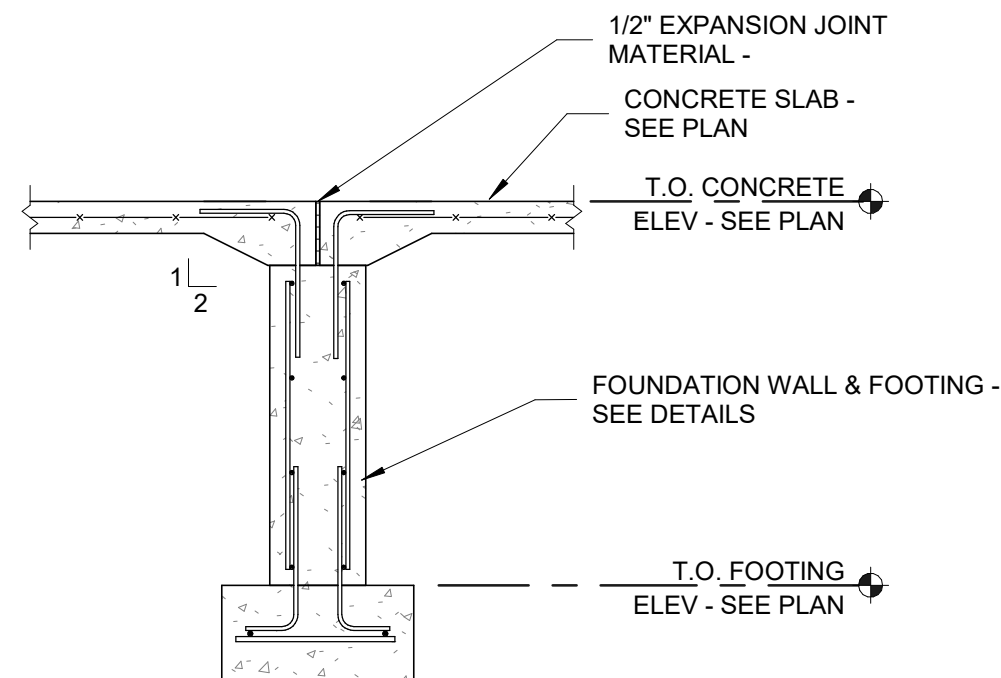
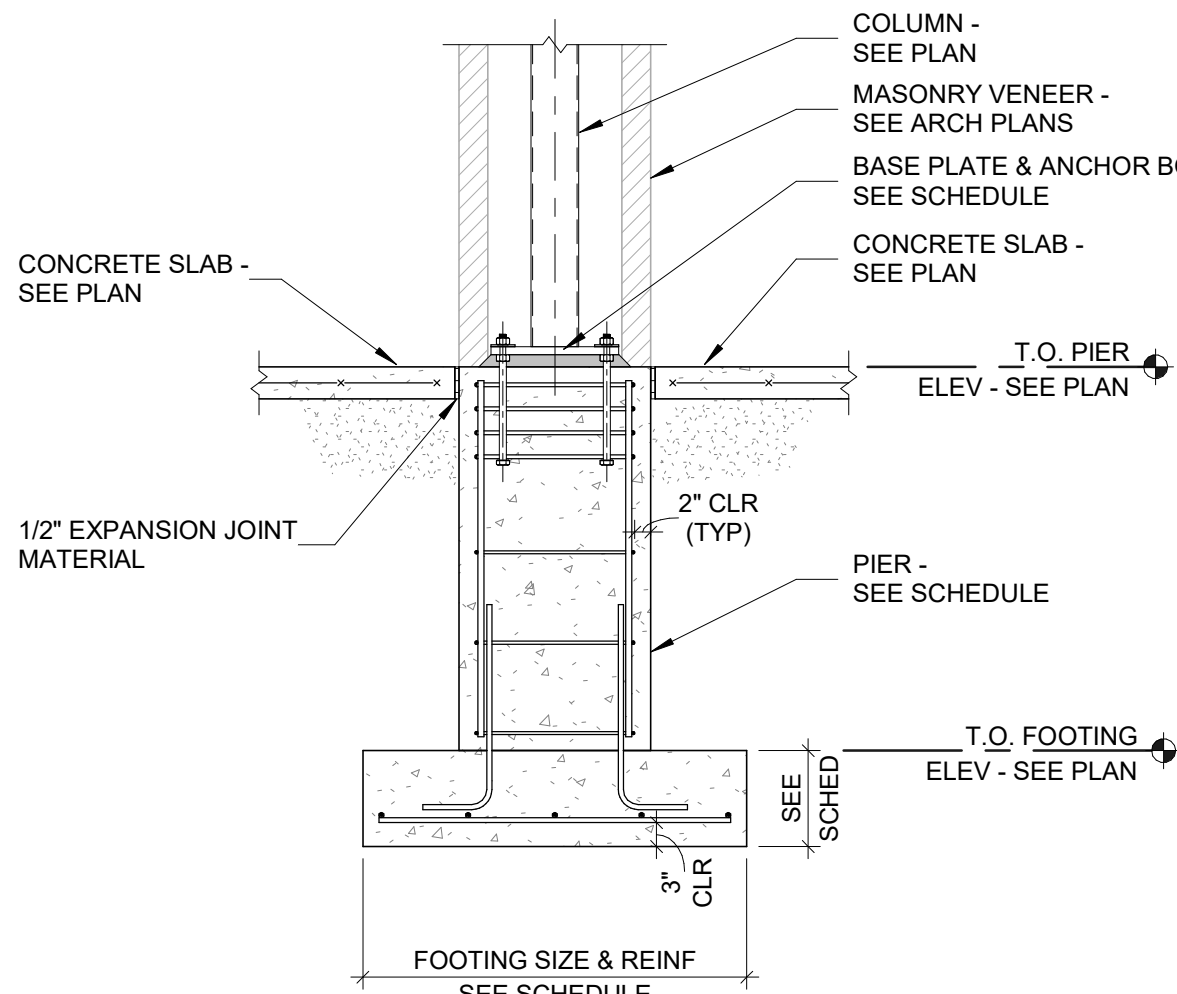


5 TYP WALL OR FOOTING CONSTRUCTION JOINT
S301 1/2" = 1'-0"

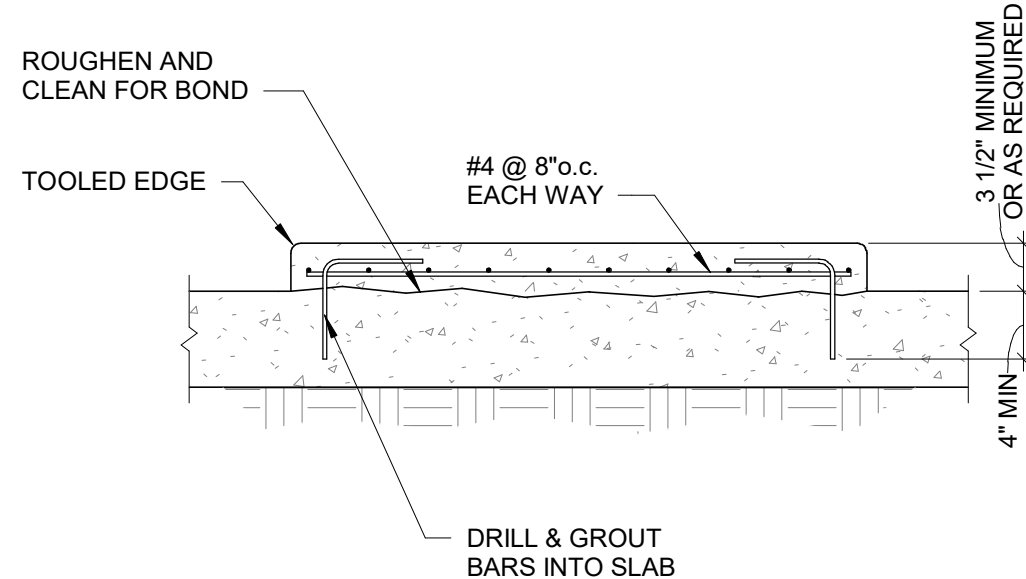
6 STEEL PIPE GUARDPOST
S301 1/2" = 1'-0"

7 TYPICAL STOOP DETAIL
S301 1/2" = 1'-0"

8 TYPICAL APRON DETAIL
S301 1/2" = 1'-0"



NOTES:
1. SEE ELECTRICAL PLANS FOR SWITCHBOARD SIZE AND LOCATION.
2. EQUIPMENT FOUNDATION PAD SIZE TO BE COORDINATED WITH FINAL SWITCHBOARD SHOP DRAWINGS. PER EQUIPMENT DRAWING DATED 12/16/2021, PAD SIZE SHALL BE 2'-6"x2'-6"x1'-0".



NOTE:
FINAL HEIGHT, SIZE, AND LOCATION OF HOUSEKEEPING PAD SHALL BE DETERMINED BY CONTRACTOR TO FIT EQUIPMENT.

9 EXTERIOR COLUMN AND PIER
S301 1/2" = 1'-0"

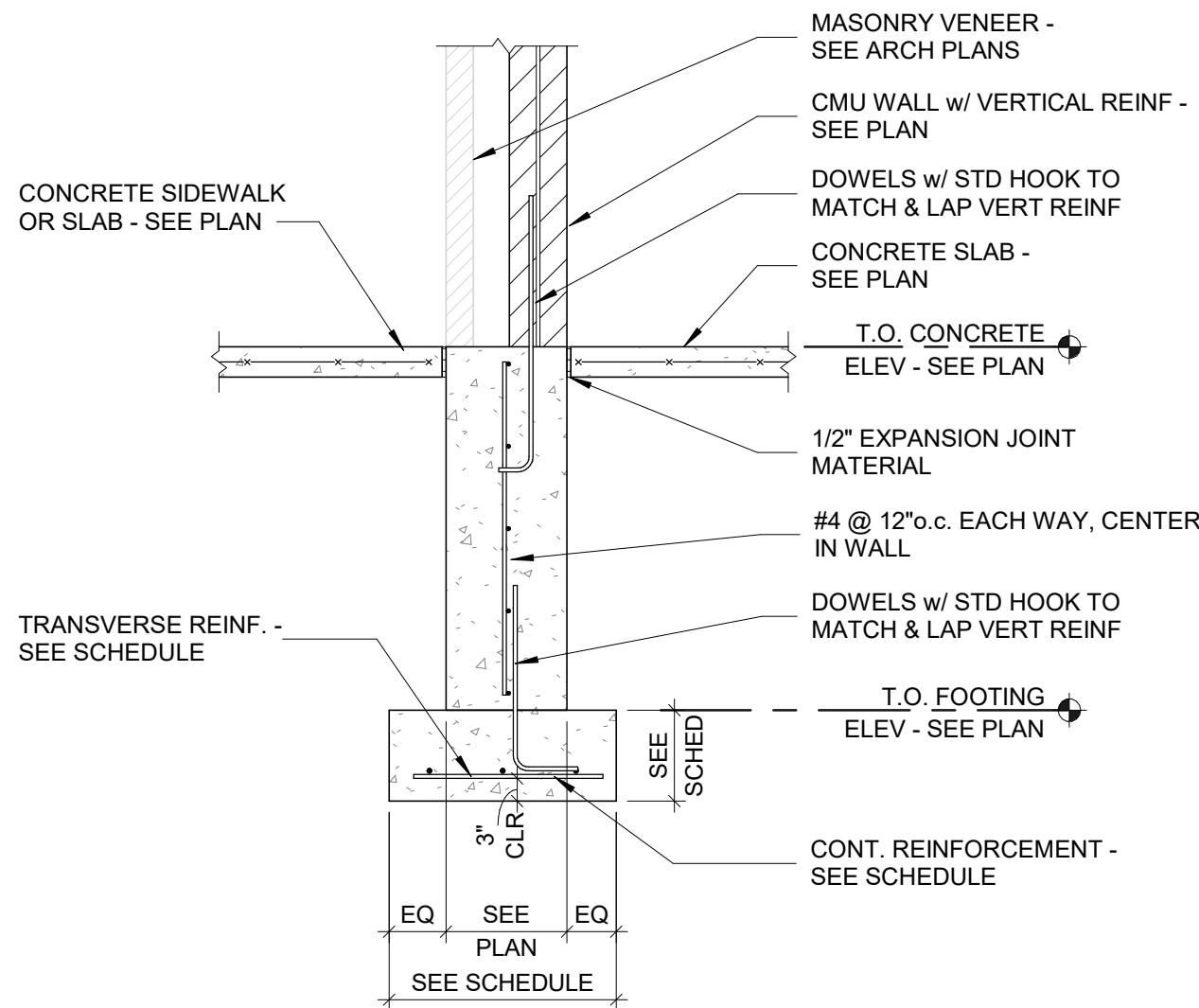
10 FOUNDATION WALL
S301 1/2" = 1'-0"

11 EQUIPMENT FOUNDATION
S301 1/2" = 1'-0"

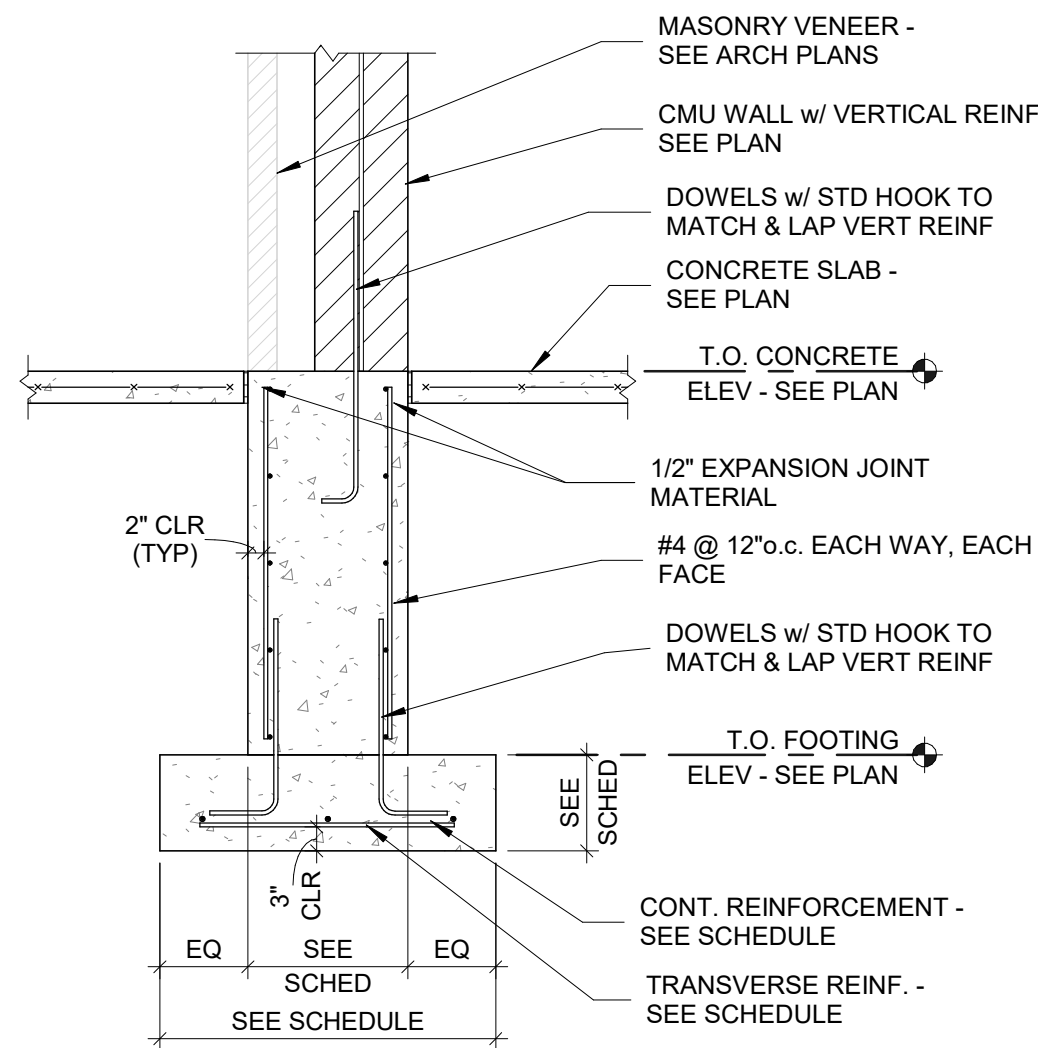
12 HOUSEKEEPING PAD AT SLAB
S301 1/2" = 1'-0"

NO.	DATE	REVISION

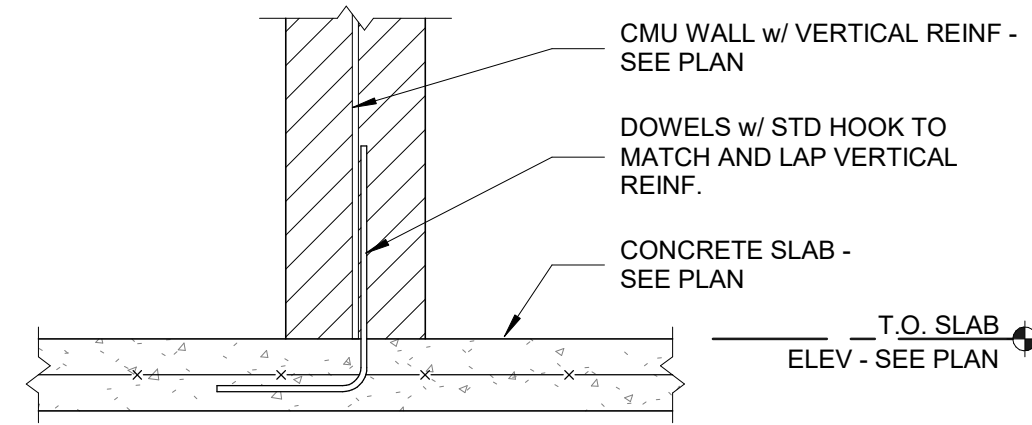
DESIGNED STK	DRAWN GYV
PROJECT NO. D0005-06-22-00146	
DATE MARCH 10, 2023	
SHEET NO. S301	



1 FOUNDATION WALL
S302 1/2" = 1'-0"

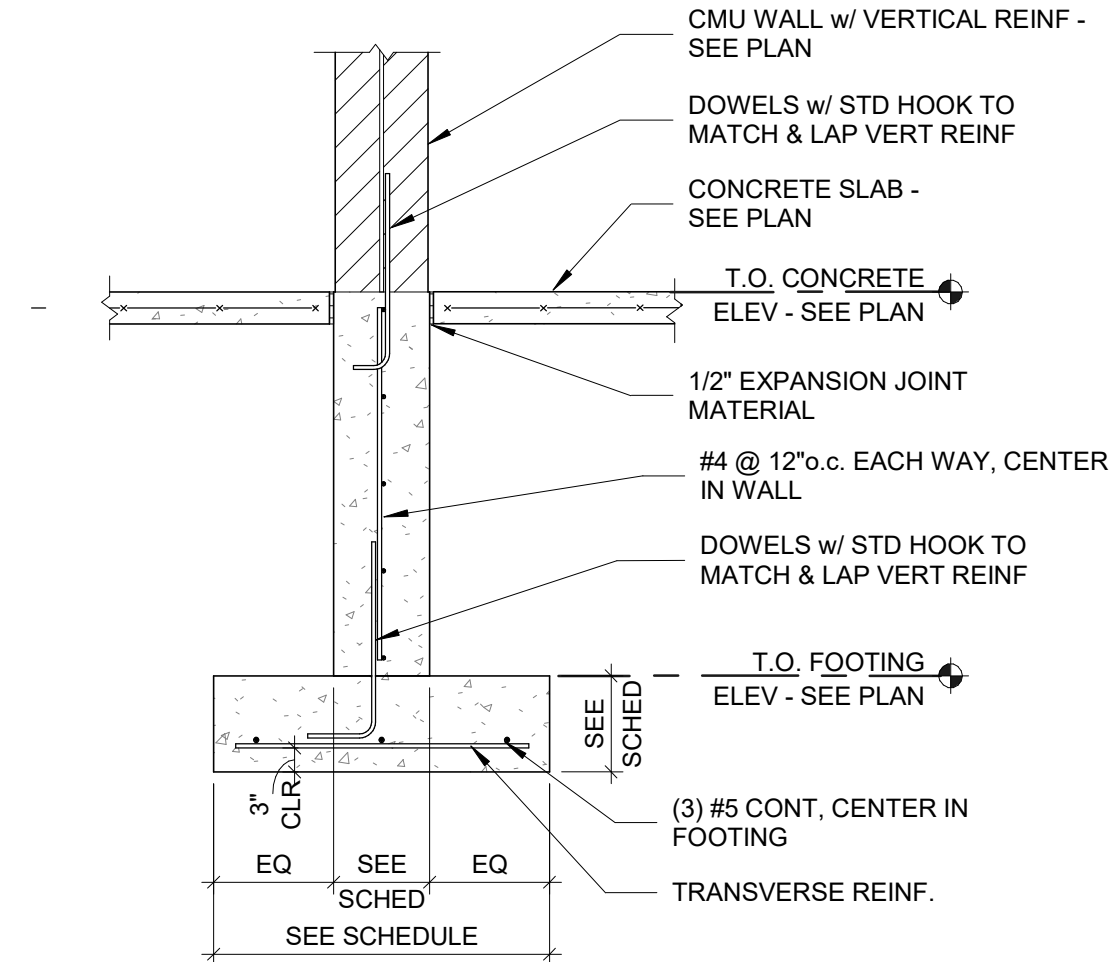


2 FOUNDATION WALL
S302 1/2" = 1'-0"

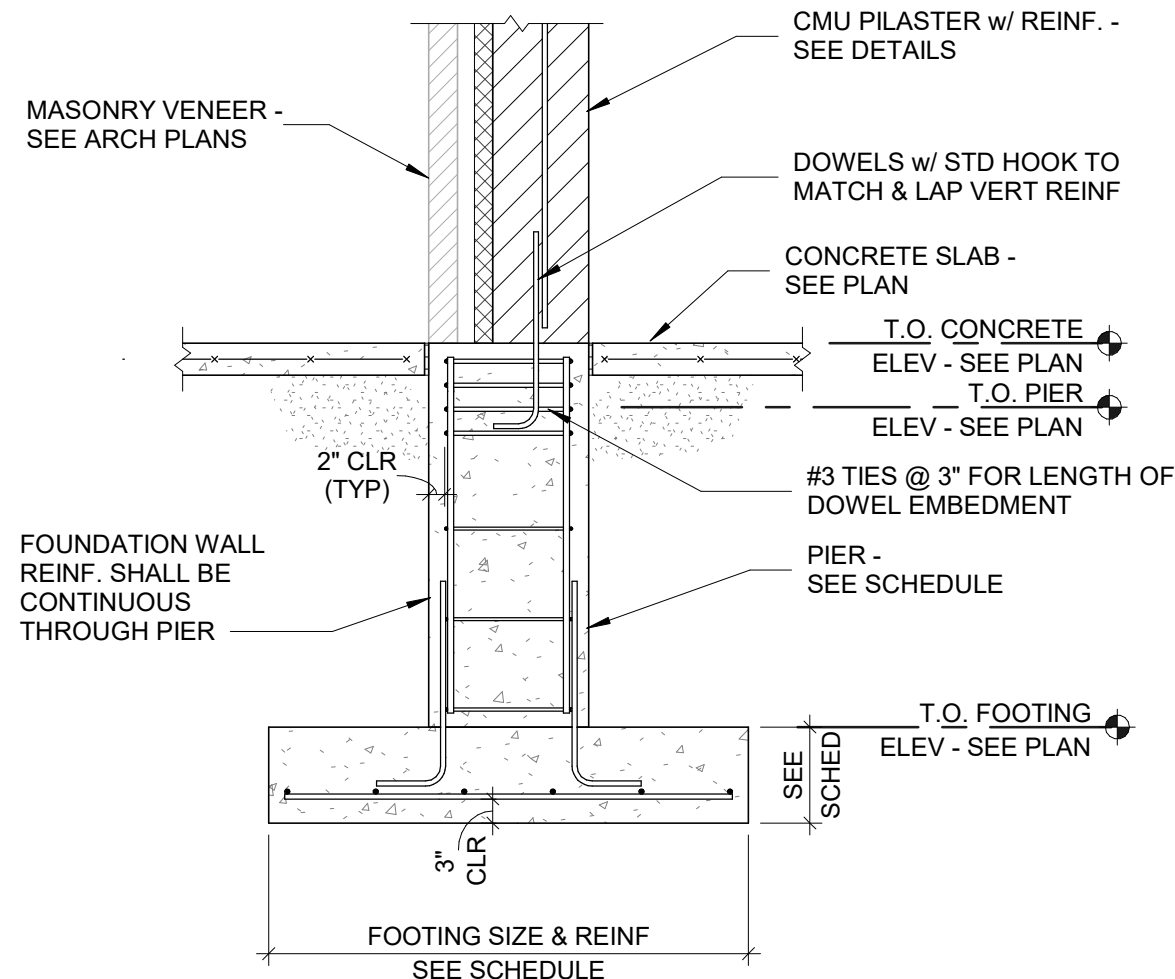


NOTE:
CONCRETE SLAB TO HAVE IN FLOOR RADIANT HEAT - SEE PLAN.

3 CMU WALL AT SLAB ON GRADE
S302 3/4" = 1'-0"



4 FOUNDATION WALL
S302 1/2" = 1'-0"

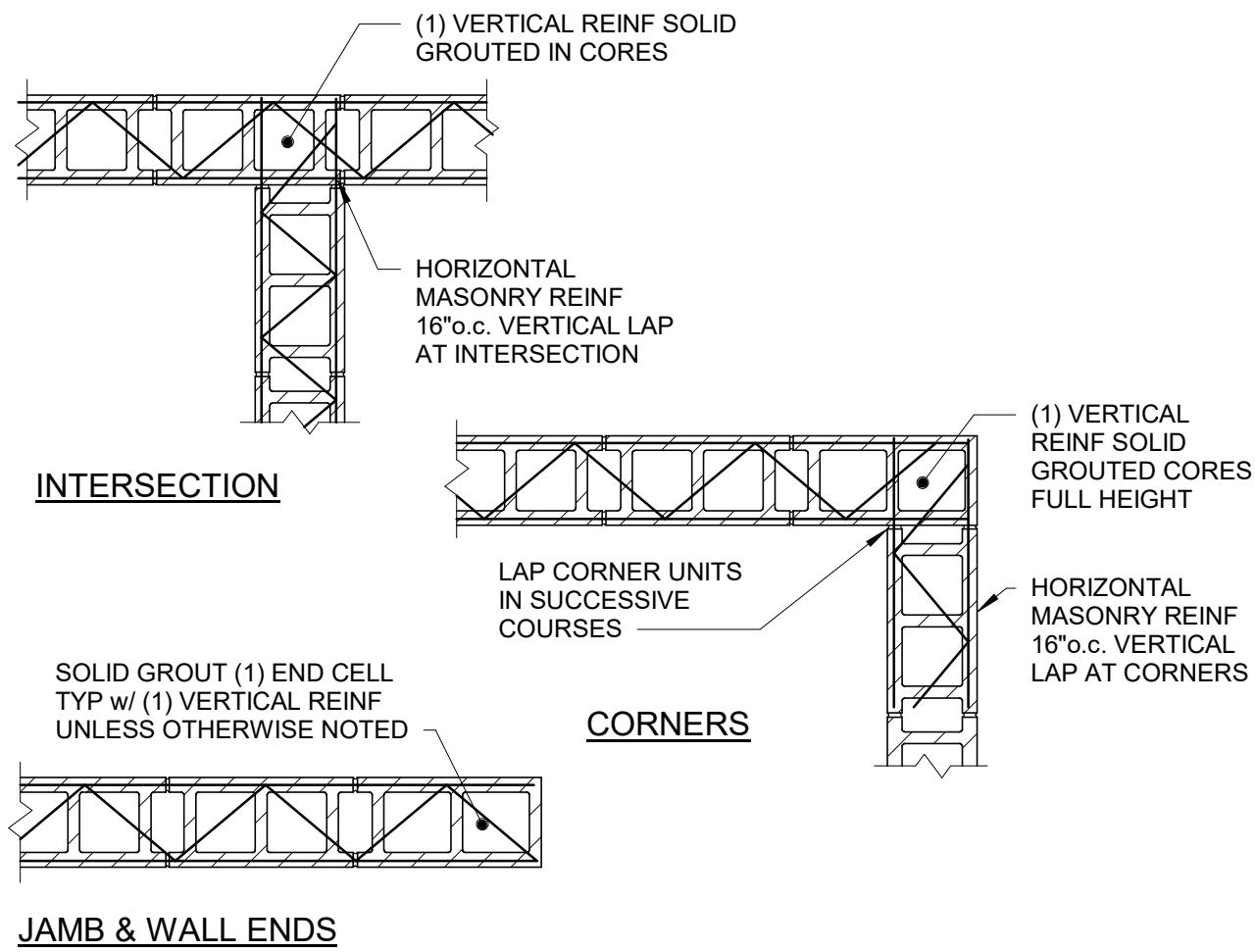


5 INTERIOR MASONRY PIER & FOOTING
S302 1/2" = 1'-0"

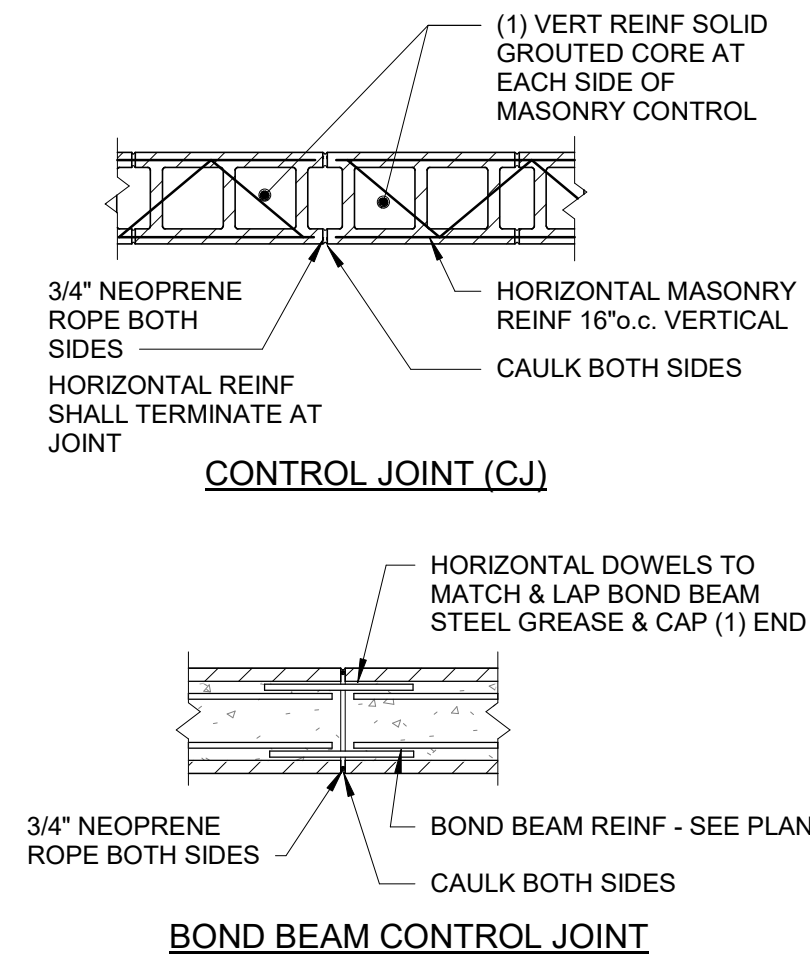
NO.	DATE	REVISION

NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAMS ST, DE PERE, WI 54115
FOUNDATION DETAILS

