



City of Charlottetown

Simmons Sports Centre Arena & Pool Replacement

TENDER PACKAGE #6 (TP6)

Community Building, Arena Interior, and Site Works Package

PROJECT MANUAL

April 10, 2023

File 2023-022

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Part 1 General

1.1 APPENDICES

.1 APPENDIX A – GEOTECHNICAL REPORT

.2 APPENDIX B - CCDC-2

.1 Whereas clause exists in this main document it will take precedence over the CCDC-2.

.3 APPENDIX C - PAYMENT ADJUSTMENT FOR FUEL COSTS

.1 Due to significant fluctuations in fuel prices this year, this contract will have additional full adjustments applied as outlined in Schedule A. This adjustment will only be applied to this specific contract in the 2022 construction season and will not be applied to any contracts in future years.

.2 This payment adjustment for the change in the price of fuel during the Work is not considered to be extra work.

.4 APPENDIX D – SMOKE FREE PLACES BYLAW

END OF SECTION

Part 1 General

1.1 SUMMARY OF WORK

- .1 The work of this Contract is as described below for Tender Package 6 Community Building, Arena Interior and Site Work. The proposed work includes but not limited to:
 - .1 All work in accordance with the requirements of the specifications and drawings listed on their respective Index of Specifications and Drawings.
 - .2 The Summary of Work described in the section 01 11 00.

1.2 ENQUIRIES

- .1 Direct all enquiries during the tender period to:

City of Charlottetown
Attention: Finance Department
E-mail: tenders@charlottetown.ca
- .2 All enquiries must be directed in writing via email no less than three (3) business days prior to tender close.

1.3 TENDERING PROCEDURE

- .1 General Contractors: Submit their tender for the entire work of this Contract, **INCLUDING** the work of all subcontractors, directly to the City of Charlottetown in accordance with the requirements of the Invitation to Tender and this specification.
- .2 Tenders shall be submitted by completing the Bid Form and placing it in a sealed envelope, clearly marked on the outside, "Simmons Sports Centre Arena & Pool Replacement – TP6 - Community Building, Arena Interior and Site Work; Attention Finance Department; 3rd Floor City Hall" and must be delivered to the 3rd Floor of City Hall, 199 Queen Street, Charlottetown PE, C1A 4B7, and received by the Finance Department before **2:00:00 pm local time on Thursday May 11th, 2023**. The City of Charlottetown will not be obligated in any way by the Proponent's response to the Request for Tender. The Proponent's submission and all supporting documents will remain with the City and will not be returned. Proponent costs related to preparing and issuing the Tender response are entirely the responsibility of the Proponent. All such documentation may be reproduced by the City, provided that such reproduction is made solely for internal use or for any purpose required by law. This Tender creates no obligation on the part of the City of Charlottetown to award the contract or to reimburse proponents for tender preparation expenses. The City of Charlottetown reserves the right to accept or reject any and all submissions, in whole or in part, received as a result of this request, and to negotiate in any manner necessary to best service the interest of the project.
- .3 Any addenda will be posted on the City of Charlottetown website:
www.charlottetown.ca/tenders

Bidders are responsible for checking the website for proposal/quote/tender notices, documents, and addenda. The City is not responsible for ensuring bidders have obtained addenda.

- .4 No fax, email or electronic documents will be accepted as the sole method of submission although an electronic copy (PDF or Microsoft WORD) of the proposal is required to be included in the envelope noted above or e-mailed by the closing date and time.

1.4 SPECIFICATION EXPLANATION

- .1 Whenever the words "as shown," "as noted," "as called for," "indicated," or similar phrases are used, they shall be understood to refer to this specification and/or the accompanying drawings and addenda.
- .2 The words "provided", "install" or similar words shall mean the work described shall be completely supplied, and erected or installed by the Contractor, unless otherwise noted.
- .3 All materials are to be new unless noted otherwise.

1.5 EXAMINATION OF SITE

- .1 All bidders submitting tenders for this work shall first examine the site and all conditions thereon and/or therein.
- .1 No formal site visit will be provided. Bidders can attend site at any time.
- .2 All tenders shall take into consideration all such conditions as may affect the work under this Contract
- .3 No extra payment will be made to the Contractor, above the Contract Price, for costs resultant from failure to determine the conditions that affect the Work.

1.6 EXISTING CONDITIONS

- .1 Refer to Appendix 'A' - Geotechnical Investigation Report prepared by Joose Environmental, for subsurface conditions and recommendations.

1.7 DOCUMENT INTERPRETATION

- .1 The Consultant's interpretation of Contract Documents shall be final.
- .2 Should the Bidder find discrepancies in, or omissions from the drawings, specifications or other tender documents, or be in doubt as to their meaning or interpretation, the Bidder should at once notify the Finance Department in writing for clarification.
- .3 Any instructions or clarifications to Bidders issued during the period of bidding will be in the form of Addenda and are to be included in the tender. Addenda will form part of the Contract Documents.
- .4 The City of Charlottetown or Consultant will not be responsible for verbal instructions.
- .5 Every effort will be made to issue addenda not less than five (5) days prior to the time for the closing of tenders, at the City of Charlottetown's discretion.

1.8 PREPARATION AND SUBMISSION OF BIDS

- .1 Contractors shall submit their bids on the Tender Form provided, which will be received at the time and place indicated on the Invitation to Tender. Late tenders will not be accepted and will be returned unopened to the bidder.
- .2 Bidders shall fill in all information requested on the Tender Form.

- .1 This form must be completely filled out in ink, or be typewritten with the signature in longhand. The completed forms shall be without interlineation, alteration or erasure.
 - .2 Failure to fill in the Tender Form, as provided, in its entirety may result in the rejection of the bid; however, bidders are not obligated to provide alternative prices to products listed on the Appendix provided for that specific purpose, as part of the tender form.
 - .3 Tender amount shall be stated both in writing and in figures.
 - .4 Signatures shall be without alteration or erasure.
 - .5 Receipt of addenda for the project shall be acknowledged by filling in the addendum number and date of issue for each addendum on the appropriate line on the Tender Form. These lines shall be initialed by the person signing the tender after they have been filled in
- .3 Each tender submitted will be accepted on the understanding that it covers all the Work called for in the specifications and on the drawings, regardless of any notations by Bidder that certain parts of the required Work are omitted from their proposal.
- .4 Each bid must:
- .1 Give the full business address of the Bidder and be signed by him with his usual signature.
 - .2 Bids by partnerships must furnish the full name of all partners and must be signed in the partnership name of one of the members of the partnership or by some authorized representative, followed by the signature and designation of the person signing.
 - .3 Bids by corporations must be signed with the legal name of the corporation, followed by the name of the Province of incorporation, and by the signature designation of the president, secretary, or other person authorized to bind it in the matter. The name of each person signed shall also be typed or printed below the signature.
 - .4 A bid by a person who affixes to his signature the word "president," "secretary," or "agent," or other designation, without disclosing his principal, may be held to be the bid of the individual signing on behalf of the corporation.
 - .5 A bid of any individual or any group of individuals operating as co-partners or the bid of any corporation which may be submitted shall be executed and authorized so that it shall be and it will constitute a legal binding act of the persons, copartners, or corporate entity making the bid.
- .5 Bidders shall include with their tender, in the space designated in Section 00 41 13, Appendix A, the name of each Subcontractor and/or Supplier, as designated, whose price has been included in their tender and who will perform the trade work. Substitution for another Subcontractor in the event that the listed Subcontractor is unable to do the work shall be subject to the approval of the City of Charlottetown and contingent on evidence satisfactory to the City of Charlottetown that the original Subcontractor's price was legitimately carried in the Tender, and that the original Subcontractor is now incapable of carrying out the work required under the subcontract, or that he refuses to carry out the work and provides documented reasons for such incapacity or refusal.
- .6 The term "Own Forces," as a subcontractor, may be used by a Bidder where the Bidder is equipped to and in fact normally carries out the trade work using employees in the direct employment of the Contractor or a wholly owned subsidiary company. Other

designations such as "Own Estimate" are unacceptable and may be cause for rejection of the tender by the City of Charlottetown.

- .7 When a Bidder indicates "Own Forces" as a subcontractor, the Bidder may be required to demonstrate to the City of Charlottetown that he has the resources, experience and employees necessary, available and qualified to perform the trade work in a manner and quality satisfactory to fulfill the obligations of the Contract Documents and that the trade work is a normal and continual part of his business operation.
- .8 A Bidder, whose tender is accepted, that included "Own Forces" for a subcontract will if requested, provide the City of Charlottetown with payroll records verifying that the employees carrying out the "Own Forces" subcontract work are direct employees of the Contractor or of a wholly owned subsidiary company of the Contractor.
- .9 Each bidder shall be prepared, if so requested by the City of Charlottetown, prior to the award of the Contract to present evidence of his experience, qualifications and financial ability to carry out the terms of the Contract.
- .10 The City of Charlottetown will evaluate Tenders submitted for this project. The criteria to be considered by the City of Charlottetown in awarding the Contract will include a combination of:
 - .1 Bid price;
 - .2 Scheduling;
 - .3 Compliance;
 - .4 Expertise;
 - .5 Qualifications of the Contractor and named Subcontractors / Suppliers and
 - .6 Any other such conditions as may be determined by the City of Charlottetown to be in the best interests of the City of Charlottetown. A decision on the acceptance of a Tender will be made by the City of Charlottetown based on the results of the City of Charlottetown's evaluation. The City of Charlottetown may request a follow up interview with bidders to verify parts of their bid.
- .11 Bidders may, at their own discretion, submit Alternatives to items identified as "Acceptable Material".
 - .1 All proposed Alternatives shall be listed in Appendix "B", ALTERNATIVE PRICES and be identified by name and model number where applicable and each Alternative shall have an associated tender price change "INCREASED BY" \$_____ or "DECREASED BY" \$_____ or "N/A," as compared with the "Acceptable Material" item carried in the tender amount.
 - .2 Alternate prices will include ALL related costs associated with charges from Accepted Material. No additional costs will be accepted for failure of the Contractor to identify the full impact of using alternate systems.
 - .3 Alternate prices will NOT be used in determining the tender price or as the basis for awarding the tender.
- .12 Bidders are to complete any other appendices forming part of the Tender Form as directed under Section 00 41 13 - Bid Form.
- .13 Tender Forms and accompanying documents shall be enclosed in a sealed envelope marked "TENDER" and bearing the following identification.
 - .1 Name of project.

- .2 Name of Contractor submitting tender.
- .14 Envelope to be addressed to the recipient of tenders indicated in the Invitation to Tender and delivered by hand, registered mail or courier.
- .15 Submit Two (2) signed copies of Tender Form.
- .16 Accompanying the Tender Form shall be:
 - .1 Two (2) copies of Bid Guarantee, together with Surety's Letter of Consent, as specified.
 - .2 Two (2) copies of a preliminary schedule demonstrating the full scope of work to be completed within the identified time for the completion of the contract work.
 - .3 Two (2) copies of a letter from Bidder's insurance provider identifying a list of any claims made against the Bidder within the last five (5) years.
- .17 Tender forms and securities must bear original signatures.
- .18 Where the bid amount is shown in both written words and number and the two are in conflict, written words will take precedence.

1.9 BID GUARANTEES

- .1 Each tender submitted shall be accompanied by the following Security:
 - .1 . For a General Contract Tender less than One Million Dollars (\$1,000,000.00), including Civil, Mechanical, Sprinkler and Electrical Subcontract values:
 - .1 A Security Deposit in the form of a Certified Cheque or Bank Draft, in an amount not less than ten per cent (10%) of the Bid Amount;
 - OR
 - .2 A Bid Bond as identified below.
 - .2 For a General Contract Tender One Million Dollars (\$1,000,000.00) or more, including Civil, Mechanical, Sprinkler and Electrical Subcontract values:
 - .1 A Bid Bond only issued by a recognized bonding company, in an amount not less than ten per cent (10%) of the Bid Amount.
- .3 The Certified Cheque, Bank Draft or Bid Bond shall be made payable to the City of Charlottetown.
- .4 The Certified Cheque, Bank Draft or Bid Bond will guarantee that:
 - .1 The Bidder will not withdraw the bid for the period indicated on the Tender Form, following the schedule closing time of the receipt of bids, and
 - .2 The Bidder will enter into a formal agreement with the City of Charlottetown in accordance with the agreement included as part of the Contract Documents, and
 - .3 The required Certified Cheque, Bank Draft or Bid Bond as Contract Security will be provided to the City of Charlottetown, and
 - .4 In the event of withdrawal of said bid within said period, or the failure to enter into said Agreement and give said contract security within ten (10) days after notice of the acceptance of the bid, the Bidder shall be liable to the City of Charlottetown for the full amount of the bid guarantee as representing the liquidating damages to the City of Charlottetown on account of the default of the Bidder in any particular hereof and shall not be construed as a penalty.

- .5 Bid Bonds or Security Deposits will be returned to all except the three (3) lowest Bidders within three (3) days after the opening of tenders. The remaining non-successful Bid Bonds or Security Deposits will be mailed to Bidders within forty-eight (48) hours after the City of Charlottetown and the successful Contractor have executed the Contract and the duty executed Bonds or Certified Cheque representing the Contract Security have been received and accepted by the City of Charlottetown from the successful Contractor.
- .6 Bonds and Letters of Surety, provided by General Contractors to the City of Charlottetown shall be from a recognized Surety Company.
- .7 Only Bid Bonds issued by insurers, licensed in Canada and authorized to do business in the Province of Prince Edward Island, will be accepted.
- .8 Security Deposits provided by General Contractors:
 - .1 Must be in the form of a Certified Cheque or Canadian Bank Draft drawn on a bank to which the Bank Act applies or a Credit Union, payable to the City of Charlottetown, OR
 - .2 Bonds of the Government of Canada, unconditionally guaranteed, as to the principal and interest by the Government of Canada if such Bonds are:
 - .1 Payable to the Bearer, or
 - .2 Accompanied by a duly executed Instrument of Transfer to the City of Charlottetown in the form prescribed by the Domestic Bonds of Canada Regulations, or
 - .3 Negotiated as to principal or as to principal and interest in the name of the City of Charlottetown, pursuant to the Domestic Bonds of Canada Regulations.
 - .3 Security Deposits submitted by Subcontractors to General Contractors, shall be in a form satisfactory to the General Contractor.
 - .4 No interest will be paid to either the successful or unsuccessful bidders for any form of Bid Guarantee.

1.10 CONTRACT SECURITY

- .1 Upon award of a Contract, the Contractor shall provide the following Contract Security:
 - .1 For a General Contract Tender less than One Million Dollars (\$1,000,000.00), including Civil, Mechanical, Sprinkler, and Electrical Subcontract values:
 - .1 A Performance Bond and a Labour and Materials Bond, each in the amount of fifty per cent (50%) of the total Contract Amount, or
 - .2 A Security Deposit in the form of a Certified Cheque or Bank Draft, in an amount not less than ten per cent (10%) of the total Contract Amount.
 - .2 For a General Contract Tender One Million Dollars (\$1,000,000.00) or more, including Civil, Mechanical, Sprinkler and Electrical Subcontract values:
 - .1 A Performance Bond and a Labour and Materials Bond, each in the amount of fifty per cent (50%) of the total Contract Amount.
- .2 All Bonds provided by General Contractors, are to be made payable to the City of Charlottetown.
- .3 Bonds shall be from a recognized Surety Company, licensed in Canada and authorized to do business in the Province of Prince Edward Island.

- .4 If a Performance Bond is utilized, it shall be maintained in force for a period of not less than twelve (12) months after the issuance of the Total Performance Certificate.
- .5 Security Deposits, provided by the General Contractor:
 - .1 Must be in the form of a Certified Cheque or Bank Draft drawn on a bank to which the Canadian Bank Act applies, or a Credit Union, payable to the City of Charlottetown,
OR
 - .2 Bonds of the Government of Canada, unconditionally guaranteed, as to the principle and interest by the Government of Canada if such Bonds are:
 - .1 Payable to the Bearer, or
 - .2 Accompanied by a duly executed Instrument of Transfer to the City of Charlottetown, in the form prescribed by the Domestic Bonds of Canada Regulations,
OR
 - .3 Negotiated as to principle or as to principle and interest in the name of the City of Charlottetown pursuant to the Domestic Bonds of Canada Regulations.
- .6 Contract Security shall be provided at the expense of the General Contractor. Cheques or Bank Drafts shall be drawn on an account with recognized Financial Institutions.
- .7 Contract Security submitted by Subcontractors to General Contractors, shall be in a form acceptable to the General Contractor.
- .8 No interest will be paid to the successful Contractor on any form of Contract Security.
- .9 If in accordance with the Contract Security requirements the successful Contractor has used a Certified Cheque or Bank Draft as Contract Security, the Certified Cheque or Bank Draft will be held by the City of Charlottetown until the date of Substantial Performance for the Contract as defined under Definition 19 of CCDC2-2008. Subject to the Work being acceptable to the City of Charlottetown and Consultant it will be returned to the Contractor, without interest. The Certified Cheque or Bank Draft used as contract Security used through the construction period will be replaced with a Certified Cheque or Bank Draft in the amount of 20% of the original Contract Security during the Warranty Period. Subject to Warranty issues being addressed during the 1-year Warranty Period to the satisfaction of the City of Charlottetown and Consultant it will be returned to the Contractor, without interest.

1.11 RECEIPT AND OPENING OF BIDS

- .1 There will be a public opening of tenders received immediately after closing. The selection of vendor resulting from this tender call, shall be done, upon approval by City Council, as soon as practical after tender evaluation have been completed. Results of this tender call will be posted on the City's awards webpage at www.charlottetown.ca/tenders
- .2 Facsimile transmitted bids will not be considered.

1.12 ADJUSTMENT AND WITHDRAWAL OF BIDS

- .1 A Bidder who has already submitted a bid may submit a further bid at any time up to the official closing time. The last submission received shall supersede and invalidate all submissions previously submitted by that bidder for this tender. Any bidder may withdraw or qualify his/her submission at any time up to the official closing time by re-

submitting a new bid to the City. The time and date of receipt will be marked thereon and the new submission will be placed in the tender box. The new submission shall be marked on the sealed envelope by the Bidder as "Resubmission #" along with the name of the tender and to the attention of the Finance Department, as noted above in the tender. Bids may be withdrawn at any time prior to opening upon written request from the bidder. Negligence on the part of the bidder in preparing his/her bid shall not constitute a right to withdraw a bid subsequent to the bid opening.

1.13 AWARD OF CONTRACT

- .1 The Contract, if awarded, will be awarded as promptly after the opening of bids as is possible, and at the discretion of the City of Charlottetown. The award date will not extend beyond the period indicated on the Tender Form following the scheduled time of tender closing, without first obtaining permission of the three (3) low bidders, or low bidder only, at the discretion of the City of Charlottetown.
- .2 The Form of Agreement, (Contract) which the successful Bidder will be required to enter into with the City of Charlottetown, may be seen on application to the Consultant. The drawings, specifications and any addenda issued during the tender period, will be suitably marked for identification at the time the Form of Agreement is signed by both parties, shall be considered as being included in the Contract, together with the completed Tender form and are hereinafter referred to as the "Contract Documents." All of these documents shall be read together and construed as one document. Following execution of the Contract, the Contractor shall receive from the City of Charlottetown one (1) complete signed set of Contract Documents.
- .3 Final award of Contract shall be subject to approval of all agencies having direct interest in the project.
- .4 Where identical bids are received, the low bidder will be selected on the basis of a coin toss by the City of Charlottetown in the presence of the identical bidders.

1.14 REJECTION OF BIDS

- .1 The City of Charlottetown reserves the right to reject any and all bids.
- .2 Bids submitted which indicate "own forces" for subcontract work, that in the opinion of the City of Charlottetown cannot be successfully completed by the Contractor's employees will not be accepted.
- .3 Bids not submitted on the required form will be rejected.
- .4 Bids which are incomplete or qualified will be rejected.
- .5 All Bidders acknowledge that they shall have no claim against, or entitlement to damages from the City of Charlottetown or Consultant by reason of the City of Charlottetown's rejection of their individual bids or all bids.
- .6 At the election of the City of Charlottetown, whether or not a bid or bidder otherwise satisfies the requirements of a tender, the City of Charlottetown may reject summarily any bid received from a corporation or other person which has been anywise involved in litigation, arbitration or alternative dispute resolution with the City of Charlottetown within the five (5) year period immediately preceding the date on which the request for tender was published.
- .7 Submissions will not be evaluated if the Bidder's current or past corporate or other interests may, in the City's opinion, give rise to a conflict in connection with this project.

- .8 The City of Charlottetown's evaluation may include information provided by the bidder's references and may also consider the proponent's past performance on previous contracts with the City of Charlottetown or other institutions.
- .9 The City of Charlottetown may prohibit a bidder from participating in a procurement process based on past performance or based on inappropriate conduct in a prior procurement process, and such inappropriate conduct shall include but not be limited to the following: (a) the submission of bids containing misrepresentations or any other inaccurate, misleading or incomplete information; (b) the refusal of the bidder to honour its pricing or other commitments made in its bid; or (c) any other conduct, situation or circumstance, as solely determined by the City of Charlottetown.
- .10 The City of Charlottetown may, by written notice to a bidder, reject any submission if it is found by the City of Charlottetown that gratuities, in the form of entertainment, gifts, or otherwise, were offered or given by the bidder, or the agent or representative of the bidder, to any employee or agent of the project that in the City of Charlottetown's opinion have been offered or provided with a view toward securing favorable treatment with respect to the awarding or amending, or making any determinations with respect to being selected as the successful bidder. Bidders must declare to the City of Charlottetown where there is a potential or real conflict of interest. The City of Charlottetown will take whatever steps it deems necessary to manage the potential or real conflict of interest up to and including rejection of a bid. If, during the term of the Contract, a conflict or risk of conflict of interest arises, the Contractor will notify the City immediately in writing of that conflict or risk and take any steps that the City reasonably requires to resolve the conflict or deal with the risk.
- .11 The City of Charlottetown specifically reserves the right to reject all tenders if none is considered to be satisfactory and, in that event, at its option, to call for additional tenders. No term or condition shall be implied, based upon any industry or trade practice or custom, any practice or policy of the City of Charlottetown or otherwise, which is inconsistent or conflicts with the provisions contained in these conditions.

1.15 SUBCONTRACT WORK

- .1 Contractor is to ensure that all Subcontractors understand the full extent of their responsibilities in order to complete the entire work of the project. Subcontract work may appear in various Sections of Specifications and on various Drawings.
- .2 Contractors and their Subcontractors are advised to become familiar with all specifications and drawings.

1.16 CONDITIONS OF WORK AND EMPLOYMENT IN PEI

- .1 All Construction Companies and Contractors and subcontractors submitting tenders for this work, or a portion thereof, are advised, in their own interest, to contact the Construction Association of Prince Edward Island, the accredited association for commercial and industrial sectors of the construction industry, to inquire and determine the terms and conditions of work and employment in the Province of Prince Edward Island.

1.17 LABOUR

- .1 No prospective employee in the Province of Prince Edward Island shall, with relation to his employment or eligibility for employment, be discriminated against or favored by reason of sex, racial origin, religious views, or political affiliations.

- .2 Contractors, to the extent possible, are encouraged to maximize the employment of the local labour force for the Work of this Contract.

1.18 HARMONIZED SALES TAX REQUIREMENTS

- .1 The City of Charlottetown for this project must account for the Harmonized Sales Tax (HST).
- .2 All tenders submitted for the work of this Contract shall be calculated on the basis that the City of Charlottetown is not exempt from HST. The bid will exclude HST but will show it as a separate line item.

1.19 ACCEPTABLE PRODUCTS

- .1 The Bidder shall carry in his tender the base bid product(s) identified in the specifications as "Acceptable Material", or Approved Equals as they are identified throughout the tender period.
- .2 The Bidder is also encouraged to carry the products of other manufacturers, that are not considered equals, as "Alternatives Prices," listing them by name on the Appendix provided for that specific purpose, as part of the Tender Form, together with the price difference compared to the specified products, when such Appendix is identified under Section 00 41 13 - Bid Form.

1.20 APPROVED EQUALS

- .1 Submission for an Approved Equal is to contain literature and descriptive information with full specification data. Where the requested item is contained on a printed document with other items, it is to be clearly identified.
- .2 The Consultant will not search catalogs, e-mails or websites or contact suppliers to obtain the necessary information for proper evaluation.
- .3 Submission by Bidders for evaluation of products requested to be considered as equal must be submitted to Consultant no less than 5 working days prior to closing of tenders. No consideration will be given to approving equals after the close of tenders, except when the specified product is found to have been discontinued by the manufacturer.
- .4 The consideration of a product(s) for Approved Equal status and the acceptance of individual products as approved equals is entirely at the discretion of the Consultant.
- .5 When products are given Approved Equal status these products may, at the discretion of bidders, be carried in their tender price, provided that ALL costs related to changes to the contract work required to incorporate the Approved Equal product are included in the tender price.
- .6 The acceptance of a product by the Consultant as an "Approved Equal," even where not specifically indicated on the Approved Equals listing in the Addendum, is to be understood as being contingent upon the provision of the particular series, model and/or type, complete with all options to meet the specified requirements of the Acceptable Material product.
- .7 Products given approved status that are found, during construction period, to not have all specified options available, or to have discontinued production of same, or to have made other design changes since the time of approval, will not be accepted for use on this project, except when financial compensation has been mutually agreed upon between the Contractor and the City of Charlottetown and deemed acceptable by the Consultant.

Compensation will not be paid to the Contractor for products acknowledged by the Consultant to be superior to the specified products.

1.21 ALTERNATIVES

- .1 Alternative products, when requested under Section 00 41 13 - Bid Form, must be listed in Appendix "B" provided as part of the Tender Form, and are to be understood as being offered only for the City of Charlottetown's consideration as substitutes for the specified Acceptable Material products, at the amount of increase or decrease in the tender amount indicated in the Appendix. These products and related prices are not to be included in the tender amount.
- .2 Alternative products and their related increase or decrease in the base bid amount are not used as the basis for awarding tenders.
- .3 When alternative products are listed in Appendix "B", ALL costs related to changes to the contract work required to incorporate the alternative product into the work are to be included in the amount stated in Appendix "B".
- .4 Alternative products may or may not be accepted at the discretion of the City of Charlottetown at the price difference quoted, without any other monetary consideration. If requested, bidders shall promptly supply full details of any or all Alternatives listed. Specific written direction from the Consultant must be given to the Contractor to substitute an alternative product.
- .5 Alternative Prices shall include all fees and markups, excluding taxes.

1.22 UNIT PRICES

- .1 Unit Prices, when requested under Section 00 41 13 - Bid Form, must be listed in Appendix "C", as part of the Tender Form and are to be understood as being offered only for the City of Charlottetown's consideration; to be accepted or not accepted, at the City of Charlottetown's discretion in a timely manner during the Work of the Contract, ONLY as a method of adjustment to the Contract Work for changes in the Work, should the City of Charlottetown opt for the Unit Price Method.
- .2 Unit Prices shall include all fees and markups, excluding taxes.

1.23 SEPARATE PRICES

- .1 Separate Prices, when requested under Section 00 41 13 - Bid Form, must be listed in Appendix "D", as part of the Tender Form and are to be understood as being offered only for the City of Charlottetown's consideration; to be accepted or, not accepted, in whole or in part, at the City of Charlottetown's discretion. If used the Separate Prices may be incorporated into the Contract Work either at the time of Award of Contract or in a timely manner during the Work of the Contract, at the City of Charlottetown's discretion.
- .2 Separate Prices shall include all fees and markups, excluding taxes.

1.24 GUARANTEES

- .1 The Contractor will be required to guarantee the work of this Contract in accordance with the requirements of GC12.3 of the Agreement.
- .2 Notwithstanding the above, the bidder's attention is directed to the fact that certain individual items on this project may be required to be guaranteed by the manufacturer for periods in excess of twelve months. These specific requirements are to be found in various Sections of the specifications for this project.

1.25 PAYMENT OF WORKERS

- .1 The Contractor shall, in addition to any fringe benefits, pay the workers employed by the Contractor on the work at wage rates, not less than those established by the Minimum Wage Order, issued under authority of the Labour Act, which is in effect. The Contractor shall pay workers employed on the work at intervals of not less than twice per month.
- .2 The Contractor shall require each Subcontractor, or person doing any part of the work, to covenant with the City of Charlottetown that workers are employed at the wage rates and in the manner required by this provision.
- .3 Where any person employed by the Contractor or any Subcontractor, or other person engaged on the Work of this Contract, is paid less than the amount required to be paid under the provisions of this Contract, the City of Charlottetown may deduct from any monies payable to the Contractor, under this or any other Contract, and pay to such person, a sum sufficient to bring the person's wages up to the amount required to be paid under this Contract.
- .4 No claim for extra payment from the Contractor will be considered by the City of Charlottetown concerning any change in the Minimum Wage Order which may occur during prosecution of the Contract.

END OF SECTION

Part 1 General

1.1 TENDER

.1 SUBMITTED BY:

NAME:

ADDRESS:

CONTRACT:

DATE:

FOR: SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT –
TENDER PACKAGE, TP6 - Community Building, Arena Interior, and Site
Works Package

TO: CITY OF CHARLOTTETOWN
199 QUEEN STREET, CHARLOTTETOWN, PE

Having examined ALL the drawings and specifications for this project, as well as any addenda issued, as prepared by DSRA Architecture Inc. and/or their consultants; WE HEREBY OFFER to furnish all materials, plant and labour necessary for the full and proper completion of the Contract work for:

SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT –
Community Building, Arena Interior, And Site Works Package

INCLUDING all prime cost allowances and Government sales or other taxes in force at this date, EXCLUDING Harmonized Sales Tax (HST) but not any other additional or deductible allowances or taxes which may be applicable subsequent to this date, and which shall be payable by or to the City of Charlottetown, in accordance with the above-mentioned Documents, for the bid amount of:

_____ (Dollars)
(\$ _____)

in lawful money of Canada

The following is the total amount of Harmonized Sales Tax (HST) applicable to our bid amount

_____ (Dollars)
(\$ _____)

In submitting this Tender we recognize the necessity to complete the information requested by any appendices, as well as, the right of the City of Charlottetown to reject all Tenders or to accept any Tender at the price submitted, on the condition that revised Tenders will not be called for if minor changes are made.

In the event of this Tender being accepted within thirty (30) days of the time stated for the closing of Tenders, and our failing or declining to enter into a Contract, then our Bid Guarantee, submitted with our Tender shall be forfeited to the City of Charlottetown in lieu of any damages which the City of Charlottetown may suffer by reason of our failure or refusal to enter into such Contract.

In the event of our Tender not being accepted with thirty (30) days of the time stated for the closing of Tenders, our Bid Guarantee, submitted with our Tender will be returned to us forthwith, unless a satisfactory arrangement is made with us covering its retention for a further stated period.

If we are notified of the acceptance of this Tender within the above specified time, we will:

- .1 Enter into a formal Contract Agreement with the City of Charlottetown.
- .2 Furnish the Performance Bond and Labour and Materials Payment Bonds, or other form of Contract Security, when specifically permitted, as Contract Security in accordance with the requirements of the specifications.
- .3 Furnish a cost breakdown of the Contract sum, the total aggregating the amount of our Tender, in accordance with the requirements of the specifications.
- .4 Furnish a certified copy of all insurance policies.
- .5 Furnish a certified copy of all insurance policies carried by the named subtrades.
- .6 Complete the entire work on or before the dates stated.
- .7 Provide and update as required a Construction Schedule which clearly shows the state of progress required to complete the work on the date specified.
- .8 Enter into subcontract agreements where applicable.

1.2

ACKNOWLEDGEMENT OF RECEIPT OF ADDENDA

- | | | | |
|----|------------|---------------|---------------|
| .1 | Addendum 1 | Issued: _____ | initial _____ |
| .2 | Addendum 2 | Issued: _____ | initial _____ |
| .3 | Addendum 3 | Issued: _____ | initial _____ |
| .4 | Addendum 4 | Issued: _____ | initial _____ |
| .5 | Addendum 5 | Issued: _____ | initial _____ |
| .6 | Addendum 6 | Issued: _____ | initial _____ |
| .7 | Addendum 7 | Issued: _____ | initial _____ |
| .8 | Addendum 8 | Issued: _____ | initial _____ |

1.3 FORM OF TENDER APPENDICES

- .1 TENDER FORM 'A' must be completed by bidders.
- .2 TENDER FORM 'B' (only the items indicated) may be completed by bidders, any other items are at the bidder's discretion.
- .3 TENDER FORM 'C' must be completed by bidders.
- .4 TENDER FORM 'D' must be completed by bidders.

1.4 DOCUMENTS ACCOMPANYING BID FORM

- .1 As per Section 00 21 13, Par 1.8.16
 - .1 Two (2) copies of Bid Guarantee, together with Surety's letter of consent. _____initial
 - .2 Two (2) copies of preliminary schedule. _____initial
 - .3 Two (2) copies of letter from Bidders Insurance Provider identifying list of claims made against Bidder within last five (5) years. _____initial

1.5 SUPERINTENDENT

- .1 Name of Superintendent _____ .
- .2 Years of Experience with Contractor _____ .

1.6 CONFLICT OF INTEREST

- .1 The Contractor warrants that as at the date of this Agreement, no conflict of interest, or any circumstance that might interfere with independent and objective exercise of judgment, exists or is likely to arise in relation to execution of this Agreement or its subject matter. The Contractor shall immediately notify City of Charlottetown, in writing, if any such actual or potential conflict of interest should arise at any time during the Term. In the event City of Charlottetown discovers or is notified by the Contractor of an actual or potential conflict of interest, City of Charlottetown, in its sole discretion, may either:
 - .1 Allow the Contractor to resolve the actual or potential conflict to the satisfaction of City of Charlottetown;
- OR**
- .2 Terminate the Agreement in accordance with the Termination section of this Agreement.

1.7 CONTRACTOR'S SIGNATURE

- .1 Signed sealed and submitted for and on behalf of:
 - (Company) _____
 - (Address) _____

(Authorized Signature)

(Witness Signature)

(Name and Title)

(Name and Title)

(Date) _____

1.8 TENDER FORM 'A'

.1 SUBCONTRACTORS

Herewith are identified the Subcontractors we propose to use on this project. Carrying Sub-Contractor options next to identified work, is not acceptable and may be cause for rejection of the Tender by the City of Charlottetown:

- .1
- .2
- .3
- .4
- .5
- .6
- .7
- .8
- .9
- .10
- .11
- .12
- .13
- .14
- .15
- .16
- .17
- .18
- .19
- .20

Signed on behalf of:

(Company) _____

(Authorized Signature)

1.1 TENDER FORM 'B'

.1 ALTERNATIVE PRICES

We herewith submit for consideration by the City of Charlottetown the following systems or products as Alternatives to the Base Bid items indicated below and identify the increase or decrease, as applicable, in our tender price, for each item should it be selected by the City of Charlottetown for installation in lieu of the Base Bid item. The change in tender price includes for all necessary modifications to the base bid systems.

Alternative Prices shall include all fees and markups, excluding taxes.

BASE BID ALTERNATIVE:	TENDER PRICE (excluding taxes) INCREASED BY:	TENDER PRICE (excluding taxes) DECREASED BY:
1. Remove enclosed Arena 'Warm Room' from scope of work. Including the perimeter encloser above raised floor and all room contents. Perimeter encloser below the raised floor to remain in scope, along with steel stairs and handrail/guardrail at each end of the raised floor.	\$ _____	\$ _____
2.	\$ _____	\$ _____
3.	\$ _____	\$ _____
4.	\$ _____	\$ _____
5.	\$ _____	\$ _____

Signed on behalf of:

(Company)

(Authorized Signature)

1.2 TENDER FORM 'C'

.1 UNIT PRICE

We submit herewith our Unit Prices for the additions or deletions to the work listed below. The Unit Prices listed apply to performing the Units of Work, in accordance with the requirements of the appropriate specifications herein, only during the time scheduled for such work in the project work schedule.

Unit prices shall include all fees and markups, excluding taxes.

UNIT OF WORK	UNIT OF MEASURE	ONE (1) UNIT PRICE ONLY FOR EITHER ADDITION OR DELETION
1.		\$
2.		\$
3.		\$
4.		\$
5.		\$
6.		\$

Signed on behalf of:

(Company)

(Authorized Signature)

1.1 TENDER FORM 'D'

.1 SEPARATE PRICES

We submit herewith our Separate Price for the work listed below and amounts ARE included in our Stipulated Price. Due to available funding, the City of Charlottetown has the right to delete this work from the total bid price. In accordance with the requirements of the appropriate specifications herein, only during the time scheduled for such work in the project work schedule.

Separate prices shall include all fees and markups, excluding taxes.

SEPARATE WORK	SEPARATE PRICE:
1.	\$
2.	\$
3.	\$
4.	\$
5.	\$

Signed on behalf of:

(Company)

(Authorized Signature)

END OF SECTION

Part 1 General

1.1 FORM OF AGREEMENT

- .1 The Form of Agreement between Contractor and City of Charlottetown shall be Canadian Construction Documents Committee CCDC2-2008, "Stipulated Price Contract", including the Definitions and General Conditions therein dated 2008 including items GC1.1 inclusive to GC12.3, and the modifications to items GC1.1 to GC12.3 incorporated into Section 00 73 00 - Supplementary Conditions of this Specification.
- .2 Document CCDC2-2008 may be examined at the Construction Association office in Charlottetown, PEI.
- .3 The contractor will be required to enter into the above noted formal agreement with the City following receipt of a written letter of acceptance from the City, or upon receipt of a purchase order issued by the City.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 The Definitions and General Conditions governing the Work shall be those specified in the following amendments and supplements to those provisions and shall apply to all Sections of this Specification.
- .2 Where any Article or portion of Article conflicts with the Laws of the Province concerned, such Article or portion of the Article is hereby stricken.
- .3 The following amendments shall apply to the Definitions of CCDC2 Stipulated Price Contract 2008.

1.2 DEFINITIONS

- .1 Paragraph 4 Consultant, add the following:
 - .1 The Consultant shall be the City of Charlottetown's Prime Consultant, DSRA Architecture Inc, 5495 Spring Garden Rd, Halifax, NS.
- .2 Paragraph 12 City of Charlottetown, add the following:
 - .1 The City of Charlottetown shall be the City of Charlottetown.
- .3 Paragraph 19 Subcontractor, add the following:
 - .1 All dealings with the Subcontractor shall be through the medium of the Contractor, who will be responsible for the proper coordination and execution of the Sub-contractor's work.
- .4 New Paragraph 27 Engineer:
 - .1 This shall mean the designated engineering representative(s) of the Consultant.

1.3 ARTICLE GC1.1 CONTRACT DOCUMENTS

- .1 Paragraph 1.1.8 - Delete as written and substitute:

1.1.8 The Contractor shall receive up to two (2) sets of drawings and specifications at no cost from the City of Charlottetown. Additional sets of drawings will be supplied at cost of reproduction. The above covers the requirements for all trades.
- .2 Paragraph 1.1.11 - Add new Paragraph as follows:

1.1.11 The Contract Documents are prepared solely for use by the party with whom the Consultant has entered into a Contract and there are no representations of any kind made by the Consultant to any party with whom the Consultant has not entered into a Contract.
- .3 Paragraph 1.1.12 - Add new Paragraph as follows:

1.1.12 Electronic documents are and shall remain the Consultant's property. Copies of electronic documents may be made available for the preparations of shop drawings at the Consultant's sole discretion and for a fee.

1.4 ARTICLE GC3.1 CONTROL OF THE WORK

- .1 Paragraph 3.1.1 - add new Sub-Clause 3.1.1.1 as follows:

- .1 The Contractor shall co-ordinate his own work and the work of all Subcontractors so as to facilitate and expedite the progress of the work.
- .2 Paragraph 3.1.1 Add new Sub-Clause 3.1.1.2 as follows:
 - .1 It is the responsibility of the Contractor to immediately notify the Consultant of any signs of distress or any other indications of actual or potential damage to the contract work, without regard to his awareness of any errors, inconsistencies, or omissions in the Contract Documents.
- .3 Add new Paragraph 3.1.3 as follows:
 - .1 Before ordering any materials or doing any Work, Contractor shall verify all compensation has been allowed on account of differences between actual site dimensions and the measurements indicated on the drawings. Any difference which may be found, shall be submitted to the Consultant for consideration before proceeding with the work.
- .4 Add new Paragraph 3.1.4 as follows:
 - .1 The Contractor will be responsible for effecting the removal from the site of any trade, firm, group, or person who is delaying the Work, or whose Work is unsatisfactory. The Contractor will arrange for other competent trades people to complete the Work at no expense to the City of Charlottetown.

1.5 ARTICLE GC3.6 SUPERVISOR

- .1 Add new Paragraph 3.6.3 as follows:
 - .1 The Consultant may require the Contractor to inform him, in writing, of the name and experience of the supervisory personnel he intends to use on the project.

1.6 ARTICLE GC3.8 LABOUR AND PRODUCTS

- .1 Add new Paragraph 3.8.4 as follows:
 - .1 All manufactured articles, materials and equipment shall be installed, applied, connected, erected, used, cleaned, conditioned, and commissioned as directed by the manufacturer unless specified to the contrary.

1.7 ARTICLE GC3.9 DOCUMENTS AT THE SITE

- .1 Add new Paragraph 3.9.2 as follows:
 - .1 Maintain at job site, one copy each document as follows:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed Shop Drawings.
 - .5 List of Outstanding Shop Drawings.
 - .6 Notice of Change.
 - .7 Change Orders.
 - .8 Other Modifications to Contract.
 - .9 Field Test Reports.
 - .10 Approved Work Schedule.

- .11 Health and Safety Plan and Other Safety Related Documents.
- .12 CSA Z317.13-07 - Infection Control Guidelines.
- .13 Other documents as specified.

1.8 ARTICLE GC4.1 CASH ALLOWANCES

- .1 Article GC4.1 - Delete this article.

1.9 ARTICLE GC4.2 CONTINGENCY ALLOWANCE

- .1 Article GC4.2 - Delete this article.