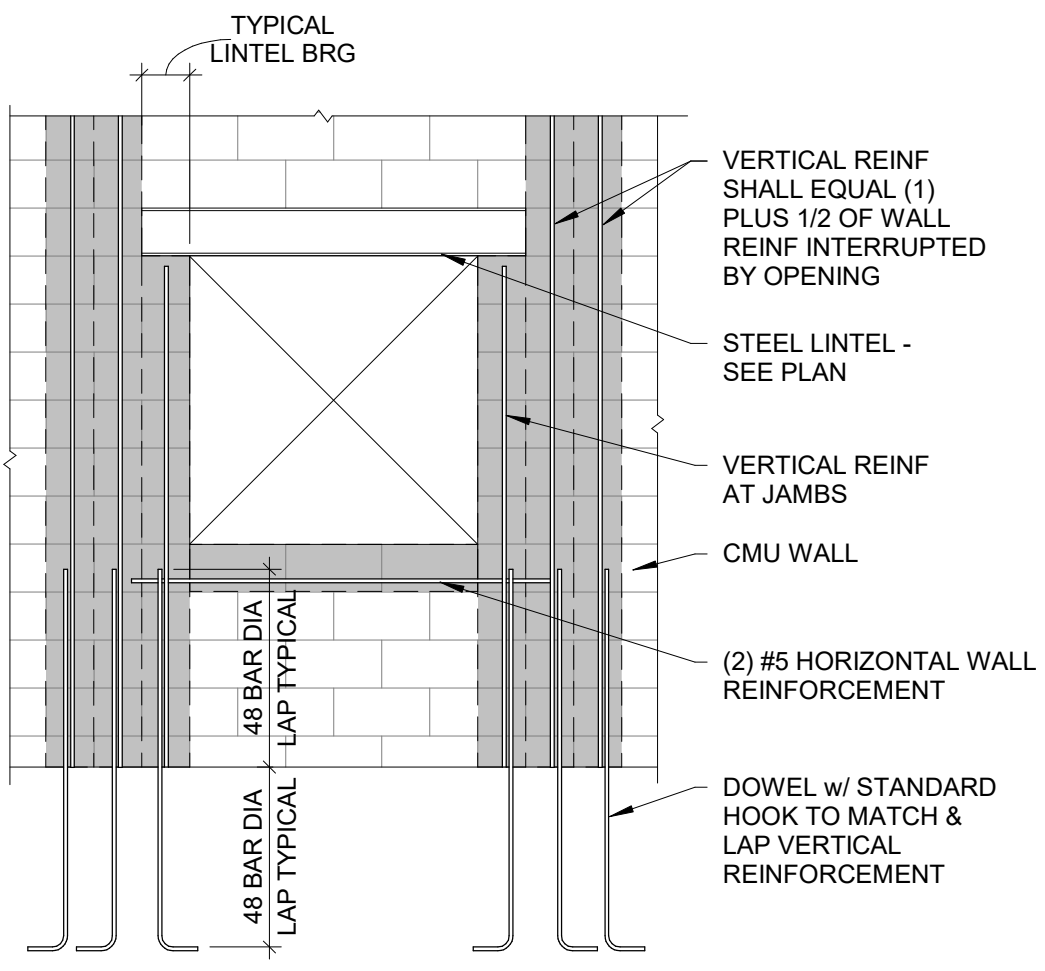
DESIGNED: STK	DRAWN: GYV
PROJECT NO. D0005-06-22-00146	
DATE MARCH 10, 2023	
SHEET NO. S302	



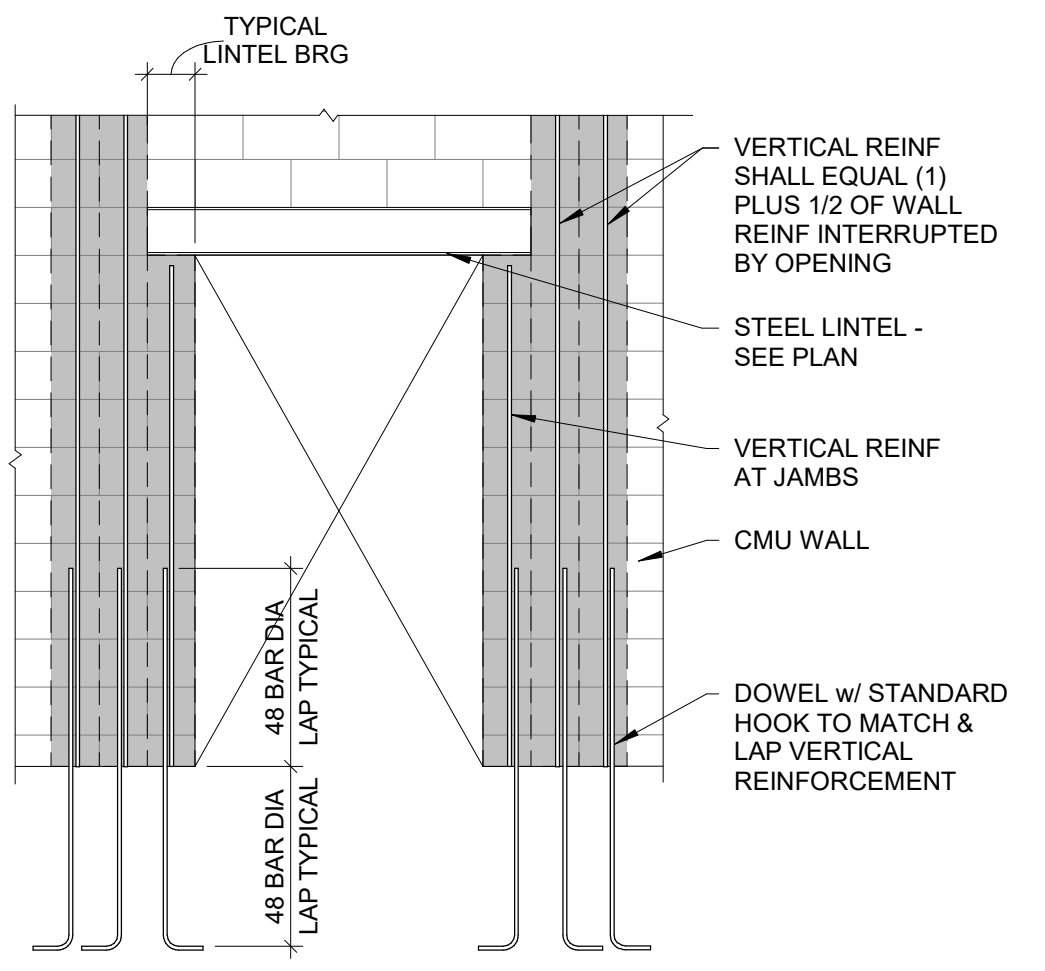
1 TYPICAL MASONRY DETAILS
S401 3/4" = 1'-0"



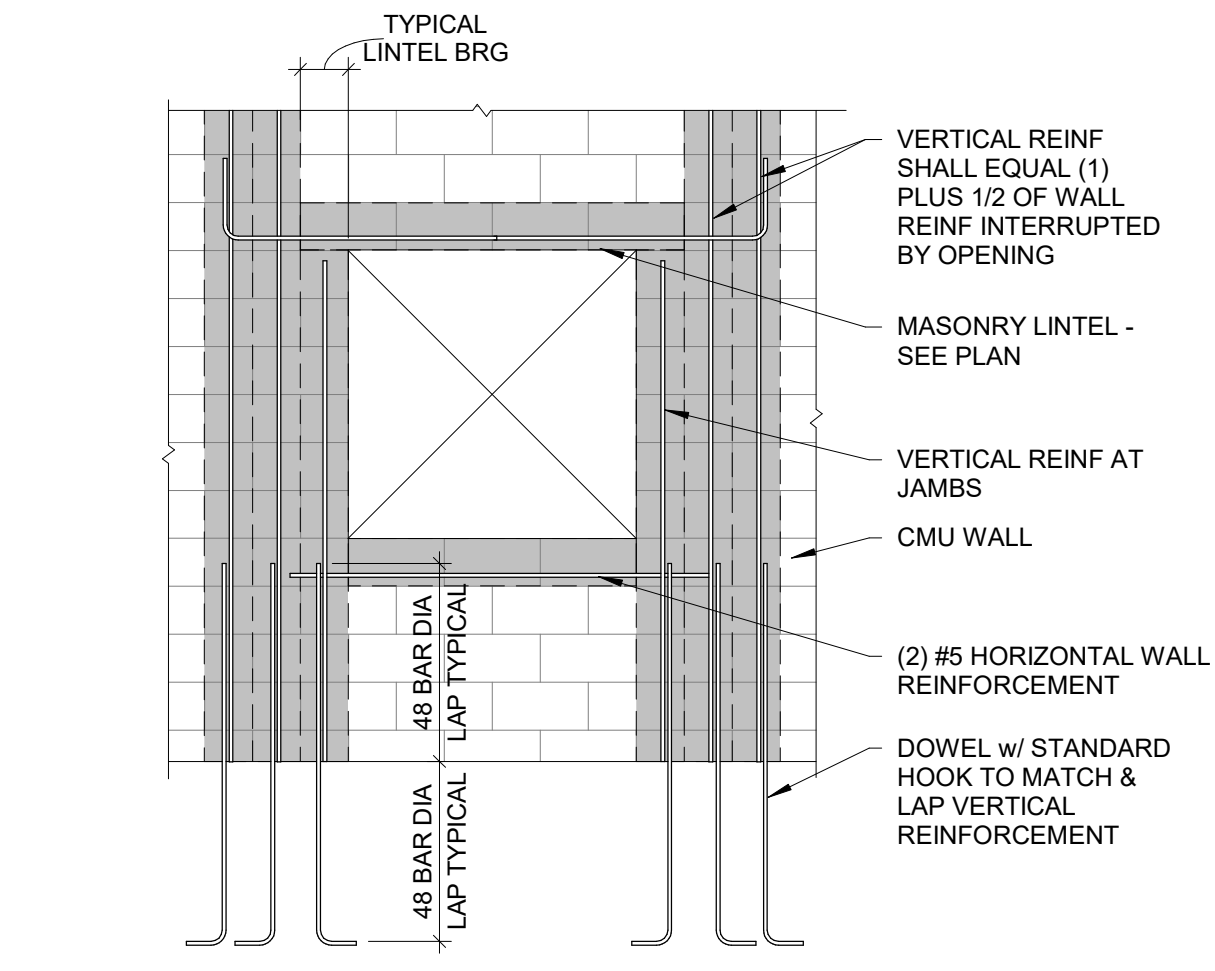
2 MASONRY CONTROL JOINT DETAILS
S401 3/4" = 1'-0"



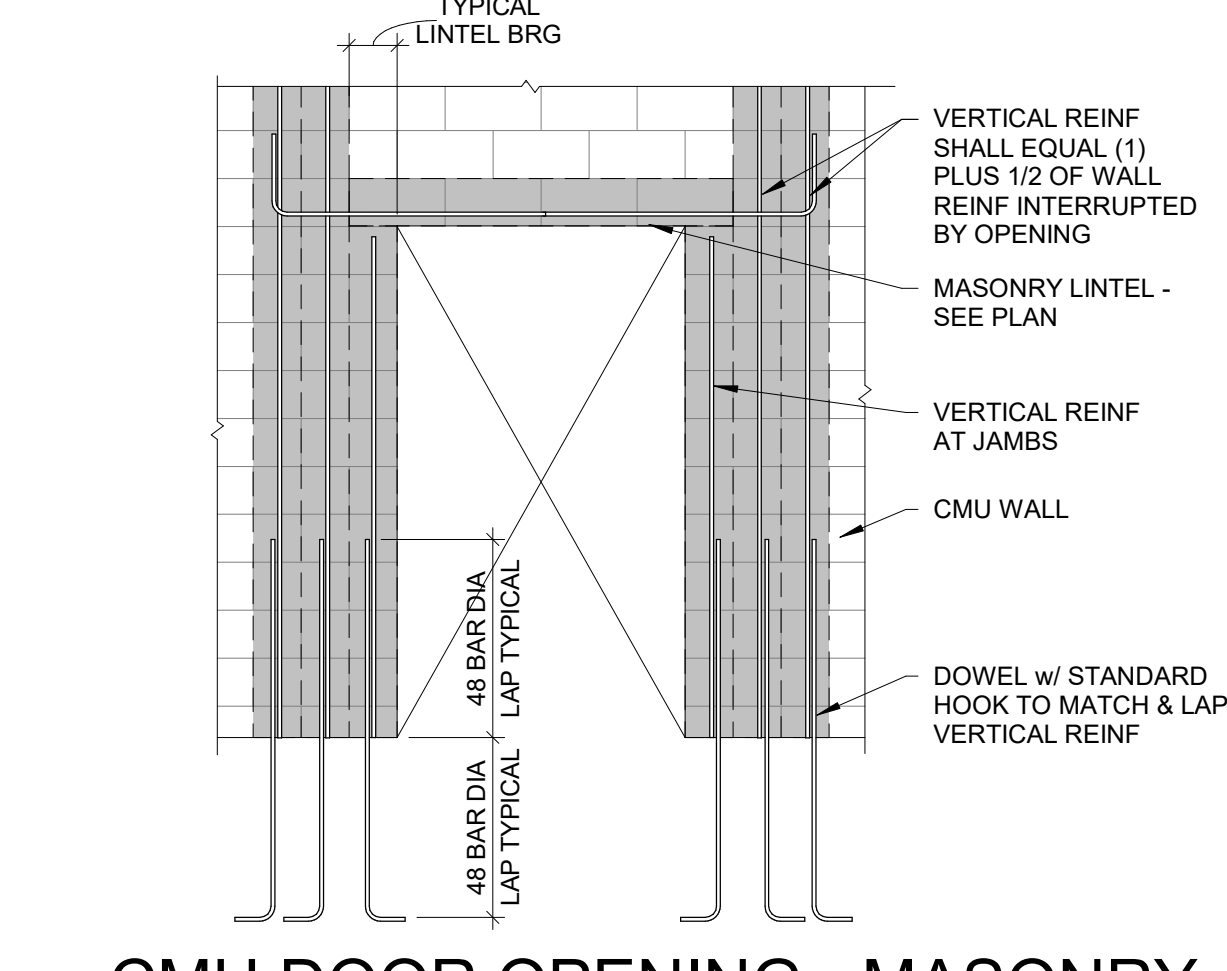
3 CMU OPENING - STEEL LINTEL
S401 3/8" = 1'-0"



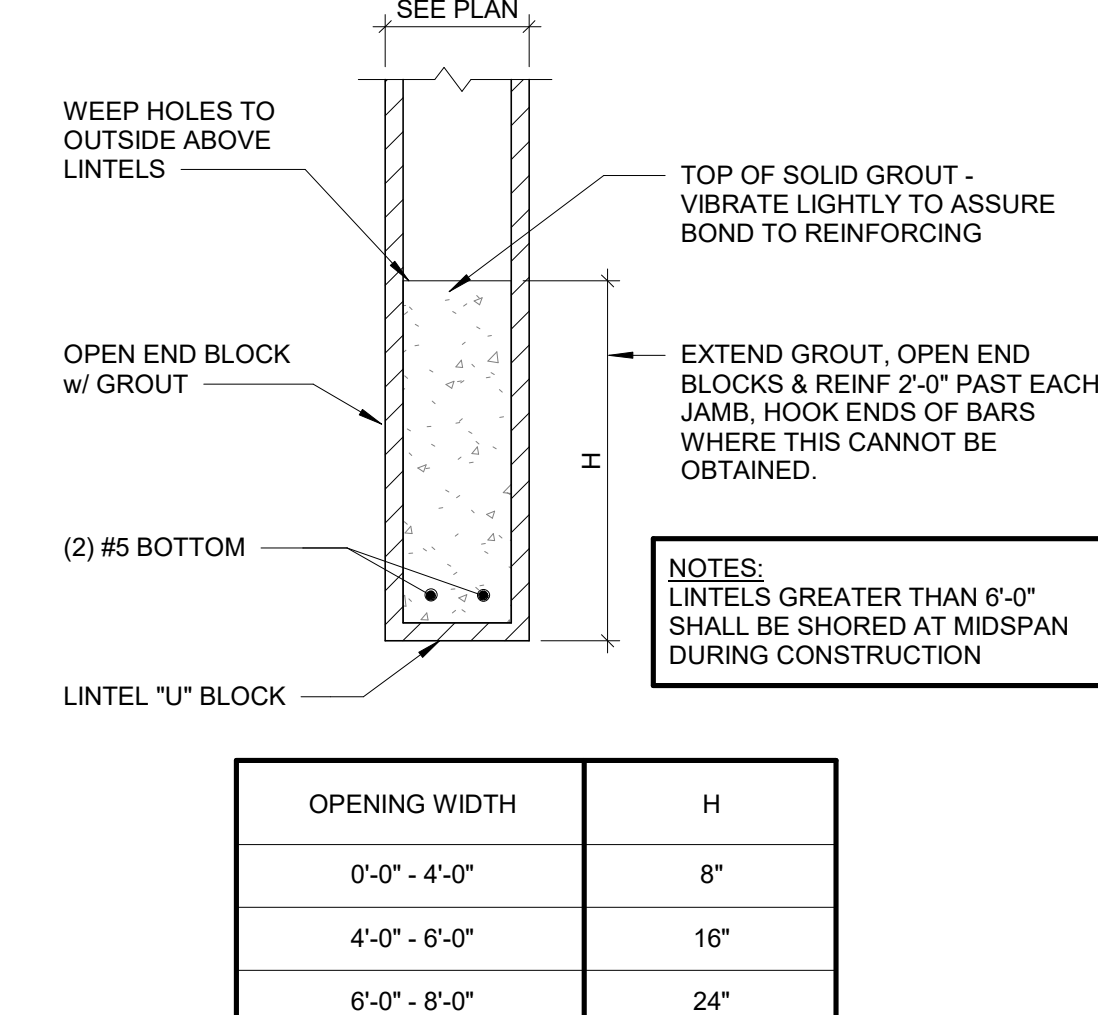
4 CMU DOOR OPENING - STEEL LINTEL
S401 3/8" = 1'-0"



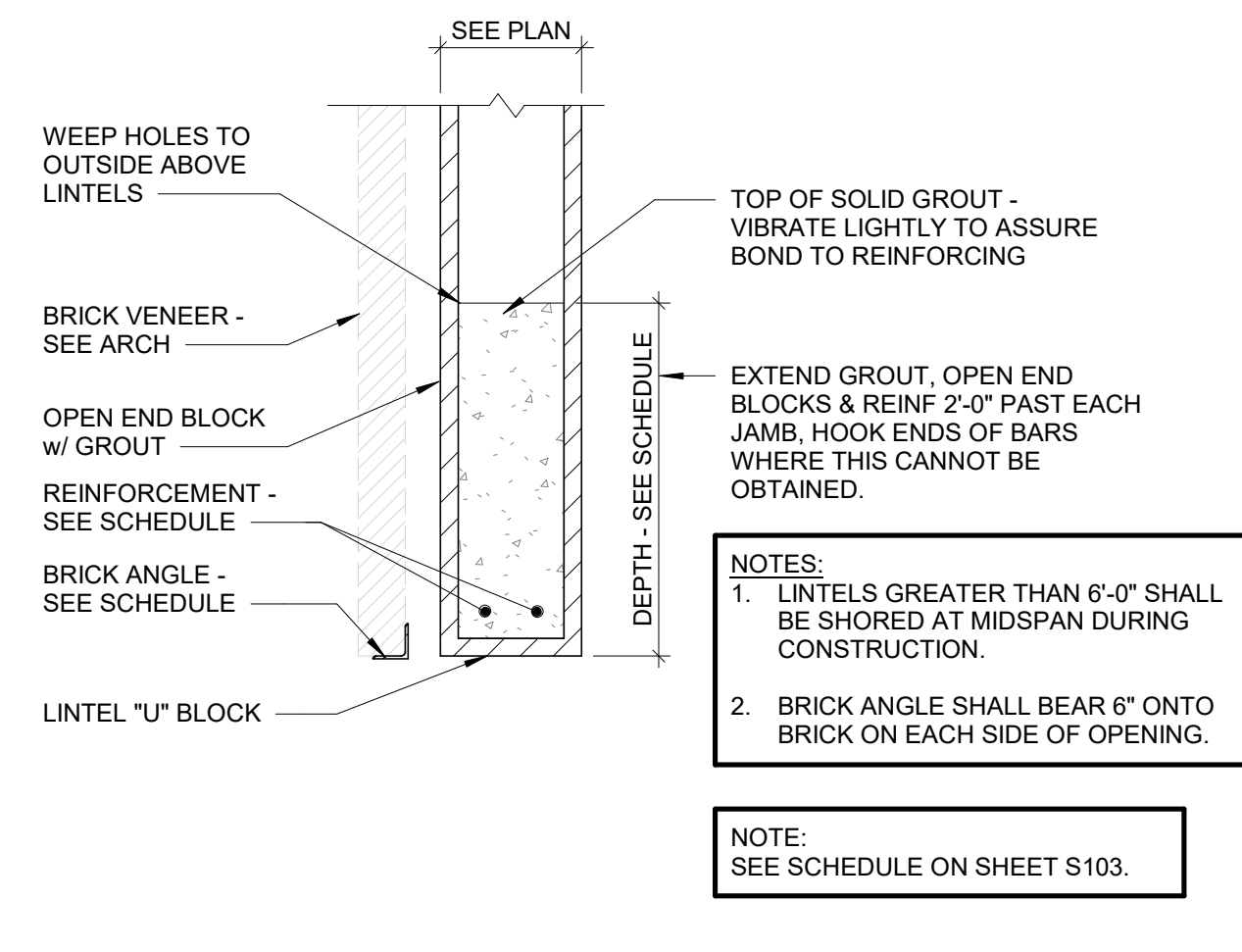
5 CMU OPENING - MASONRY LINTEL
S401 3/8" = 1'-0"



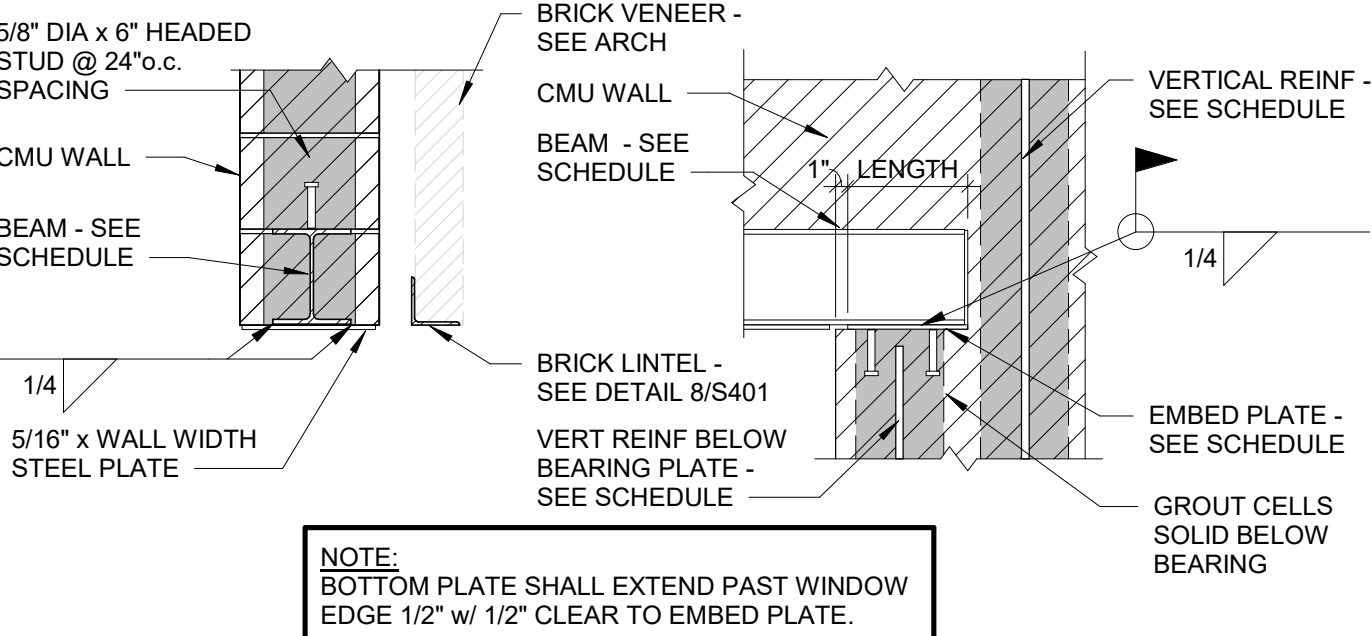
6 CMU DOOR OPENING - MASONRY LINTEL
S401 3/8" = 1'-0"



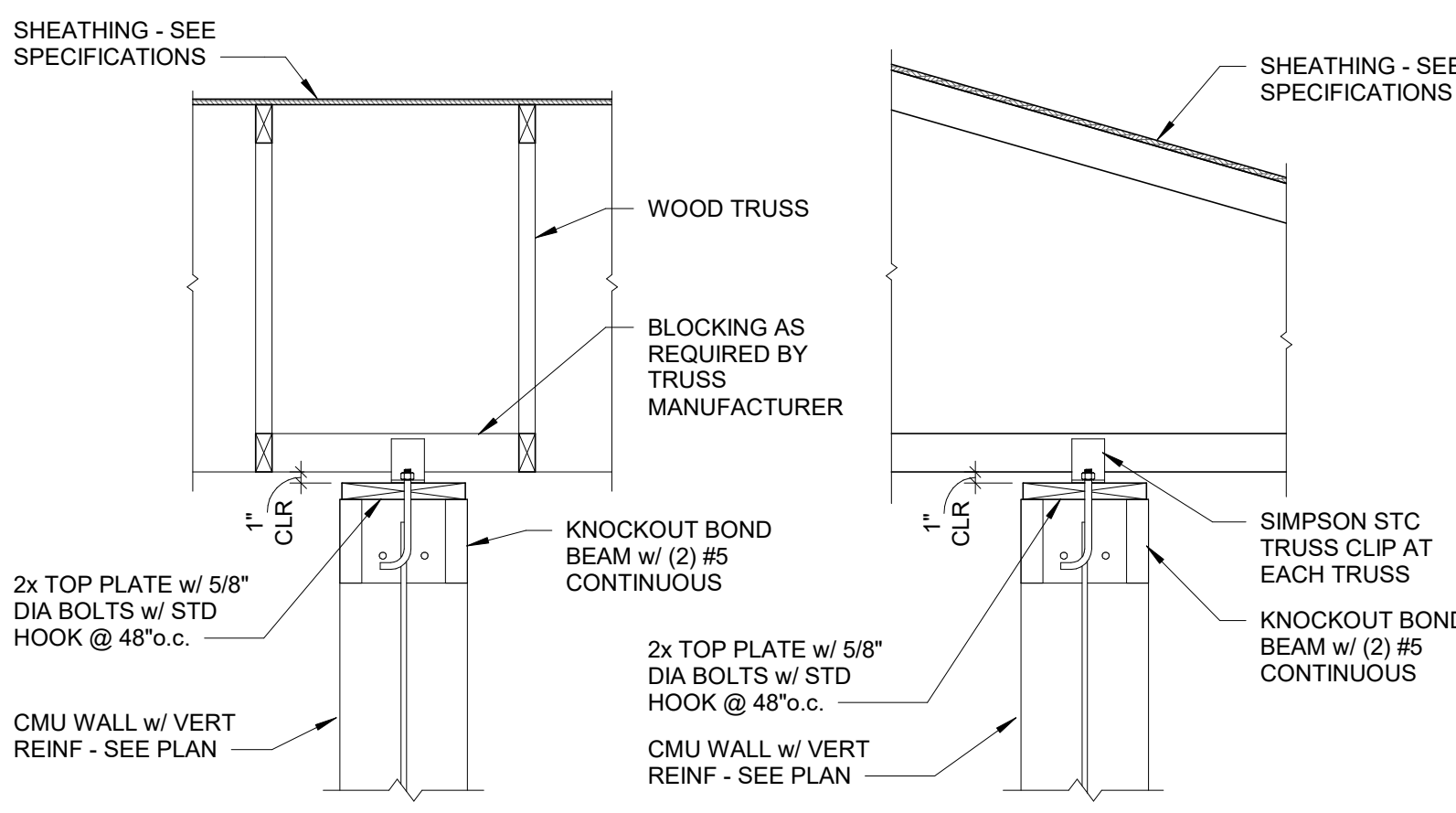
7 MASONRY LINTEL (NON-BRG WALLS)
S401 3/4" = 1'-0"



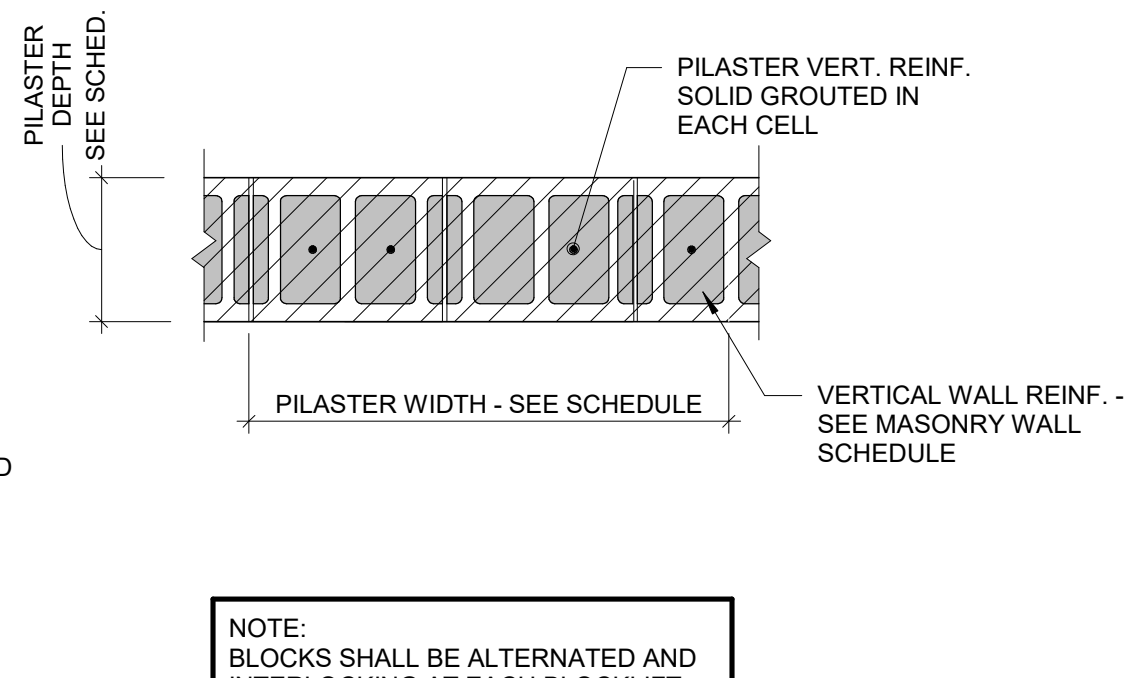
8 MASONRY LINTEL
S401 3/4" = 1'-0"