1.10 ARTICLE GC5.2 APPLICATIONS FOR PROGRESS PAYMENT

- .1 Paragraph 5.2.2 - add two new Sentences as follows:
 - .1 Payment shall be less any holdback release, which may have been made in accordance with the specific terms of this Agreement as dictated by GC 5.6. Any such holdback release by the City of Charlottetown to the Contractor shall be a payment to the Contractor in trust for the specific Subcontractor in respect of whose work the release is made.
 - .2 Payments shall be less 15% Mechanics' Lien Holdback amount claimed against each progress claim.
- .2 Add new paragraph 5.2.6 as follows:
 - .1 Authorized Change Orders shall be listed on the application for payment indicating the amount claimed against each to date of claim.
- .3 Paragraph 5.2.7 - Add new sentences as follows:
 - .1 Payment for materials will be considered only if such materials are properly stored on site in a secure enclosure acceptable to the Consultant. Security of materials so stored is the responsibility of the Contractor.
- .4 Add new Paragraph 5.2.8 as follows:
 - .1 With the second and all subsequent applications for payment the Contractor shall include a statutory declaration form CCDC 9B, or other similar form acceptable to the Consultant, declaring that all labour and materials entering into the work, including Subcontractors, covered by the previous application, have been paid. With application for release of lien holdback, the Contractor shall include a statutory declaration form CCDC 9A, or other similar form acceptable to the Consultant.
 - .2 With the second and all subsequent applications for payment the Contractor shall include a Letter of Clearance from the PEI Workers Compensation Board.

1.11 ARTICLE GC5.3 PROGRESS PAYMENT

- .1 Paragraph 5.3.1 - Add new Sentence as follows:
 - .1 When any claim for payment during the course of construction includes for completed or partially completed Work, which in the opinion of the Consultant is defective or otherwise unacceptable, a sum of monies determined by the Consultant to be two (2) times the value of the defective or unacceptable Work, or two (2) times the value of the Work required to correct the defect or an amount solely at the Consultants discretion, will be withheld from the claim.

- .2 Paragraph 5.3.1 - Add 3 new Sentences as follows:
 - .1 Deficiency monies may be held back at any time during the course of the project for Work deemed incomplete or unacceptable.
 - .2 It remains the Contractor's responsibility to undertake his own deficiency reviews and ensure the entire Work conforms to the Contract including quality, completeness and commissioning.
 - .3 Two final deficiency reviews will be conducted by the Consultant. The first review with the City of Charlottetown and Contractor will identify any minor items which may remain outstanding, and the second review will confirm that these items have been completed. All other deficiency reviews where deficiencies are incomplete or not ready for requested inspections, will be charged at cost to the Contractor. The invoice for the additional reviews will be submitted to the City of Charlottetown with a corresponding amount deducted from the Contractor's progress payment.

1.12 ARTICLE GC5.5 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK

- .1 Paragraph 5.5.1, Add new Sub-Clause .3 as follows:
 - .1 5.5.1.3 Submit with application for payment letter of clearance from The Workers Compensation Board to the City of Charlottetown stating that the Contractor is in good standing with the Board.

1.13 ARTICLE GC5.7 FINAL PAYMENT

- .1 Paragraph 5.7.2 - Add new Sentence as follows:
 - .1 Any delay in delivering the required Project Record Drawings (As-Builts) as described in Section 01 78 00 - Closeout Submittals will have the effect of delaying the final payment to the Contractor until the Consultant has received them complete and in good condition.

1.14 ARTICLE GC6.2 CHANGE ORDER

- .1 Delete Paragraph 6.2.1 and replace with a new paragraph as follows:
 - .1 6.2.1 When a change in Work is proposed or required, the Consultant will provide the Contractor with a written description of the proposed change in the Work. The Contractor shall promptly present, in forms acceptable to the Consultant, a detailed breakdown of the costs associated with the change, if any; and the adjustment in the Contract Time, if any. The breakdown shall include:
 - .1 Actual (not list) costs of material, as well as Subtrade and Supplier costs.
 - .2 Labour costs, including fringe benefits and wage levies.
 - .3 Equipment rental (excluding hand and small power tool).
- .2 Change Orders calling for normal changes or additions to the Work will be priced in detail giving actual material trade prices (not list prices) and actual labour costs and wage levies (including Employment Insurance, Worker's Compensation, Holiday Pay) and actual equipment rental.
- .3 Each Change Order will be considered as a whole to complete the work, inclusive of all Sub-Contract and/or General Contract work.
- .4 To these prices, the Contractor will add:

- .1 For all extra work, involving the General Contractor and a Subcontractor, the Subcontractor adds 15% to his cost, submits this price to the General Contractor who adds 5%; to this amount the General Contractor adds the cost of his own Work plus 15% of the cost of his own Work only. The General Contractor does NOT add a further 5% to the cost of his own Work.
- .5 Note: Costs related to management, supervision, estimating, scheduling, bonding, insurance, as built drawings, copying, courier, safety, cleaning, site overhead, site vehicle, hand and small power tools etc. are covered by the mark up indicated in Paragraph 6.2.1.4 and shall not be included on Change Orders.

1.15 ARTICLE GC6.3 CHANGE DIRECTIVE

- .1 Delete Paragraphs 6.3.6.1, 6.3.6.2 and 6.3.6.3 and replace with the following.
- .2 The City of Charlottetown or the Consultant, without invalidating the contract, may make changes by altering, adding to, or deducting from the work, the contract sum being adjusted accordingly. All such work shall be executed under the conditions of the Contract.
- .3 Where work is required to proceed immediately, work may proceed under a Change Directive. The Contractor will be instructed to proceed on a time and materials basis and maintain accurate accounting records for the cost of the change.
- .4 Change Directives calling for changes to the Work will be priced in detail giving actual material trade prices (not list prices) and actual labour costs and wage levies (including Employment Insurance, Worker's Compensation, Holiday Pay) and actual equipment rental.
- .5 Each Change Directive will be considered as a whole to complete the work, inclusive of all Sub-Contract and/or General Contract work.
- .6 To these prices, the Contractor will add:
 - .1 For all extra work, involving the General Contractor and a Subcontractor, the Subcontractor adds 15% to his cost, submits this price to the General Contractor who adds 5%; to this amount the General Contractor adds the cost of his own Work plus 15% of the cost of his own Work only. The General Contractor does NOT add a further 5% to the cost of his own Work.
 - .2 Deletions to Contract: A mark-up by either Sub-Contractor or General Contractor shall not be charged or credited on credit Change Orders
 - .3 Supervision related to Change Orders shall be considered as included in the allowable mark-up, and shall not be included in the labour changes for a Change order.

1.16 ARTICLE GC9.1 PROTECTION OF WORK AND PROPERTY

- .1 Add new Paragraph 9.1.5 as follows:
 - .1 The Contractor shall be responsible for implementing all necessary security measures required to protect the areas of Work under his control and shall be responsible for damage which may arise from the failure of, or the failure to implement such security measures.

1.17 ARTICLE GC10.1 TAXES AND DUTIES

- .1 Paragraph G.C. 10.1.1 - Revise as follows:

- .1 Delete the words ..."at the time of closing except for Value Added Taxes"...and replace with the words ..."at the time of closing including Value Added Taxes"...

1.18 ARTICLE GC10.2 LAWS, NOTICES, PERMITS, AND FEES

- .1 Paragraph G.C. 10.2.2 - Delete "the building permit" and add the new sub-clause 10.2.2.1 as follows:
 - .1 The Contractor shall apply for, obtain, and pay for the building permit.

1.19 ARTICLE GC11.1 INSURANCE

- .1 Paragraph 11.1 (CCDC-2): Delete section and replace with CCDC-41 located in Appendix B.

1.20 ARTICLE GC12.3 WARRANTY

- .1 Add new Paragraph 12.3.7 as follows:
 - .1 When a part of the work is occupied by the City of Charlottetown, directly or for the use intended prior to Substantial Performance, the warranty for the Work directly related to the construction and normal operation of that part of the Work, shall start on the date of occupancy.
- .2 Add new paragraph 12.3.8 as follows:
 - .1 The Contractor shall ensure that his subcontractors are bound to the requirements of GC12.3 insofar as their work is concerned.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 The Bid Form and all other documents including those listed in the Specification Index shall form an integral part of this Specification. All trades shall read them and adhere to them fully and completely. Capitalized terms here in are as defined elsewhere in the Bid Documents listed in the Bid Instructions.
- .2 The Specifications have been written in such a way as to break up the work based on the different trades involved. This has been done for convenience only and does not relieve the Trade Contractor of any responsibility whatsoever for the work as a whole. Further, it does not mean that the Trade Contractor is required to subcontract all the work according to the divisions as indicated. Such separations shall in no instance make the City Representative or the Consultant an arbiter to establish limits to the contracts between Trade Contractor and Subcontractor.
- .3 The Sections of the Specifications are of the abbreviated type and include incomplete sentences. Definite and indefinite articles have often been omitted and sentences are written in the form of direct instructions to the Trade Contractor without using the phrase "the Trade Contractor shall".

1.2 SCOPE OF WORK

- .1 The Work required under this contract is the supply of all labour materials, tools and equipment to construct the Work. The Work is to be completed in all details as described in the Specifications and on the Drawings.
- .2 Unless specifically noted otherwise, the Drawings and Specifications are intended to include everything obviously requisite and necessary to satisfactorily complete and finish each trade or branch of the Work mentioned. All work essential to each trade or division to fulfil the reasonable intent of the Drawings and Specifications must be performed whether or not each item is mentioned.
- .3 Co-ordinate all divisions of the Work including the work of all Subcontractors and suppliers. Be responsible for scheduling and expediting their work and deliveries, including correction of all defective work.

1.3 EXAMINATION OF SITE AND FIELD DIMENSIONS

- .1 Visit the site, examine thoroughly and be fully aware of the existing conditions, character and extent of work necessary for completing the Work as illustrated. No allowance will be made by reason or error in not complying with this Specification.
- .2 Commencement of Work implies acceptance of all relevant conditions. No claims based on these conditions will be entertained.

1.4 METHOD OF CARRYING ON THE WORK

- .1 Provide Work schedule information as requested by the City Representative.

- .2 Begin work immediately upon receipt of the City Representative's notice to proceed.
- .3 Before concealing any Work, ascertain that all inspections have been made and satisfactory approvals obtained.

1.5 TIME OF COMPLETION

- .1 The Trade Contractor shall be responsible for inclusion of all branches of the Work and each trade shall be given a copy of schedules and shall be expected to so expedite the manufacture and installation of the Work as to adhere to the schedules.

1.6 INSURANCE

- .1 Insurances shall be provided as called for in the Contract Form GC 11.1 Insurance
- .2 The Trade Contractor shall provide, to the City Representative, certificates of the aforementioned insurance.

1.7 PAYMENTS

- .1 Payments will be made monthly in accordance with the Contract. Retention will be in accordance with the lien legislation of Prince Edward Island.
- .2 For the second and subsequent progress claims, a Statutory Declaration of Payment, CCDC Document 9A, must accompany the invoice. Form CCDC Document 9A must be submitted for release of Builders' lien holdback at completion.

1.8 DEFICIENCIES/INCOMPLETE WORK

- .1 All deficiencies and/or outstanding Work and/or all warranties and documentation requested under the terms of the Contract are to be completed by the Trade Contractor and/or its Subcontractor. Sufficient funds will be retained from final payment at the time of Substantial Performance of the Work for failure to adhere to this condition. This money will be used for engaging another trade contractor to complete the outstanding items.

1.9 LIENS

- .1 The City of Charlottetown, through the City Representative, will require the Trade Contractor to provide a statutory declaration, properly notarized, and a legal title search confirming that there are no builders' liens registered against the job and that all accounts have been paid in full, before certifying final payment including holdback monies.

1.10 WORKERS' COMPENSATION, VACATION PAY, EMPLOYMENT INSURANCE CANADA PENSION, ETC.

- .1 Workers' Compensation: Comply with the provisions of the *Workers' Compensation Act* Prince Edward Island and supply Certificates of Good Standing at commencement of contract, before final payment is made, and at such other times as may be required.
- .2 Vacation With Pay: Comply with any Regulations or Act covering vacations with pay.

.3 Employment Insurance: Comply with the regulations of the Canada Employment Insurance Commission.

.4 Canada Pension: Comply with the regulations of the *Pension Act* (Canada).

1.11 PERMITS, BY-LAWS AND REGULATIONS

.1 Obtain and pay for all permits, and other levies as required by local authorities other than the building permit and sewer development charge.

.2 Nothing contained in the Drawings and Specifications shall be construed as to be in conflict with any laws, by-laws, or regulation of municipal, provincial or other authority having jurisdiction. Perform Work in conformity with such laws, by-laws and regulations.

.3 Verify that each Section or portion of work to be executed or tendered does conform to such laws, by-laws and regulations prior to commencement of the work involved, and give notice to the Consultant of non-conformity. Any changes or deviations necessary after commencement of the work shall be executed as directed at no cost to the City of Charlottetown.

.4 Furnish inspection certificate and/or permits as may be applicable as evidence that installed work conforms with laws, by-laws and regulations of authorities having jurisdiction.

.5 Be responsible for damage and required repairs to adjoining properties.

1.12 WARRANTY

.1 In addition to any specific warranty required in any particular Section of the Specifications, the Trade Contractor shall guarantee work performed under this contract for a period of one (1) year from the date of Substantial Performance of the Project. This warranty shall be in writing, in a form acceptable to the City of Charlottetown. Refer to Individual Technical Specification Sections for specific Warranty requirements.

.2 The Trade Contractor shall correct at its own expense any defects in the Work due to faulty products and/or workmanship appearing within a period of one year from the date of Substantial Performance of the Project. The Trade Contractor shall correct and/or pay for any damage to other work resulting from any corrections required.

.3 Neither the final certificate nor payment thereunder shall relieve the Trade Contractor from its responsibility hereunder.

.4 The City of Charlottetown and/or the Consultant and/or the City Representative shall give the Trade Contractor written notice of observed defects.

.5 The Trade Contractor shall be liable for the proper performance of the Work only to extent that careful workmanship and proper implementation of the Contract Documents will permit and any warranty given respecting the Work and performance shall only be valid so far as the design will permit such performance.

- .6 Nothing in this clause shall be deemed to restrict any liability of the Trade Contractor arising out of any law in force in Prince Edward Island.
- .7 Neither the final certificate nor payment nor any provision of the contract documents, shall relieve the Trade Contractor from the responsibility for faulty materials or workmanship or both, which shall appear at any time prior to or within a period of one (1) year from the date of Substantial Performance of the Project, and the Trade Contractor shall remedy any defects due thereto and pay any damage to other work resulting therefrom which shall appear at any time prior to the said date of completion or within such period of one (1) year.

1.13 WORK OF OTHER TRADES

- .1 Be wholly responsible for the proper condition of the works of all trades prior to proceeding. Inform the City of Charlottetown through the City Representative of all defects in the work of other trades and see that the necessary corrections are made before proceeding with further work. In failing to comply with this requirement, replace at no expense to the City of Charlottetown, such parts of the works as may be damaged in correcting the initial faults.

1.14 ATTENDANCE

- .1 Each Trade Contractor shall supply all necessary attendance for their work such as scaffolding, bracing, bases, cutting, patching, making good, etc.

1.15 INSPECTION AND TESTING

- .1 Make necessary arrangements with, and give ample notice to selected inspection and testing agencies concerned, with regard to their presence being required at the site or manufacturing plant. Co-operate fully with such agencies and their representatives to facilitate their work.

1.16 ACCESS AND SECURITY PREMISES

- .1 Comply with the City of Charlottetown's requirements regarding access, hours of work and security requirements.

1.17 EXTRA WORK

- .1 When extra work is to be performed on a cost plus percentage basis, the amount to be paid shall be determined as follows:
 - .1 Labour Rates: Shall be the actual cost for labour required to complete the work including benefits plus ten (10) percent for overhead and profit. The contractor will be required to submit payroll and other backup documentation to substantiate labour costs for extra work.
 - .2 Equipment Rates: Shall be in conformance with the Prince Edward Island Roadbuilders' rates and no percentage shall be added to them in determining the cost of extra work. Other rental equipment required for extra work shall be the actual cost, substantiated by invoice copies from the rental company plus ten (10) percent for overhead and profit. Contractor owned equipment shall be

reimbursed at recognized published industry rental rates with no mark-up for overhead and profit.

- .3 Materials: will be paid for at cost as substantiated by invoices from the suppliers, plus ten (10) percent to cover handling charges, overhead and profit.
- .4 Subcontractor rates: will be paid for at cost substantiated by invoices from Subcontractors, plus ten (10) percent to cover other charges.

END OF SECTION

Part 1 General

1.1 DESCRIPTION OF WORK

- .1 Division 1 and the General Conditions of the Contract between the City of Charlottetown and Trade Contractor shall deem to apply and be a part of this section.

1.2 EXAMINATION OF SITE

- .1 Contractors are responsible for examining to site of the project in order to be familiar with local conditions and pay all costs required to perform their site examinations.
- .2 It shall be noted that site services and operation of the existing Simmons Arena will be on going and this Contractor shall be required to coordinate its activity with that of other trade contractors, as well as with the requirements of the City Representative.

1.3 DOCUMENTS AND REQUIRED AT JOB SITE

- .1 Maintain at job site, one copy each of following:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Reviewed shop drawings.
 - .5 Change Orders.
 - .6 Other modifications to Contract.
 - .7 Field test reports.
 - .8 Work schedule.
 - .9 Manufacturer's installation and application instructions.
 - .10 Standards listed in Part 1 of Specification Sections under Reference Standards.
 - .11 Permits.
 - .12 Particulars regarding daily weather conditions and work force.

1.4 COST BREAKDOWN

- .1 Before submitting first progress claim, submit breakdown of Contract price in detail as directed by City Representative and aggregating Contract price. After approval by City Representative, cost breakdown will be used as basis for progress payment.

1.5 TRADE CONTRACTOR(S) USE OF SITE

- .1 The site shall be shared with others in accordance with directions from the City Representative.
- .2 Do not unreasonably encumber site or premises with materials or equipment.
- .3 Move stored products or equipment which interfere with operations of the City of Charlottetown, or other Trade Contractors.

- .4 Obtain and pay for use of additional storage or work areas needed for operations.
- .5 Assume full responsibility for the protection and safekeeping of products under this contract, stored on site.
- .6 Cooperate with City Representative regarding access and storage.

1.6 CODES AND STANDARDS

- .1 Perform work in accordance with *National Building Code of Canada (NBC) 2015* and the *National Energy Code Canada for Buildings (NECB) 2017* any other code of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
- .2 Particular attention is drawn to the *Occupational Health and Safety Act* (Prince Edward Island) and the *Workplace Hazardous Materials Information System (WHMIS) Regulations*. The Trade Contractor shall ensure that where any materials, supplies or processes require, of themselves, Material Safety Data Sheets (MSDS), these sheets shall be provided to the City Representative, prior to or coincident with the arrival of the material on site and a copy shall be made accessible to the Trade Contractor's employees on the job site.
- .3 While on site, the Trade Contractor is to adhere strictly to and enforce the City of Charlottetown's No Smoking policy and its Parking Regulations, among its own employees and those of its Subcontractors.
- .4 Meet or exceed requirements of contract documents, specified standards, codes and referenced documents. Conform to latest revision of such documents.

1.7 SETTING OUT OF WORK

- .1 Assume full responsibility for and execute complete layout of Work to locations, lines and elevations indicated.
- .2 Provide devices needed to lay out and construct Work.
- .3 Supply such devices as straight edges and templates required to facilitate City Representative (s) inspection of Work.
- .4 Supply stakes and other survey markers required for laying out Work.

1.8 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform City Representative of impending installation and obtain Consultant's approval for actual location.

- .4 Submit field drawings to indicate relative position of various services and equipment when required by Consultant.
- .5 Locate switches, outlets, controls, etc. for electrical and mechanical systems in finished areas as follows:
 - .1 Centre line at same height from floor throughout the building and same distance from door frame, where applicable for the item concerned unless indicated otherwise.
 - .2 Where more than one such item to be installed, occur in close proximity of each other, they shall be installed with centre lines horizontally and/or vertically aligned, perfectly level and/or plumb.

1.9 CONCEALMENT

- .1 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.10 CUTTING FITTING AND PATCHING

- .1 Execute cutting (including excavation), fitting and patching required to make work fit properly.
- .2 Where new work connects with existing and where existing work is altered, cut, patch and make good to match existing work.
- .3 Obtain Consultant's approval before cutting, boring or sleeving loadbearing members.
- .4 Make cuts with clean, true, smooth edges. Make patches inconspicuous in final assembly.
- .5 Fit work airtight to pipes, sleeves, ducts and conduits.
- .6 Execute work by methods to avoid damage to other work and existing materials.
- .7 Perform cutting and remedial work using qualified specialists familiar with the materials affected. Perform this work in a manner which will neither damage nor endanger the work.
- .8 Diamond drill holes through concrete and masonry.
- .9 Saw cut other openings in concrete and masonry.
- .10 Patch openings no longer required. Refinish surfaces to match adjacent finishes. Use materials to maintain fire separation.

1.11 EXISTING SERVICES

- .1 Where Work involves breaking into or connecting to existing services, carry out work at times directed by City Representative in consultation with City of Charlottetown Representatives, with minimum of disturbance to pedestrian and vehicular traffic. Coordinate requirements with City Representative.

- .2 Before commencing Work, establish location and extent of service lines in area of Work and notify Consultant of findings.
- .3 Submit schedule to and obtain approval from City Representative for any shutdown or closure of active service or facility. Adhere to approved schedule and provide notice to affected parties.
- .4 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.
- .5 Remove abandoned service lines within 2 m of structures or where interfering with new work. Cap or otherwise seal lines at cutoff points as directed by Consultant.
- .6 Record locations of maintained, rerouted and abandoned service lines.
- .7 Existing facility must be kept operating at all times.