9 STEEL LINTEL DETAIL
S401 3/4" = 1'-0"

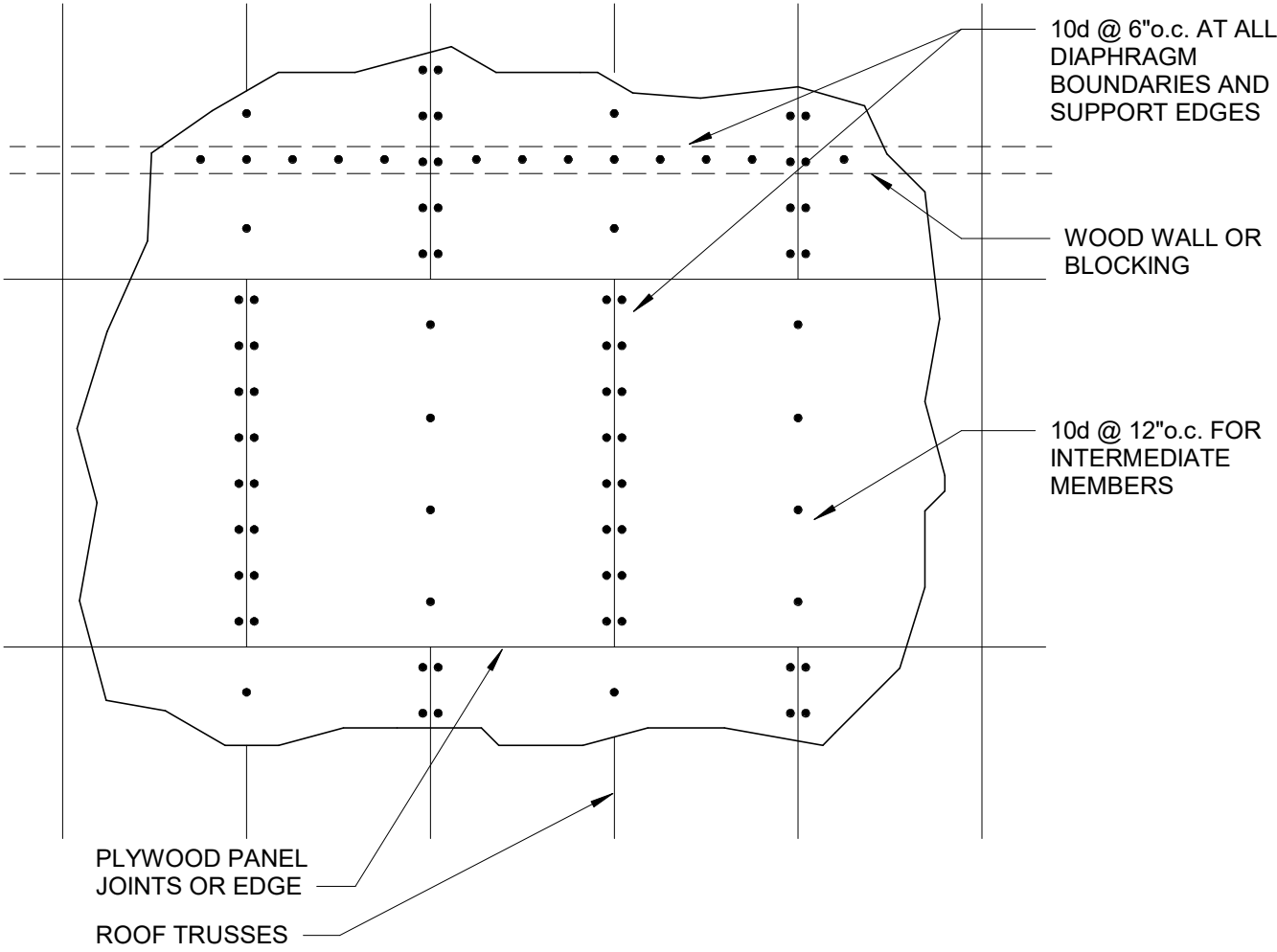


10 CMU WALL SUPPORT AT WOOD TRUSS
S401 3/4" = 1'-0"

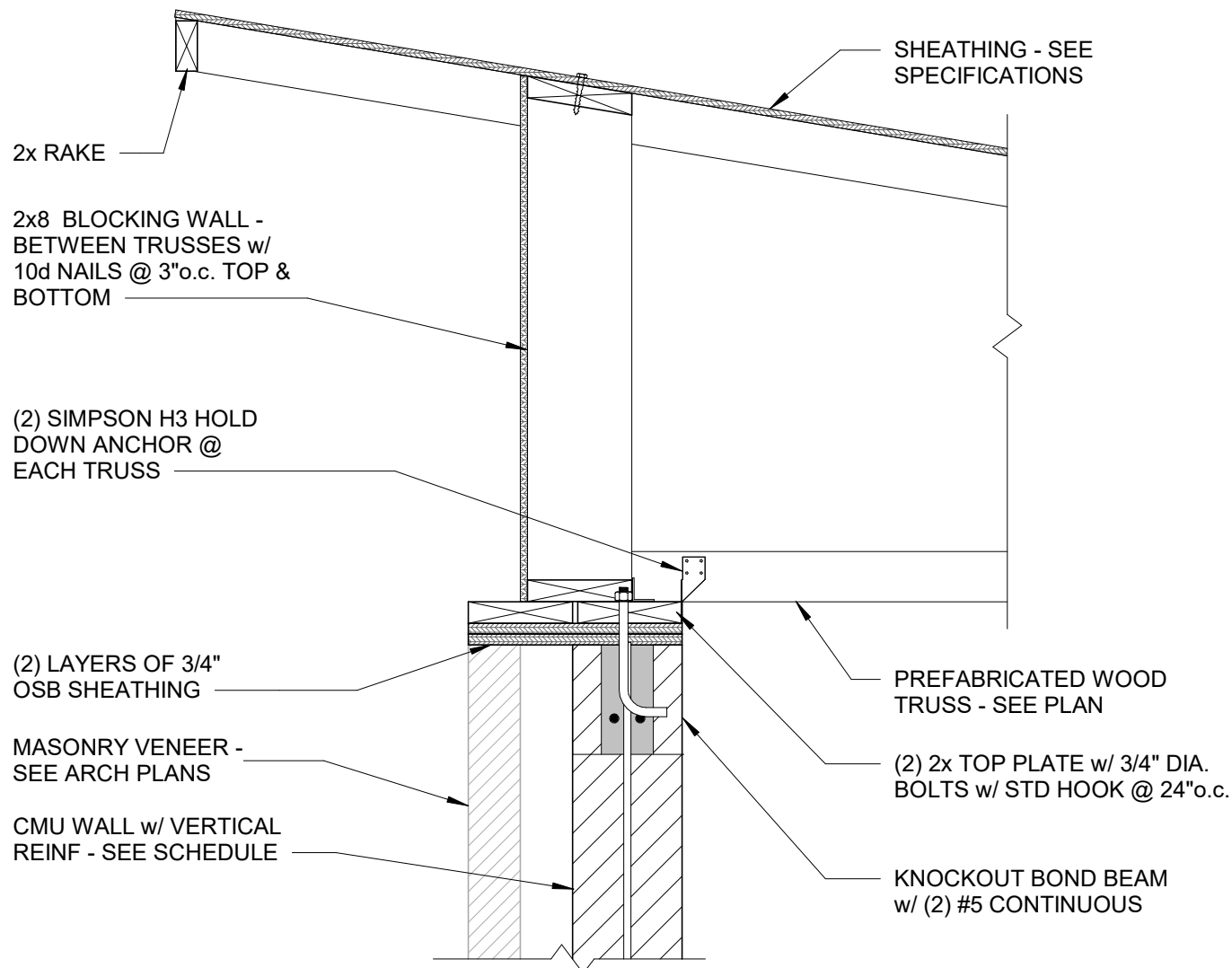


11 MASONRY PILASTER
S401 3/4" = 1'-0"

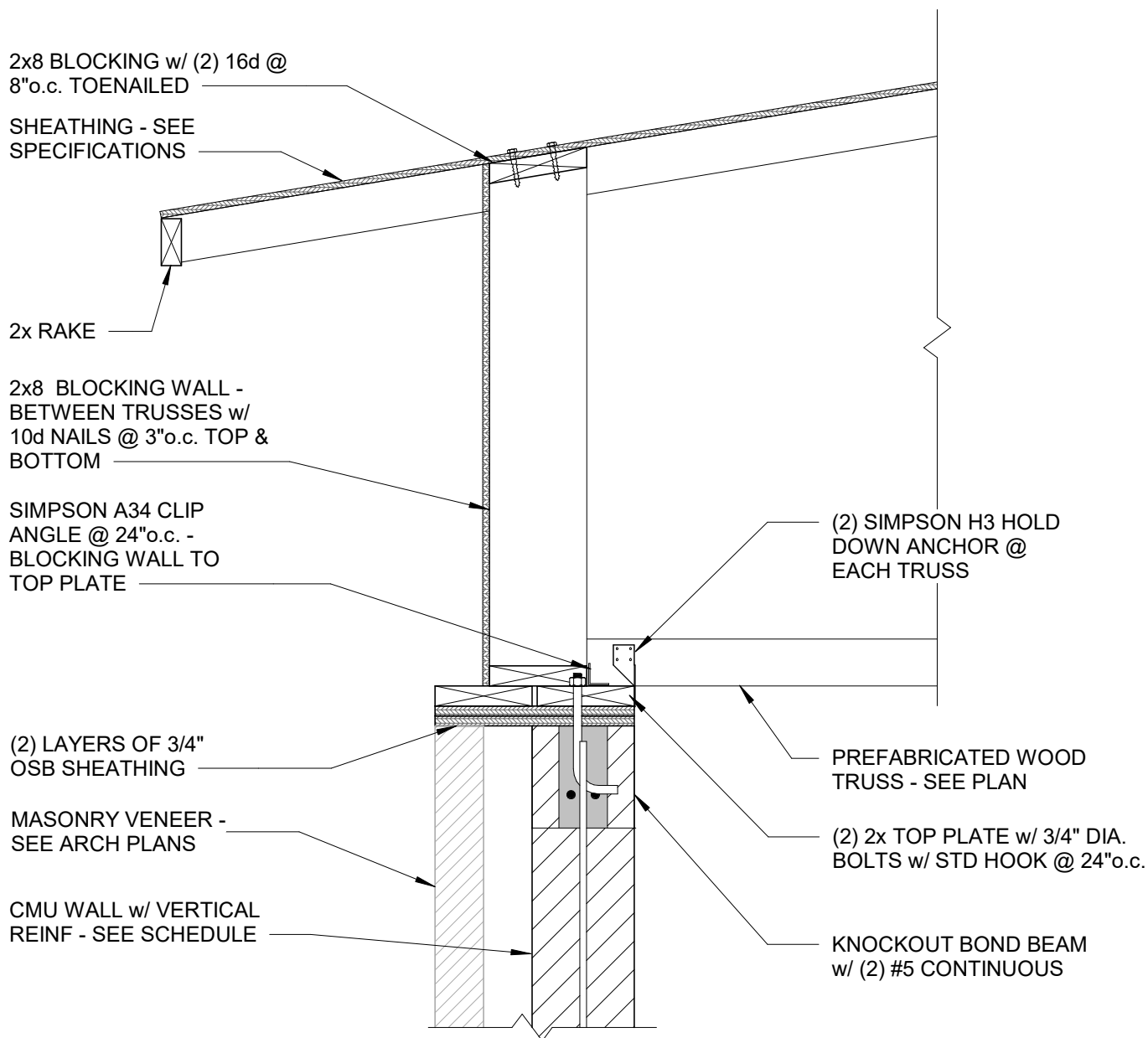
REVISION	DATE	NO.



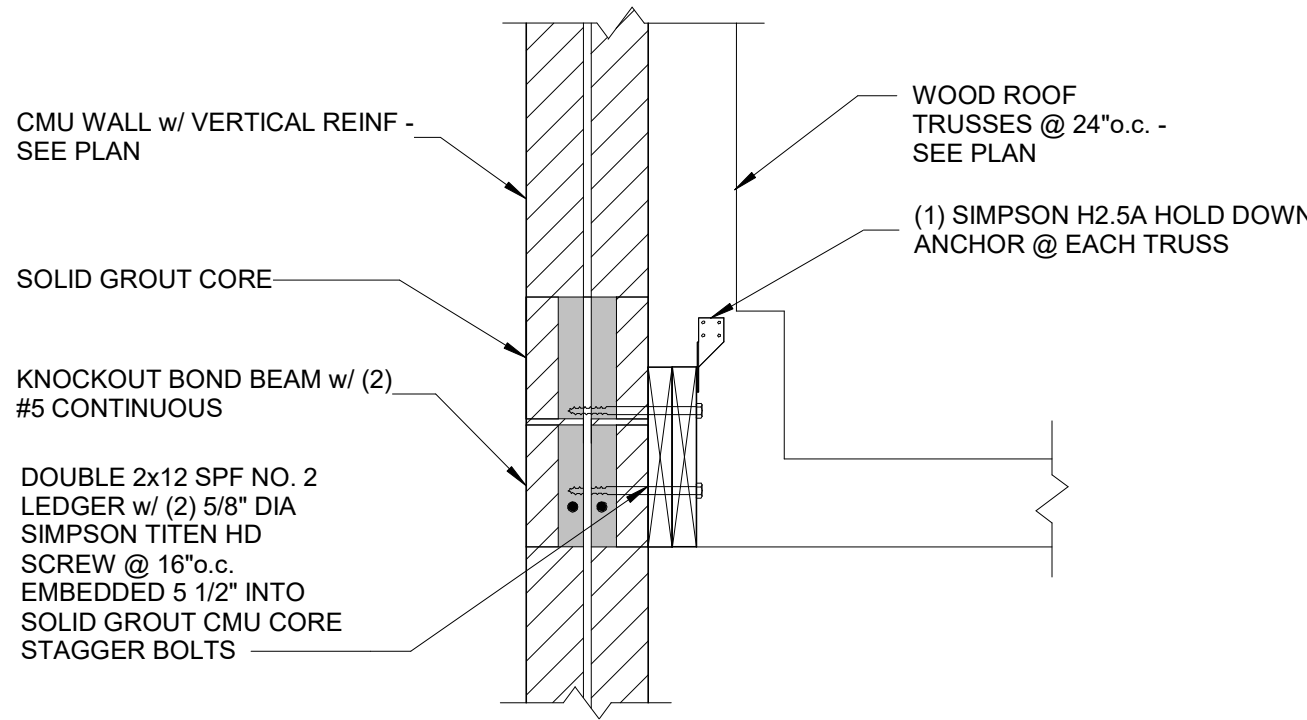
1 WOOD DIAPHRAGM NAILING
S501 NOT TO SCALE



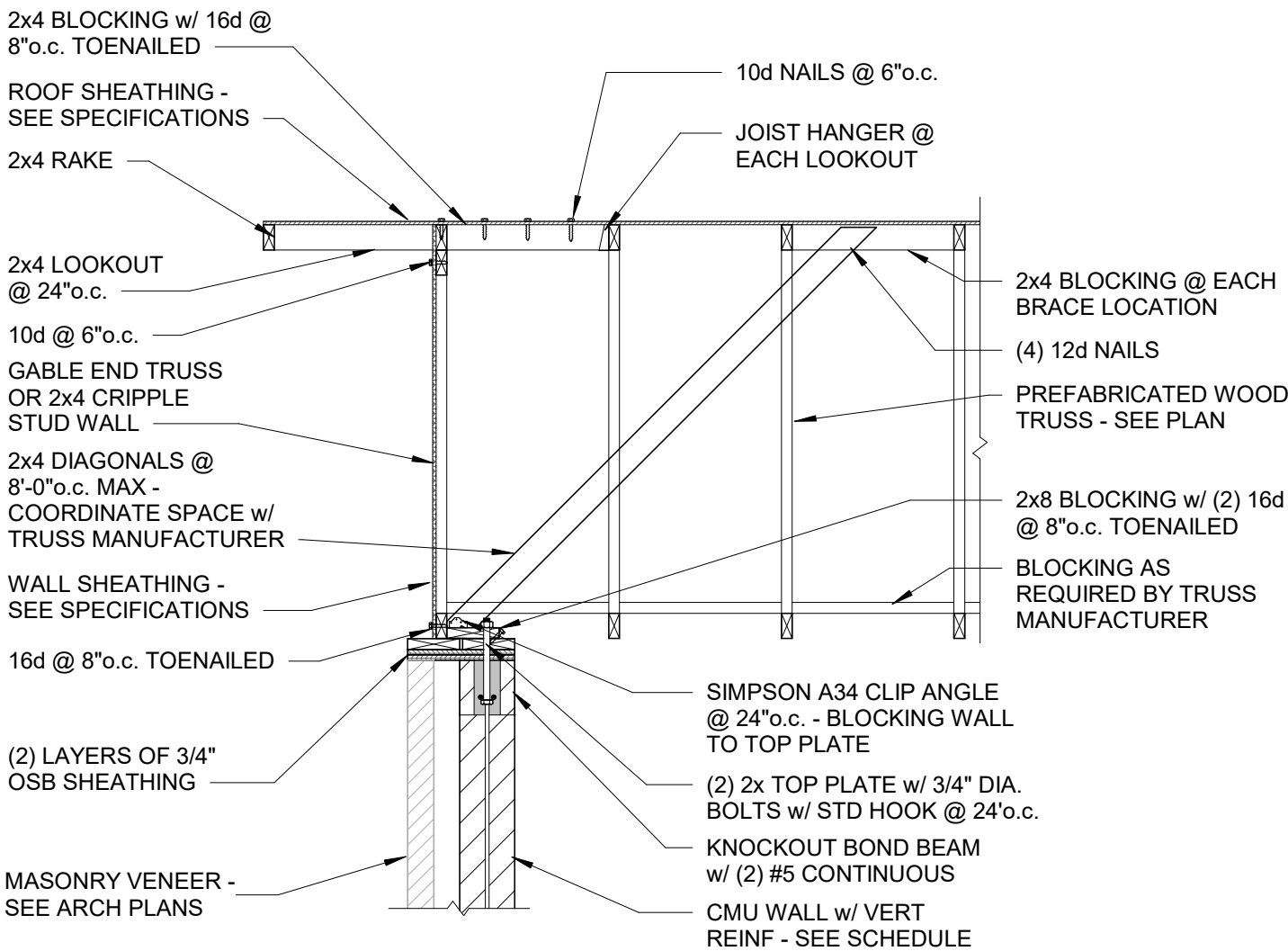
2 WOOD TRUSS BRG AT CMU WALL
S501 1" = 1'-0"



3 WOOD TRUSS BRG AT CMU WALL
S501 1" = 1'-0"



4 WOOD TRUSS BRG AT CMU WALL
S501 1" = 1'-0"



5 TRUSS TO WALL DETAIL AT RAKE
S501 1/2" = 1'-0"

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DATE

NO.

NELSON FAMILY PAVILION

CITY OF DE PERE 100 WILLIAMS ST, DE PERE, WI 54115

FRAMING DETAILS

DESIGNED: STK

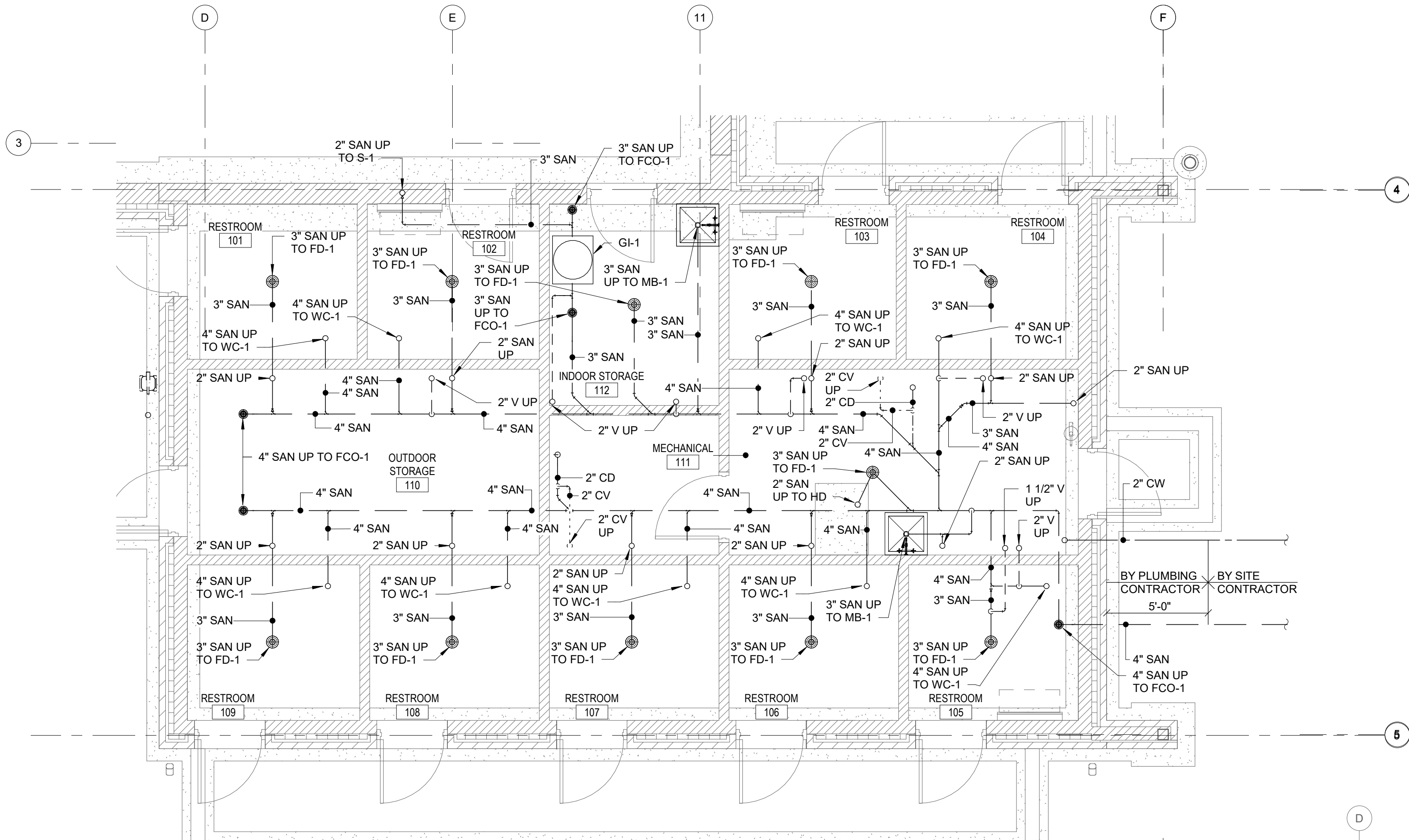
DRAWN: GYV

PROJECT NO. D0005-06-22-00146

DATE MARCH 10, 2023

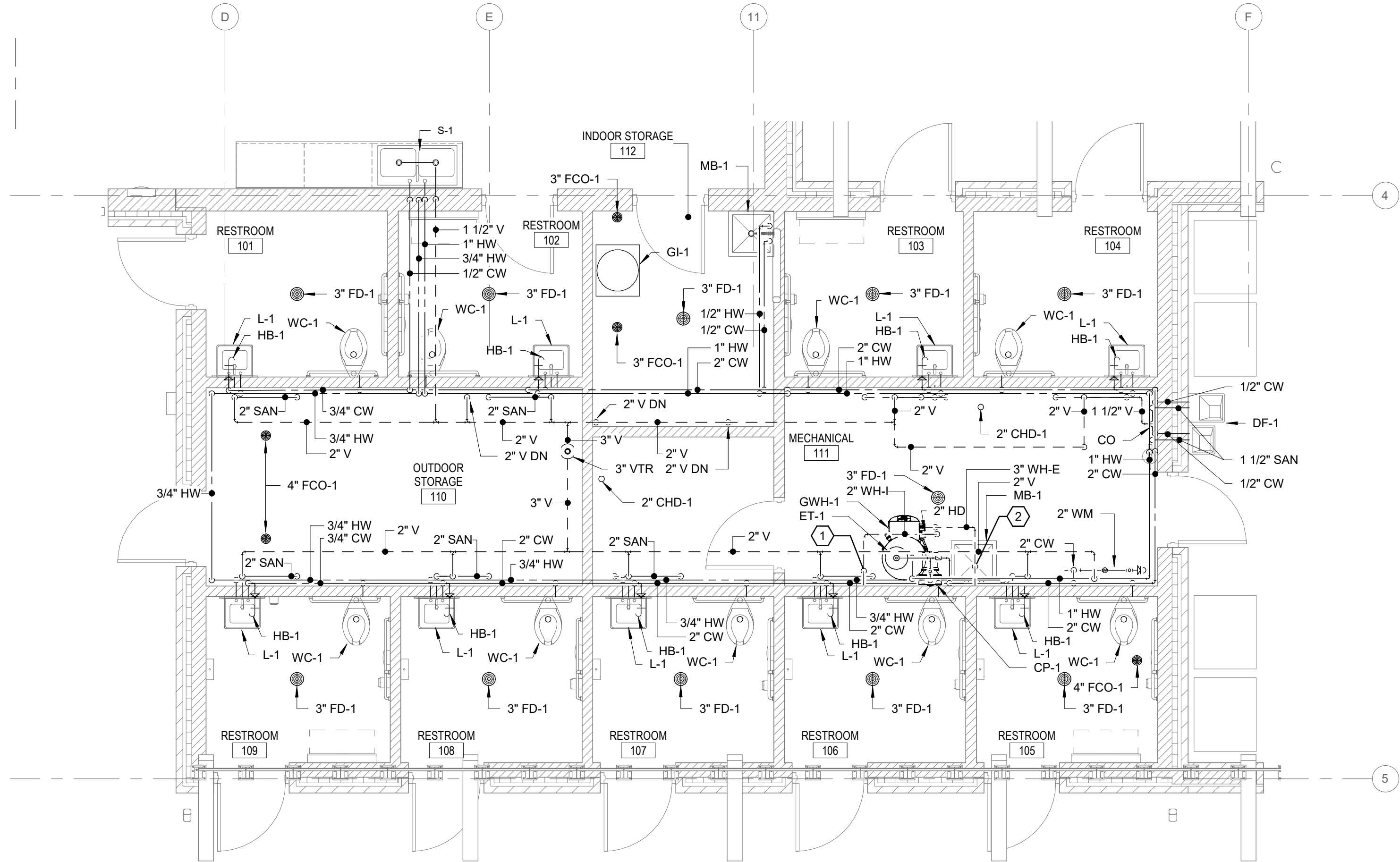
SHEET NO. S501

[illegible]



RESTROOM UNDERFLOOR PLUMBING PLAN
1
P102 1/4" = 1'-0"

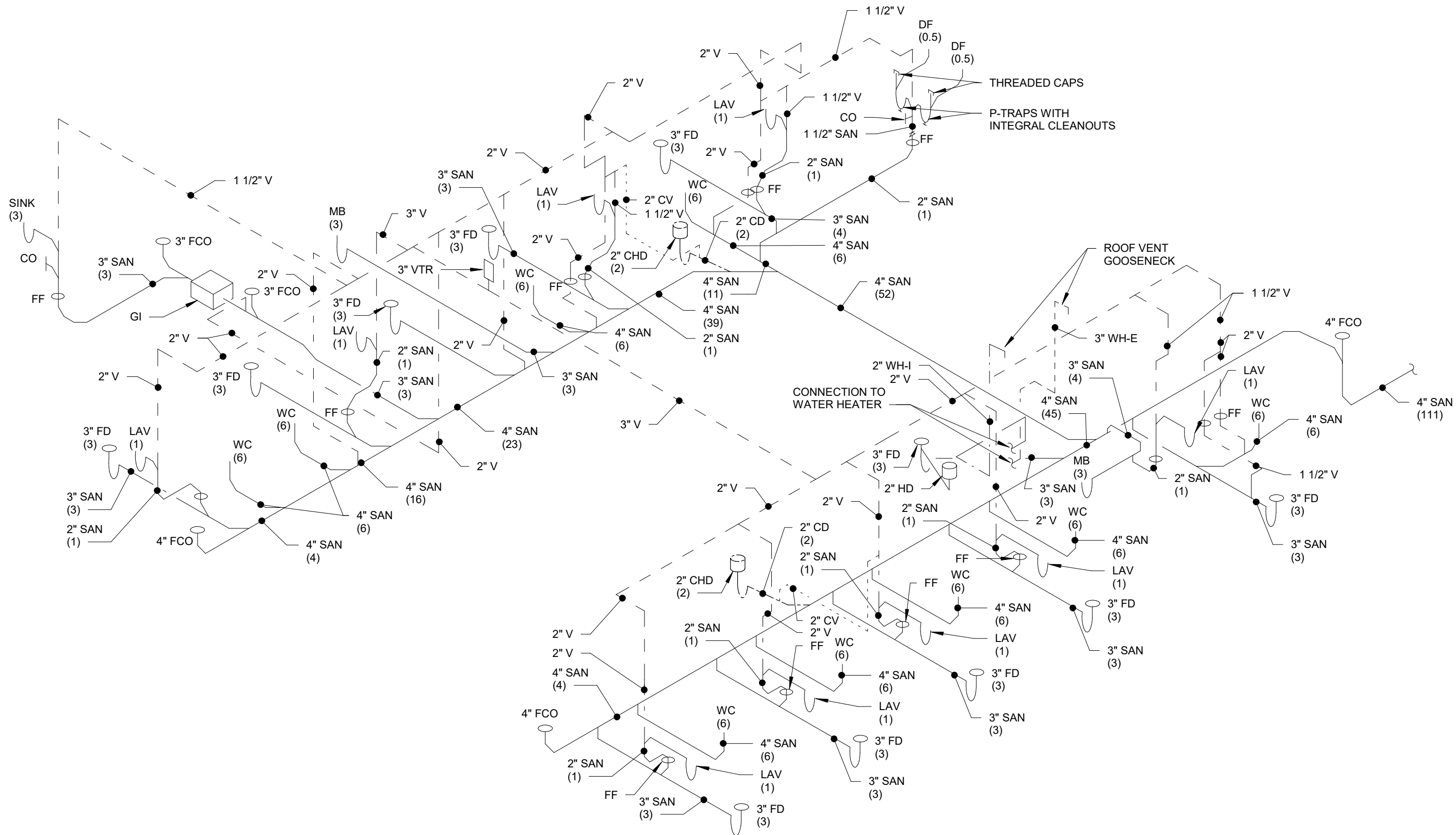
PLUMBING KEYNOTES	
Key Value	Keynote Text
1	2" PVC WATER HEATER INTAKE PIPE UP THROUGH ROOF TO GOOSENECK
2	3" CPVC WATER HEATER EXHAUST FLUE UP THROUGH ROOF TO GOOSENECK