1.12 PRECONSTRUCTION MEETING

- .1 Within five (5) days after contract award, arrange meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Representatives of the City of Charlottetown, Consultant, City Representative, Trade Contract, major Subcontractors, field inspectors and others as required and decided upon by the Consultant will be in attendance.
- .3 Establish time and location of meeting and notify parties concerned minimum two (2) days before meeting.
- .4 Agenda to include the following:
 - .1 Appointment of official representatives of participants in the work and lines of communications.
 - .2 Schedule of Work, progress scheduling.
 - .3 Schedule or submission of shop drawings.
 - .4 Requirements for temporary facilities, offices, storage sheds.
 - .5 Site security.
 - .6 Contemplated or proposed change notices, change orders, procedures, approvals required, markup percentages permitted, time extensions, overtime, administrative requirements.
 - .7 Record drawings.
 - .8 Takeover procedures, acceptance.
 - .9 Monthly progress claims, administrative procedures, photographs, holdbacks.
 - .10 Appointment of inspection and testing agencies or firms.
 - .11 Others as required.

1.13 PROGRESS MEETING

- .1 During course of Work, attend project meetings at times and locations approved by City of Charlottetown/ Consultant /City Representative. There will be at least two meetings per month plus additional meetings as required.

- .2 The City Representative will notify all parties concerned prior to meetings.
- .3 The City Representative shall record minutes of meetings and distribute to all parties within seven (7) days of meeting.
- .4 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting
 - .2 Review of work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of offsite fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revisions of construction schedule.
 - .8 Progress, schedule, during succeeding work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Pending changes and substitutions.
 - .12 Review proposed changes for effect on construction schedule and on completion date.
 - .13 Other business.

1.14 ADDITIONAL DRAWINGS

- .1 City Representative may furnish additional drawings to assist proper execution of the Work. These drawings will be issued for clarification only. Such drawings shall have same meaning and intent as if they were included with plans referred to in Contract documents.

1.15 RELICS AND ANTIQUITIES

- .1 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents, commemorative plaques, inscribed tablets and similar objects found on site or in buildings to be demolished, shall remain property of the City of Charlottetown. Protect such articles and request directive from Consultant.
- .2 Give immediate notice to Consultant if evidence of archaeological finds are encountered during construction, and await the Consultant's written instructions before proceeding with work in this area.

1.16 ITEMS SUPPLIED BY OWNER

- .1 Examine all Specifications Sections and Drawings for items that will be supplied by the City Representative for installation by the Trade Contractor.
- .2 Include in Bid for the costs of installing these items.

1.17 DOCUMENTS REQUIRED FOR SUBMISSION AND STAMPED

- .1 At Closing:

- .1 Two (2) Copies of Bid Form appropriately filled out, signed and stamped.
 - .2 Security Deposit.
 - .3 List of all subtrades by firm name.
 - .4 A Prince Edward Island Construction Safety Association Certificate or such other Certificate of Recognition that is approved by the Prince Edward Island Department of Labour and Advanced Education, or as acceptable to the City Representative.
- .2 At Commencement of Contract:
- .1 Certificate of good standing from Workers' Compensation Board (Prince Edward Island) for Trade Contractor and all Subcontractors.
 - .2 Labour and Materials Payment Bond and Performance Bond if required by the contract documents.
 - .3 Contract sum breakdown to serve as the basis of all monthly applications for payment.
 - .4 Construction schedule and any other required schedules and estimates.
 - .5 Confirmation of insurance coverage.
 - .6 Copies of all required building and other permit applications.
 - .7 Copy of action plan to reduce false (fire) alarms from Trade Contractor's work site.
 - .8 Names and 24-hour phone numbers of Trade Contractor's responsible persons.
- .3 During Constructions:
- .1 Progress Reports.
 - .2 Job Meetings, Reports, Minutes.
 - .3 Updated Schedules
 - .4 Copies of Signed and/or Contemplated Change Orders.
 - .5 Material Safety Data Sheets (MSDS) for all materials requiring same, prior to the arrival of the material on site.
 - .6 Confirmation by statutory declaration that payments are being made to Subcontractors and Suppliers with second and all subsequent applications for payment. No payment will be made for unincorporated materials on site unless a bill of sale in proper format is provided.
- .4 On Substantial Performance of the Work:
- .1 Reference records.
 - .2 Inspection Certificates and Guarantees.
 - .3 Trade Contractor's Statement of Substantial Performance of the Work.
 - .4 Firm date of completion of the Work.
 - .5 Receipts for all keys signed by City Representative.
 - .6 All reports required elsewhere in the Specifications.
 - .7 Statutory declaration from the Trade Contractor, signed by an authorized signing officer of the Trade Contractor and duly notarized, stating that all payments resulting from the Contract for which the Trade Contractor is liable have been paid.

- .8 Written statement from the Trade Contractor that all claims and demands for extra work or otherwise, under or in connection with the Contract, have been presented.
- .9 A statement from the Trade Contractor and all Subcontractors identifying the dollar split between labour and equipment/materials incorporated into the project; and, in the case of the equipment/materials, a copy of each invoice of this direct purchase, including supply only contracts, identifying the amount of the Harmonized Sales Tax paid.
- .10 Written statement from the Trade Contractor's legal representative certifying that no lien has been filed against the Trade Contractor, or on the premises, or materials mentioned herein, for work constructed under or by virtue of this agreement.
 - .1 Release of all liens arising out of this contract and legal search. (If a Subcontractor or supplier refuses to furnish a release of such lien, furnish a bond satisfactory to the City of Charlottetown to indemnify him against claims under such lien).
- .11 Certificates of Good Standing from the Workers' Compensation Board (Prince Edward Island) for the Trade Contractor and all Subcontractors.
- .12 Final list of deficiencies signed completed by the City of Charlottetown's authorized representative, the Consultant, and City Representative.

END OF SECTION

Part 1 General

1.1 WORK COVERED BY CONTRACT DOCUMENTS

- .1 The work included in this Trade Contract Package (TP6 - Community Building, Arena Interior, and Site Works Package) shall comprise the provision of all necessary labour, materials, tools, equipment, hoisting, insurance, bonding or contract security, taxes, licenses, permits, safety equipment, scaffolding, general requirements, competent supervision, office management, overhead and profit, and all else necessary or required for the proper execution of the Work in accordance with the full intent of the drawings, specifications, applicable regulations and codes and construction schedule, including the scope of work, and shall include, but not necessarily be limited to the following:
 - .1 Supply and install all structural steel and steel deck to complete the structure of the Front addition volume from grid lines 1' through 4.9 and C' through J, and part of the lobby area between gridlines 4.9-6 and I-J.
 - .2 Supply and install all associated miscellaneous metals to complete the enclosure of the building envelope and roofing in between grid lines 1' through 4.9 and C' through J, and part of the lobby area between gridlines 4.9-6 and I-J.
 - .3 Supply and install all components required for wall and roof envelope system as detailed in the drawings and specifications for the Front addition volume from grid lines 1' through 4.9 and C' through J, and part of the lobby area between gridlines 4.9-6 and I-J.
 - .4 Supply and install all exterior and interior doors, windows and door hardware for the entire building, including the Arena area. Please note that steel framing and prefinished metal trims for doors and windows in between the grid lines 5 and 16 are not part of this package, but doors and windows in this area are included in this package.
 - .5 Supply and install all interior partitions, finishes, millwork, dressing and change room furniture and accessories, exterior and interior stairs, guardrails, handrails, precast bleachers and bleachers seating, and all other elements to completely enclose and finish the whole building in order to be fully operable. Refer to drawings and specification sections included with this package.
 - .6 Supply and install permanent wire mesh fence and emergency exit gates around the pool deck. Refer to drawings and specifications.
 - .7 Supply and install all electrical, communication and audio-visual services for the entire building. Refer to Drawings and Specification. Provide separate price for supply of Power Diesel Generator (installation and connection to the Power Diesel Generator to be part of the main price). Provide separate price for supply and installation of the score clock.
 - .8 Supply and install all mechanical plumbing, sprinkler and propane services and fixtures for the entire building.
 - .9 Exterior work including site grading, sodding, concrete paving and concrete pads, asphalt, lighting, new fire hydrant, bike racks, painting for lanes and parking but not inclusive to this are part of this package. Refer to Landscape and Civil drawings and specifications.
 - .10 Provide and install passenger lift, refer to specifications and drawings.

- .11 Provide fireproofing of all steel elements, fire stops, fire dampers, fire rated assemblies, fire shutters for the whole building. Refer to specifications and drawings.
 - .12 This contractor shall design, provide, erect, maintain, remove and assume full responsibility for all temporary works required for the safe and complete execution of the works.
 - .13 Provide necessary manpower to maintain construction schedule.
 - .14 Provide all traffic control as required.
 - .15 Always maintain adjacent streets free of mud and debris
 - .16 Hoisting, as required, for all components supplied or installed under the scope of work of this contract.
 - .17 Provision of scaffolding as required for the work of this contract.
 - .18 Provide and maintain temporary barricades for all work areas.
 - .19 Co-ordinate all work by this Trade Contract with the work of other Trades on site.
 - .20 This contractor is required to provide temporary power and lighting as required to complete the work in this package.
- .2 The work excluded from this Tender package:
- .1 Footings, foundation walls and slab on grade.
 - .2 Steel structure, steel deck, slab on deck, wall and roof envelope for Main Arena between the gridlines 5 and 16.
 - .3 Steel deck and slab on deck above pool mechanical room.
 - .4 Underground services
 - .5 HVAC, Refrigeration system, Ice slab, dasher boards and glass, netting around the Ice surface.
 - .6 Elevator
 - .7 Pool, pool deck, and pool accessories.
 - .8 Kitchen appliances, furniture for sitting area in atrium, staff room desks and chairs are not part of this package, all other furniture, accessories and millwork are part of this package.
 - .9 Arena Score Clock – only electrical and data rough in to be included.

1.2

PROGRAM OF WORKS AND SCHEDULES

- .1 As soon as it is practicable, and not later than one (1) week after the Award, submit to the City of Charlottetown for review and approval, a program and construction schedule showing the order of procedure, significant Contract dates, and method in which the Contractor proposes to carry out and complete the Works within time period required by Contract Documents.
- .2 Provide information regarding the implementation of the Works and of the Construction Equipment, temporary works, labour and construction crews which the Contractor intends to supply, use or construct as the case may be.
- .3 Construction Schedule to be standard "bar" type, showing commencement, duration and completion of activities of all trades and suppliers involved.

- .4 Have construction schedule subject to review by the City Representative and the Consultant. Revise and resubmit as directed.
- .5 Update schedules periodically and submit updated Construction Schedule in duplicate with each request for payment. Where Work has fallen behind the original schedule times, indicate methods proposed to Completion Time.
- .6 Coordinate and schedule Work with other trades, including the Consultant, such that the construction proceeds in a timely and efficient manner. Minimize disturbance to existing systems and provide access for the Consultant to conduct routine maintenance and inspection.

1.3 EXISTING SERVICES

- .1 Notify the Consultant, City Representative and utility companies of intended interruption of services and obtain required permission.
- .2 Phase installation of equipment to ensure downtime of equipment is minimized.
- .3 Where Work involves breaking into or connecting to existing services, give City Representative 48 hours notice for necessary interruption of mechanical or electrical service throughout course of work. Minimize duration of interruptions. Carry out work at times as directed by governing authorities with minimum disturbance to vehicular traffic.
- .4 Provide alternative routes for vehicular traffic when requested.
- .5 Establish location and extent of all service and utility lines in area of work before starting Work. Notify the City Representative of findings.
- .6 Where unknown services are encountered, immediately advise the City Representative and confirm findings in writing.

1.4 DOCUMENTS REQUIRED

- .1 Maintain at job site, one (1) copy each document as follows:
 - .1 Specifications.
 - .2 Drawings.
 - .3 Addenda.
 - .4 Change Orders.
 - .5 Other Modifications to Contract.
 - .6 Field Test Reports.
 - .7 Copy of Approved Work Schedule.
 - .8 Health and Safety Plan and Other Safety Related Documents.
 - .9 Other documents as specified.

1.5 STANDARD SPECIFICATIONS

- .1 Reference has been made to certain Domestic, National and International Standard Specifications throughout the various sections of the Specification contained herein. These Standard Specifications will be considered an integral part hereof and must be read in conjunction with the Drawings and Specifications as if they were reproduced herein. Be familiar with their contents and requirements. The latest editions of these Standard Specifications at the time of tendering will always govern.

Part 2 Products

.1 Not Used.

Part 3 Execution

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REQUIREMENTS INCLUDED

- .1 Constituent inclusions within Contract Price.

1.2 CONTRACT PRICE

- .1 All prices included in this Contract shall be in Canadian funds and shall be complete for the applicable Work, and shall include for each price:
 - .1 Expenditures for wages and for salaries of workmen, engineers, superintendents, draftsmen, foremen, office staff, watchmen and any other personnel employed directly under the Trade Contractor and while engaged on the applicable Work and expenditures for travelling and board allowances of such employees when required by location of the applicable Work.
 - .2 Expenditures for material used in or required in connection with the construction of the applicable Work including material tests and mix designs required by the laws or ordinances of any authority having jurisdiction.
 - .3 Expenditures for preparation, inspection, delivery, installation and removal of materials, plant, tools and supplies.
 - .4 Temporary facilities as required for the applicable Work.
 - .5 Expenses incurred by the Trade Contractor in connection with the inspection and supervision of the applicable Work or in connection with the inspection of materials prepared or in course of preparation for the applicable Work and in expediting their delivery.
 - .6 Rentals of all equipment, whether rented from the Trade Contractor or others, in accordance with approved rental agreements including any approved applicable insurance premiums thereon and expenditures for transportation to and from the site of such equipment, costs of loading and unloading, cost of installation, dismantling and removal thereof and repairs or replacements during its use on the applicable Work.
 - .7 The cost of all expendable materials, supplies, and tools (other than tools customarily provided by tradespersons).
 - .8 Assessments under the *Workers' Compensation Act* (Prince Edward Island), the *Employment Insurance Act* (Canada), *Pension Act* (Canada), statutes providing for government hospitalisation, vacations with pay or any similar statutes; or payments on account of usual vacations made by the Trade Contractor to his employees engaged on the applicable Work at the site, to the extent to which such assessments or payments for vacations with pay relate to the Work covered by the specified price; and all sales taxes or other taxes where applicable.
 - .9 The amounts of all subcontracts related to the specified price.
 - .10 Premiums on all insurance policies and bonds called for under this Contract as related to the specified price.
 - .11 Royalties and fees for licences and permits in connection with the applicable Work.
 - .12 Duties and taxes imposed on the applicable Work, excluding HST.

- .13 Cash allowances stipulated to be carried in the Contract Price.
- .14 Such other expenditures in connection with the applicable Work as may be required.

1.3 ALTERNATIVE PRICES

- .1 Alternative Prices shall be expressed as either a credit or extra to the tendered bulk sum price based on a change in specified products, methods, or requirements. Each price shall be complete, and include all material, labour, incidentals, taxes (excluding HST), profit, overhead, surcharges, as detailed in Paragraph 1.2 above, as well as all charges for work which would be inherent in using the substituted products and/or methods or in meeting the alternative requirements.
- .2 Coordinate the pertinent related work and modify surrounding work as required to complete the Work under each alternative designated.
- .3 The submission of the following specified alternative prices is required for the purposes of this tender. Show alternative prices in the designated location on Bid Form for the work listed.
 - .1 None Required

1.4 ITEMIZED PRICES

- .1 An itemized price is based on Work which has been included in the Tendered Price on the Bid Form and a credit is being offered for that work to be deleted from the Scope of Work. Each price shall be complete, and include all material, labour, incidentals, taxes (excluding HST), profit, overhead, surcharges, as detailed in Paragraph 1.2 above, as well as all charges for work which would be inherent in meeting the alternative requirements.
- .2 Coordinate the pertinent related work and modify surrounding work as required to complete the Work under each designated item.
- .3 The submission of the following specified itemized prices is required for the purposes of this tender. Show itemized prices in the designated location on Bid Form for the work listed.
 - .1 None Required

1.5 SEPARATE PRICES

- .1 A separate price is based on Work which has NOT been included in the Tendered Price on the Bid Form and an extra is being offered for that work to be added to the Scope of Work. Each price shall be complete, and include all material, labour, incidentals, taxes (excluding HST), profit, overhead, surcharges, as detailed in Paragraph 1.2 above, as well as all charges for work which would be inherent in meeting the alternative requirements.
- .2 Coordinate the pertinent related work and modify surrounding work as required to complete the Work under each designated item.
- .3 The submission of the following specified separate prices is required for the purposes of this Bid. Show separate prices in the designated location on Bid Form for the work listed.

- .1 None Required

1.6 UNIT PRICES

- .1 A Unit Price is for a particular measurable unit of labour and materials which may be added or deducted from the Tendered Price based on the quantities required. Note that the Tendered Price will include all work for the quantity shown on the drawings. Such unit price must include the cost of all material, equipment, labour, overhead, profits, assessments, duties, and changes that may be required to other associated work. The only exclusion from the unit price is to be HST:
- .2 The submission of the following specified unit prices is required for the purposes of this Bid. Show unit prices in the designated location on Bid Form for the work listed.

- .1 None Required

1.7 CASH ALLOWANCES

- .1 Cash allowances, unless otherwise stipulated, cover the net cost to the Trade Contractor of services, products, construction machinery and equipment, freight, handling, unloading, storage, installation, and other authorized expenses incurred in performing the Work.
- .2 Expenditures against cash allowances require written acceptance by City Representative of cost proposals submitted by the Trade Contractor; no claims against the allowance will be administered for items that do not receive prior approval and authorization.
- .3 The Contract Price, and not the cash allowance, includes the Trade Contractor's overhead and profit in connection with such cash allowance.
- .4 The Contract Price will be adjusted by written order to provide for an excess or deficit to each cash allowance.
- .5 Where costs under a cash allowance exceed the amount of the allowance, the Trade Contractor will be compensated for any excess incurred and substantiated plus an allowance for overhead and profit as set out in the Contract Documents.
- .6 Progress payments on accounts of work authorized under cash allowances shall be included in the City Representative's monthly certificate for payment.
- .7 Note the following cash allowances for this Bid:

- .1 None

1.8 SUPPLEMENTAL PRICE BREAKDOWN

- .1 For the purpose of cost accounting, bidders may be required to provide additional breakout pricing **after tender**, on request, with respect to the cost of specialized systems, equipment, and components. Supplementary information required may include the following:
 - .1 None required

1.9 ASSIGNED CONTRACTS

- .1 Where the City of Charlottetown has made arrangements to tender certain products and services outside the procedures of this Bid, the successful trade contractor shall assume responsibility for purchasing, off-loading, handling, on-site storage, installation, commissioning, and warranties in exactly the same manner as products furnished by that Trade Contractor.
- .2 The Tendered Price submitted by the Trade Contractor shall include the amount of the purchase order plus any markups by the Trade Contractor, plus all installation, and incidental materials required to incorporate these products into the Work, handling and other costs listed in Section 01025. On execution of the agreement with the City of Charlottetown, the Trade Contractor shall execute an agreement with the designated Supplier.
- .3 The following products and services have been arranged as assigned contracts:
 - .1 None

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 Referenced Specification Sections contain pertinent requirements for materials and methods to achieve Work described herein.
- .2 Coordinate pertinent related work and modify surrounding work as required to complete Work under each alternative designated.

1.2 ALTERNATIVES

- .1 State in Bid Form variation in bid price for alternatives listed in Bid Form and specific sections of the Work.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Inspection and testing, administrative and enforcement requirements.
- .2 Tests and mix designs.
- .3 Mock-ups.
- .4 Mill tests.
- .5 Equipment and system adjust and balance.

1.2 PRECEDENCE

- .1 Division 1 Sections take precedence over technical specification sections in other Divisions of these Specifications.

1.3 INSPECTION AND TESTING

- .1 This Section establishes requirements for performance of inspection and testing specified under Source Quality Control and Field Quality Control in other sections of these Specifications.
- .2 Allow City of Charlottetown's representative access to the Work. If part of the Work is in preparation at locations other than Place of the Project, allow access to such Work whenever it is in progress.
- .3 Give timely notice requesting inspection if Work is designated for special tests, inspections or approvals by City of Charlottetown's representative instructions, or law of the Place of the Project.
- .4 If a Trade Contractor covers or permits to be covered Work that has been designated for special tests, inspections or approvals before such is made, uncover such Work, have inspections or tests satisfactorily completed and make good such Work.
- .5 City of Charlottetown's Representative may order any part of work to be examined if Work is suspected to be not in accordance with Contract Documents. If, upon examination such work is found not in accordance with Contract Documents, correct such Work and pay cost of examination and correction.
- .6 The passing of inspections and tests shall not relieve the Trade Contractor from responsibility of performing its Work in accordance with the Contract Documents. The Trade Contractor shall carry out any other necessary testing required to ensure that the Work is in strict compliance with Contract Documents.
- .7 Responsibility for ensuring that products and execution of the Work meet Contract requirements, and inspection and testing required to this end, shall not be restricted to or limited by inspection and testing specified in this or any Section. Independent of any such specified testing and inspections, the Trade Contractor is expected to take carry out

any necessary supplementary tests to ensure that the Work is in strict compliance with Contract Documents. Any resulting test reports are to be copied to the Consultant.

- .8 Failure to procure tests, inspections, or approvals of the Work by the Consultant, an inspection firm, jurisdictional authorities, or manufacturer's representatives at specified stages, before proceeding with the Work, will render the Trade Contractor responsible for the costs, delays, and other consequences of appropriate corrective action, which may include supplementary investigation and testing, rejection and removal of the Work in question, alternative remedial work, sworn affidavits, extended guarantees and maintenance bonds, or other such remedies which are deemed by the City of Charlottetown or the authorities to be appropriate to the circumstances.

1.4 TOLERANCES

- .1 Unless acceptable tolerances are otherwise specified in a Section:
- .1 "Plumb and Level" shall mean plumb or level within 1/8" in 10'-0".
- .2 "Square" shall mean not in excess of 10 seconds less or greater than 90 deg.
- .3 "Straight" shall mean within 1/8" under a 10'-0" long straight edge

1.5 INDEPENDENT INSPECTION AGENCIES

- .1 Independent inspection/testing agencies will be engaged by City of Charlottetown for purpose of inspecting and/or testing portions of the Work. Cost of such services will be borne by City of Charlottetown.
- .2 Provide equipment required for executing inspection and testing by appointed agencies.
- .3 Employment of inspection/testing agencies does not relieve the Trade Contractor's responsibility to perform Work in accordance with Contract Documents.
- .4 If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by City Representative at no cost to City of Charlottetown. Pay costs for retesting and reinspection.

1.6 ACCESS TO WORK

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.
- .3 Notify appropriate agency and City Representative in advance of requirement for tests, in order that attendance arrangements can be made.

1.7 PROCEDURES

- .1 Submit samples and/or materials required for testing, as specifically requested in specifications. Submit with reasonable promptness and in an orderly sequence so as not to cause delay in Work.

- .2 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

1.8 CONSULTANT INSPECTIONS

- .1 The Trade Contractor is to establish an organized process and orderly flow of work whereby a reasonable amount of Work can be inspected at each of the following stages at one time.
- .2 Above and beyond the inspection requirements of jurisdictional authorities, the key stages at which work in progress is to be formally inspected and approved by the consultants, specialized testing and inspection agencies, and/or manufacturer's representatives, prior to proceeding further, are as follows:
 - .3 Initial takeover inspection:
 - .1 At the commencement of the Work a joint inspection by the City Representative, Consultants, and Trade Contractor will take place to document the condition of finishes, surfaces, as well as special items which are to be retained and protected by the Trade Contractor. At the end of the Work, the Trade Contractor shall make good any such existing surfaces, finishes, and items which were subsequently damaged during construction.
 - .4 Subsurface installations inspection:
 - .1 Footing excavations and structural fills; visual/compaction testing prior to formwork.
 - .2 Formwork and Re-enforcement, immediately prior to concrete pour.
 - .3 Concrete (compressive strength testing as directed).
 - .4 Underground services, prior to backfill.
 - .5 Preliminary interior (rough-in) inspection:
 - .1 Entrances and Windows, prior to drywall and trim.
 - .2 Exterior walls/insulation/vapour/air barrier, prior to drywall.
 - .3 Partitions/Bulkheads/Chases/Blocking, prior to drywall finish.
 - .4 Structural inspection of beams/ columns/ lintels/ connections etc.
 - .5 Electrical Rough-in, prior to drywall and fixtures.
 - .6 Plumbing Rough-in, prior to drywall and fixtures.
 - .7 Heating Rough-In, prior to cabinet installation.
 - .8 Ventilation Rough-in, prior to drywall.
 - .9 Firestopping and Sealants.
 - .6 Intermediate interior inspection:
 - .1 Finish surfaces, prior to painting.
 - .2 Subfloor preparation (prior to finish flooring).
 - .7 Exterior inspection:
 - .1 Cavities, insulation and air barrier prior to cladding.
 - .8 Final inspections:

- .1 All finish installations by all appropriate consultants and City of Charlottetown's representative.
- .2 Coatings by Coating Manufacturer's Representative.
- .3 Roofing by Membrane Manufacturer's Representative.

1.9 REJECTED WORK

- .1 Remove defective Work, whether result of poor workmanship, use of defective products or damage and whether incorporated in Work or not, which has been rejected by City of Charlottetown's representatives as failing to conform to Contract Documents. Replace or re-execute in accordance with Contract Documents.
- .2 Make good other trade contractor's work damaged by such removals or replacements promptly.
- .3 If in opinion of City Representative it is not expedient to correct defective Work or Work not performed in accordance with Contract Documents, City of Charlottetown may deduct from Contract Price difference in value between Work performed and that called for by Contract Documents, amount of which shall be determined by City Representative.

1.10 REPORTS

- .1 Submit four (4) copies of inspection and test reports to City Representative.

1.11 TESTS AND MIX DESIGNS

- .1 Furnish test results and mix designs as may be requested.

1.12 MOCK-UPS

- .1 Prepare mock-ups for work specifically requested in specifications.
- .2 Construct in all locations acceptable to City Representative.
- .3 Prepare mock-ups for City of Charlottetown's Representatives review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 If requested, City Representative will assist in preparing a schedule fixing dates for preparation.
- .6 Remove mock-up at conclusion of Work or when acceptable to City Representative.
- .7 Mock-ups may remain as part of Work.
- .8 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

1.13 MILL TESTS

- .1 Submit mill test certificates as requested and required by Specification Sections.

1.14 EQUIPMENT AND SYSTEMS

- .1 Submit adjustment and balancing reports for mechanical, electrical and building equipment systems.

END OF SECTION

Part 1 General

1.1 CONSTRUCTION SAFETY MEASURES

- .1 All City of Charlottetown construction sites, both exterior and within buildings shall comply with and enforce construction safety measures of National Building, Fire and Electrical Codes, all applicable Regulations and the *Occupational Health and Safety Act* of the Province of Prince Edward Island, including all of the latest amendments and draft amendments, Workers' Compensation Board and municipal authority, Contractor Health and Safety and Environmental program, and the applicable trade contractor program.
- .2 In event of conflict or discrepancy between any provisions of above authorities, the most stringent provision will apply.
- .3 Trade Contractors may be required to meet with the City of Charlottetown's Health and Safety Program Manager and the City Representative prior to commencement of the work.
- .4 Immediately notify the City Representative and City of Charlottetown's Occupational Health and Safety Program Manager of any incident while on site.
- .5 The City of Charlottetown's Occupational Health and Safety Manager has the authority to review the construction site and direct Trade Contractors to comply with the Provincial *Occupational Health and Safety Act* and Regulations.
- .6 Provide a copy of all accident / incident / near miss reports, inspection reports, hazard assessment reports , test results, any Form 67 reports submitted to WCB.
- .7 Provide copies of all incident reports and / or orders received from the Department of Labour and Advanced Education and the Department of the Environment to the City Representative and the City of Charlottetown's Occupational Health and Safety Program Manager.
- .8 Provide the City Representative twenty four (24) hours advance notice of any planned cutting, welding or grinding which produce sparks, open flame or odours.
- .9 Provide sufficient ventilation of any work area during activities producing odours including burning, cutting, welding, flooring preparation and painting utilizing systems other than the building mechanical ventilation systems.
- .10 The Trade Contractors bidding this project must provide evidence that they have obtained and is currently in force a Prince Edward Island Construction Safety Association Certificate or such other Certificate of Recognition that is approved by the Prince Edward Island Department of Labour and Advanced Education, or as acceptable to the City of Charlottetown.
- .11 A City of Charlottetown- Safety and Contractor's Handbook will be available to each successful Trade Contractor. The guidelines of this handbook are to be adhered to and form part of the Specifications under these Contract Documents. In the case of a conflict between the handbook and the Specifications, these Specifications will take precedence.

1.2 FIRE SAFETY REQUIREMENTS

- .1 Comply with requirements of standard for Building Construction Operations FCC No. 301-1982, & Standard for Welding and Cutting FCC 302-1982 issued by Fire Commissioner of Canada.
- .2 All Hot Work operations shall have a Hot Work Permit prior to work being performed each day.
- .3 A ten (10) lb. ABC fire extinguisher shall be maintained at the work site and ready for use.
- .4 Provide a fully equipped trained Fire Watch during and after for a minimum of four (4) hours for any open flame procedure.

1.1 OVERLOADING

- .1 Ensure no part of Work is subjected to loading that will endanger its safety or will cause permanent deformation.

1.2 FALSEWORK

- .1 Design and construct falsework in accordance with CSA S269.1 --16.

1.3 SCAFFOLDING

- .1 Design and construct scaffolding in accordance with CSA S269.2-16.
- .2 Maintain records of inspections for scaffolding on site. (Documents inspection prior to each use as per *Workplace Health and Safety Regulations* (Prince Edward Island))

1.4 WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS)

- .1 The City of Charlottetown complies with the WHMIS program, the national system providing information on hazardous materials used in the workplace including:
 - .2 Labels on hazardous materials that alert employers and workers
 - .3 Material safety Data Sheets (MSDS) providing detailed hazard and precautionary information on the product and
 - .4 Worker education that provides instruction on hazards and training in work procedures.
 - .5 Trade Contractors are required to:
 - .1 Trade Contractors are to provide evidence that WHMIS training, including annual workplace specific training, has been provided to workers required to work with or near controlled products.
 - .2 Ensure that all MSDS are readily available on site to workers who work in close proximity to the controlled product.

- .3 Ensure that all controlled products used in the construction of the Work have the original manufactures labels intact or other labels required by law.
- .4 Replace any damaged labels with approved “workplace labels”
- .5 Hazardous material transferred from its original container to another container must have an approved “workplace label” affixed thereto.
- .6 The workplace label shall: a) identify the product; b) indicate how to handle it safely and c) indicate the availability of a MSDS.
- .7 Provide copies of all MSDS to the City of Charlottetown Occupational Health and Safety Program Manager.

1.5 CITY OF CHARLOTTETOWN (NO) SMOKING POLICY

- .1 While on site, the Trade Contractor is to observe and strictly enforce, amongst the Trade Contractor’s employees and those of his sub-contractors, the City of Charlottetown’s (No) Smoking Policy. For more information refer to The City of Charlottetown Smoke Free Places Bylaw at the Appendix D.
- .2 Smoking is NOT permitted on the Project or on any City of Charlottetown property.

1.6 LANGUAGE AND HARASSMENT POLICY

- .1 Foul language is not tolerated on City of Charlottetown property.
- .2 Harassment of any student, employee or visitor on City of Charlottetown property is not tolerated.
- .3 Trade Contractors are to ensure all workers are made aware of this policy. Individuals not abiding by this policy will be dismissed from City of Charlottetown property.

1.7 PERSONNEL PROTECTION

- .1 Personnel on site shall dress in accordance with the Provincial *Occupational Health and Safety Act*.

1.8 ASBESTOS CONTAINING PRODUCTS

- .1 New products containing fibrous asbestos material are prohibited.
- .2 A copy of City of Charlottetown Hazardous Materials Survey and Management Plan will be provided to each successful Trade Contractor. Trade Contractors are required to acknowledge receipt of this information and ensure all workers are fully informed of the presence of asbestos or other hazardous materials.
- .3 If asbestos is encountered on site, advise the City Representative immediately.
- .4 Inform workers of the presence of asbestos containing material and that only trained personnel work with asbestos.
- .5 Removal will be in accordance with the Prince Edward Island *Occupational Health and Safety Act* and Regulations.

1.9 COMPRESSED GAS BOTTLES

- .1 All compressed gas cylinders shall be stored and secured in an upright position and in accordance with the Provincial *Occupational Health and Safety Act* and Regulations.

1.10 FIRST AID PERSONNEL

- .1 Maintain appropriate First aid kit on site for the use of the Trade Contractors personnel. First aid kits are to be inspected monthly.
- .2 Provide the names of trained First aid personnel on site to the City Representative.

1.11 DOCUMENTATION

- .1 All Trade Contractors are required provide the following documentation to the City Representative prior to work commencing on site:
 - .1 Trade Contractor Pre-Qualification Summary (Form A)
 - .2 Trade Contractor Safety Acknowledgment and Declaration of Competent Supervision (Form B)
 - .3 Addendum to add Supervisors (Form C)
 - .4 Job Hazard Analysis, with examples (Form D)
 - .5 Copy of WCB Clearance Certificate
 - .6 Copy of the Trade Contractor's Safety Policy and Safety Program
 - .7 Fall Protection Plan and Fall Rescue Plan (if applicable, based on scope)
 - .8 Engineered Systems (if applicable, based on scope)
 - .9 Identity and contact information of Safety Consultant or Internal Safety Person
- .2 All Trade Contractors are required provide the following documentation to the City Representative while the work is progressing:
- .3 Daily:
 - .1 Pre-Job Safety Assessments (PSA) – required daily, at the beginning of the shift and as work conditions change.
- .4 Weekly:
 - .1 Minutes of Weekly Toolbox talks
 - .2 Trade Contractor Weekly Safety Inspection (Form E)
 - .3 Trade Contractor Weekly Safety Summary (Form F)
- .5 As Required:
 - .1 Safety Inspections
 - .2 Material Safety Data Sheets – required at least 72 hours prior to bringing products on site
 - .3 Incident Investigation Reports
 - .4 Engineered Drawings for all fall protection systems, scaffolds, formwork, or any other engineered structure, system, modification or procedure
 - .5 Hoisting Plan submitted 72 hours in advance of activity

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 Work of this Section will be performed in such a manner as to prevent environmental damage to watercourses and surrounding property.
- .2 It is the responsibility of the Trade Contractor to ensure that regulations respecting protection of the environment during Work and the requirements of this Section are understood and followed. Obtain necessary permits and approvals from authorities having jurisdiction.
- .3 Cover and/or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for roads used to access site. Provide duct control for roads used to access the site. Control particulate discharge resulting from demolition, cutting and grinding operations. Use water sprinkling to control dust generation.
- .4 It is emphasized that control of water and prevention of siltation is the responsibility of the Trade Contractor. Installation of sediment traps and siltation fences will be considered incidental to the completion of the Work.

1.2 SUBMITTALS

- .1 Prior to commencing construction activities or delivery of materials to site, submit an Erosion and Sedimentation Control Plan and an Environmental Protection Plan for review and approval by City Representative.
- .2 Update Environmental Protection Plan as required by weather and stage of construction or as directed by City Representative. Submit updated Plan for review and approval by City Representative.

1.3 DEFINITIONS

- .1 Environmental Pollution and Damage: presence of chemical, physical, biological elements or agents which adversely affect human health and welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to humankind; or degrade environment aesthetically, culturally and/or historically.
- .2 Environmental Protection: prevention/control of pollution and habitat or environment disruption during construction. Control of environmental pollution and damage requires consideration of land, water, and air; biological and cultural resources; and includes management of visual aesthetics; noise; solid, chemical, gaseous, and liquid waste; radiant energy and radioactive material as well as other pollutants.

1.4 REFERENCE DOCUMENTS

- .1 The following reference documents form a part of this specification:
 - .1 Sulphide Bearing Material Disposal Regulations and Guidelines for Development of Slate Sites in Prince Edward Island.

- .2 Prince Edward Island Department of the Environment Construction and Demolition Debris Disposal Site Guidelines (latest edition).
- .3 Prince Edward Island Department of Transportation and Public Works - Erosion and sediment Control for Construction and Building Sites.
- .4 Prince Edward Island Standard Specification for Highway Construction, current edition.
- .5 Province of Prince Edward Island *Special Places Protection Act*.

1.5 EROSION CONTROL

- .1 Perform grading work to minimize the effects of erosion on site and as specified on Erosion and Sedimentation Control Plan.
- .2 Install erosion control measures as specified in the Prince Edward Island Standard Specification for Highway Construction, current edition. Take additional measures to prevent erosion as required by site conditions or as directed by the Prince Edward Island Department of Environment or authority having jurisdiction. Repair any damage which occurs as a result of erosion.
- .3 Maintain erosion control measures and monitor daily and as required by work and weather throughout duration of the Contract.
- .4 The site is to be left so that no environmental damage to watercourses and surrounding properties may occur after completion of the Contract.
- .5 Dispose of water so as not to be injurious to public health and safety, to property or to any part of work completed under construction.
- .6 Keep gutters open at all times for surface discharge.
- .7 Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than fourteen (14) days after the construction activity in that portion of the site has temporarily or permanently ceased. There are two exceptions that apply in Prince Edward Island as follows:
 - .1 Where the initiation of stabilization measures by the fourteenth (14th) day after construction activity temporary or permanently cease is precluded by snow cover, stabilization measures shall be initiated as soon as practicable.
 - .2 Where construction activity will resume on a portion of the site within twenty-one (21) days from when the activities ceased, (e.g., the total time period that construction activity is temporarily ceased is less than twenty-one (21) days) then stabilization measures do not have to be initiated on the portion of the site by the fourteenth (14th) day.

1.6 FIRES

- .1 Fires and burning of rubbish on site not permitted.

1.7 DISPOSAL OF WASTES

- .1 Do not bury rubbish or waste materials on site.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into waterways, storm or sanitary sewers.

1.8 DRAINAGE

- .1 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.
- .2 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .3 Do not pump water containing suspended materials into waterways, sewer or drainage systems.

1.9 PLANT PROTECTION

- .1 Protect existing trees and plants from damage by the Work.
 - .1 Protect root systems within dripline of existing trees to remain. Avoid unnecessary traffic, dumping and storage of materials over root zones.
 - .2 Cleanly cut roots that need to be removed as part of landscape construction with sharp hand cutting tools
 - .3 Cover soil roots exposed during landscape construction that are to be preserved with moist soil until grades necessary for permanent root coverage are reestablished.
- .2 Restrict tree removals to areas indicated or designated by City Representative. For more information on protection and restitution refer to The City of Charlottetown Tree Protection Bylaw at the following link: www.charlottetown.ca/bylaws.

1.10 POLLUTION CONTROL

- .1 Prior to the commencement of the Work, prepare a contingency plan which addresses procedures to follow in the event of a pollution incident and ensure that all staff are aware of these procedures. Provide copy of contingency plan to the City of Charlottetown.
- .2 Immediately report any environmental emergency, such as an oil spill of a contaminant, to the Environmental Emergencies 1-800-565-1633.
- .3 Maintain temporary pollution control device installed under this Contract until the Work is completed. Remove control measures, if directed by the City Representative, prior to project completion.
- .4 Keep all paved surfaces and public streets used by construction vehicles clean to approval of City Representative.

1.11 HISTORICAL / ARCHAEOLOGICAL CONTROL

- .1 Undertake work in compliance with the Prince Edward Island Special Places Protection Act.
- .2 Plan: include methods to assure protection of known or discovered resources and identify lines of communication between City Representative personnel and City Representative.
- .3 Notify City Representative whenever historic artifacts are encountered.

1.12 NOTIFICATION

- .1 City Representative will notify the Trade Contractor in writing of observed noncompliance with Federal, Provincial or Municipal environmental laws or regulations, permits, and other elements of City Representative's Environmental Protection plan. The Trade Contractor, after receipt of such notice, will inform the City Representative of proposed corrective action and take such action for approval by City Representative.
- .2 City Representative will issue stop order of work until satisfactory corrective action has been taken. No time extensions granted, or equitable adjustments allowed to City Representative for such suspensions.

Part 2 Products

2.1 GEOTEXTILE

- .1 Siltation fencing - Armtec Siltfence or approved equal.
- .2 Geotextile - Texel 7607, SI401, Terrafix 200 or approved equal.
- .3 Plastic Sheeting - minimum 8 mil heavy duty polyethylene sheet plastic.

Part 3 Execution

3.1 MATERIAL ON SITE

- .1 Keep reserve of materials accessible at all times and in a functional condition. Install in accordance with the drawings and to the approval of the Engineer.
- .2 Maintenance
 - .1 Regularly inspect and make necessary repairs to ensure that ponds or traps function adequately.
- .3 Removal and Disposal
 - .1 Remove all trapped sediment and installed materials at regular intervals as required, and dispose in an acceptable location.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Quality assurance criteria.

1.2 RELATED SECTIONS

- .1 Section 01 45 00 - Quality Control.
- .2 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 REFERENCES

- .1 Associated Air Balance Council (AABC): National Standards For Field Measurements and Instrumentation, Total Systems Balance, Air Distribution-Hydronics Systems.
- .2 ASTM E 783 "Standard Test Method for Field Measurement of Air Leakage through installed Exterior Windows and Doors".

1.4 QUALITY ASSURANCE

- .1 Cooperate with testing organization services as specified in Section 01 45 00.
- .2 Testing organization: Current member in good standing of their respective professional or industry organization and certified to perform specified services.
- .3 Comply with applicable procedures and standards of the certification sponsoring association.
- .4 Perform services under direction of supervisor qualified under certification requirements of sponsoring association.
- .5 Qualifications:
 - .1 Provide adequate workforce training through meetings and demonstrations.
 - .2 Provide a designated experienced person on site with de-construction experience throughout the project for consultation and supervision purposes.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 This Section specifies general requirements and procedures for Trade Contractors' submissions of shop drawings, product data, samples, mock-ups and other submittals called for in this section and in individual specification sections.
- .2 Make submittals specified in this Section to the City Representative unless otherwise specified, with additional submissions made, in manner directed by the City Representative, to other parties involved with construction of the Project as their interests are concerned. These parties are, but shall not be restricted to, consultants, jurisdictional authorities, and Subcontractors whose work must be coordinated with Work related to submittals.
- .3 Do not proceed with work until the relevant submissions have been reviewed by the Consultant.
- .4 Submissions are to be made in imperial units. Where information is not produced in imperial units, converted values made on the submissions are acceptable.
- .5 The Trade Contractor's responsibility for errors and omissions is not relieved by the submission's review by the Consultant. The Trade Contractor's responsibility for deviations from the Contract Documents is not relieved by the Consultant's review of the submission unless the Consultant gives written acceptance of such deviation.
- .6 The Trade Contractor shall explicitly indicate in writing any proposed changes from the Contract Documents that have been incorporated into each submission. Such changes that are only shown on a submission but are not explicitly noted as "changes" shall not be considered to have been so communicated as changes.
- .7 If a resubmission of a submittal is directed by the Consultant make the required changes and re-submit. Notify the Consultant in writing if changes other than those requested were also made before re-submission.
- .8 At the completion of the work, the Trade Contractor shall submit CAD drawings (Latest Autocad) for use by the City of Charlottetown.