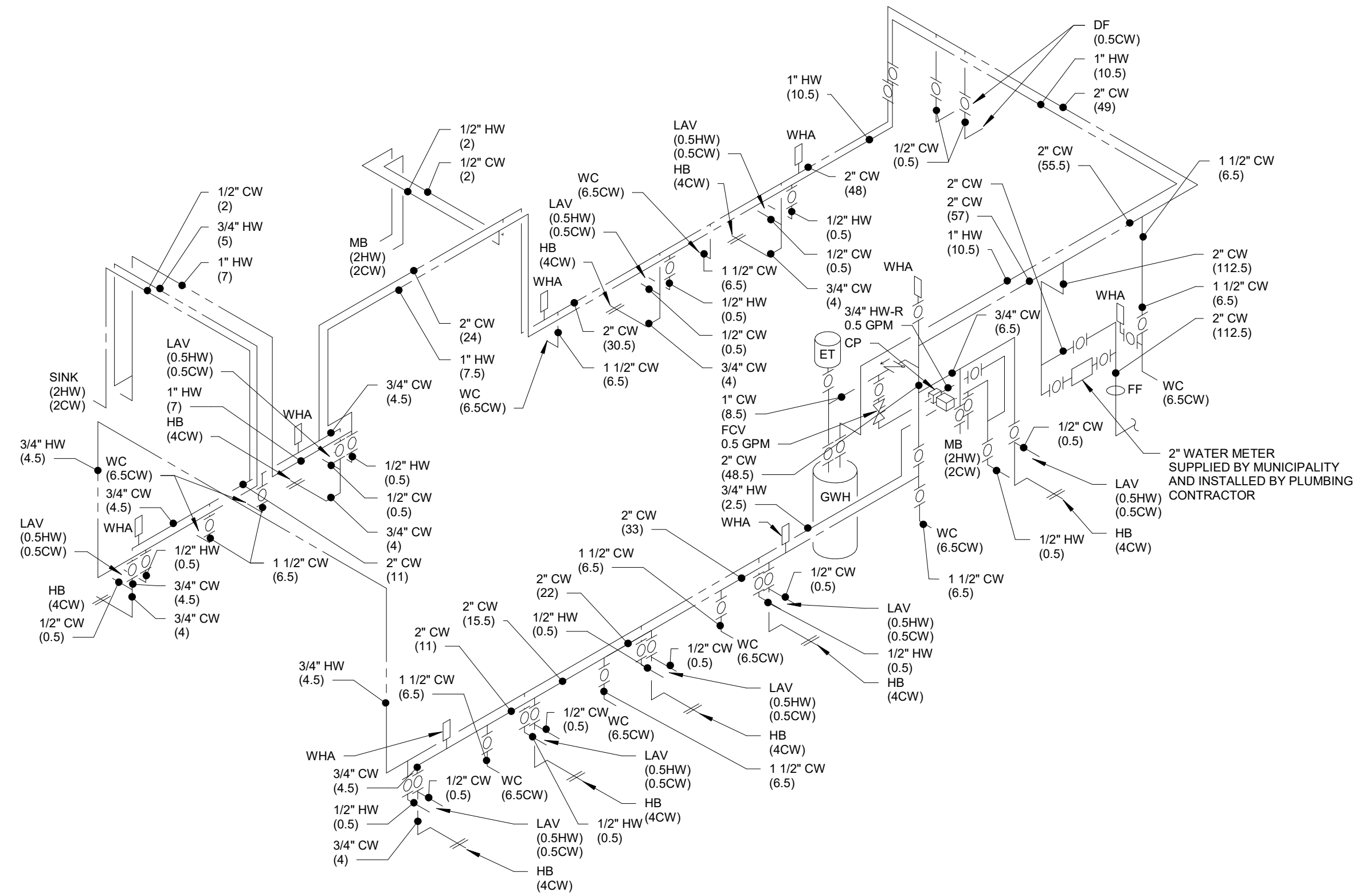
RESTROOM ABOVE FLOOR PLUMBING PLAN
2
P102 1/4" = 1'-0"

NO.	DATE	REVISION

DESIGNED ECE	DRAWN ZOP
PROJECT NO. D0005 06-22-00146	
DATE MARCH 10, 2023	
SHEET NO. P102	



2 WASTE & VENT RISER DIAGRAM
P901 NOT TO SCALE



1 DOMESTIC WATER RISER DIAGRAM
P901 NOT TO SCALE

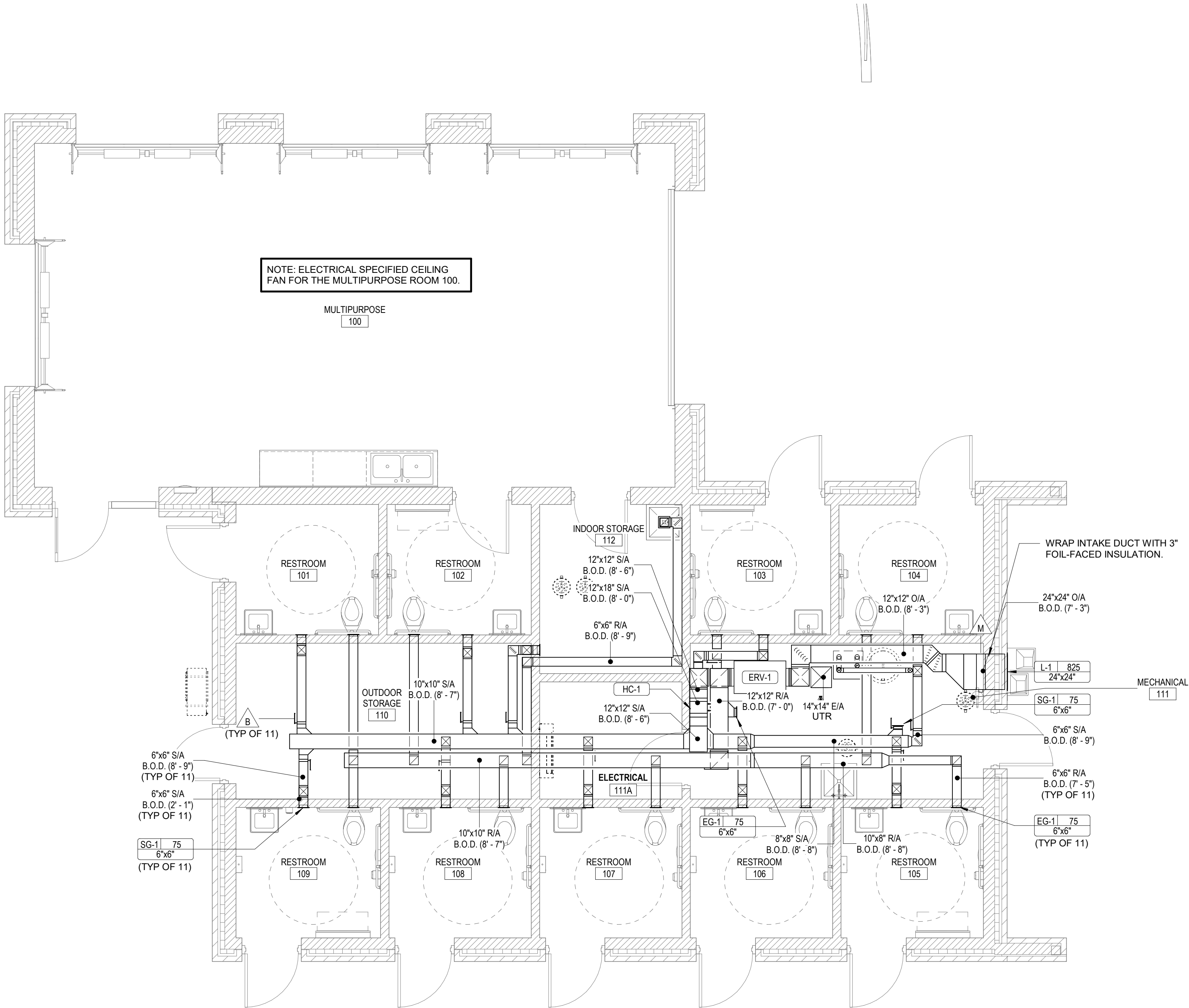
PROPOSED NEW FACILITY
CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115
RISER DIAGRAMS

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PROJECT NO. D0005 06-22-00146	
DATE MARCH 10, 2023	
SHEET NO. P901	

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DESIGNED JJF		DRAWN GTG	
PROJECT NO. D0005 06-22-00146			
DATE MARCH 10, 2023			
SHEET NO. H001			
NELSON FAMILY PAVILION CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115 HVAC TITLE SHEET			
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1 HVAC FIRST FLOOR PLAN
H201 1/4" = 1'-0"



NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115
HVAC FIRST FLOOR PLAN

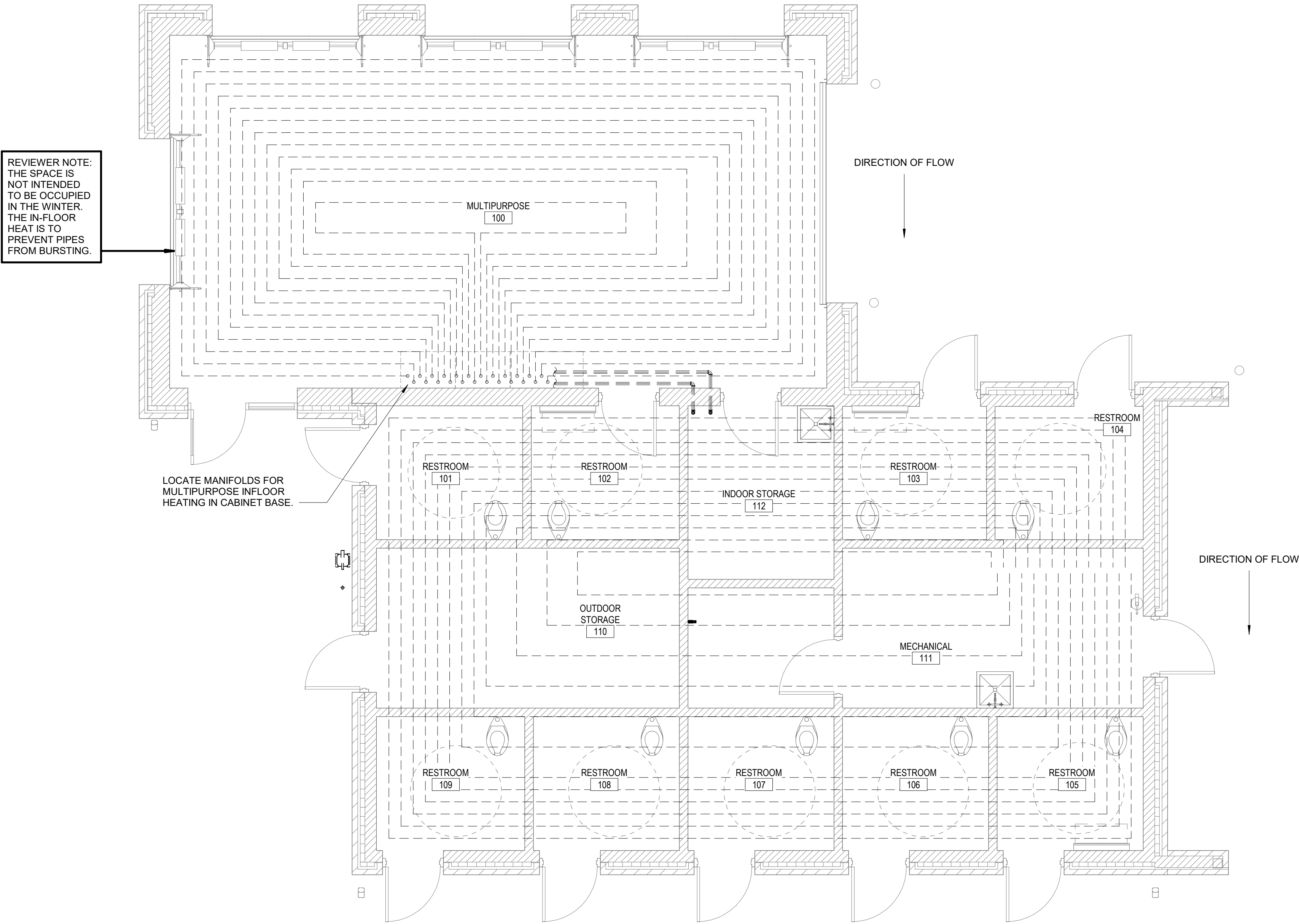
DESIGNED JUF	DRAWN GTG
PROJECT NO. D0005 06-22-00146	
DATE MARCH 10, 2023	
SHEET NO.	

H201

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1 HVAC UNDERGROUND PIPING PLAN
H202 1/4" = 1'-0"



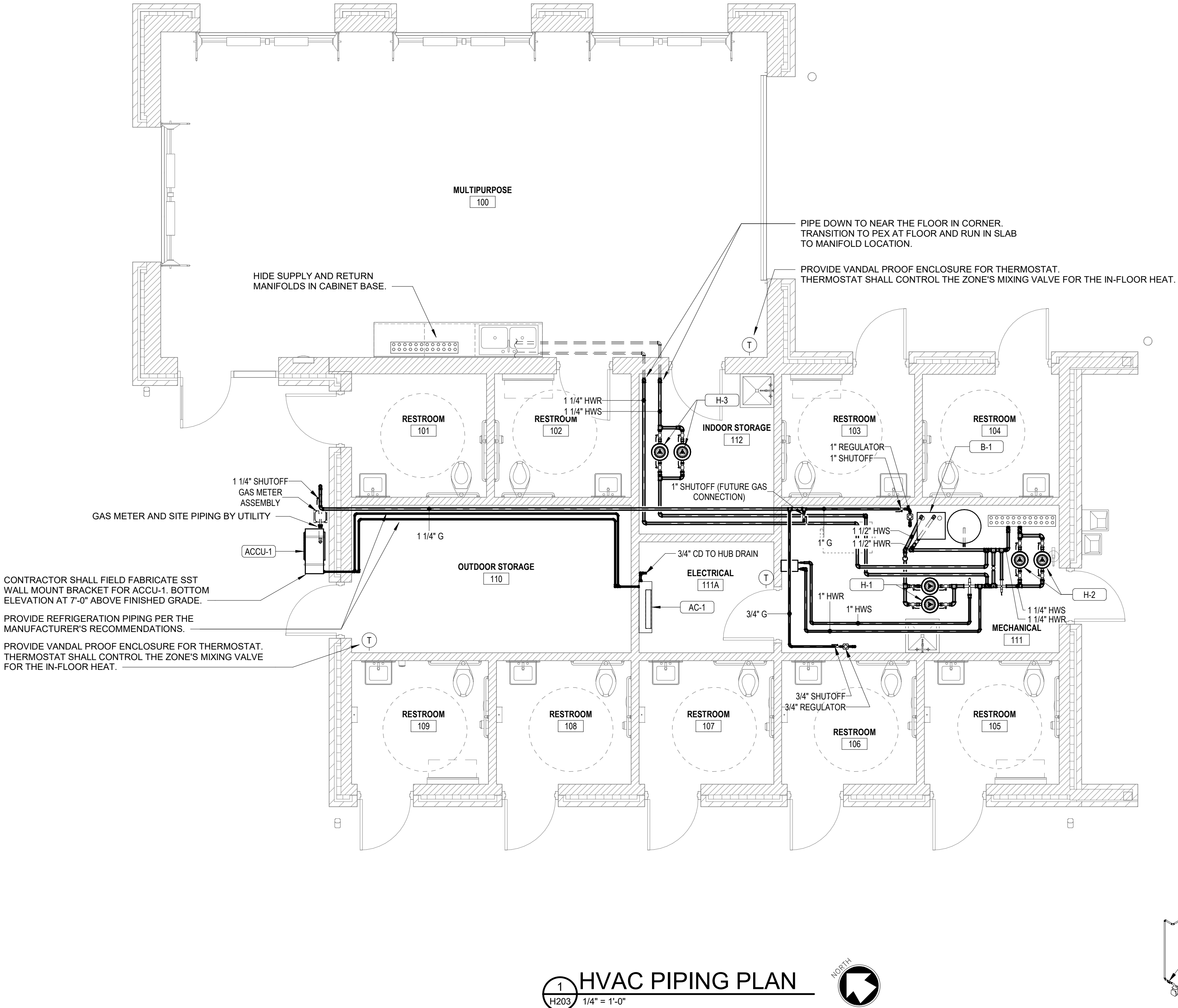
NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115
HVAC UNDERGROUND PIPING PLAN

DESIGNED JFJ	DRAWN GTG
PROJECT NO. D0005 06-22-00146	
DATE MARCH 10, 2023	
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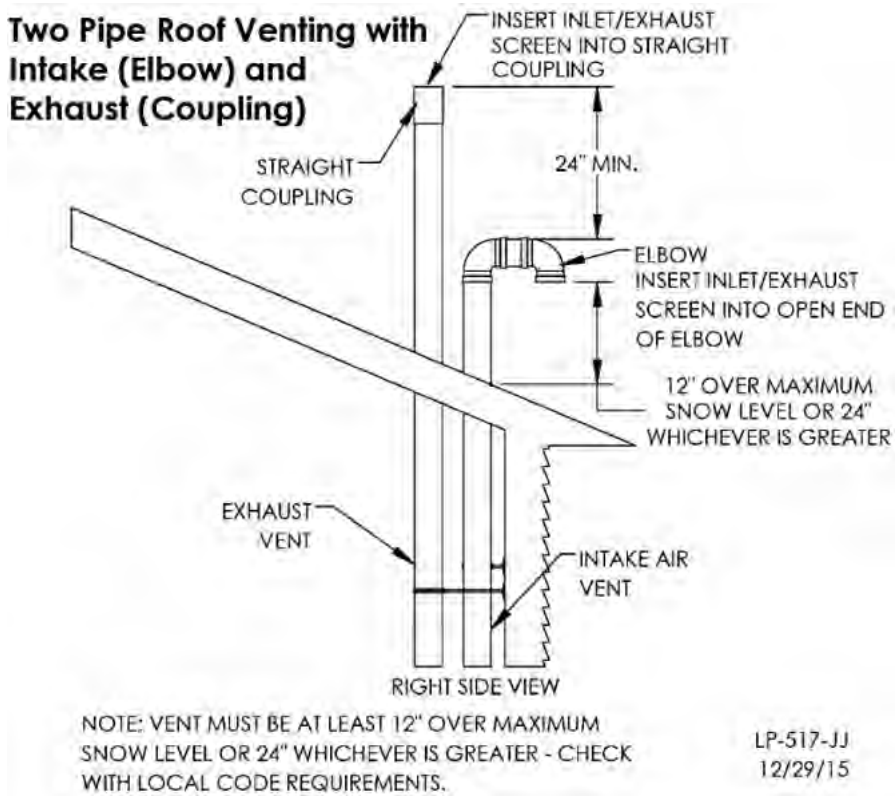
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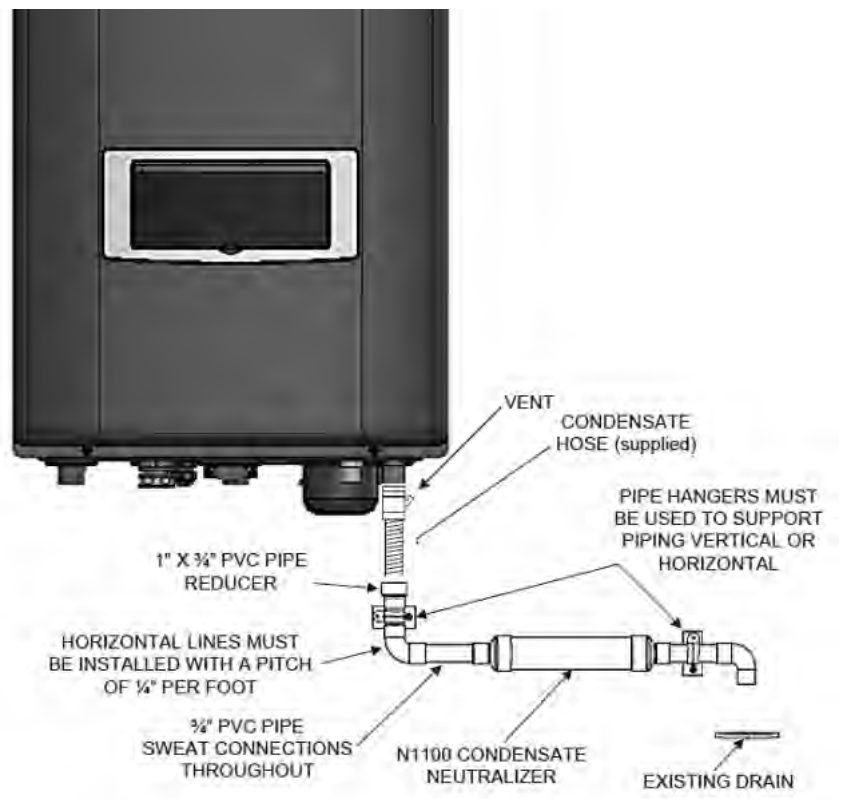
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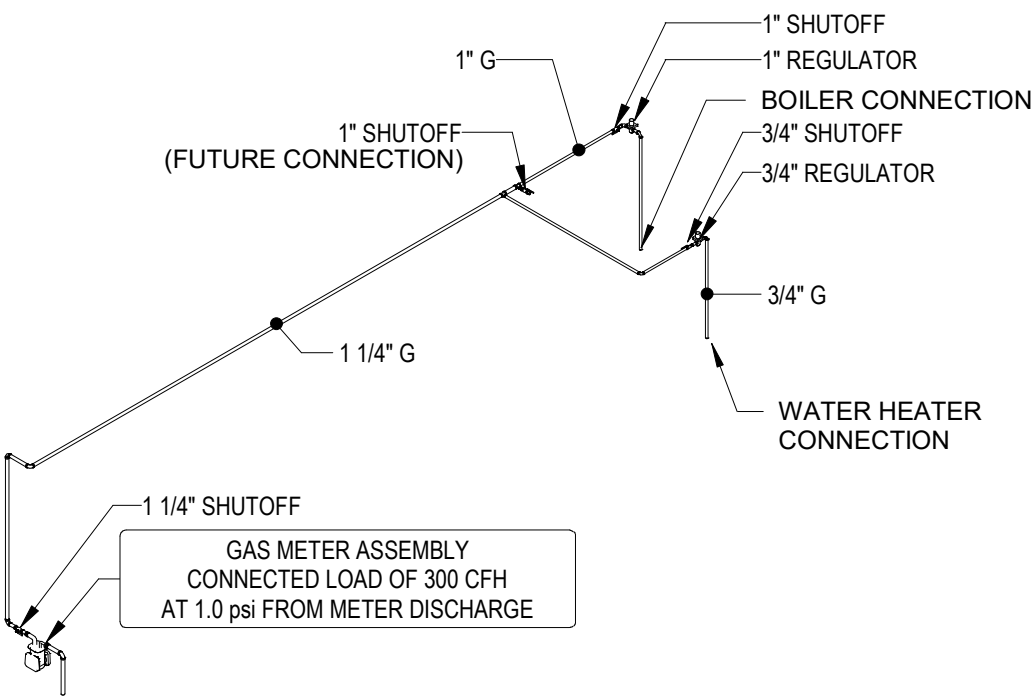
1 HVAC PIPING PLAN
H203 1/4" = 1'-0"



2 BOILER VENT DETAIL
H203 NOT TO SCALE



3 BOILER CONDENSATE DETAIL
H203 NOT TO SCALE



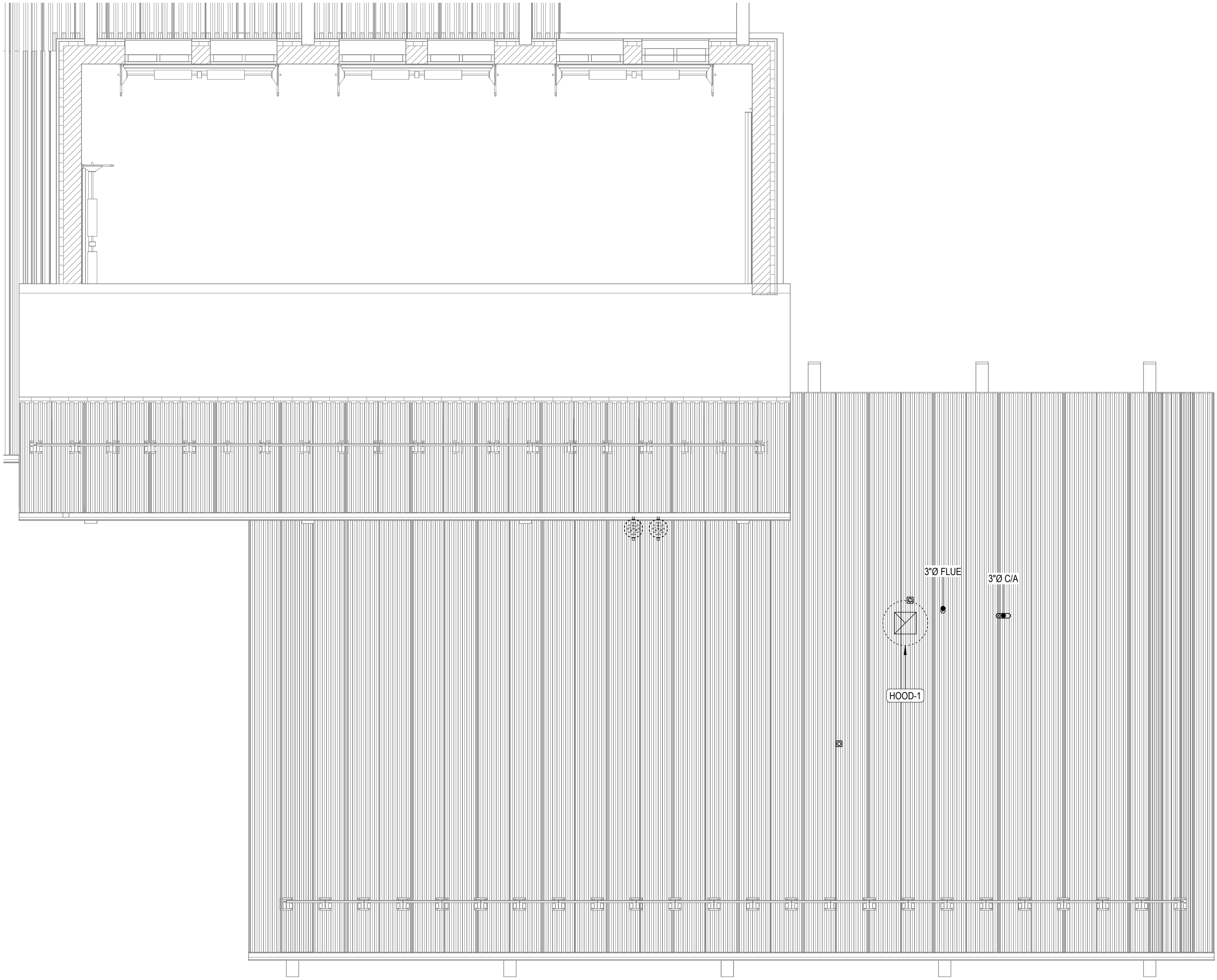
4 GAS RISER DIAGRAM
H203 NOT TO SCALE

NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115
HVAC PIPING PLAN

DESIGNED JJF	DRAWN GTG
PROJECT NO. D0005 06-22-00146	
DATE MARCH 10, 2023	
SHEET NO. H203	

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1 HVAC ROOF PLAN
H231 1/4" = 1'-0"



DESIGNED: JJF		DRAWN: GTG	
PROJECT NO. D0005 06-22-00146			
DATE MARCH 10, 2023			
SHEET NO. H231			

NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115
ROOF HVAC PLAN

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LOUVER AND HOOD SCHEDULE											
TAG	LOCATION	SERVICE	MATERIAL	FINISH	ACCESSORIES	FREE AREA	FREE AREA VELOCITY	DIM W X H	OPENING DIM W X H	MANUFACTURER AND MODEL	REMARKS
L-1	MECH. 111	ERV-1 O/A	ALUMINUM	BY ARCH.	VCD-23 MD W/ 24 VAC ACTUATOR	1.8 SQFT	453	23.75" SQ.	24" SQ.	GREENHECK: ESD 635	1,3
HOOD-1	MECH. 111	ERV-1 E/A	ALUMINUM	BY ARCH.	BACKDRAFT DAMPER, CURB	1 SQFT	-	29" DIA.	14.5" SQ.	GREENHECK: GRSR-12	1,2,3

REMARKS: 1. SEE DRAWINGS FOR LOCATION.
2. PROVIDE SLOPED CURB. GC SHALL VERIFY SLOPE PRIOR TO PURCHASE OF UNIT.
3. FINISH WILL BE SELECTED FROM STANDARD COLORS BY ARCHITECTECT OR OWNER.

REGISTER/ GRILLE SCHEDULE							
TAG	TYPE	DESCRIPTION	MATERIAL	FINISH	ACCESSORIES	MANUFACTURER AND MODEL	REMARKS
SG-1	SUPPLY	WALL SUPPLY GRILLE	STEEL	BY ARCH.	45" DOUBLE DEFLECTION GRILLE & OBD	NAILOR: 61DH-DD	1,2
EG-1	EXHAUST	WALL EXHAUST GRILLE	STEEL	BY ARCH.	45" BLADES & OBD	NAILOR: 6145H	1,2

REMARKS: 1. SEE DIFFUSER TAGS FOR GRILLE SIZE.
2. FINISH WILL BE SELECTED FROM STANDARD COLORS BY ARCHITECTECT OR OWNER.

AIR COOLED CONDENSING UNIT SCHEDULE (SPLIT SYSTEM)												
TAG	LOCATION	UNIT SERVED	MAXIMUM OPERATING TEMP. °F	REJECTION CAPACITY BTU/HR	ELECTRICAL DATA					UNIT WEIGHT (LBS)	MANUFACTURER AND MODEL	REMARKS
					V	PH	MCA	MOCP	EER			
ACCU-1	WALL	AC-1	115	9,000	230	1	7	15	15.4	81	MITSUBISHI: NTYSST09A112A	1,2,3

REMARKS: 1. PROVIDE FULLY PACKAGED CONTROLS BY MANUFACTURER FOR A COMPLETE SYSTEM. COORDINATE WITH AC-1.
2. PROVIDE ALL NECESSARY REFRIGERANT PIPING TO AC-1, SIZED PER MANUFACTURER'S RECOMMENDATIONS.
3. CONTRACTOR SHALL FIELD FABRICATE STAINLESS STEEL WALL MOUNTING BRACKET. MOUNT TO EXTERIOR WALL AT AN ELEVATION OF 7'-0" ABOVE FINISHED GRADE. PROVIDE CLEARANCES AS RECOMMENDED BY MANUFACTURER.

AIR CONDITIONING UNIT SCHEDULE													
TAG	LOCATION	CFM	COOLING CAPACITY (BTU/HR)	UNIT MOUNTING DATA			ELECTRICAL DATA			REFR. TYPE	MANUFACTURER AND MODEL	REMARKS	
				WALL	CEILING	FLOOR	V	PH	HZ				MCA
AC-1	ELECTRICAL 111A	399	9,000	X			230	1	60	15	R-410A	MITSUBISHI: NTYWST09A112A	1,2,3

REMARKS: 1. PROVIDE CONDENSATE DRAIN TO NEAREST HUB DRAIN. SEE PLUMBING SHEETS.
2. PROVIDE DIGITAL WALL-MOUNTED THERMOSTAT.
3. PROVIDE REFRIGERANT PIPING, SIZED PER MANUFACTURER'S RECOMMENDATIONS.

BOILER SCHEDULE (CONDENSING)																		
TAG	LOCATION	INPUT MBH	OUTPUT MBH	EFF	FLUID	RELIEF VALVE SETTING	CONTROL	VENT SIZE	GAS TYPE	ELECTRICAL DATA					EMPTY WEIGHT (LBS)	DIM. D x W x H	MANUFACTURER AND MODEL	REMARKS
										VOLT	PH	FLA	MCA	MOCP				
B-1	MECH. 111	199	181.3	95%	20% PG	30.0 psi	MODULATING 10:1	3"	NG	120	1	<12 A	-	-	152	17" x 23" x 40"	IBC: SL SERIES G3 199 SL	1,2,3,4

REMARKS: 1. PROVIDE AN ACID-NEUTRALIZING BASIN PRIOR TO DISCHARGE TO A DRAIN IN THE MECHANICAL ROOM.
2. MOUNT BOILER TO WALL. COORDINATE WITH GENERAL CONTRACTOR.
3. PROVIDE FULLY PACKAGED CONTROLS BY MANUFACTURER.
4. PROVIDE A B&G MODEL D-80V EXPANSION TANK.

ENERGY RECOVERY VENTILATION UNIT (ERV) SCHEDULE																				
TAG	LOCATION	AREA SERVED	OUTSIDE AIR CFM	SUPPLY FAN		EXHAUST FAN		ELECTRICAL DATA					UNIT DIMENSIONS			FILTERS	UNIT WT. LBS	THERMAL EFF	MANUFACTURER AND MODEL	REMARKS
				HP	ESP IN. WC	HP	ESP IN. WC	VOLTS	PH	FLA	MCA	MOCP	L	W	H					
ERV-1	MECH. 111	MECH. AND RESTROOMS	825	3/4	0.75	3/4	0.75	230	1	4.5 A	10.1 A	15.0 A	35"	24"	51"	MERV 8	272	66%	RENEWAIRE: HE 1XINV	1,2,3

REMARKS: 1. UNIT SHALL COME COMPLETE WITH DIGITAL PROGRAMMABLE TIME-CLOCK, MERV 8 FILTERS, MOTORIZED ISOLATION DAMPERS, SPEED CONTROL, AND DISCONNECT.
2. PROVIDE FULL PACKAGED CONTROLS BY MANUFACTURER. UNIT SHALL RUN CONTINUOUSLY WHEN SHELTER IS 'OPEN'.
3. ALL FANS SHALL BE INTERNALLY ISOLATED BY EQUIPMENT MANUFACTURER UTILIZING SPRING ISOLATORS.
4. PROVIDE 24" STAND FOR UNIT.

PUMP SCHEDULE															
TAG	LOCATION	SERVICE	TYPE	FLUID TYPE	GPM	HEAD (FT)	MOTOR DATA							MANUFACTURER AND MODEL	REMARKS
							HP	RPM	VOLT	PH	FLA	MCA	MOCP		
H-1A H-1B	MECH. 111	BOILER	INLINE	20% PG	18	10	1/6	3300	120	1	1.4	-	-	BELL & GOSSETT PL 36	1,3,4
H-2A H-2B H-3A H-3B	MECH. 111 STOR. 112	IN-FLOOR	INLINE	20% PG	12	14	1/12	2650	120	1	1.4	-	-	BELL & GOSSETT PL 30	2,3,4

REMARKS: 1. BOILER COMES COMPLETE WITH CAPABILITY OF CONTROLLING PUMP H-1.
2. PUMP H-2 SHALL ENERGIZE WHEN OUTSIDE AIR TEMPERATURES DROP BELOW 55 DEGREES F AND SHALL RUN CONTINUOUSLY.
3. PROVIDE SPRING VIBRATION ISOLATION HANGERS.
4. H.C. SHALL PROVIDE DISCONNECTS AND TURN OVER TO E.C. FOR INSTALLATION.

HEATING COIL SCHEDULE (HOT WATER)													
TAG	LOCATION	HTG. CFM	SIZE	CONTROL VALVE	HEATING COIL						EWT °F	LWT °F	MANUFACTURER AND MODEL
					EAT °F	LAT °F	BTUH	GPM	ROWS				
HC-1	MECH. 111	800	12"x18"	3-WAY	36	96	51432	8	4		130	116	RAE CORP.: 58W12X18-8-4-W-H-R

GENERAL NOTES:

- CONTRACTOR SHALL PROVIDE COMPLETE CONTRACTING SERVICES INCLUDING HEATING, VENTILATING AND AIR-CONDITIONING WORK, AND CONTROL WORK.
- ALL WORK SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE OF COMPLETION.
- PROVIDE FLEXIBLE CONNECTORS BETWEEN ALL MOTORIZED EQUIPMENT AND ITS ASSOCIATED DUCTWORK SYSTEM.
- VERIFY LOCATION OF ALL THERMOSTATS.
- DO NOT FABRICATE DUCTWORK WITHOUT FIELD CHECKING CLEARANCES.
- HVAC CONTRACTOR SHALL BE RESPONSIBLE FOR ALL GAS PIPING ASSOCIATED WITH THIS PROJECT.
- GAS PIPING SHALL BE BLACK IRON SCHEDULE 40 WITH GAS COCK AND DIRT LEG AT EACH APPLIANCE.
- ALL HOT WATER PIPING SHALL BE WRAPPED WITH 1-1/2" THICK PIPE INSULATION APPLIED PER CODE AND MFR RECOMMENDATIONS.
- ALL DUCTWORK SHALL BE PRIME FIRST QUALITY GALVANIZED STEEL SHEETS. GAUGES OF METAL, SUPPORT SPACING, ETC. SHALL CONFORM TO THE LATEST EDITION OF ASHRAE AND SMACNA CONSTRUCTION STANDARDS.
- ALL RECTANGULAR DUCTWORK SHALL UTILIZE A TDC OR DUCTMATE CONNECTING SYSTEM.
- ALL MANUAL VOLUME DAMPERS SHALL BE MULTI-BLADE CONTROL DAMPERS (WHERE DUCT SIZES ALLOW).
- SEAL ALL DAMPER FRAMES AND DUCTWORK.
- HEATING CONTRACTOR SHALL MOUNT ALL ELECTRIC HEATING UNITS.
- ALL SUPPLY DUCT TAKE-OFFS SHALL BE 45 DEGREE OR WITH CONICAL TEE.
- THE E.C. IS RESPONSIBLE FOR PROVIDING ALL WIRING 115/1 VOLT AND HIGHER. THIS CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL LOW VOLT CONTROL WIRING AND THERMOSTATS.
- THE ENGINEER IS NOT RESPONSIBLE FOR THE MEANS AND METHODS OF CONSTRUCTION OR THE SAFETY OF THE JOB SITE, AND THAT THESE RESPONSIBILITIES ARE INTENDED AND REMAIN SOLEY THOSE OF THE CONTRACTOR.
- FLEX DUCT, WHERE USED, MAY NOT EXCEED 4'-0" IN LENGTH.
- ALL WORK SHALL CONFORM TO STATE AND LOCAL CODES WHETHER OR NOT SPECIFICALLY SHOWN ON THE PLANS.
- ALL HVAC PLANS AND DRAWINGS SHALL BE CONSIDERED DIAGRAMMATIC. THE HVAC CONTRACTOR MUST CONSULT AND COOPERATE WITH THE GENERAL CONTRACTOR, AND THE CONSTACTORS OF ALL OTHER TRADES, AS WELL AS THE BUILDING OWNERS SO AS TO AVOID EQUIPMENT AND DUCTWORK COLLISION, AS WELL AS OTHER PROJECT CONTRVERSIES. THE GENERAL CONTRACTOR AND THE HVAC CONTRACTOR SHALL VERIFY ANY AND ALL EXISTING CONDITIONS AND DIMENSIONS BEFORE PROCEEDING WITH THE INSTALLATION OF THE HVAC SYSTEM.
- ANY VARIATION FROM THESE PLANS AND/OR SPECIFICATIOIS WITHOUT THE EXPRESS WRITTEN CONSENT OF THE HVAC DESIGNER, SHAL RELIEVE THE DESIGNER OF ANY RESPONSIBILITY FOR THE SATISFACTORY OPERATION OF THE ENTIRE HVAC SYSTEM.

GENERAL NOTES:

EQUIPMENT NOTES:

- EQUIPMENT SHALL BE ENCLOSED, SUSPENDED, OR GUARDED AS SHOWN ON THE PLANS. EQUIPMENT LOCATIONS SHALL COMPLY WITH ANY/ALL MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS AS WELL AS ALL STATE AND LOCAL CODES WHETHER OR NOT INDICATED ON THE PLANS.
- ALL CLEARANCES AROUND EQUIPMENT SHALL COMPLY WITH MANUFACTURER'S RECOMMENDATIONS AND STATE AND LOCAL CODES WHETHER OR NOT INDICATED ON THE PLANS. CLEARANCES SHALL ALLOW EASE OF ACCESS AND MAINTENANCE FOR ALL EQUIPMENT AS INSTALLED.
- HVAC CONTRACTOR SHALL PROVIDE TWO (2) SETS OF OPERATIONS AND MAINTENANCE MANUALS FOR ANY MAJOR HVAC EQUIPMENT PROVIDED. MANUALS ARE TO BE KEPT ON FILE BY OWNER, AS WELL AS NEAR EQUIPMENT FURNISHED.
- THERMOSTATS AND ROOM CONDITIONINGS DEVICES SHALL BE MOUNTED A MAXIMUM OF 4' ABOVE THE FLOOR IN ORDER TO COMPLY WITH "THE AMERICANS WITH DISABILITIES ACT."

ADDITIONAL GAS PIPING NOTES:

- ALL GAS PIPING SHALL BE RUN STRAIGHT AND TRUE AND BE INSTALLED IN A QUALITY WORKMANLIKE FASHION.
- GAS PIPING SHALL CONFORM TO ALL STATE AND LOCAL CODES, AS WELLAS NATIONAL FUEL GAS CODE RECOMMENDATIONS.
- HVAC CONTRACTOR SHALL FURNISH AND INSTALL SCHEDULE 40 STEEL GAS PIPING AND FITTINGS. HVAC CONTRACTOR SHALL INSTALL NECESSARY VALVES, FITTINGS, REGULATORS, AND SAFETY AND OPERATING DEVICES. THE HVAC CONTRACTOR SHALL PROVIDE AND INSTALL AN APPROVED GAS SHUT-OFF VALVE.

AIR BALANCING NOTE:

- ALL BALANCING SHALL BE DONE BY A RECOGNIZED (THIRD PARTY) BALANCING CONTRACTOR AND SHALL BALANCE THE ENTIRE SYSTEM SUCH THAT THE SUPPLY AIR, RETURN AIR, EXHAUST AIR, AND FRESH AIR ARE WITHIN +/- 10% OF THE AIR QUANTITIES SHOWN ON THE PLAN. THE HVAC CONTRACTOR SHALL FURNISH THE HVAC DESIGNER WITH TWO COPIES OF THE BALANCING DATA. A COPY OF THE BALANCE DATA SHALL BE RETAINED AT THE PROJECT SITE AND AVAILABLE FOR INSPECTION. THE AIR SYSTEMS SHALL BE BALANCED IN SUCH A MANNER AS TO MINIMIZE LOSSES FROM DAMPER THROTTLING BY ADJUSTING FAN SPEED, AND ADJUSTING DAMPERS TO MEET AIR FLOW CONDITIONS. BALANCING PROCEDURES SHALL BE ACCEPTABLE TO THE DEPARTMENT OF COMMERCE AND THE IMC. THE HVAC CONTRACTOR SHALL FURNISH AND INSTALL ALL NECESSARY VOLUME, CONTROL, AND BACKDRAFT DAMPERS REQUIRED FOR INSTALLATION AND BALANCING.

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REVISION

DATE

NO.

NELSON FAMILY PAVILION

CITY OF DE PERE

100 WILLIAM ST, DE PERE, WI 54115

HVAC SCHEDULES

DESIGNED
JUF

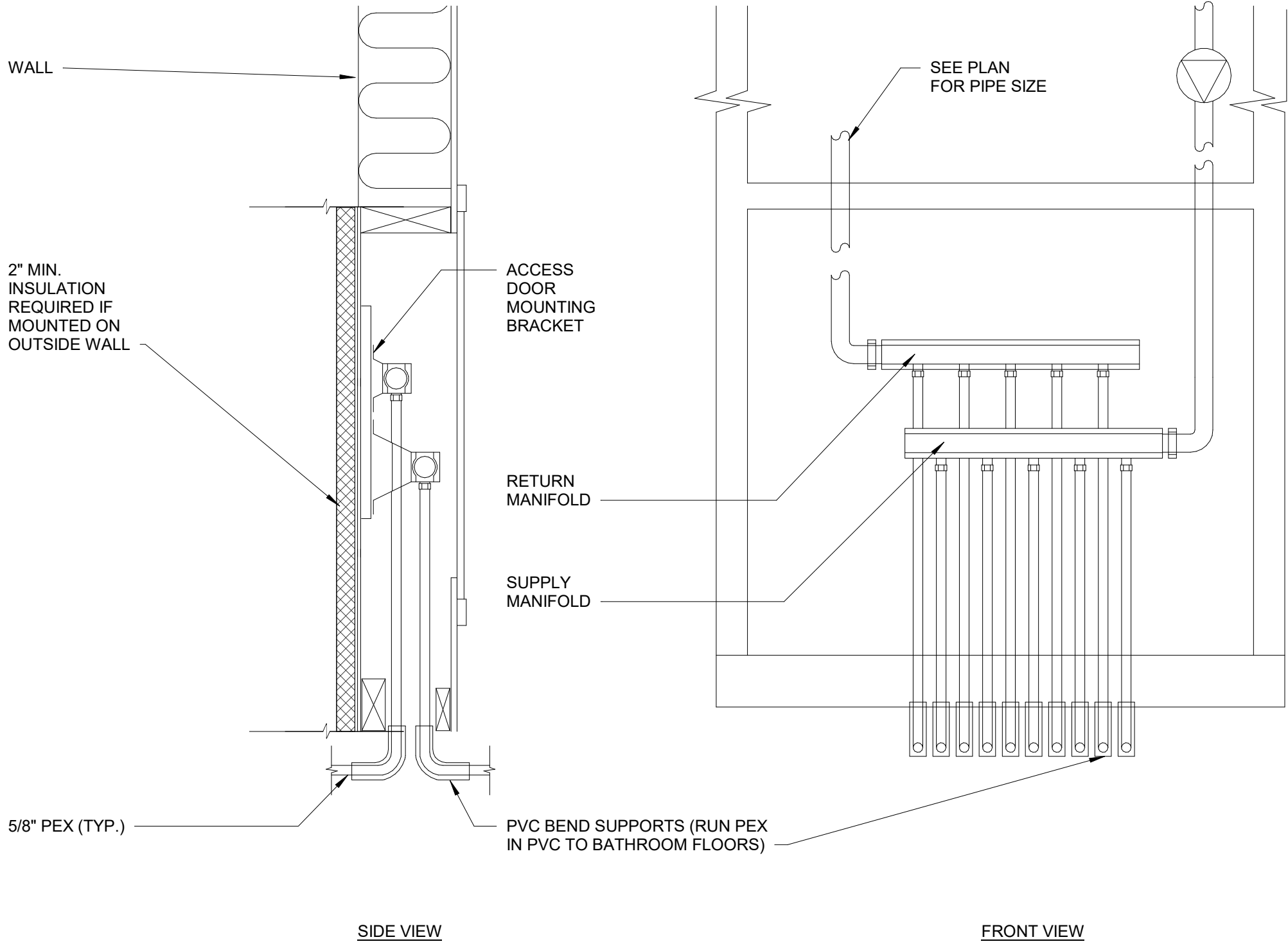
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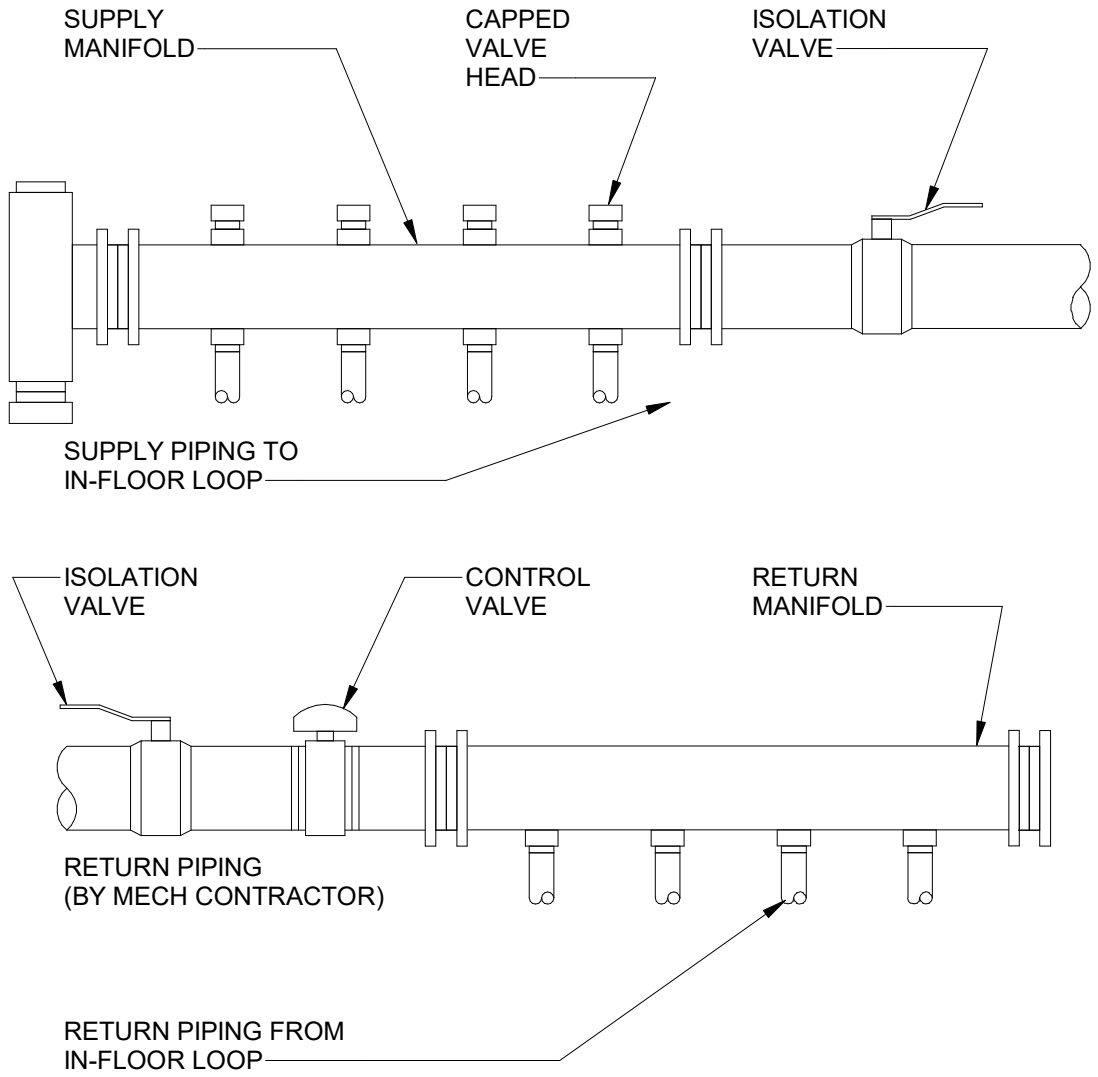
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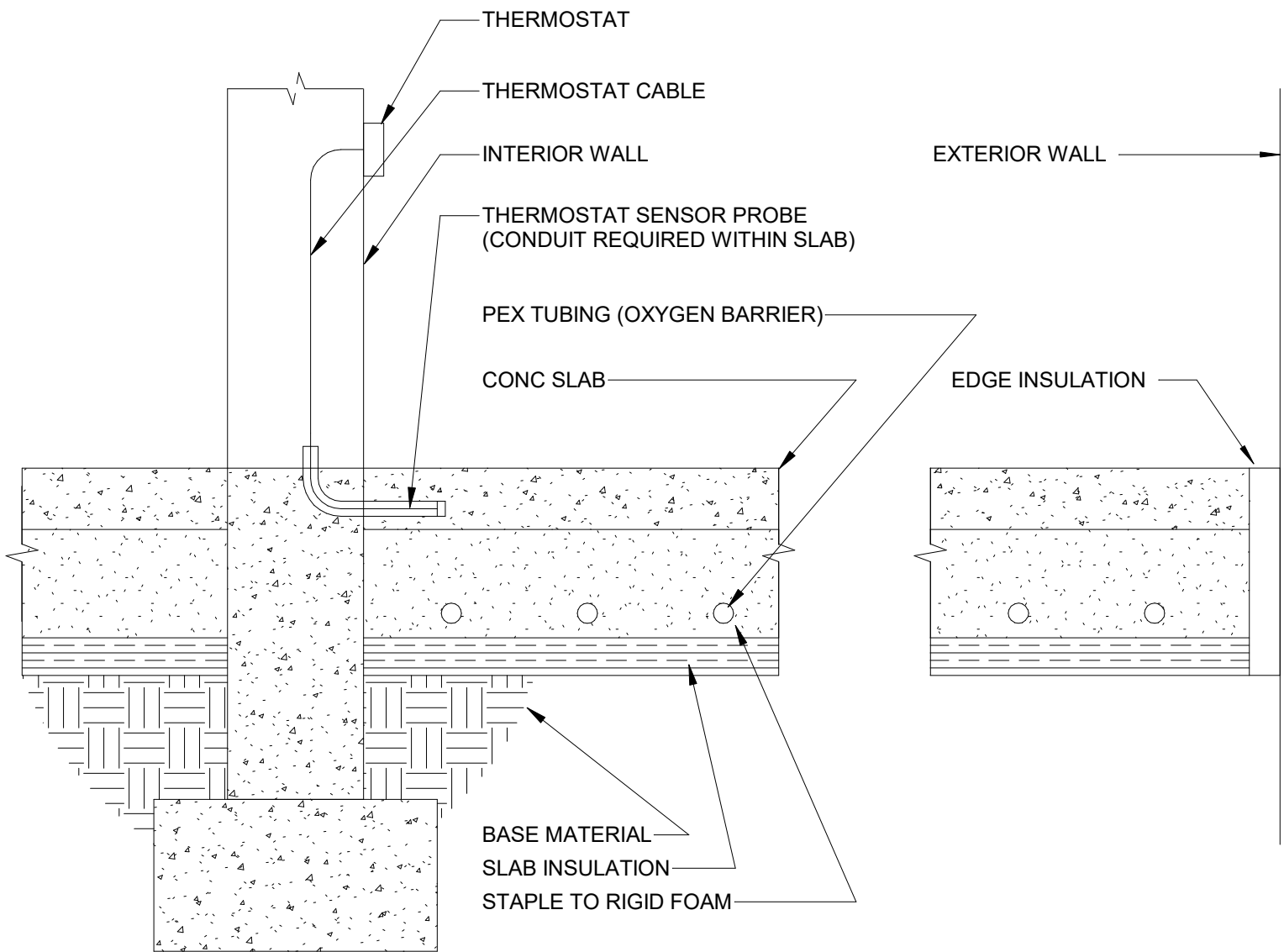
H501



1
H601
TYPICAL WALL-MOUNT
MANIFOLD DETAIL
NOT TO SCALE



2
H601
IN-FLOOR MANIFOLD DETAIL
NOT TO SCALE



3
H601
IN-FLOOR HEATING DETAIL
(INTERIOR WALL)
NOT TO SCALE

NO.	DATE	REVISION

DRAWINGS

- 1. THESE DRAWINGS ARE DIAGRAMMATIC IN NATURE, AND INDICATE THE GENERAL ARRANGEMENT OF EQUIPMENT, BUT ACCURACY IS NOT GUARANTEED, AND FIELD VERIFICATION OF ALL LOCATIONS AND DIMENSIONS IS DIRECTED.
- 2. THESE DRAWINGS WILL NOT SHOW ALL INSTALLATION DETAILS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO MAKE A COMPLETE AND SATISFACTORY INSTALLATION IN ACCORDANCE WITH THE BEST MODERN PRACTICE METHODS.
- 3. E.C. SHALL MAKE OWN COUNT OF ALL EQUIPMENT TO BE WIRED BASED ON ALL PLANS AND SPECIFICATIONS IN THEIR ENTIRETY.
- 4. CAREFULLY REVIEW THE ARCHITECTURAL, STRUCTURAL, HVAC AND PLUMBING PLANS AND SPECIFICATIONS FOR FURTHER WORK SCOPE AND FOR ADDITIONAL INFORMATION.
- 5. THE ELECTRICAL DRAWINGS ARE NOT TO BE USED FOR ROOM DIMENSIONS AND EQUIPMENT PLACEMENT. REFERENCE THE APPROPRIATE ARCHITECTURAL, STRUCTURAL, OR MECHANICAL PLANS. DRAWINGS ARE SCHEMATIC -- VERIFY ALL LOCATIONS BEFORE INSTALLING CONDUIT, EQUIPMENT, ETC.
- 6. DETAILS ARE TYPICAL OF THE INSTALLATIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FAMILIARIZE HIMSELF WITH THE INSTALLATION AND TO PROVIDE THE PROPER INSTALLATION FOR SITUATIONS WHICH MAY VARY FROM THE DETAILS OR DRAWINGS. CONTRACTORS ARE ADVISED TO COMPLETELY SURVEY THE WORK AREA FOR NON-TYPICAL SITUATIONS, ETC.
- 7. ALL EQUIPMENT DIMENSIONS SHOWN ON PLANS AND ELEVATIONS ARE APPROXIMATE ONLY. THE CONTRACTOR SHALL USE THE SHOP DRAWINGS FOR PROPER LAYOUT, FOUNDATION AND PAD, ETC. FOR FINAL INSTALLATION WITHOUT AND ADDITIONAL COST TO THE OWNER.
- 8. REFER TO HVAC DRAWINGS FOR LOCATION OF HVAC EQUIPMENT.
- 9. REFER TO ARCHITECTURAL, HVAC & PLUMBING PLANS FOR ADDITIONAL SCOPE, DETAILS, ORIENTATION & OTHER INFORMATION.

COORDINATION

- 1. E.C. SHALL BE RESPONSIBLE FOR COORDINATING THE ELECTRICAL WORK WITH CONTRACTORS OF OTHER TRADES.
- 2. CAREFULLY REVIEW THE FINAL EQUIPMENT LAYOUT. DO NOT ROUGH-IN ANY ELECTRICAL EQUIPMENT WITHOUT FIRST COORDINATING THE LATEST SET OF EQUIPMENT LAYOUT PLANS.
- 3. VERIFY THE LOCATION OF ALL DEVICES PRIOR TO ROUGH-IN.
- 4. FOR ALL CONTROL PANELS AND FIELD DEVICES, VERIFY ACTUAL FIELD WIRING REQUIRED PRIOR TO START OF ROUGH-IN. REVIEW SUBMITTAL DRAWINGS OF ALL EQUIPMENT TO BE WIRED.
- 5. IN CASE OF INTERFERENCE BETWEEN ELECTRICAL EQUIPMENT SHOWN ON THE DRAWINGS AND THE OTHER EQUIPMENT, THE CONTRACTOR SHALL NOTIFY THE FIELD REPRESENTATIVE IN WRITING AND THE ENGINEER SHALL REVIEW THE PROPOSED CHANGES BEFORE THEY ARE MADE.
- 6. REFER TO HVAC AND PLUMBING DRAWINGS FOR EXACT SIZE AND LOCATION OF ALL MOTORS AND EQUIPMENT. PROVIDE ELECTRICAL SERVICE AS REQUIRED FOR EACH ITEM. VERIFY CONTROL REQUIREMENTS OF ALL MOTORS WITH MECHANICAL, PLUMBING AND TEMPERATURE CONTROL CONTRACTORS AND PROVIDE STARTER AND AUXILIARY CONTACTS AS REQUIRED.
- 7. COORDINATE EXACT REQUIREMENTS OF MOTORS, PUMPS AND CONDENSERS WITH DIVISION 23 CONTRACTORS. EQUIPMENT INSTALLATION DOCUMENTS AND EQUIPMENT NAMEPLATES, PRIOR TO INSTALLING BRANCH CIRCUITS, SAFETY SWITCHES AND CONDUIT. INSTALL THE REQUIRED BRANCH CIRCUIT, CONDUIT, OVER CURRENT PROTECTION AND SAFETY SWITCH REQUIRED BY THE EQUIPMENT SELECTED AND BEING INSTALLED.
- 8. COORDINATE ELECTRICAL CONTROL REQUIREMENTS OF 120 VOLT MOTORS WITH THE TEMPERATURE CONTROL CONTRACTOR. THE TEMPERATURE CONTRACTOR WILL INSTALL A CONTROL RELAY FOR 120 VOLT MOTORS. THE ELECTRICAL CONTRACTOR SHALL WIRE THE BRANCH CIRCUIT SERVING THE MOTOR FROM THE PANEL TO THE CONTACTS IN THE CONTROL RELAY AND EXTEND THE BRANCH CIRCUIT FROM THE CONTROL RELAY TO THE MOTOR.