1.2 SUBMISSION REQUIREMENTS

- .1 Ensure that submissions are made to allow sufficient time for review without the construction schedule being delayed. Failure to make timely submissions shall not be considered reason for extension of the contracted completion date. Allow fourteen (14) days for review of each submission by the Consultant.
- .2 Accompany each submission with a transmittal in duplicate containing
 - .1 Date
 - .2 Project Title and Number
 - .3 Trade Contractor's name and address

- .4 Specific identification and quantity of each submission
- .5 Any other pertinent information
- .3 Each submission shall show clearly:
 - .1 Issue date and revision dates
 - .2 Project Title and Number
 - .3 Name and address of Trade Contractor, supplier and manufacturer
 - .4 Trade Contractor's stamp signed by an authorized representative of that contractor certifying approval of the submission, verification of field dimensions, and compliance with Contract Documents
- .4 After Consultant's review, distribute copies.
- .5 Keep on site one copy of each submission.

1.3 SUBMISSIONS AT COMMENCEMENT OF CONTRACT

- .1 Performance and Payment Bonds.
- .2 Fire Insurance Policy, Public Liability and Property Damage Insurance Certificates and all other insurance certificates as required by the Contract.
- .3 Submit proposed construction schedule at beginning of Work.
- .4 Within ten (10) days from contract award, prepare a schedule of submissions and product deliveries which is necessary in order to meet the requirements of the Work construction schedule and submit such schedule each month to the City Representative.
- .5 Permits as required by the Work.
- .6 In accordance with the requirements of 01 35 29 - Health and Safety Procedures, provide the City Representative with a site-specific health and safety plan which will be implemented for the duration of the Work.
- .7 Within ten (10) days of Contract award, each trade contractor shall submit to the City Representative a detailed breakdown of their hourly rate on the form that is attached.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings for which submission requirement is specified in other Sections of these Specifications. The term "shop drawings" shall mean drawings, diagrams, illustrations, performance charts, brochures, and other data which are to be provided by the Trade Contractor to illustrate details of a portion of the total Work.
- .2 Show on shop drawings:
 - .1 Clear and obvious notes of any proposed changes from Drawings and Specifications.
 - .2 Fabrication and erection dimensions.
 - .3 Setting or erection details.
 - .4 Location and type of anchors, and exposed fastenings.

- .5 Details to indicate construction arrangements of the parts and their connections, and interconnections with other work.
 - .6 Materials and finishes.
 - .7 Descriptive names of equipment.
 - .8 Capacities and performance characteristics
 - .9 Mechanical and electrical characteristics, including wiring diagrams and schematics.
 - .10 Operating weight and information to verify that superimposed loads will not affect function, appearance, and safety of the Work detailed as well as of interconnected work.
 - .11 State assumed design loadings, and dimensions and material specifications for load-bearing members.
 - .12 Include in shop drawing submissions to City Representative detailed information, templates and installation instructions required for incorporation and connection of the Work concerned.
 - .13 Review of the shop drawings by the Consultant is for the sole purpose of ascertaining conformance with the general design concept. This review shall not mean that the Consultant approves the detail design inherent in the shop drawings, responsibility for which shall remain with the Trade Contractor
 - .14 submitting same, and such review shall not relieve the Trade Contractor of its responsibility for errors or omissions in the shop drawings or of its responsibility for meeting all requirements of the Contract Documents.
 - .15 Each trade contractor is responsible for dimensions to be confirmed and correlated at the job site, for information that pertains solely to fabrication processes or to techniques of construction and installation and for coordination of the Work of all sub-trades.
- .3 Submit electronic files in PDF format or, if that is not available, eight white prints of shop drawings, engineering data sheets, catalogue cuts and standard diagrams:
- .1 Except as noted otherwise, shop drawings will be sent back with review comments only.
 - .2 Shop drawings which require extensive correction will be sent back for revisions and resubmission.
 - .3 Only drawings noted for revision and resubmission may be resubmitted.
 - .4 Do not add new details or information to shop drawings after they have been finally reviewed.
 - .5 Fabricate Work exactly as shown on shop drawings.
 - .6 Any adjustments made during review by the Consultant of the shop drawings are not intended to change the Contract Price. If such adjustments do affect the value of the Work, state such in writing to the City Representative prior to proceeding with the Work.
 - .7 Do not proceed with Work dependent on shop drawing information until approval is given and verification received from the Consultant. Approval shall not relieve the Contractor of its responsibility for execution of Work in accordance with Contract Documents.

1.5 PRODUCT DATA

- .1 Product data includes manufacturer's catalogue sheets, brochures, literature, performance charts and diagrams used to illustrate manufactured products.
- .2 Submit in PDF format, or if that is not available, eight copies 8 ½" x 11".
- .3 Note the features specific to this Project and delete information not applicable.
- .4 Note the reference to applicable sections of the Contract Documents.

1.6 RECORD DRAWINGS

- .1 City Representative will provide two sets of white prints for record drawing purposes.
- .2 Maintain project record drawings and record accurately deviations from Contract documents.
- .3 Mark changes in red and have these verified by Consultant at each project meeting.
- .4 Record following information:
 - .1 Depths of various elements of foundation in relation to first floor level.
 - .2 Horizontal and vertical location of underground utilities and appurtenances referenced to permanent surface improvement.
 - .3 Location of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of structure.
 - .4 Field changes of dimension and detail.
 - .5 Changes made by Change Order or field order.
- .5 At completion of Work and prior to final inspection, neatly transfer notations to second set and submit both sets to Consultant.
- .6 At Work completion, provide a computer disc (AutoCad 2022) for the City of Charlottetown's use.
- .7 Final acceptance of the Work will be predicated on receipt and approval of record drawings.

1.7 SAMPLES

- .1 Submit samples for which submission requirement is specified in other Sections of these Specifications.
- .2 Submit samples in duplicate of adequate size to represent the material in its intended use in the Work and as specified within each section. Submit an extreme range of samples when the degree of marking or colour cannot be represented by a single sample.
- .3 Label samples with Project name, number, Trade Contractor, and date.
- .4 When samples are very large, require assembly, or require evaluation at the site, they may be delivered to the Site, but only with approval and as directed.

- .5 Include cost of delivery and handling, assembly, and return to supplier of samples in the Tendered Price.
- .6 If sample is not approved, both samples will be returned. If sample is approved, one sample will be returned, marked "Approved".
- .7 Approved samples shall serve as a model against which the products incorporated in the Work shall be judged.
- .8 Each product incorporated in the Work shall be precisely the same in all details as the approved sample.

1.8 MOCK-UPS

- .1 Mockups: field directed example of Work complete with specified materials and workmanship as described in Section 01 45 00.
- .2 Erect mockups at locations acceptable to Consultant and City Representative.
- .3 Reviewed and accepted mockups will become standards of workmanship and material against which installed Work will be verified.
- .4 Maintenance Manual and Operating Instructions
 - .1 Submit two copies of completed volumes in final form at time indicated in Section 01 78 00 - Closeout Submittals.
- .5 Maintenance Materials
 - .1 Supply extra stock at completion of Work as specified in other Sections of the Specifications.
 - .2 Deliver extra stock as directed by the City Representative to location it designates.
 - .3 Trade contractors are not to use maintenance materials in the completion of their work, including deficiencies.
- .6 Inspection and Test Reports
 - .1 Submit copies of inspection and test reports obtained by the Trade Contractor and Subcontractors for the Work or for jurisdictional authorities, if requested by the Consultant.
- .7 Affidavits:
 - .1 Submit affidavits which are required in other Sections of the Specifications.
 - .2 Submit affidavits in duplicate and signed and notarised by a responsible officer of the certifying company.
 - .3 For Work incorporating structural, mechanical and electrical design validation, affix seal of design engineer registered to practice in Prince Edward Island and who is a specialist in the applicable Work.
 - .4 Submit reports and affidavits in accordance with requirements specified in Section 01 45 00.

END OF SECTION

Part 1 General

1.1 ACCESS/KEYS

- .1 Site access and extent of fencing shall be provided by the City of Charlottetown through the City Representative.
- .2 If authorized to use existing roads for access to Place of the Project, maintain such roads for duration of Contract and make good damage resulting from Trade Contractor's use of roads.
- .3 Lost keys will result in rekeying charges assessed to the key holder on record.

1.2 TRADE CONTRACTOR'S SITE OFFICE

- .1 Trade Contractor to provide its own site office at location determined by City Representative. Each trade contractor is to arrange and pay for temporary services required for their own site office including power and communications connections.

1.3 STORAGE SHEDS

- .1 Each trade contractor shall provide adequate weather tight sheds with raised floors, for storage of materials, tools and equipment which are subject to damage by weather. There is very limited space on site. Trade contractors will be required to bring materials to site on an "as required" basis.

1.4 SANITARY FACILITIES

- .1 The City of Charlottetown, through the City Representative, will supply temporary portable washrooms for the Trade Contractor's use throughout the duration of the construction.
- .2 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.

1.5 PARKING

- .1 Upon request, a limited number of parking spaces may be made available to trade contractors.
- .2 All parking and delivery requirements shall be identified by the Trade Contractor prior to commencement of the Work
- .3 Adhere to posted parking regulations including fire lanes, building entrances, receiving and loading zones, designated barrier free parking, and posted signage for specific parking lots.
- .4 Parking is not permitted on grass, curbs or sidewalks unless written permission is received from City Representative.

- .5 Vehicles parked without permission will be ticketed and / or towed away at the vehicle owner's expense.

1.6 SITE ENCLOSURES

- .1 The City of Charlottetown through the City Representative will erect temporary site enclosure.

1.7 ENCLOSURE OF STRUCTURE

- .1 The Trade Contractor is responsible for the protection of its Work.
- .2 Design enclosures to withstand wind pressure.

1.8 POWER

- .1 The City of Charlottetown through the City Representative will arrange, pay for and maintain limited 110 v temporary electrical power supply for use during construction in accordance with governing regulations and ordinances.
- .2 Trade contractors shall include for their own arrangements for specific requirements such as hoisting equipment, welders, swing stages etc.
- .3 Electrical power and lighting systems installed under this Contract may be used for construction requirements with prior approval of Consultant. Warrantees and guarantees are not to be affected. Any damage will be made good by the Trade Contractor responsible for same.

1.9 WATER SUPPLY

- .1 The City of Charlottetown through the City Representative will arrange, pay for and maintain temporary water supply in accordance with governing regulations and ordinances.

1.10 HEATING AND VENTILATING

- .1 The Trade Contractor will be responsible to provide temporary heat and ventilation as required to perform and protect the Work.
- .2 The Trade Contractor will:
 - .1 Prevent accumulations of dust, fumes, mists, vapours or gases in areas occupied during construction or areas immediately adjacent to construction.
 - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
 - .3 Dispose of exhaust materials in manner that will not result in harmful exposure to persons.
 - .4 Ventilate storage spaces containing hazardous or volatile materials.
 - .5 Ventilate temporary sanitary facilities.
 - .6 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful contaminants.

- .3 Use of new systems for temporary heating, ventilating or air conditioning will only be permitted by approval of Consultant.
- .4 If permitted, the City Representative shall activate heating system under direction of Consultant to provide temporary heat, after building is closed in. Finally flush system and treat water, under direction of Consultant, as specified in Division 23.
- .5 If permitted, activate air system under direction of Consultant to provide temporary heat, after Consultant is satisfied that system will not be damaged by freezing. Protect ducting system by filters 50% effective National Bureau of Standards (NBS) inspected daily and replaced weekly or more frequently as necessary. Finally vacuum clean entire ducting system and renew filters.
- .6 Refer to Division 23 for replacement of filters at time of final acceptance of the Work.

1.11 DRAINAGE

- .1 Environmental protection for site drainage and pumping is required.
- .2 Refer to Section 01 35 45 Environmental Procedures.

1.12 SCAFFOLDING

- .1 Each Trade Contractor will construct and maintain scaffolding in rigid, secure and safe manner and will conform to all mandatory regulations.
- .2 Remove promptly when no longer required. Refer to Section 01 35 30 for Health and Safety Requirements for scaffolding.

1.13 REMOVAL OF TEMPORARY FACILITY

- .1 Remove temporary facilities from site when directed by the City Representative.

1.14 LIFTING AND HOISTING

- .1 The Trade Contractor shall be responsible to provide its own lifting and hoisting devices as required and in accordance with the regulations as mandated by law.

1.15 PROTECTION OF TREES AND LANDSCAPING

- .1 All trade contractors are advised that the protection of plants and trees is a contract requirement and neglect in this regard will not be tolerated. For more information on protection and restitution refer to The City of Charlottetown Tree Protection Bylaw at the following link: www.charlottetown.ca/bylaws.
- .2 Lawns disturbed by the performance of the Work are to be sodded.

1.16 EXCAVATION

- .1 Trade contractors are to co-ordinate with the City Representative prior to any excavation work.
- .2 Comply with the PEI *Occupational Health and Safety Act* and Regulations.

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 Use new material and equipment unless otherwise specified.
- .2 Within seven (7) days of written request by Consultant, submit following information for materials and equipment proposed for supply:
 - .1 name and address of manufacturer,
 - .2 trade name, model and catalogue number,
 - .3 performance, descriptive and test data,
 - .4 manufacturer's installation or application instructions,
 - .5 evidence of arrangements to procure.
- .3 Use products of one manufacturer for material and equipment of same type or classification unless otherwise specified.

1.2 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods.
- .2 Notify Consultant in writing of any conflict between these specifications and manufacturer's instructions. Consultant will designate which document is to be followed.

1.3 FASTENINGS - GENERAL

- .1 Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non-corrosive fasteners, anchors and spacers for securing exterior work.
- .2 Space anchors within limits of load bearing or shear capacity and ensure that they provide positive permanent anchorage. Wood plugs not acceptable.
- .3 Conceal fasteners where indicated. Space evenly and lay out neatly.
- .4 Fastenings which cause spalling or cracking are not acceptable.
- .5 Obtain Consultant's approval before using explosive actuated fastening devices. If approval is obtained comply with CSA Z1661985.

1.4 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semifinished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.

- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.5 DELIVERY AND STORAGE

- .1 Deliver, store and maintain packaged material and equipment with manufacturer's seals and labels intact.
- .2 Prevent damage, adulteration and soiling of material and equipment during delivery, handling and storage. Immediately remove rejected material and equipment from site.
- .3 Store material and equipment in accordance with supplier's instructions.
- .4 Touch up damaged factory finished surfaces to Consultant's satisfaction. Use primer or enamel to match original. Do not paint over name plates.

1.6 CONSTRUCTION EQUIPMENT AND PLANT

- .1 On request, prove to the satisfaction of Consultant that the construction equipment and plant are adequate to manufacture, transport, place and finish work to quality and production rates specified. If inadequate, replace or provide additional equipment or plant as directed.
- .2 Maintain construction equipment and plant in good operating order.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Use new material and equipment unless otherwise specified.
- .2 Within seven (7) days of written request by Consultant, submit following information for any materials and products proposed for supply:
 - .1 Name and address of manufacturer.
 - .2 Trade name, model and catalogue number.
 - .3 Performance, descriptive and test data.
 - .4 Compliance to specified standards.
 - .5 Manufacturer's installation or application instructions.
 - .6 Evidence of arrangements to procure.
 - .7 Evidence of manufacturer delivery problems or unforeseen delays.
- .3 Provide material and equipment of specified design and quality, performing to published ratings and for which replacement parts are readily available.
- .4 Use products of one manufacturer for equipment or material of same type or classification unless otherwise specified.
- .5 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.2 PRODUCT QUALITY

- .1 Contractor shall be solely responsible for submitting relevant technical data and independent test reports to confirm whether a product or system proposed for use meets contract requirements and specified standards.
- .2 Final decision as to whether a product or system meets contract requirements rest solely with the Consultant in accordance with the General Conditions of the Contract.

1.3 ACCEPTABLE MATERIALS AND ALTERNATIVES

- .1 Acceptable Materials: When materials specified include trade names or trade marks or manufacturer's or supplier's name as part of the material description, select and only use one of the names listed for incorporation into the Work.
- .2 Alternative Materials: Submission of alternative materials to trade names or manufacturer's names specified must be done during the bidding period following procedures indicated in the Instructions to Bidders.
- .3 Substitutions: After contract award, substitution of a specified material will be dealt with as a change to the Work in accordance with the General Conditions of the Contract.

1.4 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise specified, comply with manufacturer's latest printed instructions for materials and installation methods to be used. Do not rely on labels or enclosure provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Consultant in writing of any conflict between these specifications and manufacturers instructions, so Consultant will designate which document is to be followed.

1.5 AVAILABILITY

- .1 Immediately notify Consultant in writing of unforeseen or unanticipated material delivery problems by manufacturer. Provide support documentation.

1.6 WORKMANSHIP

- .1 Ensure quality of work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed.
- .2 Remove unsuitable or incompetent workers from site as stipulated in the General Conditions of the Contract.
- .3 Ensure cooperation of workers in laying out work. Maintain efficient and continuous supervision on site at all times.
- .4 Coordinate work between trades and subcontractors..
- .5 Coordinate placement of openings, sleeves and accessories.

1.7 FASTENINGS - GENERAL

- .1 Provide metal fastenings and accessories in same texture, colour and finish as base metal in which they occur. Prevent electrolytic action between dissimilar metals. Use non-corrosive fasteners, anchors and spacers for securing exterior work and in humid areas.
- .2 Space anchors within limits of load bearing or shear capacity and ensure that they provide positive permanent anchorage. Wood or organic material plugs not acceptable.
- .3 Keep exposed fastenings to minimum, space evenly and lay out neatly.
- .4 Fastenings which cause spalling or cracking of material to which anchorage is made, are not acceptable.
- .5 Do not use explosive actuated fastening devices unless approved by Consultant. See section on Health and Safety Requirements in this regard.

1.8 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified.

- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur and, use resilient washers with stainless steel.

1.9 STORAGE, HANDLING AND PROTECTION

- .1 Deliver, handle and store materials in manner to prevent deterioration and soiling and in accordance with manufacturer's instructions when applicable. Provide same degree of protection to materials supplied by City of Charlottetown.
- .2 Store packaged or bundled materials in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work. Provide additional cover where manufacturer's packaging is insufficient to provide adequate protection.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials and lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Immediately remove damaged or rejected materials from site.
- .9 Touch-up damaged factory finished surfaces to Consultant's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.10 CONSTRUCTION EQUIPMENT AND PLANT

- .1 On request, prove to the satisfaction of Consultant that the construction equipment and plant are adequate to manufacture, transport, place and finish work to quality and production rates specified. If inadequate, replace or provide additional equipment or plant as directed.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Substitutions.
- .2 Alternatives.

1.2 RELATED SECTIONS

- .1 This section describes requirements applicable to all Sections within Divisions 02 to 49.

1.3 SUBSTITUTIONS

- .1 Instructions to Bidders specify time restrictions for submitting requests for Substitutions during the bidding period to requirements specified in this section.
- .2 Substitutions will be considered when a Product becomes unavailable through no fault of the Contractor.
- .3 Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- .4 A request constitutes a representation that the Bidder:
 - .1 Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
 - .2 Will provide the same warranty for the Substitution as for the specified Product.
 - .3 Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
 - .4 Waives claims for additional costs or time extension which may subsequently become apparent.
 - .5 Will reimburse Owner and Consultant for review or redesign services associated with re-approval by authorities.
- .5 Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

1.4 ALTERNATIVES

- .1 Accepted Alternatives will be identified in Owner-Contractor Agreement.
- .2 Submit alternatives identifying the effect on adjacent or related components.
- .3 Alternatives quoted on Bid Forms will be reviewed and accepted or rejected at the Owner's option. Accepted alternatives will be identified in the Owner-Contractor Agreement.
- .4 Coordinate related work and modify surrounding work to integrate the Work of each alternative.

END OF SECTION

Part 1 General

1.1 EXISTING SERVICES

- .1 Before commencing work, establish location and extent of service lines in area of Work and notify Consultant of findings.
- .2 Remove abandoned service lines within 2m of structures. Cap or otherwise seal lines at cut-off points as directed by Consultant.

1.2 LOCATION OF EQUIPMENT AND FIXTURES

- .1 Location of equipment, fixtures and outlets indicated or specified are to be considered as approximate.
- .2 Locate equipment, fixtures, and distribution systems to provide minimum interference and maximum usable space and in accordance with manufacturer's recommendations for safety, access and maintenance.
- .3 Inform City Representative of impending installation and obtain approval for actual location.
- .4 Submit field drawings to indicate relative position of various services and equipment when requested by City Representative.

1.3 RECORDS

- .1 Maintain a complete, accurate log of control and survey work as it progresses.
- .2 On completion of foundations and major site improvements, prepare a certified survey showing dimensions, locations, angles, and elevations of Work.
- .3 Record locations of maintained, re-routed, and abandoned service lines.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit name and address of Surveyor to City Representative.
- .2 On request of City Representative, submit documentation to verify accuracy of field engineering work.
- .3 Submit certificate signed by surveyor certifying and noting those elevations and locations of completed Work that conform and do not conform with Contract Documents.

1.5 SUBSURFACE CONDITIONS

- .1 Promptly notify City Representative in writing if subsurface conditions at Place of Work differ materially from those indicated in Contract Documents, or a reasonable assumption of probable conditions based thereon.
- .2 After prompt investigation, should City Representative determine that conditions do differ materially, instructions will be issued for changes in Work as provided in Changes and Change Orders.

Part 2 Products

- .1 Not Used

Part 3 Execution

.1 Not Used

END OF SECTION

Part 1 General

1.1 SUBMITTALS

- .1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit written request in advance of cutting or alteration which affects:
 - .1 Structural integrity of elements of project.
 - .2 Integrity of weather-exposed or moisture-resistant elements.
 - .3 Efficiency, maintenance, or safety of operational elements.
 - .4 Visual qualities of sight-exposed elements.
 - .5 Work of City of Charlottetown or separate contractor.
- .3 Include in request:
 - .1 Identification of project.
 - .2 Location and description of affected Work.
 - .3 Statement on necessity for cutting or alteration.
 - .4 Description of proposed Work, and products to be used.
 - .5 Alternatives to cutting and patching.
 - .6 Effect on Work of City of Charlottetown or separate contractor.
 - .7 Written permission of affected separate contractor.
 - .8 Date and time work will be executed.

1.2 MATERIAL

- .1 Required for original installation.
- .2 Change in Materials: Substitutions for materials specified will only be considered under extenuating circumstances at the discretion of the Consultant and City Representative.

1.3 PREPARATION

- .1 Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- .2 After uncovering, inspect conditions affecting performance of Work.
- .3 Beginning of cutting or patching means acceptance of existing conditions.
- .4 Provide supports to assure structural integrity of surroundings; provide devices and methods to protect other portions of project from damage.
- .5 Provide protection from elements for areas which are to be exposed by uncovering work; maintain excavations free of water.

1.4 TOLERANCES

- .1 Monitor fabrication and installation tolerance control of Products to produce acceptable Work.
- .2 Do not permit tolerances to accumulate beyond effective or practical limits.

- .3 Comply with manufacturers' tolerances. In case of conflict between manufacturers' tolerances and Contract Documents, request clarification from Consultant before proceeding.
- .4 Adjust Products to appropriate dimensions; position and confirm tolerance acceptability, before permanently securing Products in place.

1.5 EXECUTION

- .1 Execute cutting, fitting, and patching including excavation and fill, to complete Work.
- .2 Fit several parts together, to integrate with other Work.
- .3 Uncover Work to install ill-timed Work.
- .4 Remove and replace defective and non-conforming Work.
- .5 Provide openings in non-structural elements of Work for penetrations of mechanical and electrical Work.
- .6 Execute Work by methods to avoid damage to other Work, and which will provide proper surfaces to receive patching and finishing.
- .7 Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- .8 Cut rigid materials using masonry saw or core drill. Pneumatic or impact tools not allowed on masonry work without prior approval.
- .9 Restore work with new products in accordance with requirements of Contract Documents.
- .10 Fit Work airtight to pipes, sleeves, ducts, conduit, and penetrations through surfaces.
- .11 At penetration of fire rated wall, ceiling, or floor construction, completely seal voids with firestopping material in accordance with Section 07 84 00 - Firestopping, full thickness of the construction element.
- .12 Refinish surfaces to match adjacent finishes: Refinish continuous surfaces to nearest intersection. Refinish assemblies by refinishing entire unit.
- .13 Conceal pipes, ducts and wiring in floor, wall and ceiling construction of finished areas except where indicated otherwise.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Section 01 74 20 Waste Management and Disposal.

Part 2 Products

- .1 Not Used

Part 3 Execution

- .1 Not Used

END OF SECTION

Part 1 General

1.1 GENERAL

- .1 Each trade contractor is responsible for its portion of general cleanup as well as the cleanup specific to that trade. Conform to the instructions of the City Representative.
- .2 Conduct cleaning and disposal operations to comply with requirements of the City of Charlottetown, local ordinances and anti-pollution laws. No burning of waste materials is permitted on City of Charlottetown property.
- .3 Store volatile waste in covered metal containers and remove from premises at end of each working day.
- .4 Prevent accumulation of wastes which create hazardous conditions.
- .5 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

1.2 MATERIALS

- .1 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.

1.3 CLEANING DURING CONSTRUCTION

- .1 Floor Surfaces (tile & carpet) shall be protected during demolition and construction phases to ensure floor surfaces are not damaged.
- .2 Maintain all access to construction area free from accumulations of dust, waste materials and rubbish. Daily vacuum areas affected and immediately clean up spills or debris that can be tracked to other parts of the building.
- .3 Entrance mats, to be supplied by the Trade Contractor and/or Subcontractors, will be utilized at the Place of the Project to prevent trackage and spillage.
- .4 Provide on-site metal containers for collection of waste materials and rubbish, where required. Dispose of waste materials and debris off-site in accordance with provincial and municipal regulations.
- .5 Remove construction and demolition waste materials and rubbish daily from the building utilizing Trade Contractor supplied lidded plastic debris cart on wheels. Daily remove demolition debris from the site, unless utilizing an external metal waste container; empty this waste container as and when full.
- .6 Vacuum clean interior building areas when ready to receive finish painting and continue vacuum cleaning on an as-needed basis until space is ready for substantial completion or occupancy.
- .7 The use of drop cloths is mandatory to prevent staining and dirtying of finished floor surfaces.

- .8 Schedule and control cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces, foul other areas of the building, nor contaminate building systems.
- .9 Trade contractors who fail to clean-up and remove excess materials and debris will be back charged by the City Representative.

1.4 FINAL CLEANING

- .1 Final cleaning is to be conducted by a firm licensed to practice in Prince Edward Island, engaged full time in the business of commercial, industrial and institutional cleaning, and having the necessary expertise, equipment, materials and trained manpower and supervisory personnel assigned to complete the cleaning to a standard deemed acceptable to the City of Charlottetown Custodial Services or designate.
- .2 In preparation for Substantial Performance of the Work or occupancy, conduct inspection of sight-exposed interior and exterior surfaces.
- .3 Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from sight-exposed interior and exterior finished surfaces including glass and other polished surfaces.
- .4 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, mechanical and electrical fixtures. Replace broken, scratched, or disfigured glass. Clean lighting reflectors, lenses and other lighting surfaces.
- .5 Remove debris and surplus materials from crawl areas and other accessible concealed spaces.
- .6 Replace heating, ventilating and air conditioning filters if units were operated during construction. Vacuum interior of ducts.
- .7 Where the size of the project does not warrant the level of cleaning expertise as called for in items 1 & 6 above, the Trade Contractor shall ensure that the work area and adjacent areas affected by the work are cleaned by the Trade Contractor to a standard acceptable to both the City Representative and Custodial Manager. Where new tile flooring has been installed, the Trade Contractor, just prior to take over, shall have the flooring scrubbed clean in accordance with the manufacturer's recommended practice.

END OF SECTION

Part 1 General

1.1 DEFINITIONS

- .1 Hazardous Material: Product, substance, or organism that is used for its original purpose, and that is either dangerous goods or a material that may cause adverse impact to the environment or adversely affect health of persons, animals, or plant life when released into the environment.

1.2 WASTE MANAGEMENT

- .1 Incorporate environmental and sustainable practises in managing waste resulting from work.
- .2 Divert 75% of construction waste from landfill.
- .3 Coordinate work of subtrades and subcontractors to ensure all possible waste reduction and recycling opportunities are taken. Follow waste management requirements specified in trade sections of the Specifications.
- .4 Reduce waste during installation of new materials. Undertake practices which will optimize full use of materials and minimize waste.
- .5 Develop innovative procedures to reduce quantity of waste generated by construction such as by delivering materials to site with minimal packaging etc.
- .6 Provide on-site facilities to collect, handle and store anticipated quantities of reusable, salvageable and recyclable materials.
- .7 During demolition and removal work separate materials and equipment at source, carefully dismantling, labelling and stockpiling alike items for the following purposes:
 - .1 Reinstallation into the work where indicated.
 - .2 Salvaging reusable items not needed in project which Contractor may sell to other parties.
 - .3 Sending as many items as possible to locally available recycling facility.
 - .4 Segregating remaining waste and debris into various individual waste categories for disposal in a "non-mixed state" as recommended by waste processing/landfill sites.
- .8 Isolate product packaging and delivery containers from general waste stream. Send to recycling facility or return to supplier/manufacturer.
- .9 Send leftover material resulting from installation work for recycling whenever possible.
- .10 Establish methods whereby hazardous and toxic materials, and their containers used on site are properly handled, stored and disposed in accordance with applicable federal, provincial and municipal laws and regulations.

1.3 DISPOSAL REQUIREMENTS

- .1 Burying or burning of rubbish and waste materials is prohibited.
- .2 Disposal of volatile materials, mineral spirits, oil, paint, and other hazardous materials into waterways, storm, or sanitary sewers is prohibited.
- .3 Dispose of waste only at approved waste processing facility or landfill sites approved by authority having jurisdiction.
- .4 Contact the authority having jurisdiction prior to commencement of work, to determine what, if any, demolition and construction waste materials have been banned from disposal in landfills and at transfer stations. Take appropriate action to isolate such banned materials at site of work and dispose in strict accordance with provincial and municipal regulations.
- .5 Transport and dispose of waste intended for waste processing plant or landfill facility in separated condition and to Operator's rules and recommendations in support of their effort to recycle, reduce and divert certain waste stream from general landfill.
- .6 Collect, bundle and transport salvaged materials to be recycled in separated categories and condition as directed by recycling facility. Ship materials only to approved recycling facilities.
- .7 Sale of salvaged items by Contractor to other parties not permitted on site.

Part 2 Products

- .1 Not Used.

Part 3 Execution

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 MANUAL

- .1 The City of Charlottetown will compile operating and maintenance data including detailed technical information, documents and records describing operation and maintenance of individual products or systems as specified in individual sections of Division 13. Each Trade Contractor shall provide the information in the required number of copies without delay, to enable early completion of the Building Management Manual (BMM).

1.2 GENERAL

- .1 Each Trade Contractor will assemble, coordinate, bind and index required data into Operation and Maintenance Manual for incorporation into the BMM.
- .2 Submit complete operation and maintenance manual to the Consultant prior to application for Substantial Performance of the Work. Manuals will be reviewed and may be returned for correction if not meeting the specified requirements.
- .3 Submit three (3) copies in English.
- .4 Material: label each section with tabs protected with celluloid covers fastened to hard paper dividing sheets.
- .5 Type lists and notes.
- .6 Drawings, diagrams, and manufacturers' literature must be legible. Information on materials or systems pertinent to the specified project is to be extracted or clearly highlighted from the manufacturers' data sheets to exclude extraneous information.

1.3 BINDERS

- .1 Binders: vinyl, hard covered, 3 ring, loose leaf, sized for 8½" x 11" paper, with clear spine and front pockets.
 - .1 Acceptable product: D-ring binder.
- .2 Identify contents of each binder on spine.

1.4 CONTENTS

- .1 Binder 1:
 - .1 Cover sheet containing:
 - .1 Date submitted.
 - .2 Project title, location and project number.
 - .3 Names and addresses of Trade Contractor, and all Subcontractors.
 - .4 Table of Contents of all binders.
 - .5 Warranties.

- .6 Copies of TAB tests, systems verification tests, approvals and certificates.
- .2 Remaining binders:
 - .1 Cover sheet containing:
 - .1 Date submitted.
 - .2 Project title, location and project number.
 - .3 Name and addresses of Trade Contractor and all Sub-Contractors.
 - .4 Table of Contents of all binders.
 - .2 The following data as specified in individual sections of Division 02 to 16.
 - .1 Installation details.
 - .2 Description of systems operation.
 - .3 Maintenance instructions for equipment c/w frequencies and materials/tools required to complete the task.
 - .4 Maintenance instructions for finishes.
 - .5 Suppliers lists.
 - .3 A complete set of all final shop drawings and technical data.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Spare parts.
- .2 Special tools.
- .3 Storage, handling and protection.

Part 2 Products

2.1 SPARE PARTS

- .1 Provide spare parts, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Receive and catalogue all items. Submit inventory listing to City Representative. Include approved listings in Maintenance Manual.
- .4 Obtain receipt for delivered products and submit prior to final payment.

2.2 MAINTENANCE MATERIALS

- .1 Provide maintenance and extra materials, in quantities specified in individual specification sections.
- .2 Provide items of same manufacture and quality as items in Work.
- .3 Receive and catalogue all items. Submit inventory listing to City Representative. Include approved listings in Maintenance Manual.
- .4 Obtain receipt for delivered products and submit prior to final payment.

2.3 SPECIAL TOOLS

- .1 Provide special tools, in quantities specified in individual specification section.
- .2 Provide items with tags identifying their associated function and equipment.
- .3 Receive and catalogue all items. Submit inventory listing to City Representative. Include approved listings in Maintenance Manual.

Part 3 Execution

3.1 DELIVER TO SITE

- .1 Deliver to site; place and store.

3.2 STORAGE, HANDLING AND PROTECTION

- .1 Store spare parts, maintenance materials, and special tools in manner to prevent damage or deterioration.
- .2 Store in original and undamaged condition with manufacturer's seal and labels intact.
- .3 Store components subject to damage from weather in weatherproof enclosures.
- .4 Store paints and freezable materials in a heated and ventilated room.
- .5 Remove and replace damaged products at own expense and to satisfaction of City Representative.

END OF SECTION

The Executed Agreement (CCDC 2) including General Conditions and Supplementary Conditions, applicable Sections of Division 0, Division 1, applicable drawings and amendments are part of and are to be read in conjunction with this Section.

Part 1 - General

1.1 RELATED WORK

1. Concrete Formwork Section 03 10 00
2. Concrete Reinforcement Section 03 20 00

1.2 REFERENCES

1. CSA-A23.1, Concrete Materials and Methods of Concrete Construction.
2. CSA-A23.2, Methods of Test and Standard Practices for Concrete.
3. CSA-A23.3, Design of Concrete Structures
4. CSA-A3000, Cementitious Materials Compendium.
5. ASTM C260, Specification for Air-Entraining Admixtures for Concrete.
6. ASTM C494, Specification for Chemical Admixtures for Concrete.
7. CAN/CGSB-37.2, Emulsified Asphalt, Mineral Colloid-Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
8. CAN/CGSB-51.34, Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
9. ASTM C939, Test Method for Flow of Grout for Preplaced-Aggregate Concrete
10. ASTM D412, Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension
11. ASTM D624, Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomer
12. ASTM D1653, Test Methods for Water Vapour Transmission of Organic Coating Films
13. ASTM D1751, Specification for Preformed Expansion Joint Fillers
14. ASTM D2240, Test Method for Rubber Property—Durometer Hardness
15. ASTM C309, Specification for Liquid Membrane-Forming Compounds for Curing Concrete
16. ASTM C578, Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation

1.3 CERTIFICATES

1. Submit certificates in accordance with Section 01 00 00.
2. Provide certification that mix proportions selected will produce concrete of quality, yield and strength as specified in concrete mixes, and will comply with CSA-A23.1.
3. Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1. Ready-mix Plant must be a member of the Atlantic Provinces Ready Mixed Concrete Association and must hold a current “Certificate of Ready Mixed Concrete Production Facilities” as issued by the Association.

Part 2 - Products

2.1 MATERIALS

- .1 Portland cement with fly ash replacement: to CSA-3000.

- .2 Supplementary cementing materials: to CSA-A3000.
- .3 Water: to CSA-A23.1.

- .4 Aggregates: to CSA-A23.1. Coarse aggregates to be normal density.
- .5 Air entraining admixture: to ASTM C260.
- .6 Chemical admixtures: to ASTM C494. Consultant to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .7 Concrete retarders: to ASTM C494 low VOC, solvent free.
- .8 Shrinkage compensating grout: premixed compound consisting of aggregate, cement, water reducing and plasticizing agents. Compressive strength: 8000 psi at 28 days.
- .9 Waterstops: in areas of construction designed to retain liquids, extruded PVC Arctic Grade with shop welded corner and intersecting pieces:
 - .1 Tensile strength: to ASTM D412, method A, Die "C", minimum 1600 psi.
 - .2 Elongation: to ASTM D412, method A, Die "C", minimum 275%.
 - .3 Tear resistance: to ASTM D624, method A, Die "B", minimum 3 kip/ft.Areas of construction designed to resist water penetration, specially formulated mixture of natural sodium bentonite and butyl rubber specifically manufactured as a waterstop such as Waterstop-RX or approved equal.
- .10 Premoulded joint fillers:
 - .1 Bituminous impregnated fiber board: to ASTM D1751.
- .11 Weep hole tubes: plastic.
- .12 Dampproof membrane:
 - .1 10 mil polyethylene film to CAN/CGSB-51.34
- .13 Dampproofing:
 - .1 Emulsified asphalt, mineral colloid type, unfilled: to CAN/CGSB-37.2.
- .14 Control Joint Filler:
 - .1 Two component, quick setting, semi-rigid, solvent free, self leveling, polyurea; Minimum tensile strength of 650 psi; minimum elongation of 200% as per ASTM D412, and a minimum Shore A Hardness of 85 as per ASTM D2240.
- .15 Curing and Sealing Compound:
 - .1 Shall be an acrylic emulsion and water based curing compound, clear in colour. Product shall meet the requirements of ASTM C 309 and shall have a maximum VOC content of 300 ounces per cubic foot.
- .16 Surface Hardener:
 - .1 Shall be mineral, non metallic, shake applied. Minimum hardness shall be 6.5-7 on Mohs scale. Minimum compressive strength at 28 days shall be 7250 psi
- .17 Cast in Place Insulation System
 - .1 Extruded polystyrene rigid board insulation having physical properties defined by ASTM C578 Type IV
 - .2 High-strength, polymer locking retainers designed to position the fiber connector within the sheets of insulation.
 - .3 Structurally non-composite Wythe connectors

2.2 CONCRETE MIXES

- .1 Proportion normal density concrete in accordance with CSA-A23.1, Alternative 1 to give the following properties for all concrete:
 - .1 Type GU Portland cement.

- .2 Minimum compressive strength at 28 days: Refer to structural drawings
- .3 Nominal size of coarse aggregate: $\frac{3}{4}$ inch.
- .4 Slump at time and point of discharge: as per structural drawings
- .5 Air content: as per Table 4 of CSA Standard A23.1
- .6 Chemical admixtures: in accordance with CSA – A3000.
- .7 Replace 20% of cement by mass with fly ash in accordance with CAN/CSA-A23.5. If floor hardener is to be used in slabs, contact supplier of hardener regarding compatibility between hardener and fly ash and adjust fly ash content as necessary.
- .8 Class of exposure shall be to Table 1 of CSA A23.1
- .9 Concrete Mix design to meet requirements of Table 2 in CSA A23.1 for appropriate class of exposure
- .10 All concrete to meet requirements of Tables 1 through 4 of CSA A23.1.

Part 3 - Execution

3.1 PREPARATION

1. Obtain Consultant's approval before placing concrete. Provide 24 hours notice prior to placing of concrete.
2. Pumping of concrete is permitted only after approval of equipment and mix.
3. Ensure reinforcement and inserts are not disturbed during concrete placement.
4. Prior to placing of concrete obtain Consultant's approval of proposed method for protection of concrete during placing and curing in adverse weather.
5. Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.
6. In locations where new concrete is dowelled to existing work, drill holes in existing concrete. Place steel dowels of deformed steel reinforcing bars and pack solidly with epoxy grout to anchor and hold dowels in positions as indicated.
7. Do not place load upon new concrete until authorized by Consultant.

3.2 CONSTRUCTION

- .1 Do cast-in-place concrete work in accordance with CSA-A23.1/ A23.2.
- .2 Holes, sleeves and inserts cast in during construction.
 - .1 No sleeves, ducts, pipes or other openings shall pass through beams or columns except where indicated or approved by Structural Consultant.
 - .2 Where approved by Structural Consultant, set sleeves, ties, pipe hangers and other inserts and openings as indicated or specified elsewhere. Provided they are shown on structural drawings, sleeves, pipes or openings, that are not greater than 18 inch square, or 18 inch in diameter, may pass through walls and slabs provided that no more than two reinforcing bars are interrupted and additional reinforcing steel is incorporated as per details on structural drawings. Contact structural consultant before installing any openings greater than 6 inch square or 150 mm diameter that are not shown on structural drawings.