DEFINITIONS

- 1. "PROVIDE" MEANS FURNISH AND INSTALL.
- 2. INSTALL" MEANS SET AND WIRE COMPLETE.

DEMOLITION

- 1. WHERE EXISTING MOTORS AND OTHER ELECTRICAL EQUIPMENT ARE TO BE REWIRED TO NEW ELECTRICAL DISTRIBUTION EQUIPMENT, PORTIONS OF EXISTING CONDUCTORS, RACEWAY AND JUNCTION BOXES MAY BE REUSED WHERE PRACTICABLE. WHERE NOT PRACTICABLE, PROVIDE ALL NEW CONDUCTORS, RACEWAY, AND JUNCTION BOXES. (TYPICAL)
- 2. WHERE EXISTING CONTROL AND INSTRUMENTATION DEVICES ARE TO REWIRED TO NEW CONTROL CABINETS, PORTIONS OF EXISTING CONDUCTORS, RACEWAY AND JUNCTION BOXES MAY BE REUSED WHERE PRACTICABLE. WHERE NOT PRACTICABLE, PROVIDE ALL NEW CONDUCTORS, RACEWAY, AND JUNCTION BOXES. (TYPICAL)
- 3. E.C. TO DE-ENERGIZE AND MAKE SAFE ALL AREAS, AND STRUCTURES, AND EQUIPMENT SCHEDULED OR OTHERWISE IDENTIFIED FOR DEMOLITION.
- 4. SEE ALSO ARCHITECTURAL AND HVAC PLANS FOR DEMOLITION WORK. DEMOLITION WORK INDICATED ON SUCH PLANS ALSO APPLIES TO THE ELECTRICAL CONTRACTOR.
- 5. WHERE EQUIPMENT IS IDENTIFIED FOR DEMOLITION, E.C. SHALL MAKE SAFE, AND REMOVE EXISTING WIRING TO POINT OF SUPPLY. CONDUIT SERVING DEMOLISHED EQUIPMENT SHALL ALSO BE REMOVED TO POINT OF SUPPLY EXCEPT WHERE SUCH CONDUIT MAY BE REUSED.
- 6. NO ABANDONED CONDUIT SHALL REMAIN AT THE CONCLUSION OF THE PROJECT, EXCEPT:
 - A. CONCRETE-ENCASED CONDUIT.
 - B. CONDUITS DETERMINED BY THE ENGINEER AS SUITABLE FOR SPARE OR FUTURE USE.
- 7. WHERE EXISTING MOTORS ARE SCHEDULED FOR DEMOLITION, PROVIDE ALSO DEMOLITION OF ALL ASSOCIATED CONTROL WIRING BETWEEN MOTOR STARTER/CONTROLLER AND CONTROL PANEL.
- 8. MAINTAIN AND RESTORE, IF INTERRUPTED, ALL CONDUITS AND FEEDERS PASSING THRU RENOVATED AREAS AND SERVICING UNDISTURBED AREAS. THE EXACT METHOD OF RE-ROUTING NEW CONDUIT AND WIRE TO EQUIPMENT REMAINING SHALL BE COORDINATED WITH WORK OF OTHER TRADES PRIOR TO AND INSTALLATION.
- 9. MAINTAIN AND RESTORE, IF INTERRUPTED, ALL LOW VOLTAGE CABLING, FIRE ALARM CABLING, BRANCH CIRCUITS AND ASSOCIATED RACEWAY SYSTEMS PASSING THRU RENOVATED AREAS AND SERVICING UNDISTURBED AREAS. THE EXACT METHOD OF RE-ROUTING NEW RACEWAYS AND CABLE TO EQUIPMENT REMAINING SHALL BE COORDINATED WITH WORK OF OTHER TRADES PRIOR TO ANY INSTALLATION.
- 10. ALL ELECTRICAL EQUIPMENT BEING REMOVED OR RELOCATED BY DEMOLITION SHALL BE ELECTRICALLY DISCONNECTED BACK AT PANELBOARD WHICH SERVICES THE EQUIPMENT. REMOVE AND DISPOSE OF EQUIPMENT (OR RELOCATE IF NOTED) UNLESS NOTED OTHERWISE, AFTER TESTING TO DETERMINE THAT ELECTRICITY HAS BEEN TURNED OFF.
- 11. LEGALLY DISPOSE OF ALL LIGHT FIXTURES, LAMPS AND BALLASTS BEING REMOVED. THIS CONTRACTOR SHALL VERIFY THE EXISTENCE OF PCB'S, DEHP'S, MERCURY AND OTHER HAZARDOUS MATERIALS AND DISPOSE OF OR RECYCLE THEM PER THE WISCONSIN EPA AND THE FEDERAL GOVERNMENT.
- 12. E.C. SHALL PROVIDE TEMPORARY LIGHTING AND POWER DURING AND AFTER DEMOLITION AND DURING CONSTRUCTING. TEMPORARY SERVICES SHALL BE TAKEN FROM EXISTING PANELBOARDS AND EXISTING EQUIPMENT MAY BE UTILIZED WHERE FEASIBLE. COORDINATE TEMPORARY SERVICES WITH OWNER TO VERIFY THAT SERVICES WILL NOT ADVERSELY AFFECT EMERGENCY OR STANDBY POWER SYSTEMS.
- 13. RE-ROUTE EXISTING CONDUIT AND WIRE INTERFERING WITH THE NEW WORK. RE-ROUTED CONDUIT AND WIRE SHALL BE CONCEALED IN THE NEW CONSTRUCTION, UNLESS NOTED OTHERWISE.
- 14. EXISTING ELECTRICAL EQUIPMENT REQUIRED TO BE REMOVED AND/OR RELOCATED, BUT NOT SHOWN ON THE DRAWINGS, SHALL BE INCLUDED IN THE SCOPE OF WORK.
- 15. VISIT AND EXAMINE THE BUILDING ELECTRICAL SYSTEMS AND EXISTING CONSTRUCTION SO AS TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL BE ENCOUNTERED AS PART OF THE PROJECT. BEFORE SUBMITTING PROPOSALS. SUBMISSIONS OF PROPOSAL WILL BE EVIDENCE THAT SUCH EXAMINATION HAS BEEN MADE AND LATER CLAIMS FOR LABOR, EQUIPMENT OR MATERIALS WILL NOT BE RECOGNIZED.
- 16. SHUTDOWN OF ANY SERVICE TO EQUIPMENT REMAINING SHALL ONLY BE FOR THE TIME AGREED UPON BY THE OWNER'S REPRESENTATIVE. ALL SHUTDOWN AGREEMENTS SHALL BE IN WRITING WITH COPIES TO THE OWNER, GENERAL CONTRACTOR AND CONSULTANTS.

LEGEND

X - EXISTING TO REMAIN
X/D - EXISTING TO BE DEMOLISHED
X/R - EXISTING TO BE RELOCATED
X/S - EXISTING TO BE SALVAGED

- DEMO

- INDICATES DEMO

CONDUCTORS AND CABLE

- 1. EVERY WIRE/CABLE SHALL BE MARKED AT BOTH ENDS IN ALL JUNCTION BOXES, TERMINAL BOXES, AND FINAL DESTINATION EQUIPMENT. USE PRINTED HEAT SHRINK SLEEVE TYPE MARKERS. HAND MARKING IS NOT ACCEPTABLE. VERIFY WITH ENGINEER WHAT THE IDENTIFICATION SHALL BE IF NOT DESCRIBED WITHIN THESE DRAWINGS.
- 2. E.C. SHALL TERMINATE ALL CONDUCTORS INDICATED IN DRAWINGS, UNLESS OTHERWISE NOTED.
- 3. A 24" SEPARATION SHALL BE MAINTAINED BETWEEN INSTRUMENT, CONTROL, AND COMMUNICATION CABLES AND A.C. CABLES. IF CONDUITS MUST BE RUN PROXIMATE TO EACH OTHER, RIGID STEEL CONDUIT SHALL BE USED FOR THE LOW VOLTAGE CABLE.
- 4. ALL DATA CABLES SHALL INCLUDE ENDS, BY CONTRACTOR.
- 5. ROUTE A SEPARATE NEUTRAL CONDUCTOR FOR ALL CIRCUITS THAT REQUIRE A NEUTRAL. DO NOT USE CIRCUIT BREAKER TIE HANDLES.

RACEWAYS AND BOXES

- 1. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR CUTTING/CORING ANY OPENINGS THROUGH CONCRETE, PRECAST OR MASONRY WALLS AND FLOORS, AS NEEDED, FOR CONDUIT. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR ALL TOUCH-UP PATCHING AROUND THE OPENINGS AND ALL CLEAN-UP OF STAINS, DEBRIS, DAMAGE, ETC., ON WALLS AND FLOORS BELOW TO RESTORE ALL SURFACES TO THEIR ORIGINAL CONDITION.
- 2. CONDUIT FITTINGS AND SUPPORTS ARE NOT SHOWN ON THE DRAWINGS. THE CONTRACTOR SHALL FURNISH ALL SUPPORT CHANNELS, CLAMPS, HARDWARE, ETC. MATERIAL TO BE SUITABLE FOR THE AREA IN WHICH THEY ARE INSTALLED.
- 3. THE E.C. SHALL BE RESPONSIBLE FOR PROVIDING ALL SLEEVES AND OPENINGS REQUIRED FOR THE PASSAGE OF ELECTRICAL RACEWAYS OR CABLES.
- 4. UNDERGROUND CONDUITS SHALL BE BURIED A MINIMUM OF 36" BELOW GRADE. U.N.O. WARNING MARKER TAPE SHALL BE LAID IN TRENCHES AND GROUND SYSTEM TRENCHES A MINIMUM OF 12" ABOVE CONDUIT. ALL UNDERGROUND CONDUIT RUNS SHALL BE WITH LONG RADIUS SWEEP BENDS. THE MINIMUM BENDING RADIUS SHALL BE 12 TIMES NOMINAL DIAMETER OF THE CONDUIT.
- 5. THE MINIMUM SIZE OF CONDUITS INSTALLED BELOW GRADE SHALL BE 1", UNLESS OTHERWISE NOTED.
- 6. THE MINIMUM SIZE OF CONDUIT INSTALLED ABOVE GRADE SHALL BE 3/4", UNLESS OTHERWISE NOTED.
- 7. ALL CONDUITS SHALL FOLLOW WALLS, COLUMNS, OR HANDRAILS OR BE IN APPROVED TRAPEZE HANGERS PARALLELING MECHANICAL RUNS.
- 8. IMMEDIATELY UPON AWARD OF THE CONTRACT, THE E.C. SHALL ASSUME RESPONSIBILITY FOR COORDINATION, PLACEMENT, AND COSTS FOR SLEEVES, CORES, AND BOX-OUTS REQUIRED FOR TRAY AND CONDUIT PENETRATIONS THROUGH CONCRETE, BLOCK, PRECAST, AND STEEL WALLS AND ROOFS.
- 9. ARRANGE STUB-UPS SO CURVED PORTIONS OF BENDS ARE NOT VISIBLE ABOVE FINISHED SLAB.
- 10. INSTALL NO MORE THAN THE EQUIVALENT OF THREE 90-DEGREE BENDS IN ANY CONDUIT RUN.
- 11. INSTALL SLEEVES AND SLEEVE SEALS AT PENETRATIONS OF EXTERIOR FLOOR AND WALL ASSEMBLIES.
- 12. INSTALL FIRESTOPPING AT PENETRATIONS OF FIRE-RATED FLOOR AND WALL ASSEMBLIES.

HVAC

- 1. SEE HVAC PLANS FOR LOCATION OF HVAC EQUIPMENT.

LIGHTING

- 1. THE LIGHTING SHOWN IS IN IT'S APPROXIMATE LOCATION, AND MAY REQUIRE FIELD ADJUSTING IN ORDER TO AVOID PIPING AND OTHER EQUIPMENT. INSTALL LIGHTING AFTER THE PIPING AND EQUIPMENT HAVE BEEN INSTALLED.
- 2. FIELD VERIFY ALL LUMINAIRE MOUNTING HEIGHTS WITH OTHER TRADES. IF LUMINAIRE MOUNTING HEIGHT CONFLICTS WITH PIPING, ETC., CONSULT WITH FIELD REPRESENTATIVE BEFORE MOUNTING LUMINAIRES.
- 3. 0-10V CONTROL WIRING SHALL BE ROUTED IN A SEPARATE CONDUIT SYSTEM FROM CLASS 1 LINE VOLTAGE.

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REGION

DATE

NO.

NELSON FAMILY PAVILION

CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115

ELECTRICAL NOTES

DESIGNED
JAF

DRAWN
KMG

PROJECT NO.
D00005 06-22-00146

DATE
MARCH 10, 2023

SHEET NO.
E001

LIGHTING

1. TYPICAL LUMINAIRE NOMENCLATURE:

LUMINAIRE TYPE

RF1

b,c

8'-6"

SWITCHING - FIRST LETTER INDICATES CONTROL OF (2) OUTBOARD LAMPS. SECOND LETTER: CENTER LAMP (NL) INDICATES NIGHTLIGHT CIRCUIT (-D) INDICATES DAYLIGHT ZONE

MOUNTING HEIGHT

SHADED LUMINAIRE INDICATES UNIT ON EMERGENCY CIRCUIT.

SYMBOL	DESCRIPTION	SUBSCRIPTS
	RECESSED 2'x4' TROFFER	
	RECESSED 1'x4' TROFFER	
	RECESSED 2'x2' TROFFER	
	WALL MOUNT BRACKET	
	SURFACE MOUNT STRIP	
	WALL BRACKET- LED, HID, FLUORESCENT OR INCANDESCENT	
	CEILING MOUNT-FLUSH OR SURFACE-LED, HID, FLUORESCENT OR INCANDESCENT	
	POLE MOUNTED FIXTURE	
	EXIT SIGN, SINGLE FACE, CEILING MOUNT	← = ARROW LEFT
	EXIT SIGN, DOUBLE FACE, CEILING MOUNT	↔ = DOUBLE ARROW
	EXIT SIGN, SINGLE FACE, WALL MOUNT	→ = ARROW RIGHT
	EXIT SIGN, DOUBLE FACE, WALL MOUNT	G = GUARD
	EMERGENCY UNIT EQUIPMENT	
	EMERGENCY UNIT EQUIPMENT REMOTE	
	OCCUPANCY SENSOR	WG = WIRE GUARD
	PHOTO-CELL	
	RELAY	
	TIME SWITCH	
	POWER PACK	
	CONTACTOR	
	LOW VOLTAGE WALL CONTROLLER	D = DIMMING
	WALL SWITCH	3 = 3-WAY 4 = 4-WAY D = DIMMER SWITCH P = PILOT LIGHT T = TIMER SWITCH OS = OCCUPANCY SENSOR WP = WEATHER PROTECTIVE (USE KILLARK WCS SWITCH COVER OR EQUAL) MD = OCCUPANCY SENSOR (MOTION) W/ DIMMING CF = CEILING FAN CONTROL *small = SWITCHING CIRCUIT letter

SECURITY SYSTEM		
SYMBOL	DESCRIPTION	SUBSCRIPTS
	DOOR CONTACT	OH = OVERHEAD DOOR
	ELECTRIC STRIKE	
	CARD READER	REX = REQUEST TO EXIT
	SECURITY CAMERA	

POWER/SPECIAL SYSTEMS		
SYMBOL	DESCRIPTION	SUBSCRIPTS
	CONDUIT	UE = UNDERGROUND ELECTRIC UT = UNDERGROUND TELEPHONE UTV = UNDERGROUND CABLE T.V.
	CONDUIT STUBBED DOWN	
	CONDUIT STUBBED UP	
	CONDUIT STUBBED OUT	
	BRANCH CIRCUIT	— = HOT — = NEUTRAL X = GROUND
	HOMERUN	
	MOTOR	
	DISCONNECT OR SAFETY SWITCH	
	FUSED DISCONNECT OR SAFETY SWITCH	
	COMBINATION STARTER	
	METER	UM = UTILITY METER
	PULL BOX	
	SPECIAL OUTLET WALL MOUNT	
	SPECIAL OUTLET CEILING OR FLOOR MOUNT	
	PUSH PLATE FOR POWER OPERATED DOOR.	PLATE FURNISHED BY DOOR CONTRACTOR/SUPPLIER AND WIRED AND INSTALLED BY E.C. COORDINATE ALL WIRING AND INSTALLATION REQUIREMENTS WITH DOOR CONTRACTOR/SUPPLIER
	ELECTRIC HAND DRYER	VERIFY EXACT ELECTRICAL REQUIREMENTS WITH OWNER
	PANELBOARD	
	GROUND PLATE	

TELEPHONE/DATA		
SYMBOL	DESCRIPTION	SUBSCRIPTS
	DATA OUTLET	
	WIFI ACCESS POINT	

RECEPTACLES		
SYMBOL	DESCRIPTION	SUBSCRIPTS
	SIMPLEX (SINGLE) RECEPTACLE	EWC = ELECTRIC WATER COOLER SP = SUMP PUMP WP = TAMPER PROOF WP = WEATHER PROTECTIVE GFI = GROUND FAULT INTERRUPTING USB = USB CHARGING CF = COFFEE MIC = MICROWAVE REF = REFRIGERATOR VEND = VENDING MACHINE AC = ABOVE COUNTER PR = PRINTER CO = COPIER CF = CEILING FAN LAV = LAVATORY POWERED FAUCET
	SIMPLEX (SINGLE) RECEPTACLE CEILING MOUNTED	
	DUPLEX RECEPTACLE	
	DUPLEX RECEPTACLE CEILING MOUNTED	
	DOUBLE DUPLEX RECEPTACLE	
	DOUBLE DUPLEX RECEPTACLE CEILING MOUNTED	
	JUNCTION BOX CEILING MOUNTED	P = POWER FA = FIRE ALARM TD = TELEPHONE/DATA
	JUNCTION BOX WALL MOUNTED	

TYPICAL MOUNTING HEIGHTS

DEVICE	MOUNTING HEIGHT	NOTES
WALL LIGHTING CONTROL SWITCHES	48 IN.	1
RECEPTACLE OUTLETS	18 IN.	
POWER / LOW VOLTAGE OUTLETS - ABOVE COUNTER	44 IN.	4
DATA / TELEPHONE OUTLETS	18 IN.	
DATA / TELEPHONE OUTLETS - ABOVE COUNTER	44 IN.	4
PUSH BUTTONS	48 IN.	
DISCONNECT SWITCHES		2
PANELBOARDS		3

GENERAL NOTES

A. ALL HEIGHTS ARE MEASURED FROM FINISHED FLOOR TO CENTERLINE OF DEVICE.
B. ADDITIONAL REQUIREMENTS OF ADA GUIDELINES SHALL BE OBSERVED.
C. ALL INDICATED HEIGHTS: UNLESS OTHERWISE NOTED ON DRAWINGS.

NOTES

1. INDICATED HEIGHT IS A MAXIMUM
2. DISCONNECT SWITCHES: NOT MORE THAN 6'-7" AFF, PER NEC.
WHERE NOT OTHERWISE SPECIFIED, OPERATING HANDLE AT 60" AFF.
3. PANELBOARDS: LOCATE SUCH THAT HIGHEST OVERCURRENT PROTECTIVE DEVICE IS A MAXIMUM OF 6' 7" TO THE CENTER OF OPERATING HANDLE.
4. ADJUST TO ACCOMMODATE COUNTER TOP AND BACK SPLASH HEIGHT.

ABBREVIATIONS	
ABBR.	DESCRIPTION
A	AMPERES
AF	AMPERES FRAME SIZE
A.F.F.	ABOVE FINISHED FLOOR
A.F.G.	ABOVE FINISHED GROUND
AIC	AMPERE INTERRUPTING CAPACITY
AT	AMPERES TRIP
ATRVSS	AUTO TRANSFORMER REDUCED VOLTAGE STARTER
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AUX	AUXILIARY
AV	AUDIO VISUAL
AWG	AMERICAN WIRE GAUGE
BAS	BUILDING AUTOMATION SYSTEM
BC	BYPASS CONTACTOR
BPS	BOLTED PRESSURE SWITCH
C	CONDUIT CONTACTOR
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CNTL	CONTROL
CPT	CONTROL POWER TRANSFORMER
CR	CONTROL RELAY
CT	CURRENT TRANSFORMER
CU	COPPER
D.C.	DIRECT CURRENT OR DRIVE CONTACTOR
DET	DETAIL
DISC	DISCONNECT
DSW	DISCONNECT SWITCH
E.C.	ELECTRICAL CONTRACTOR
E.C.C.	EDDY CURRENT CONTROLLER
ECM	ELECTRICALLY COMMUTATED MOTOR
EF	EXHAUST FAN
EGC	EQUIPMENT GROUNDING CONDUCTOR
EH	ELECTRIC HEATER
EL	ELEVATION
EMT	ELECTRICAL METALLIC TUBING
ES	EMERGENCY STOP
ETM	ELAPSED TIME METER
EWG	ELECTRIC WATER COOLER
EX	EXISTING
F.B.O.	FURNISHED BY OTHERS
F.C.	FAIL CLOSED
FCP	FAN CONTROL PANEL
FDR	FEEDER
FDSW	FUSIBLE DISCONNECT SWITCH
FECA	FUSE ENCLOSED CONTROLLER AT
FHP	FRACTIONAL HORSEPOWER
F.O.	FAIL OPEN
FUT	FUTURE
FVNR	FULL VOLTAGE NON-REVERSING
FVR	FULL VOLTAGE REVERSING
G.C.	GENERAL CONTRACTOR
GEC	GROUNDING ELECTRODE CONDUCTOR
GFEP	GROUND FAULT INTERRUPTING FOR EQUIPMENT PROTECTION
GFI	GROUND FAULT INTERRUPTING FOR PERSONNEL
GND	GROUND
GP	GROUND PLATE
GW	GROUND WELL
HOA	HANDS-OFF-AUTO
HP	HORSEPOWER
HVAC	HEATING, VENTILATION & AIR CONDITIONING
HW	HOT WATER
HHW	HOT WATER HEATER
HZ	HERTZ, CYCLES PER SECOND
IC	ISOLATION CONTACTOR
IMC	INTERMEDIATE METAL CONDUIT
INSTALL	INSTALLATION, WIRING, & CONNECTIONS BY E.C.
INTLK	INTERLOCK
IS	INTRINSICALLY SAFE
ISB	INTRINSIC SAFETY BARRIER
IO	INPUT/OUTPUT
Kcmil	THOUSAND CIRCULAR MILS
KV	KILOVOLTS
KVA	KILOVOLT AMPERES (APPARENT POWER)
KVAR	KILOVARS (REACTIVE POWER)
KW	KILOWATTS (REAL POWER)
LC	LIGHTING CONTRACTOR
LCS	LOCAL CONTROL STATION
LP	LIGHTING PANEL
LPF	LUMENS PER FOOT
LV	LOW VOLTAGE
MAN	MANUAL
MCC	MOTOR CONTROL CENTER
MCMI	THOUSAND CIRCULAR MILS
MCP	MOTOR CIRCUIT PROTECTOR
MDP	MAIN DISTRIBUTION PANEL
M.MTR	MOTOR
MOD	MOTOR OPERATED DAMPER
MPA	MANUAL PURGE/ALARM
MSB	MAIN SWITCHBOARD
mA	MILLIAMPERE
mV	MILLIVOLT
N.C.	NORMALLY CLOSED
N.I.C.	NOT IN CONTRACT
N.O.	NORMALLY OPEN
N.U.	NEAR UNIT
NEC	NATIONAL ELECTRICAL CODE
NL	NIGHT LIGHT
O.C.	ON CENTER
OH	OVER HEAD
O.L.	OVERLOAD
O/O	ON/OFF
O/SIC	OPEN/STOP/CLOSE PUSH BUTTONS
O.T.	OVER TEMPERATURE
OVR. TQ	OVER TORQUE
PB	PUSHBUTTON
PLC	PROGRAMMABLE LOGIC CONTROLLER
PROVIDE	FURNISHED, INSTALLED, WIRED AND CONNECTED BY E.C.
PTT	PUSH TO TEST
PVC	POLYVINYL CHLORIDE CONDUIT
RAC	RIGID ALUMINUM CONDUIT
RECPT	RECEPTACLE
RGC	RIGID GALVANIZED CONDUIT
RMC	RIGID METAL CONDUIT
RMS SYM.	ROOT-MEAN-SQUARED VALUE OF SYMMETRICAL COMPONENT
RPC	RIGID PVC-COATED CONDUIT
RU	RACK UNIT
S.C.KVA	SHORT CIRCUIT KVA
SD	SMOKE DETECTOR
S.O.	SPECIAL OUTLET
SPD	SURGE PROTECTION DEVICE
SPEC	SPECIFICATIONS
SSRVSS	SOLID STATE REDUCED VOLTAGE STARTER
SW	SWITCH
SSW	SAFETY SWITCH
ST	SHUNT TRIP
SUSE	SUITABLE FOR USE AS SERVICE EQUIPMENT
T.C.C.	TEMPERATURE CONTROL CONTRACTOR
TM	THERMAL MAGNETIC
TR	TIMING RELAY
TS	TEMPERATURE SWITCH
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TYP	TYPICAL
UG	UNDERGROUND
UGE	UNDERGROUND ELECTRIC
UPS	UNINTERRUPTABLE POWER SUPPLY
V	VOLTS
VAC	VOLTS ALTERNATING CURRENT
VDC	VOLTS DIRECT CURRENT
VFD	VARIABLE FREQUENCY AC DRIVE
VSD	VARIABLE SPEED DC DRIVE
W	WITH
W/O	WITHOUT
WP	WEATHER PROTECTIVE
WPF	WATTS PER FOOT
XOCR	TRANSODUCER
XFER	TRANSFER
XFMR	TRANSFORMER
XMTR	TRANSMITTER
Z	IMPEDENCE

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PROJECT NO.

D0005 06-22-00146

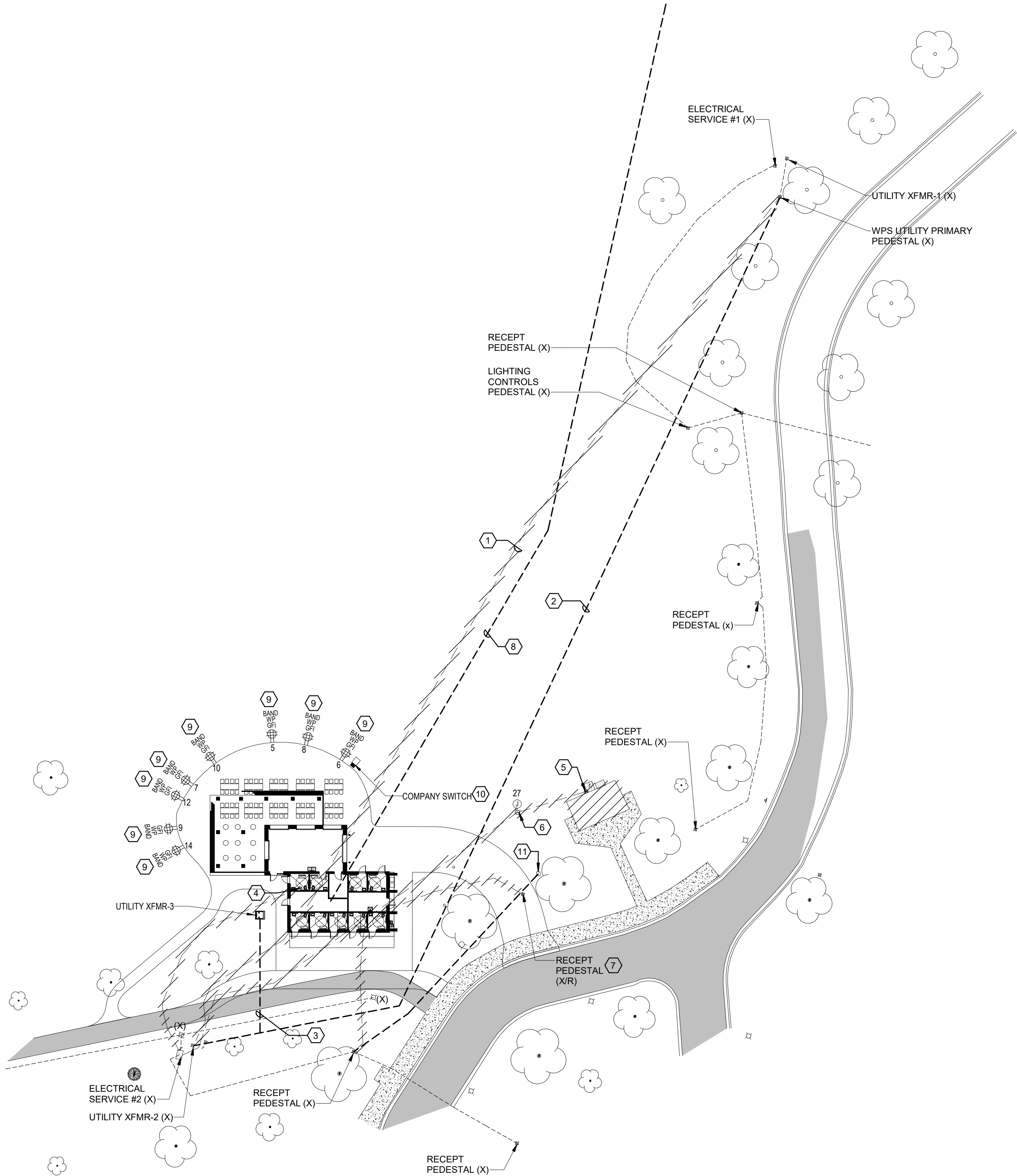
DATE

MARCH 10, 2023

SHEET NO.

E002

NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115
ELECTRICAL SYMBOLS AND ABBREVIATIONS



1 ELECTRICAL SITE PLAN
E101 1" = 30'-0"

KEYNOTES

- 1 APPROXIMATE ROUTE OF EXISTING WPS PRIMARY TO UTILITY XFMR-2. THE EXISTING PRIMARY WILL NEED TO BE RE-ROUTED AROUND PROPOSED BUILDING PRIOR TO DEMOLITION. THE ELECTRICAL SERVICE FOR UTILITY SERVICE #2 CANNOT BE INTERRUPTED FOR MORE THAN A WEEK SINCE ELECTRICAL SERVICE #2 SERVES THE MAJORITY OF SECURITY LIGHTING.
- 2 PROPOSED ROUTE FOR NEW WPS PRIMARY. PROVIDE (1) 4" EMPTY CONDUIT.
- 3 WPS TO COORDINATE WHETHER UTILITY TRANSFORMER #2 CAN FEED THE PROPSD BUILDING UTILITY TRANSFORMER #3 VIA RADIAL LOOP OR SPLICE PEDESTAL. ONCE WPS COORDINATES HOW THE PROPOSED BUILDING PRIMARY IS FED, PROVIDE (1) 4" CONDUIT FROM THE PROPOSED UTILITY TRANSFORMER #3 LOCATION TO THE LOCATION REQUIRED BY WPS.
- 4 ELECTRICALLY DISCONNECT AND REMOVE EXISTING 100A POWER PEDESTAL. REMOVE ASSOCIATED FEEDER AND CONDUIT BACK TO ELECTRICAL SERVICE #2.
- 5 ELECTRICALLY DISCONNECT EXISTING 100A PANELBOARD FED FROM ELECTRICAL SERVICE #2. REMOVE ASSOCIATED FEEDER AND ASSOCIATED CONDUIT BACK TO SOURCE. ENTIRE BUILDING TO BE DEMOLISHED, COORDINATE WITH GENERAL CONTRACTOR. PRIOR TO DISCONNECTING POWER TO BUILDING, RE-ROUTE A NEW 100A FEEDER AROUND THE NEW BUILDING AS A TEMPORARY POWER SOURCE. THIS BUILDING TO BE KEPT IN SERVICE DURING FIRST COUPLE OF MONTHS OF NEW BUILDING CONSTRUCTION.
- 6 ELECTRICALLY DISCONNECT LIGHTING POLE AND REMOVE BRANCH CIRCUIT BACK TO SOURCE. LIGHTING POLE IS TO REMAIN AND TO BE RE-FED FROM THE PROPOSED BUILDING.
- 7 ELECTRICALLY DISCONNECT RECEPTACLE PEDESTAL AND REMOVE BRANCH CIRCUIT BACK TO NEARBY POWER PEDESTAL AS SHOWN. RECEPTACLE PEDESTAL TO BE RELOCATED TO AVOID NEW DRIVEWAY. COORDINATE WITH GENERAL CONTRACTOR. RE-FEED BRANCH CIRCUIT BACK TO NEARBY POWER PEDESTAL SO THAT POWER PEDESTAL RETAINS EXISTING CONTROLS.
- 8 PROVIDE (1) 2" CONDUIT FOR OWNERS FIBER OPTIC UTILITY. PROVIDER. ROUTE CONDUIT TO UTILITY RIGHT OF WAY EAST OF PARKING LOT AND WEST OF FOX RIVER TRAIL. DIRECTIONAL BORE UNDER SIDEWALKS AND PARKING LOT. TERMINATE CONDUIT INSIDE ELECTRICAL / IT ROOM. COORDINATE WITH OWNER AND GENERAL CONTRACTOR.
- 9 LOCATE RECEPTACLES ALONG FACE OF RETAINING WALL. APPROXIMATELY 24" ABOVE GRADE. BOX SHALL BE RECESSED IN BLOCK RETAINING WALL. ROUTE BRANCH CIRCUIT VIA LIGHTING CONTROL RELAY PANEL "LRP1".
- 10 LOCATE COMPANY SWITCH LINED UP WITH THE BACK OF THE CABINET ADJACENT TO THE RETAINING WALL. SEE STRUCTURAL PLANS FOR CONCRETE PAD.
- 11 APPROXIMATE LOCATION OF RELOCATED RECEPTACLE PEDESTAL, SEE KEYED NOTE #7.

GENERAL SHEET NOTES

1. VERIFY EXACT LOCATIONS OF ALL EXTERIOR EQUIPMENT WITH GENERAL CONTRACTOR FOR STAKING.
2. COORDINATE EXACT ROUTING OF OUTDOOR LIGHTING BRANCH CIRCUITS AND POWER BRANCH CIRCUITS WITH GENERAL CONTRACTOR.
3. COORDINATE SITE WORK OF OTHER TRADES AND REVIEW CIVIL UTILITY PLANS FOR LOCATIONS OF EXISTING UTILITIES.
4. CUTTING AND/OR DAMAGE TO EXISTING UTILITIES CAUSED BY THE INSTALLATION OF THE WORK, SHALL BE REPAIRED BY THIS CONTRACTOR AT NO ADDITIONAL EXPENSE.
5. INCLUDE WORK TO LOCATE AND MARK EXISTING UNDERGROUND UTILITIES WHERE UNDERGROUND WORK IS INDICATED, PRIOR TO ANY CONSTRUCTION.
6. COORDINATE THE EXACT ROUTING OF WPS PRIMARY AND LOCATION OF WPS TRANSFORMER WITH WPS REPRESENTATIVE AND GENERAL CONTRACTOR.
7. COORDINATE EXACT ROUTING OF SERVICE LATERAL WITH WPS AND GENERAL CONTRACTOR.
8. COORDINATE THE EXACT ROUTING OF COMMUNICATION CONDUITS WITH OWNER'S INTERNET SERVICE PROVIDER AND GENERAL CONTRACTOR.
9. INCLUDE WORK TO LOCATE AND MARK EXISTING PRIVATE UNDERGROUND ELECTRICAL UTILITIES, BRANCH CIRCUITS, COMMUNICATION SYSTEMS, AND SITE UTILITIES WHERE UNDERGROUND WORK IS INDICATED, PRIOR TO ANY CONSTRUCTION.
10. CUTTING AND/OR DAMAGE TO EXISTING PRIVATE UNDERGROUND ELECTRICAL UTILITIES, BRANCH CIRCUITS, ELECTRICAL, COMMUNICATION SYSTEMS, WATER, SEWER, GAS UTILITIES, AND LOW VOLTAGE SYSTEMS CAUSED BY THE TRENCHING, CUTTING AND INSTALLATION OF THE WORK, SHALL BE REPAIRED BY THIS CONTRACTOR AT NO ADDITIONAL EXPENSE.
11. REFER TO DETAIL 1/E501 FOR TYPICAL TRENCHING
12. CIRCUIT NEW DEVICES AND MODIFIED EQUIPMENT TO PANEL RP1 IN THE NEW BUILDING, UNLESS NOTED OTHERWISE.

LEGEND

- = NEW UNDERGROUND CONDUIT
- ////// = EXISTING TO BE DEMOLISHED
- = EXISTING

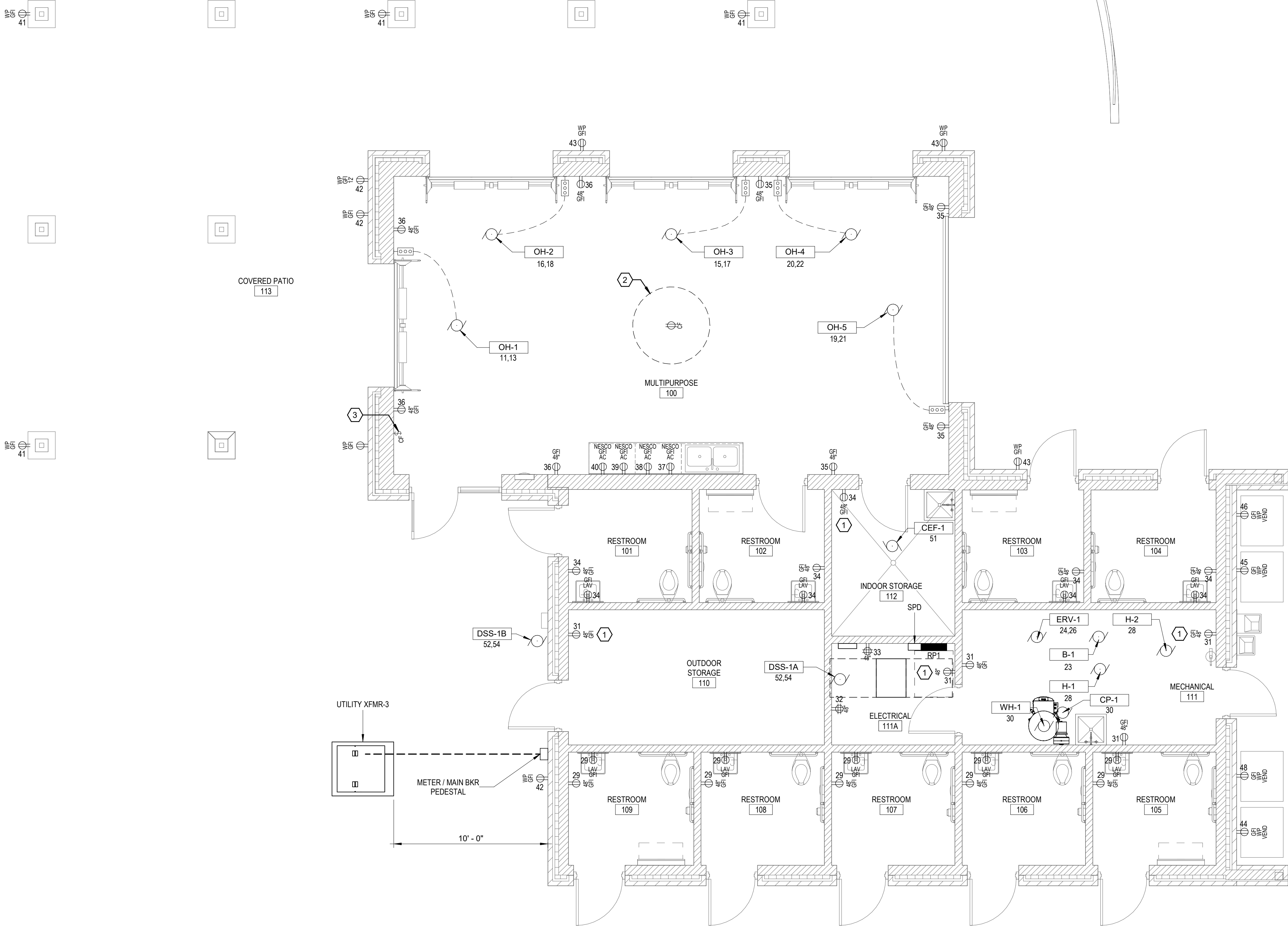
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NO.	DATE	REVISION

NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115
ELECTRICAL SITE PLAN

DESIGNED JAF	DRAWN KMG
PROJECT NO. D0005 06-22-00146	
DATE MARCH 10, 2023	
SHEET NO. E101	



1 FIRST FLOOR POWER PLAN
E201 1/4" = 1'-0" NORTH

KEYNOTES	
1	MOUNT IN 2-GANG BOX WITH LIGHTING CONTROL SWITCH.
2	PROVIDE OUTDOOR-RATED 60" CEILING FAN, GLOBAL INDUSTRIES T9F292677. PROVIDE WITH FAN SPEED CONTROL THAT IS COMPATIBLE WITH THE FAN.
3	LOCATE CEILING FAN CONTROL ADJACENT TO LIGHTING CONTROLS.

POWER GENERAL NOTES	
1.	CIRCUIT ALL EQUIPMENT TO PANEL RP1.

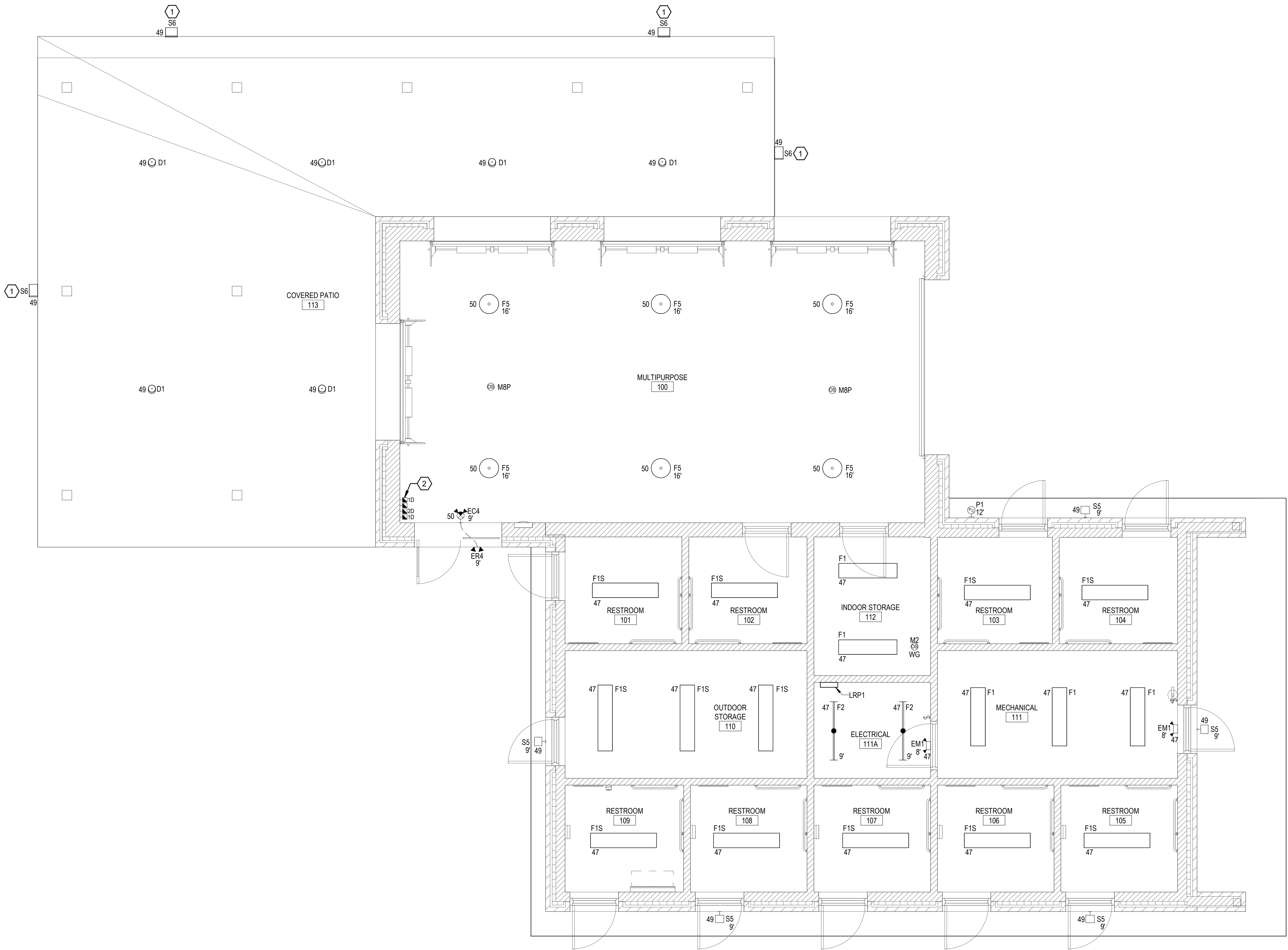
NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115
FIRST FLOOR POWER PLAN

DESIGNED JAF	DRAWN KMG
PROJECT NO. D0005 06-22-00146	
DATE MARCH 10, 2023	
SHEET NO.	

E201

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LIGHTING GENERAL NOTES

1. CIRCUIT ALL EQUIPMENT TO PANEL RP1.

KEYNOTES

1. FIXTURE TO BE MOUNTED TO SIDE OF CANOPY.
2. SEE DETAIL 1/E411.

FIRST FLOOR LIGHTING PLAN

1/4" = 1'-0"

1
E211

NORTH

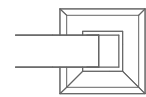
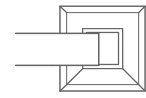
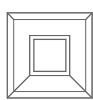
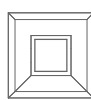
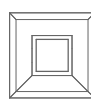
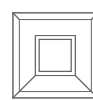
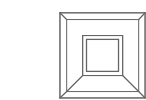
NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115
FIRST FLOOR LIGHTING PLAN

DESIGNED JAF	DRAWN KMG
PROJECT NO. D0005 06-22-00146	
DATE MARCH 10, 2023	
SHEET NO.	

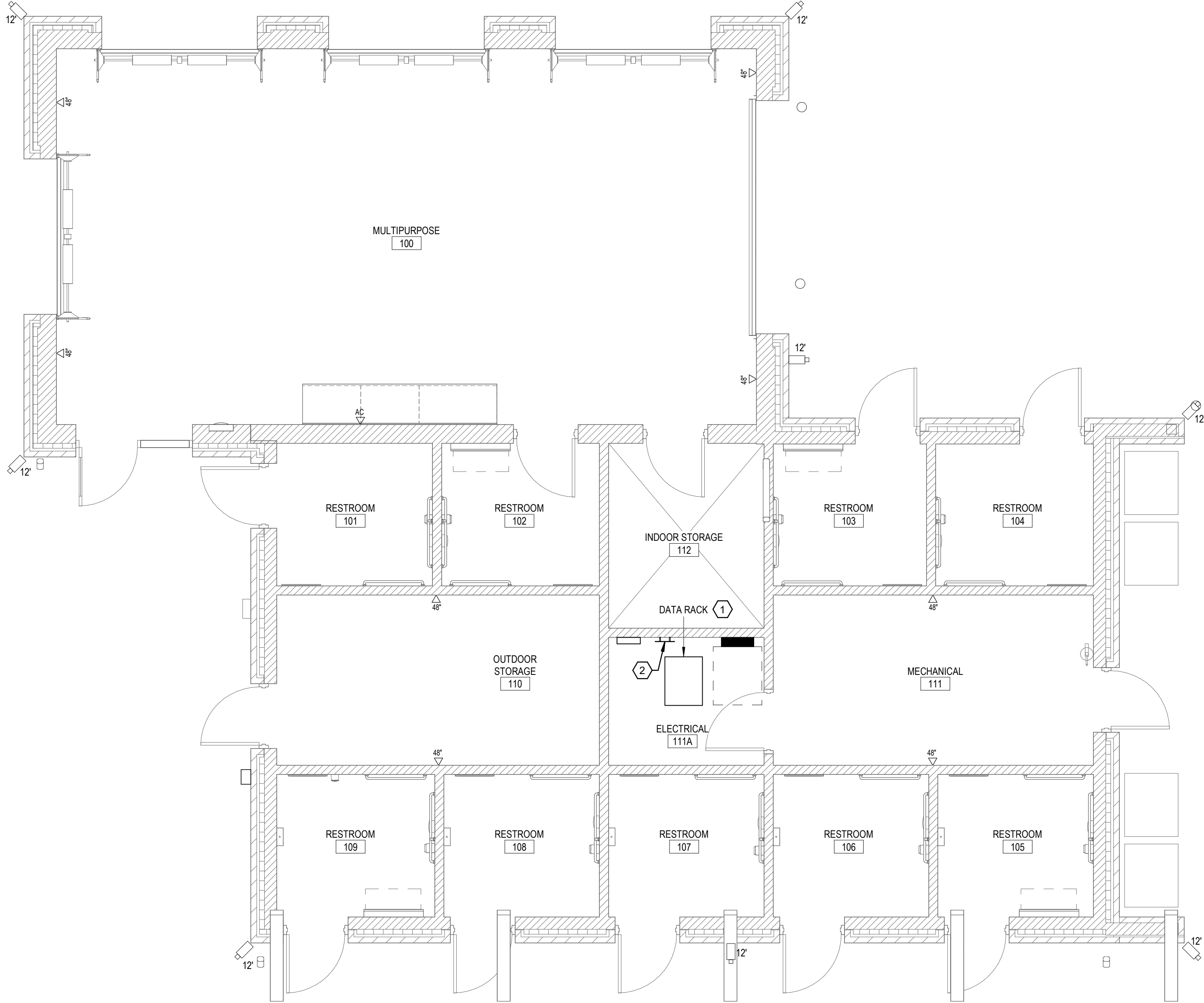
E211

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COVERED PATIO
113



1
E221 1/4" = 1'-0"

FIRST FLOOR SYSTEMS PLAN



SYSTEMS GENERAL NOTES

1. SECURITY CAMERAS: PROVIDE 1-GANG MASONRY BOX, 3.5" DEEP, WITH 3/4" CONDUIT BACK TO IT / ELECTRICAL ROOM. DO NOT DAISY CHAIN BOXES / CONDUIT.
2. WIRELESS ACCESS POINTS AND DATA OUTLETS: PROVIDE 1-GANG MASONRY BOX, 3.5" DEEP, WITH 1" CONDUIT BACK TO IT / ELECTRICAL ROOM. DO NOT DAISY CHAIN BOXES / CONDUIT.

KEYNOTES

- 1 TWO-POST DATA RACK FURNISHED AND INSTALLED BY OWNER.
- 2 PROVIDE TELECOMMUNICATIONS GROUND BUS BAR, BLINE SBTGBK, PROVIDE 1" C, #6 GROUNDING CONDUCTOR FROM GROUND BUS BAR TO NEARBY STRUCTURAL STEEL. PROVIDE #6 GROUNDING CONDUCTOR FROM GROUND BUS BAR TO OWNER'S DATA RACK. PROVIDE 1" C, #3 FROM GROUND BUS BAR TO GROUNDING BUS IN METER / MAIN BREAKER PEDESTAL. BOND CONDUCTORS AT EACH END USING GROUND BUSHINGS.

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NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115
FIRST FLOOR SPECIAL SYSTEMS PLAN

DESIGNED: JAF
DRAWN: KMG

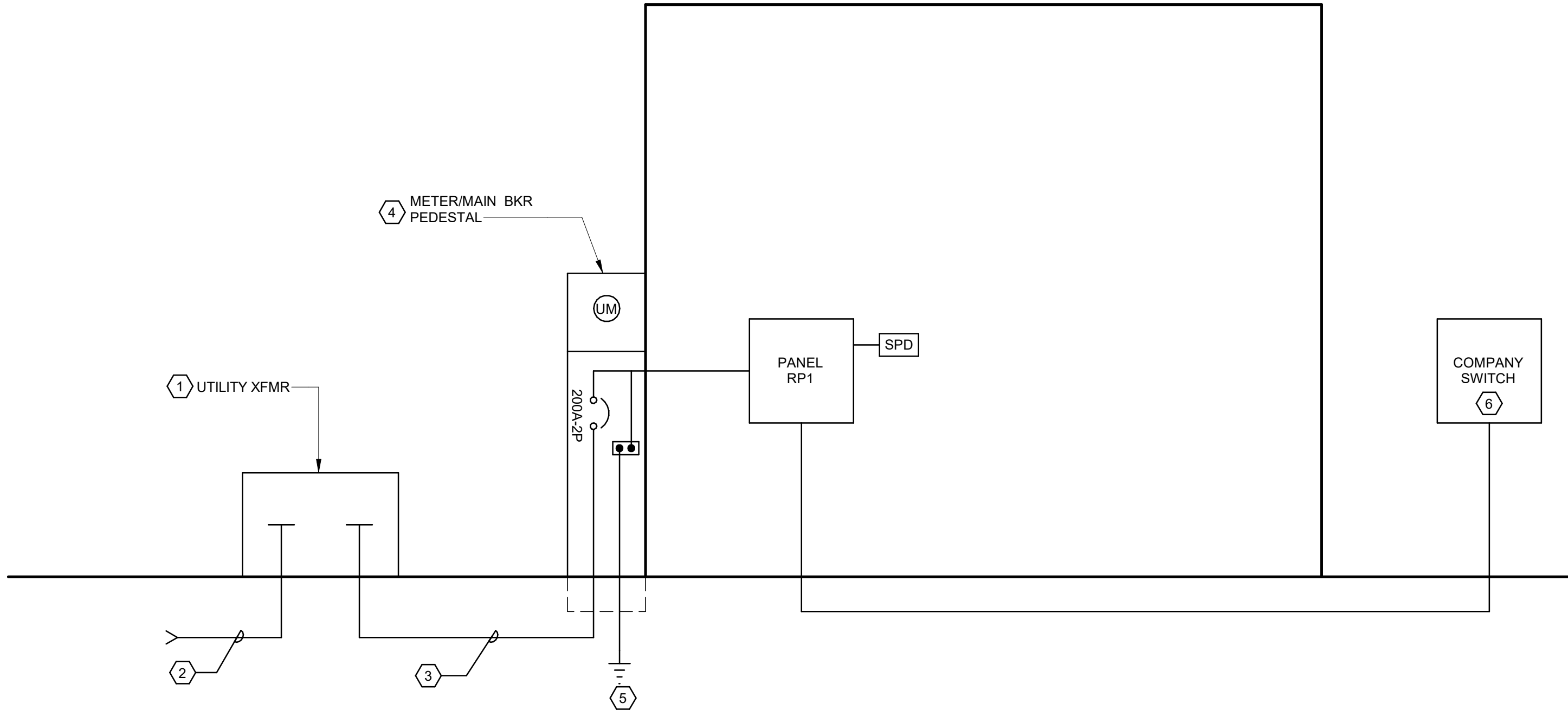
PROJECT NO.
D0005 06-22-00146

DATE
MARCH 10, 2023

SHEET NO.

E221

PANELBOARD: RP1															
LOCATION: Space 114				VOLTAGE: 120/240 V. 1 ø 3 W.											
MOUNTING: SURFACE NEMA 1				A.I.C. RATING: 22,000											
MAIN DEVICE: 225.0 A MLO				SPECIAL:											
BUS AMPS: 225 AMPS															
LOAD DESCRIPTION	BKR	P	WIRE	CKT	A		B		CKT	WIRE	P	BKR	LOAD DESCRIPTION		
SPD	60 A	2	#4	1	0.0	3.0			2			100 A	COMPANY SWITCH		
				3			0.0	3.0	4						
RCPT BAND-EXTERIOR	20 A	1	#12	5	0.4	0.4			6	#12	1	20 A	RCPT BAND-EXTERIOR		
RCPT BAND-EXTERIOR	20 A	1	#12	7			0.4	0.4	8	#12	1	20 A	RCPT BAND-EXTERIOR		
RCPT BAND-EXTERIOR	20 A	1	#12	9	0.4	0.4			10	#12	1	20 A	RCPT BAND-EXTERIOR		
OH-1	20 A	2	#12	11			0.8	0.4	12	#12	1	20 A	RCPT BAND-EXTERIOR		
				13	0.8	0.4			14	#12	1	20 A	RCPT BAND-EXTERIOR		
OH-3	20 A	2	#12	15			0.8	0.8	16						
				17	0.8	0.8			18	#12	2	20 A	OH-2		
OH-5	20 A	2	#12	19			0.8	0.8	20						
				21	0.8	0.8			22	#12	2	20 A	OH-4		
B-1	20 A	1	#12	23			1.4	0.8	24						
				25		0.8			26	#12	2	15 A	ERV-1		
LIGHTING POLE	20 A	1	#12	27			0.2	0.3	28	#12	1	20 A	H-1, H-2		
RCPT Room 109, 108, 107, 106, 105	20 A	1	#12	29	1.0	1.3			30	#12	1	20 A	WH-1		
RCPT Room 110, 111, 114	20 A	1	#12	31			0.9	0.4	32	#12	1	20 A	RCPT Space 114		
RCPT Space 114	20 A	1	#12	33	0.4	0.9			34	#12	1	20 A	RCPT Room 101, 102, 112, 104, 103		
RCPT MULTIPURPOSE 100	20 A	1	#12	35			0.7	0.7	36	#12	1	20 A	RCPT MULTIPURPOSE 100		
RCPT MULTIPURPOSE 100	20 A	1	#12	37	1.0	1.0			38	#12	1	20 A	RCPT MULTIPURPOSE 100		
RCPT MULTIPURPOSE 100	20 A	1	#12	39			1.0	1.0	40	#12	1	20 A	RCPT MULTIPURPOSE 100		
RCPT COVERED SEATS 113	20 A	1	#12	41	0.7	0.7			42	#12	1	20 A	RCPT COVERED SEATS 113		
RCPT	20 A	1	#12	43			0.5	0.4	44	#12	1	20 A	VENDING		
VENDING	20 A	1	#12	45	0.4	0.4			46	#12	1	20 A	VENDING		
LITES Room 110, 101, 102, 112, 103....	20 A	1	#12	47			0.9	0.4	48	#12	1	20 A	VENDING		
LITES	20 A	1	#12	49	0.3	0.7			50	#12	1	20 A	LITES MULTIPURPOSE 100		
CEF-1	20 A	1	#12	51			0.2	1.1	52	#12	2	15 A	DSS-1A/B		
				53		1.1			54						
				55					56						
				57					58						
				59					60						
				61					62						
				63					64						
SPARE	20 A	1	--	65	0.0	0.0			66	--	1	20 A	SPARE		
SPARE	20 A	1	--	67			0.0	0.0	68	--	1	20 A	SPARE		
SPARE	20 A	1	--	69	0.0	0.0			70	--	1	20 A	SPARE		
SPARE	20 A	1	--	71			0.0	0.0	72	--	1	20 A	SPARE		
TOTAL LOAD:					19 kVA		19 kVA								
TOTAL AMPS:					161 A		156.5 A								
LOAD CLASSIFICATION	CONNECTED		DEMAND		ESTIMATED		PANEL TOTALS								
Motor	2352 VA		100.00%		2352 VA										
Other	1600 VA		100.00%		1600 VA		CONNECTED LOAD: 38122 VA								
RCPT	19477 VA		75.67%		14739 VA		ESTIMATED DEMAND: 29848 VA								
LITES	2090 VA		125.00%		2612 VA		CONNECTED CURRENT: 158.8 A								
HEAT	2376 VA		100.00%		2376 VA		EST. DEMAND CURRENT: 124.4 A								
AC	2102 VA		100.00%		2102 VA										
OVERHEAD DOORS	8280 VA		50.00%		4140 VA										
NOTES:															



1 ONE-LINE DIAGRAM
E301 NOT TO SCALE

FAULT CURRENT SCHEDULE							
DEVICE	FAULT AT DEVICE	AIC RATING	VOLTAGE	FEEDER		TRANSFORMER	
				SIZE	KVA	Z%	FAULT AT PRIMARY
UTILITY XFMR-3	14,200		13,800V		75	1.75	
METER / MAIN BKR PEDESTAL	12,148	42,000	240V	3/0			
RP1	9,473	22,000	240V	4/0			
COMPANY SWITCH	5,462	10,000	240V	#1			

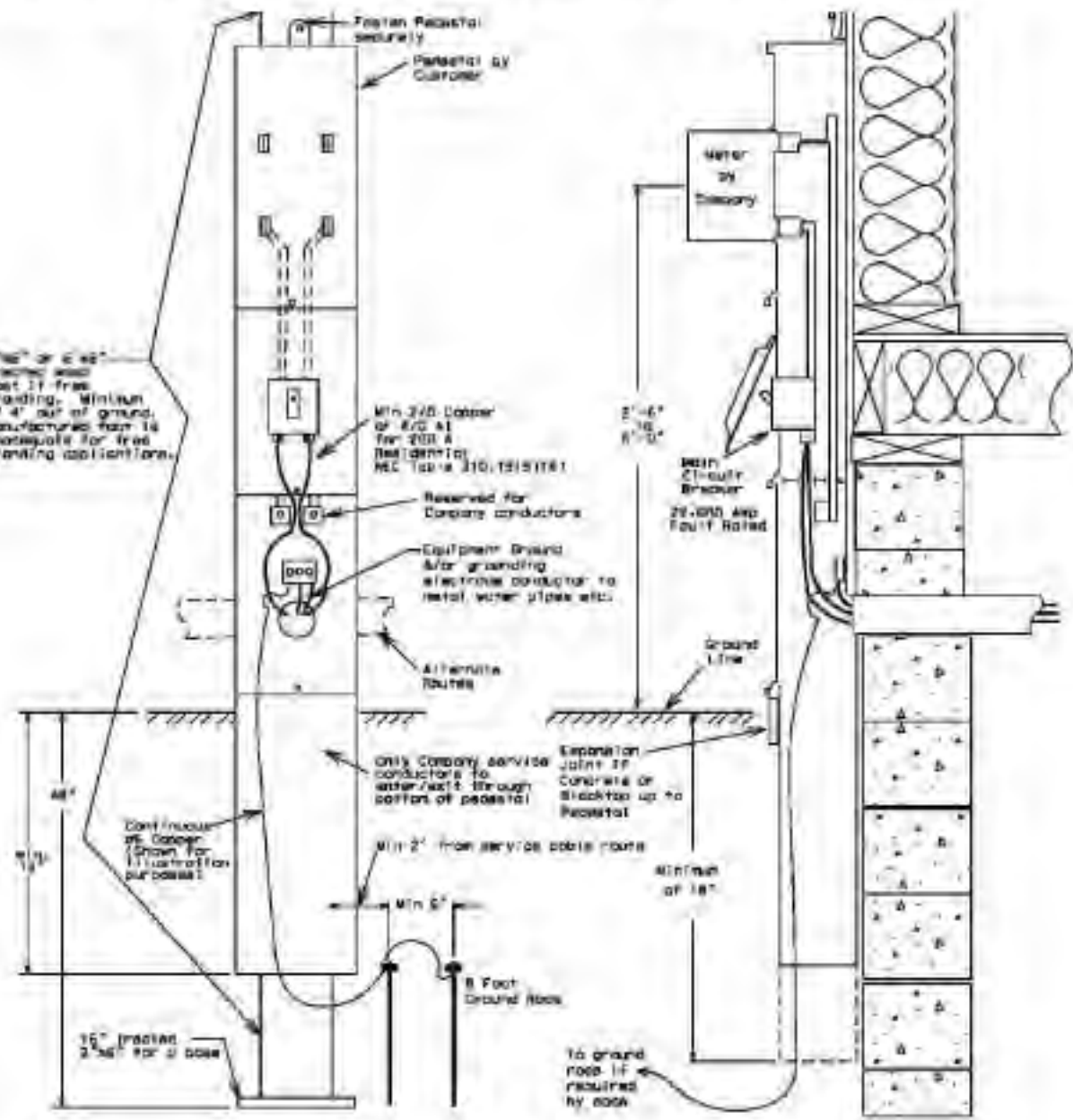
DEVICE	FEEDER		BRANCH CIRCUIT			TOTAL VOLTAGE DROP
	VOLTAGE DROP	WIRE SIZE	MAX VOLTAGE DROP	CIRCUIT NUMBER	WIRE SIZE	
UTILITY XFMR-3	0.00%					0.00%
METER / MAIN BKR PEDESTAL	0.21%	3/0				0.21%
RP1	0.55%	4/0	1.37%	41	#12	1.91%
COMPANY SWITCH	0.77%	#1	0.22%	1,3	#8	0.99%

FROM DEVICE	TO DEVICE	AMPACITY	FEEDER SIZE
UTILITY XFMR-3	METER / MAIN BKR PEDESTAL	200	2°C, 2-3/0, 3/0N, #4G
METER / MAIN BKR PEDESTAL	RP1	225	2°C, 2-4/0, 4/0N, #4G
RP1	COMPANY SWITCH	100	1-1/4°C, 2#1, #1N, #8G

KEYNOTES	
Key Value	Keynote Text
1	UTILITY TRANSFORMER AND ASSOCIATED CONCRETE PAD BY WPS.
2	UTILITY PRIMARY CONDUCTORS BY WPS. SEE SHEET E101 SITE PLAN FOR FURTHER INFORMATION.
3	SERVICE LATERAL CONDUCTORS BY WPS. PROVIDE A 2-1/2" CONDUIT FOR SERVICE LATERAL CONDUCTORS.
4	PROVIDE WPS-APPROVED SINGLE PHASE UNDERGROUND METER PEDESTAL WITH 200A 80%-RATED MAIN SERVICE DISCONNECT. CIRCUIT BREAKER RATED AT 42,000 AIC. REFER TO DETAIL #1/E301 FOR WPS MANUAL INFORMATION.
5	SERVICE GROUNDING ELECTRODE SYSTEM TO CONSIST OF: 3/4"C, #4G TO (3) GROUND RODS, 3/4"C, #4G TO CONCRETE UFER GROUND (SEE DETAIL 2/E501), AND 3/4"C, #4 TO INCOMING WATER SERVICE.
6	COMPANY SWITCH, PAD-MOUNT, NEMA 3RX STAINLESS STEEL ENCLOSURE, 120/240V SINGLE PHASE, 100A, 80% RATED CIRCUIT BREAKER.

WPS SERVICE MANUAL		
Revised 06/2018	Section 2 200 AMP AND SMALLER - COMMON	Page 6 of 17

2-3 100-200 Amp Single-Phase UG with Main
200 Amp Single Phase UG Pedestal with 4-6 Position Main Disconnect



Possible acceptable catalog numbers; Extension only needed if required for height reasons.

Milbank	HUB800-D-KK	No extension available
Cutler Hammer	100130-01 Series	No extension available
Danfoss	1008046 or 1009078 or 1008961	Ext. 1009021 (CH 118") or 1009024 (CH 130")

- Must be attached to support post if free standing. Use a minimum of 8 foot, pressure treated 6X6 or 4X6. This must be buried at least 48 inches with a 16 inch treated 2X6 for a base.
- This is commonly used if the service entrance conductor extends into the building longer than permitted by WI SPS 316.230(3) (8 foot rule) or by NEC 230.70(A) for MI. It is also acceptable to use a standard pedestal (subsection 2-2) and use a separate weatherproof disconnect.

2 WPS SERVICE MANUAL
E301 NOT TO SCALE

NELSON FAMILY PAVILION
CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115

ELECTRICAL DETAILS

DESIGNED JAF	DRAWN KMG
PROJECT NO. D0005 06-22-00146	
DATE MARCH 10, 2023	
SHEET NO. E301	

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EQUIPMENT SCHEDULE																	
ID		LOCATION	LOAD						CONTROLS			LOCAL DISCONNECT					NOTES
TAG	DESCRIPTION	ROOM / AREA	HP	A	KVA	MOCP	VOLTS	PHASE	FURN BY	INST. BY	TYPE	FURN BY	INST. BY	TYPE	SWITCH AMPS	FUSE AMPS	
OH-1	OVERHEAD DOOR	MULTIPURPOSE	0.75	6.9			230.0	1	DIV 08	DIV 26	3-BUTTON	DIV 26	DIV 26	1SW			
B-1	BOILER	MECH 111		12			120.0	1	DIV 23	DIV 23		DIV 26	DIV 26	1\$FH			
ERV-1	ENERGY RECOVERY VENTILATION UNIT	MECH 111	0.75	6.9		15.0	230.0	1	DIV 23	DIV 23		DIV 23	DIV 26				
H-1	PUMP (SECONDARY)	MECH 111		1.4			120.0	1	DIV 23	DIV 23		DIV 23	DIV 26				1
H-2	PUMP (IN-FLOOR HEAT)	MECH 111		1.4			120.0	2	DIV 23	DIV 23		DIV 23	DIV 26				1
DSS-1B	CONDENSING UNIT	EXTERIOR		8		15.0	240.0	1	DIV 23	DIV 23		DIV 26	DIV 26	3FSW	30	15	
DSS-1A	SPLIT SYSTEM (INDOOR CASSETTE)	ELECTRICAL 111A		0.76			240.0	1	DIV 23	DIV 23		DIV 26	DIV 26	1SW			2
WH-1	GAS WATER HEATER	MECH 111		5			120.0	1	DIV 22	DIV 22		DIV 26	DIV 26	1\$FH			
CP-1	CIRCULATION PUMP	MECH 111	0.25	5.8			120.0	1	DIV 22	DIV 22		DIV 26	DIV 26	1\$FH			
CEF-1	CEILING EXHAUST FAN	INDOOR STORAGE 112		2			120.0	1	DIV 23	DIV 23		DIV 26	DIV 26	1\$FH			
<div><div><div>LOCAL DISCONNECT LEGEND:</div><div>1\$FH-HOA: NEMA 1 FRACTIONAL HORSEPOWER MOTOR STARTER W/ HOA SWITCH, SQUARE D 2510 SERIES</div><div>1\$FH: NEMA 1 FRACTIONAL HORSEPOWER MOTOR STARTER</div><div>1SW: NEMA 1 DISCONNECT SWITCH</div><div>1FSW: NEMA 1 FUSED DISCONNECT SWITCH</div><div>1CMS: NEMA 1 ENCLOSED COMBINATION MOTOR STARTER W/ HOA, ADJUSTABLE THERMAL OVERLOAD, AND FUSED DISCONNECT SWITCH</div><div>3FSW: NEMA 3R FUSED DISCONNECT SWITCH</div><div>4SW: NEMA 4X DISCONNECT SWITCH</div><div>4FSW: NEMA 4X FUSED DISCONNECT SWITCH</div></div><div><div>NOTES:</div><div>1. PROVIDE RELAY AND POWER CONNECTION FOR BACKUP PUMP. BACKUP PUMP CAN BE ON SAME CIRCUIT AS MAIN PUMP. THE BACKUP PUMP WILL NEVER RUN AT THE SAME TIME AS THE MAIN PUMP.</div><div>2. INDOOR UNIT SHALL BE FED FROM OUTDOOR UNIT. PROVIDE CONTROL WIRING BETWEEN UNITS, COORDINATE WITH DIV. 23.</div></div></div>																	

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REVISION

NELSON FAMILY PAVILION

CITY OF DE PERE 100 WILLIAM ST, DE PERE, WI 54115

ELECTRICAL SCHEDULES

DESIGNED: JAF

DRAWN: KMG

PROJECT NO. D0005 06-22-00146

DATE MARCH 10, 2023

SHEET NO. E401

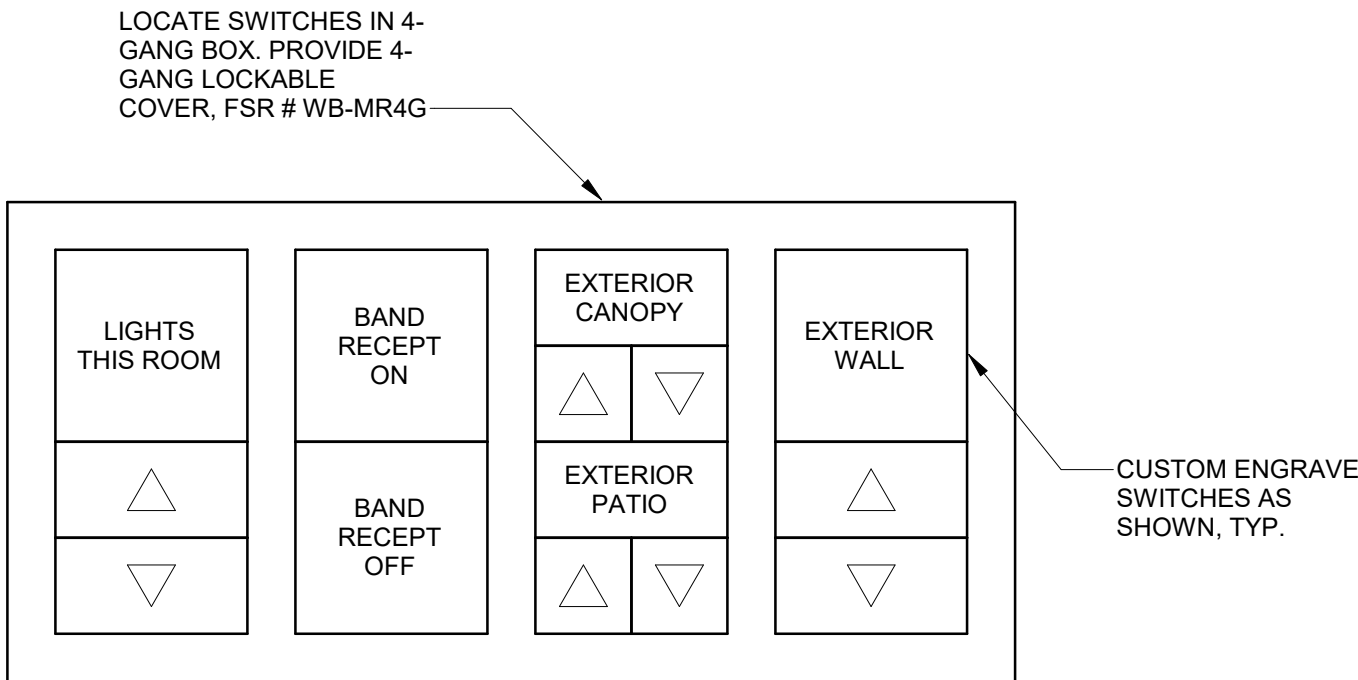
LIGHT FIXTURE SCHEDULE												
TYPE	PRODUCT			LIGHT SOURCE			ELECTRICAL			MOUNTING	DESCRIPTION	NOTE
	MFR	CATALOG NUMBER	EQUIVALENT MANUFACTURERS	LAMP	LUMENS DOWN	COLOR TEMP.	BALLAST/DRIVER	WATT S	VOLT			
D1	KENALL	HADL6 FF XBR 12L 30K8 W CSS G RIG6 DV DIM1	GOTHAM EVO6VR SERIES	LED	1000 lm	3000 K	0-10V DIMMING	15 W	120 V	RECESSED	EXTERIOR DOWNLIGHT, IP65	--
EC4	KENALL	METEC 40N MW R 2 6.5L DT	EXITRONIX NXFC SERIES	LED	1200 lm	5000 K	BATTERY	25 W	120 V	WALL	VANDAL RESISTANT EXIT / EMERGENCY BATTERY LIGHT COMBO, IP64	1
EM1	DUAL LITE	EZ-2L I	LITHONIA ELM2L SERIES	LED	1200 lm	5000 K	BATTERY	1 W	120 V	WALL	EMERGENCY UNIT BATTERY LIGHT	--
ER4	KENALL	METER XX 2 6.5L 12VAC/DC	EXITRONIX NXFR SERIES	LED	1200 lm	5000 K	REMOTE	0 W	12 V	WALL	VANDAL RESISTANT REMOTE HEAD, WET LOCATION	2
F1	KENALL	MLHA8 48 F MW PP 45L40K DCC DV	LUMINAIRE LED VPf8 SERIES	LED	5000 lm	4000 K	0-10V DIMMING	49 W	120 V	SURFACE	4FT VANDAL WRAP, IP65	--
F1S	KENALL	MLHA8 48 F MW PP 45L40K DCC DV TL50	LUMINAIRE LED VPf8 SERIES	LED	5000 lm	4000 K	0-10V DIMMING	49 W	120 V	SURFACE	4FT VANDAL WRAP, IP65, EMBEDDED SENSOR	--
F2	COLUMBIA	MPS 4 40 HL C W E U CM24SCF3-KIT	LITHONIA CLX SERIES	LED	5800 lm	4000 K	NON-DIMMING	42 W	120 V	SUSPENDED	4FT LENSED STRIP	--
F5	KENALL	EPLB 16 E PM PPA XX 94L 30K8 DCC DV	LITHONIA JCBL SERIES	LED	9700 lm	3000 K	0-10V DIMMING	106 W	120 V	SUSPENDED	PENDANT LOW BAY, IP65	2, 3
S5	ARCHITECTURAL AREA LIGHTING	CY2 25 3K8 1 3 UNV XX E	LITHONIA WDGE2 SERIES	LED	2500 lm	3000 K	0-10V DIMMING	26 W	120 V	WALL	EXTERIOR WALL SCONCE, DARK SKY COMPLIANT, IP66	2
S6	BEACON	RWL1 48L 20 3K7 3 UNV CC	LITHONIA WDGE2 SERIES	LED	2500 lm	3000 K	0-10V DIMMING	20 W	120 V	WALL	EXTERIOR WALL SCONCE, DARK SKY COMPLIANT, IP66	4, 5
LIGHT FIXTURE SCHEDULE GENERAL NOTES												
A. THE BUILDING WILL NOT BE AIR-CONDITIONED, BUT WILL BE VENTILATED AND HEATED. ALL LIGHTING MUST BE ABLE TO OPERATE UP TO 104F.												
LIGHT FIXTURE SCHEDULE NOTES:												
1. PROVIDE DIRECTIONAL ARROWS AS SHOWN ON PLAN DRAWINGS AND AS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION. PROVIDE LETTER SIZE, COLOR AND TYPE AS REQUIRED BY LOCAL AUTHORITIES.												
2. HOUSING FINISH SHALL BE SELECTED BY THE ARCHITECT.												
3. PROVIDE FIXTURE WITH 250 LB SWIVEL HANGER WITH 3/4" CONDUIT THREAD, APPLETON JBK-75-BS-3/4". PROVIDE 3/4" RIGID CONDUIT STEM. LENGTH AS NEEDED SO BOTTOM OF FIXTURE IS AT 16'-0".												
4. CUSTOM COLOR HOUSING FINISH SHALL BE SELECTED BY THE ARCHITECT.												
5. FIXTURE SHALL BE MOUNTED TO EDGE OF CANOPY, SEE ARCHITECTURAL DETAILS. CONDUIT SHALL BE CONCEALED.												

LIGHTING CONTROL NARRATIVE																								
ROOM / SPACE	MANUAL		OCCUPANCY SENSOR								SWITCH				TIME CLOCK				PHOTOCONTROL				UL924 EMERGENCY	NOTES
	ON	OFF	OCCUPIED DIM LEVEL	IDLE TIME UNTIL DIM	UNOCCUPIED DIM LEVEL	DIM TO OFF TIME DELAY	AUTO ON	AUTO OFF	OFF TIME DELAY	MANUAL ON	DIMMING	OVERRIDE	SCENE	ZONE	ON	OFF	DIM	AFTER HOURS OCC. SENSOR OVERRIDE	ON	OFF	DIMMING	SET POINT		
RESTROOMS			100%	5 MIN	30%	5 MIN																		
OUTDOOR STORAGE 110			100%	5 MIN	30%	5 MIN																		
MECHANICAL 111	●	●																					1	
ELECTRICAL 111A	●	●																					1	
INDOOR STORAGE 112							100%	●	5 MIN														4	
MULTIPURPOSE			80%	20 MIN	20%	5 MIN					●			●	●	●		●			●	30 FC	3	
EXTERIOR COVERED SEATS / CANOPY											●	●		●			●		●	●		3 FC	2,3	
EXTERIOR CANOPY EDGE SECURITY / PATIO	●										●			●			●			●		3 FC	3	
EXTERIOR WALL SCONCES (SECURITY)											●	●		●			●		●	●		3 FC	2,3	
EXTERIOR BAND RECEPTACLES	●	●																					3	
NOTES:																								
1. AUTOMATIC LIGHTING SHUTOFF NOT REQUIRED PER IECC-2015 DUE TO DANGERS TO OCCUPANTS.																								
2. DIM DOWN TO 50% OUTPUT AFTER 11:00PM AND TURN OFF AT DAWN. MANUAL DIMMING CONTROL ALSO ALLOWS OVERRIDE FOR TIME-BASED REDUCTION FOR 2 HOURS. AT 11:00, NO MATTER WHAT LEVEL OCCUPANTS HAVE MANUAL CONTROLS SET AT, LIGHTS SHALL GO BACK TO TIME CLOCK BASED CONTROL.																								
3. LIGHTING CONTROLS SHALL BE NETWORKED TOGETHER FOR CENTRAL SOFTWARE CONTROLS.																								
4. INTERLOCK LIGHTING CONTROLS TO CONTROL EXHAUST FAN.																								

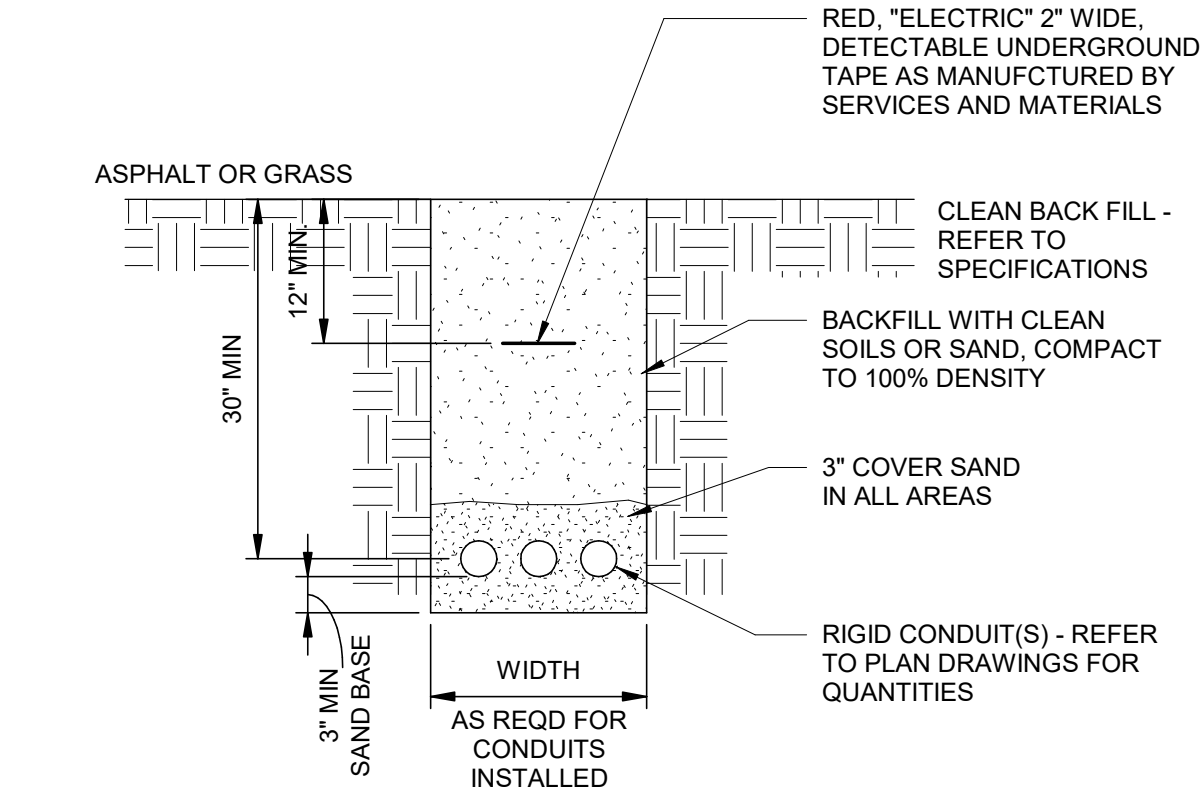
LIGHTING CONTROL DEVICE SCHEDULE

TYPE	LABEL	MANUFACTURER	MODEL NO.	DESCRIPTION	MOUNT	OTHER	COVERAGE	NOTES
OCCUPANCY SENSOR	M8P	SENSOR SWITCH	NCM-6-RJB-ADCX-AR	PIR - HIGH CEILING W/ DIMMING PHOTOCELL	CEILING	CAT5	2500 SQ. FT., 360 DEG.	
OCCUPANCY SENSOR	M2	SENSOR SWITCH	NCM PDT 9 RJB AR	DUAL TECH	CEILING	CAT6	500 SQ. FT., 360 DEG.	4
LOW VOLTAGE WALL CONTROLLER	"BLANK"	SENSOR SWITCH	NP0DM XX	SINGLE CHANNEL - ON/OFF	WALL	CAT5	-	
LOW VOLTAGE WALL CONTROLLER	1D	SENSOR SWITCH	NP0DM DX XX	SINGLE CHANNEL - DIMMING	WALL	CAT5	-	
LOW VOLTAGE WALL CONTROLLER	2D	SENSOR SWITCH	nPODM 2P DX XX	DUAL CHANNEL - DIMMING	WALL	CAT5	-	
PHOTOCELL	P1	SENSOR SWITCH	ARPA PC	OUTDOOR PHOTOCELL - ON/OFF	WALL	3-WIRE	-	1
LIGHTING RELAY PANEL	LRP1	SENSOR SWITCH	ARP INTENC16 NLT 16SPR MVOLT SC SM	8 SINGLE POLE RELAYS - 0-10V DIMMING	WALL	120/277V	-	2, 3
GENERAL NOTES:								
A. ACCEPTABLE ALTERNATE MANUFACTURERS ARE COOPER LIGHTING DLVP SYSTEM, WATTSTOPPER DLM SYSTEM, AND HUBBELL LIGHTING NX SYSTEM.								
B. MODEL NUMBERS DO NOT INCLUDE FINISH FOR WALL MOUNT SENSORS AND LOW VOLTAGE CONTROLS. SEE SPECIFICATIONS FOR FINISH.								
NOTES:								
1. ANALOG INPUT TO LIGHTING RELAY PANEL.								
2. SEE RELAY PANEL SCHEDULE THIS SHEET FOR FURTHER INFORMATION.								
3. PROVIDE WITH NLIGHT ECLYPSE CONTROLLER FOR TIME-BASED FUNCTIONS, #NECY MVOLT ENC GFXX.								
4. WHERE DENOTED WITH "WG", PROVIDE WITH WIREGUARD SPECIFICALLY MADE FOR SENSOR BY THE MANUFACTURER.								

RELAY PANEL: LRP1					LOCATION: ELECTRICAL 111A
ENCLOSURE: NEMA 1					
MOUNTING: SURFACE					
RELAY	DESCRIPTION	PANEL	CIRCUIT	DIMMING	NOTES
R1	MULTIPURPOSE 100	RP1	SEE PLANS	0-10V	1-POLE
R2	EXTERIOR BAND RECEPTACLES - POWER	RP1	SEE PLANS	NON-DIMMING	1-POLE
R3	EXTERIOR BAND RECEPTACLES - POWER	RP1	SEE PLANS	NON-DIMMING	1-POLE
R4	EXTERIOR BAND RECEPTACLES - POWER	RP1	SEE PLANS	NON-DIMMING	1-POLE
R5	EXTERIOR BAND RECEPTACLES - POWER	RP1	SEE PLANS	NON-DIMMING	1-POLE
R6	EXTERIOR BAND RECEPTACLES - POWER	RP1	SEE PLANS	NON-DIMMING	1-POLE
R7	EXTERIOR BAND RECEPTACLES - POWER	RP1	SEE PLANS	NON-DIMMING	1-POLE
R8	EXTERIOR BAND RECEPTACLES - POWER	RP1	SEE PLANS	NON-DIMMING	1-POLE
R9	EXTERIOR BAND RECEPTACLES - POWER	RP1	SEE PLANS	NON-DIMMING	1-POLE
R10	EXTERIOR COVERED SEATS / CANOPY	RP1	SEE PLANS	0-10V	1-POLE
R11	EXTERIOR CANOPY EDGE SECURITY / PATIO	RP1	SEE PLANS	0-10V	1-POLE
R12	EXTERIOR WALL SCONCES	RP1	SEE PLANS	0-10V	1-POLE
R13	INDOOR STORAGE	RP1	SEE PLANS	NON-DIMMING	1-POLE
R14	SPARE				
R15	SPARE				
R16	SPARE				



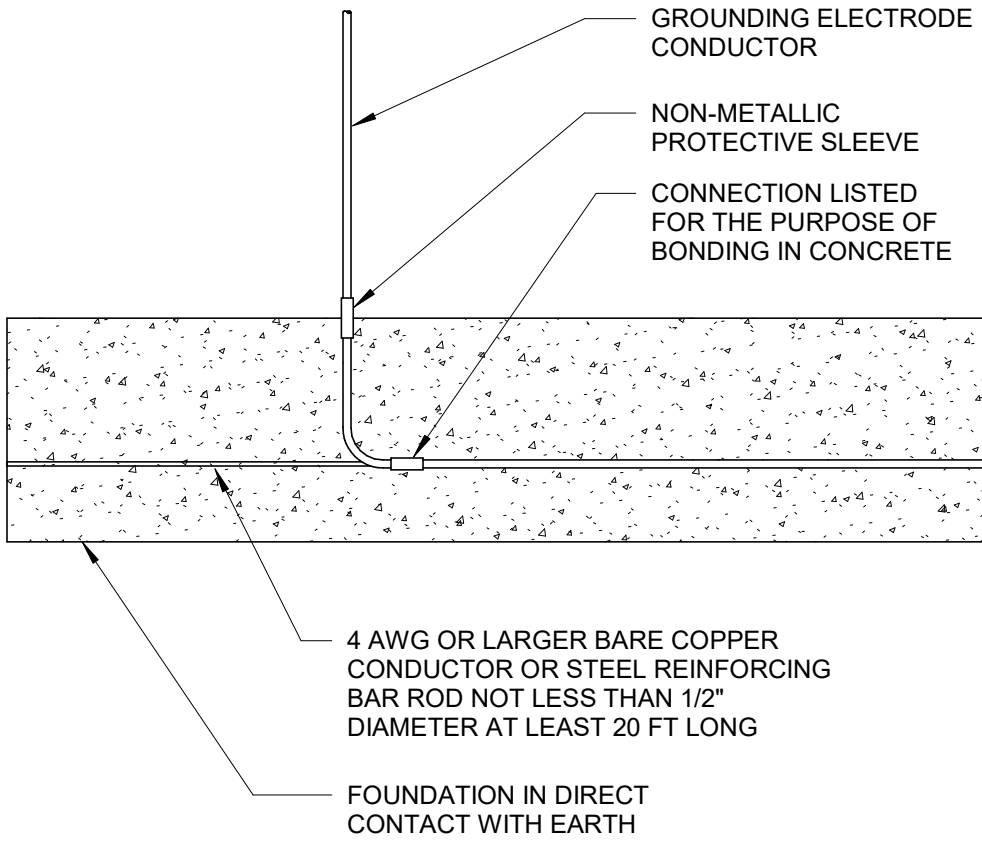
1 E411 MULTIPURPOSE 100 NOT TO SCALE



1
E501

TYPICAL CONDUIT TRENCH DETAIL

NOT TO SCALE



2
E501

CONCRETE ENCASED ELECTRODE

NOT TO SCALE

McMAHON

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NO.

DATE

REVISION

CITY OF DE PERE

NELSON FAMILY PAVILION

100 WILLIAM ST, DE PERE, WI 54115

ELECTRICAL DETAILS

DESIGNED
Designer

DRAWN
Author

PROJECT NO.
D0005 06-22-00146

DATE
MARCH 10, 2023

SHEET NO.
E501