- .3 Do not eliminate or displace reinforcement to accommodate hardware. If inserts cannot be located as specified, obtain approval of modifications from Structural Consultant before placing of concrete.
- .4 Check locations and sizes of sleeves and openings shown on drawings.
- .5 Set special inserts for strength testing as indicated and as required by non-destructive method of testing concrete.
- .3 Anchor bolts.
 - .1 Set anchor bolts to templates under supervision of appropriate trade prior to placing concrete.
 - .2 Locate anchor bolts used in connection with expansion shoes, rollers and rockers with due regard to ambient temperature at time of erection.
- .4 Drainage holes and weep holes:
 - .1 Install weep hole tubes and drains as indicated.
- .5 Grout under base plates and machinery using procedures in accordance with manufacturer's recommendations which result in 100 % contact over grouted area.
- .6 Finishing and Curing:
 - .1 Finish concrete in accordance with CSA-A23.1. Provide steel trowel finish for floor slabs unless noted otherwise. Coordinate finish with architect prior to casting slab.
 - .2 Use procedures acceptable to Consultant or those noted in CSA-A23.1 to remove excess bleed water. Ensure surface is not damaged.
 - .3 Use curing compounds compatible with applied finish on concrete surfaces.
- .7 Provide depressions to accommodate flooring as required.
- .8 Rub exposed sharp edges of concrete with carborundum to produce 3 mm radius edges unless otherwise indicated.
- .9 Cast in Place Insulation System:
 - .1 Set formwork in accordance with section 03 10 00.
 - .2 Before installation of the insulation sheets in the forms, tape the individual sheets together. Install the tape on both sides of the insulation. Apply the tape only to clean, dry surfaces.
 - .3 Install the insulation assembly in the form.
 - .4 Install the connectors per manufactures' literature.
 - .5 Place the reinforcing for the remaining concrete layer and the ties to the connectors as required. Verify that the insulation is properly located in the form and close the form.
 - .6 During concrete placement, use accepted practice for concrete mix design and placement procedures for thin wall sections. If multiple walls intersect, start the concrete placement at the insulated walls. Ensure that the concrete is placed on both sides of the insulation with a maximum differential head of approximately one foot.
 - .7 In installations with form-liners, maintain a positive differential head on the liner side to push the insulation and the connectors away from the liner.
- .10 Toppings.
 - .1 In pouring base course, make allowance for overlay toppings as necessary and applicable.
 - .2 Place toppings over hardened base course in accordance with CSA-A23.1 and topping manufacturer's recommendations.
 - .3 Follow instructions by Consultant in case conflicting requirements arise between

- CSA-A23.1 and manufacturer's recommendations.
- .4 Ensure that joints in topping are at the same locations as those in base course. Provide dividers, edge strips and reinforcing mesh as indicated.
- .11 Waterstops.
 - .1 Install waterstops to provide continuous water seal. Do not distort or pierce waterstop in such a way as to hamper performance. Do not displace reinforcement when installing waterstops. Use equipment to manufacturer's requirements to field splice waterstops. Tie waterstops rigidly in place.
 - .2 Use only straight heat sealed butt joints in field. Use factory welded corners and intersections unless otherwise approved by Consultant.
 - .12 Joints
 - .1 Construction Joints – Walls and Structural Slabs:
 - .1 In general, incorporate either horizontal or vertical construction joints, in accordance with CSA-A23.1.
 - .2 Immediately before next pour, clean construction joint and brush with grout of neat cement.
 - .3 Run reinforcement through construction joints unless noted otherwise.
 - .4 Construction Joints to be keyed unless noted otherwise.
 - .2 Construction Joints – Slabs on Grade:
 - .1 In general, incorporate construction joints, in accordance with CSA-A23.1.
 - .2 Immediately before next pour, clean construction joint and brush with grout of neat cement.
 - .3 Do not continue reinforcing thru Construction Joint. At slab mid-depth, provide ½ inch diameter plain dowels, greased one side, at 24 inch centres. If drawings note different assembly, drawings will govern.
 - .4 Construction Joints to be keyed.
 - .3 Slab on Grade Isolation Joints:
 - .1 Do not install isolation joints in structural slabs.
 - .2 Isolation joints around all columns to form a square or round panel. Square isolation joints shall be orientated so all corners of the square align with slab control joints. If drawings note different assemblies, drawings will govern.
 - .3 Install ½ inch thick premoulded joint filler where slab on grade meets vertical surfaces. Install joint filler to within ½ inch of top of slab where sealer is indicated.
 - .4 Slab on Grade Control Joints/Saw cuts:
 - .1 Discontinue reinforcing at saw cut location by stopping reinforcing 3 inches from each side of saw cut location.
 - .2 Saw 1/8 inch wide control joints into top surface of concrete slab. Depth of saw cut shall be between 1/3rd and 1/4th of total slab thickness. Do not saw-cut suspended slabs on metal deck.
 - .3 Locate control joints as indicated on structural drawings. Maximum spacing of control joints in each direction shall be 30 times the slab thickness. If drawings note different spacing, drawings will govern.
 - .4 Align control joints with columns when possible. Provide control joints in two directions at all inside corners.

- .5 Timing of cutting control joints is crucial. Cut joints as soon as possible after casting slab. Timing of cutting control joints after casting of slab will vary as weather conditions, concrete mixes, etc. change.
- .6 Completely clean out saw-cut joints of dirt, oil, grease, and similar contaminants. Mask floor surfaces at joints while filling. Follow recommendations of joint filler manufacturer and fill all saw-cut joints with joint filler as specified.
- .13 Under-slab polyethylene film:
 - .1 Install polyethylene film under concrete slabs-on-grade inside building.
 - .2 Lap polyethylene film a minimum 6 inches at joints and seal.
 - .3 Seal punctures in polyethylene film before placing concrete. Use patching material at least 6 inches larger than puncture and seal.
- .14 Curing and Sealing Compound:
 - .1 Install in accordance with the manufacturers recommendations. Ensure compatibility with flooring adhesives. Remove as required prior to using flooring adhesives.
- .15 Surface Hardener:
 - .1 Install in accordance with manufacturers recommendations. Refer to manufacturer for application rates. Do not apply on concrete containing more than 3% air.

3.3 SURFACE TOLERANCE

- .1 Concrete flatwork tolerance in accordance with CSA-A23.1 F-number method. Overall numbers for floor flatness and levelness (F_F and F_L) to meet requirements of Table 21 in CSA A23.1 for appropriate class of use.

3.4 FIELD QUALITY CONTROL

1. Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by Owner in accordance with CSA-A23.1 and CSA-A23.2.
2. Owner will pay for costs of tests.
3. Testing Laboratory will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
4. Non-destructive Methods for Testing Concrete shall be in accordance with CSA-A23.2.
5. Inspection or testing will not augment or replace Contractor quality control nor relieve him of his contractual responsibility.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Polished concrete finishing of monolithic floor slab and slabs-on-grade.

In this article, select the components or assemblies that are intended to be part of the content of this section and will not be included in other sections.

1.2 RELATED SECTIONS

- .1 Section 03 30 00 - Cast-in-Place Concrete: Prepared concrete floors ready to receive polish finish.
- .2 Section 03 35 10 – Concrete Floor Finishing

1.3 REFERENCES

- .1 CSA-A23.1-09/A23.2-09 - Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
- .2 ACI 302.1R-04 - Guide for Concrete Floor and Slab Construction.
- .3 ASTM-C779M-05, Standard Test Method of Abrasion Resistance of Horizontal Concrete Surfaces.
- .4 ASTM C805/C805M-08, Standard Test Method for Rebound Number of Hardened Concrete.
- .5 ASTM E1155/E1155M-96(2008) - Standard Test Method for Determining FF Floor Flatness and FL Floor Levelness Numbers.
- .6 ASTM D523-08, Standard Test Method for Specular Gloss.
- .7 ASTM G152-06, Standard Practice for Operating Open Flame Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials.
- .8 ASTM G153-04, Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Section 01 31 00: Project management and coordination procedures.
- .2 Coordination: Coordinate with concrete floor placement and concrete floor curing, and other work having a direct bearing on work of this section.

1.5 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Product data:
 - .1 Submit special concrete finishes manufacturer's specifications and test data.
 - .2 Submit special concrete finishes describing product to be provided, giving manufacturer's name and product name for the specified material proposed to be provided under this section.

- .3 Submit special concrete finishes manufacturer's recommended installation procedures.
- .4 Submit special concrete finishes technical data sheet giving descriptive data, curing time, and application requirements.
- .5 Submit special concrete finishes manufacturer's Material Safety Data Sheet (MSDS) and other safety requirements.
- .3 Polishing Schedule:
 - .1 Submit plan showing polished concrete surfaces and schedule of polishing operations for each area of polished concrete before start of polishing operations. Include locations of all joints, including construction joints.

1.6 SUBMITTALS FOR INFORMATION

- .1 Section 01 33 00: Submission procedures.
- .2 Sustainable Design:
 - .1 Section 01 35 21: LEED documentation procedures.
 - .2 Provide required LEED documentation for Product in support of LEED IEQc4.2 VOC limits.
 - .3 Manufacturer's Certificate: Certify that Products meet LEED VOC maximum content.

1.7 CLOSEOUT SUBMITTALS

- .1 Section 01 78 10: Submission procedures.

The following submittals are for project close-out purposes; do not request these submittals if the information submitted will be assessed for acceptability.

- .2 Maintenance Data: Provide data on maintenance renewal of applied coatings.
- .3 Sustainable Design Closeout Documentation: In support of LEED project goals.

1.8 QUALITY ASSURANCE

This article includes statements that require quality applicable to the whole section. If it is desirable or required for a manufacturer of a product to be ISO 9000/14000 certified, include such statement below.

- .1 Installer's qualifications:
 - .1 Applicator shall use only experienced installer and adequate number of skilled workmen who are thoroughly trained and experienced in the necessary craft.
 - .2 The special concrete finish manufacturer shall certify the applicator.
 - .3 Applicator shall be experienced with the specified requirements and methods needed for proper performance of this section. Provide project names, addresses, contact names, phone numbers of at least three (3) projects of similar scope completed by the installer.
- .2 Manufacturer's Certification: Provide letter of certification from concrete finish manufacturer stating that the installer is a certified applicator of the special concrete finishes and is familiar with proper procedures and installation requirements specified by the manufacturer.
- .3 Manufacturer's Obligations:

- .1 The manufacturer shall play an active role in the application of their product during the period of this contract.
- .2 The manufacturer shall be represented at all relevant meetings by a qualified technical representative, with a minimum of five (5) years' experience.
- .3 The technical representative, shall be approved by the Consultant.
- .4 A minimum of three (3) inspections from the Manufacturer's representative must be made prior to and during application of this work to ensure proper application.
- .5 After each visit provide a written report to the Contractor Manager and Consultant with five (5) working days.

1.9 MOCK-UP

- .1 Section 01 43 00: Requirements for mock-up.
- .2 A 3m (10ft) long by 3m (10ft) wide mock-up area will be selected by consultant where concrete polishing will be demonstrated prior to commencement of polishing.
 - .1 The mock up will be finished in two stages with a consultant review and approval at the end of each stage:
 - .1 Stage one: Mock-up review after 600 grit polish;
 - .2 Stage two: Mock-up review after 800 grit polish.
- .3 Locate mock-up where directed by Consultant.
- .4 Approved mock-up may not remain as part of the polished concrete Work. The mock-up area will remain in place and covered with finish material by flooring contractor under separate contract.

1.10 ADMINISTRATIVE REQUIREMENTS

- .1 Section 01 31 00: Project management and coordination procedures.
- .2 Coordination:
 - .1 Coordinate with other work having a direct bearing on work of this section.
- .3 Pre-installation Meetings: Convene one (1) week before starting work of this section.

1.11 WORK CONDITIONS

- .1 Section 01 35 26: Environmental conditions affecting products on site.
- .2 Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting topping performance.
- .3 Concrete must be wet cured a minimum of 7 days, or as directed by the densifier manufacturer before application can begin.
- .4 Application of finishing system shall take place prior to installation of equipment.
- .5 Close areas to traffic during and after floor application, for time period recommended by the manufacturer.

1.12 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials in original containers, with seal's unbroken, bearing manufacturer labels indicating brand name and directions for storage.

- .2 Dispense special concrete finish material from factory numbered and sealed containers. Maintain record of container numbers.

Part 2 Products

2.1 POLISHING SYSTEM

- .1 Commercial grade semi-gloss polishing system. Acceptable Products include:
 - .1 Product: Induroshine System PDS-2, manufactured by WR Meadows.
 - .2 Product: RetroPlate 99, manufactured by Advanced Floor Products.
 - .3 Product: HiPER Commercial Floor, manufactured by Husqvarna.
- .2 Grind Level: Class B- 'Salt and Pepper'.

2.2 EQUIPMENT

- .1 Equipment to be used for grinding/polishing shall possess at least 600 pounds of head pressure.
- .2 Grinding heads:
 - .1 Metal bonded 40, 80 and 150 grits.
- .3 Resin bonded, phenolic diamonds, 100, 200, 400, and 800 []Grinding pads for edges:
 - .1 40, 80 and 150 grits.
 - .2 200, 400, and 800.
- .4 Hand grinder with dust extraction attachment and pads.
- .5 Dust extraction system, pre-separator and squeegee attachments with minimum flow rating of 322 cubic feet per minute.
- .6 Equipment to be used for densifying and cleaning the floor after grinding/polishing procedure has been performed:
 - .1 Walk-behind auto scrubber or equivalent with a head pressure of 150 pounds.
 - .2 Follow auto-scrubber's manual for cleaning instructions after densifying and conditioning the floor.

Part 3 Execution

3.1 EXAMINATION

- .1 Section 01 70 00: Verify existing conditions before starting work.
- .2 Verify that floor surfaces are acceptable to receive the work of this section. Examine substrate, with installer present, for conditions affecting performance of finish. Correct conditions detrimental to timely and proper work. Do not proceed until unsatisfactory conditions are corrected.
- .3 Verify base slab meets finish and surface profile requirements in Sections 03 30 00 Cast-in-Place Concrete and 03 35 10 Concrete Floor Finishing.
- .4 Prior to application, verify floor surfaces are free of construction latents.

3.2 FIELD QUALITY ASSURANCE

- .1 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with Quality Assurance section in Part 1 above.
- .2 Advise Consultant and manufacturer's technical representative when surfaces and applied coatings are ready for inspection. Do not proceed with subsequent work until previous work has been approved.
- .3 Cooperate with inspections and provide access to areas of work.
- .4 Contractor to provide written reports of all gloss readings and locations from which they were taken. Gloss readings to be obtained on a 3m x 3m grid over all floor areas.

3.3 CONCRETE POLISHING APPLICATION

- .1 Applicator shall examine the areas and conditions under which work of this section will be provided and the General Contractor shall correct conditions detrimental to the timely and proper completion of the work and the Applicator shall not proceed until unsatisfactory conditions are resolved.
- .2 Apply concrete densifying material at coverage rates in strict accordance with manufacturer's written instructions. Allow to cure as per manufacturer's recommendations.
- .3 Semi-gloss sheen level is required according to the following criteria: Any individual gloss readings shall be no less than 50 and the overall gloss readings shall average 55 when measured in accordance with ASTM D523 using Horiba IG-320 Gloss Checker or equivalent. Provide written reports of gloss level readings per Field Quality Assurance article above.
- .4 Finished floor to be uniform in colour, aggregate exposure and sheen, from edge to edge and around columns.
- .5 Prime and fill construction joints with sealant materials specified, in accordance with manufacturer's instructions.

3.4 CLEANING AND PROTECTION

- .1 The premises shall be kept clean and free of debris at all times.
- .2 Remove spatter from adjoining surfaces as necessary.
- .3 Repair damages to surface caused by cleaning operations.
- .4 Remove debris from job site. Dispose of materials in separate, closed containers in accordance with manufacturer's recommendations until Substantial Performance.

3.5 PROTECTION OF FINISHED WORK

- .1 No satisfactory chemical or cleaning procedure is available to remove petroleum stains from the concrete surface. Prevention is therefore essential.
- .2 All hydraulic powered equipment must be diapered to avoid staining of the concrete.
- .3 No trade will park vehicles on the inside slab. If necessary to complete their scope of work, drop cloths will be placed under vehicles at all times.
- .4 No pipe cutting machine will be used on the inside floor slab.

- .5 Steel will not be placed on interior slab to avoid rust staining.
- .6 Acids and acidic detergents will not come into contact with slab.
- .7 All trades informed that the slab must be protected at all times.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 CSA Group
 - .1 CAN/CSA-A165 Series-14, CSA Standards on Concrete Masonry Units (Consists of A165.1, A16 and A165.3).
 - .2 CAN/CSA-A179-14, Mortar and Grout for Unit Masonry.
 - .3 CAN/CSA-A371-14, Masonry Construction for Buildings.
- .2 International Masonry Industry All-Weather Council (IMIAC)
 - .1 Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Conduct pre-installation meeting one week prior to commencing work of this Section and on-site installations to:
 - .1 Verify project requirements, including mock-up requirements.
 - .2 Verify substrate conditions.
 - .3 Co-ordinate products, installation methods and techniques.
 - .4 Sequence work of related sections.
 - .5 Co-ordinate with other building subtrades.
 - .6 Review manufacturer's installation instructions.
 - .7 Review masonry cutting operations, methods and tools and determine worker safety and protection from dust during cutting operations.
 - .8 Review warranty requirements.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for masonry and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two (2) copies of WHMIS SDS in accordance with Section 01 35 30 - Health and Safety Requirements.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Prince Edward Island, Canada.
 - .2 Submit shop drawings detailing temporary bracing required, designed to resist wind pressure and lateral forces during installation.
- .4 Test and Evaluation Reports:

- .1 Test reports to certify compliance of masonry units [and mortar ingredients] with specified performance characteristics and physical properties.
- .2 Submit data for masonry units, in addition to requirements set out in referenced CSA and ASTM Standards, indicating initial rates of absorption.
- .5 Installer Instructions: provide manufacturer's installation instructions, including storage, handling, safety and cleaning.

1.4 CLOSEOUT SUBMITTALS

- .1 Submit manufacturer's instructions for care, cleaning and maintenance of prefaced masonry units for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.5 EXTRA MATERIALS

- .1 Submit manufacturer's instructions in accordance with Section 01 78 00 - Closeout Submittals covering maintenance requirements and parts catalogue, with cuts and identifying numbers.

1.6 QUALITY ASSURANCE

- .1 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct mock-up panel of interior masonry wall construction 1200 x 1800 mm showing masonry colours and textures, jointing, pointing, coursing, mortar and quality of work.
 - .3 Mock-up used:
 - .1 To judge quality of work, substrate preparation, operation of equipment and material application.
 - .2 For testing to determine compliance with performance requirements. Perform following tests.
 - .1 For clay units, in addition to requirements set out in referenced CSA and ASTM Standards include data indicating initial rate of absorption.
 - .4 Construct mock-up where directed by Consultant.
 - .5 Allow 24 hours for inspection of mock-up by Consultant before proceeding with work.
 - .6 When accepted by Consultant, mock-up to demonstrate minimum standard for this work. Mock-up may remain as part of finished work.
 - .7 Start work only upon receipt of written acceptance of mock-up by Consultant.

1.7 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 60 00 - Material and Equipment and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

- .3 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect material packages from nicks, scratches, and blemishes.
 - .3 Keep materials dry until use [except where wetting of bricks is specified].
 - .4 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.
 - .5 Replace defective or damaged materials with new.

1.8 SITE CONDITIONS

- .1 Ambient Conditions: assemble and erect components when temperatures are above 4 degrees C.
- .2 Weather Requirements: to CAN/CSA-A371.
- .3 Cold weather requirements:
 - .1 To CAN/CSA-A371 with following requirements.
 - .1 Maintain temperature of mortar between 5 degrees C and 50 degrees C until batch is used or becomes stable.
 - .2 Maintain ambient temperature of masonry work and its constituent materials between 5 degrees C and 50 degrees C and protect site from windchill.
 - .3 Maintain temperature of masonry above 0 degrees C for minimum of 7 days, after mortar is installed.
 - .4 Preheat unheated wall sections in enclosure for minimum 72 hours above 10 degrees C, before applying mortar.
 - .2 Hot weather requirements:
 - .1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.
 - .2 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until masonry work is completed and protected by flashings or other permanent construction.
 - .3 Spray mortar surface at intervals and keep moist for maximum of three (3) days after installation.

1.9 WARRANTY

- .1 For Work in this Section 04 05 00 - Common Work Results for Masonry, 12 months warranty period is extended to 24 months.

Part 2 Products

2.1 MATERIALS

- .1 Masonry materials are specified elsewhere in related Sections:

- .1 Section 04 05 13 – Masonry Mortaring and Grouting.
- .2 Section 04 05 19 – Masonry Anchorage and Reinforcing.
- .3 Section 04 05 23 – Masonry Accessories.
- .4 Section 04 22 00 – Concrete Unit Masonry.

Part 3 Execution

3.1 INSTALLERS

- .1 Experienced and qualified masons to carry out erection, assembly and installation of masonry work.

3.2 EXAMINATION

- .1 Examine conditions, substrates and work to receive work of this Section.
- .2 Examine openings to receive masonry units. Verify opening size, location, and that opening is square and plumb, and ready to receive work of this Section.
 - .1 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation after unacceptable conditions have been remedied and after receipt of written approval from Consultant.
- .3 Verification of Conditions:
 - .1 Verify that:
 - .1 Substrate conditions which have been previously installed under other sections or contracts, are acceptable for product installation in accordance with manufacturer's instructions prior to installation of concrete block.
 - .2 Site conditions are acceptable and are ready to receive work.
 - .3 Built-in items are in proper location, and ready for roughing into masonry work.
 - .2 Commencing installation means acceptance of existing substrates.

3.3 PREPARATION

- .1 Surface Preparation: prepare surface in accordance with manufacturer's written recommendations.
- .2 Establish and protect lines, levels, and coursing.
- .3 Protect adjacent materials from damage and disfiguration.

3.4 INSTALLATION

- .1 Do masonry work in accordance with CAN/CSA-A371 except where specified otherwise.
- .2 Build masonry plumb, level, and true to line, with vertical joints in alignment, respecting construction tolerances permitted by CAN/CSA-A371.

- .3 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.

3.5 CONSTRUCTION

- .1 Exposed masonry:
 - .1 Remove chipped, cracked, and otherwise damaged units, in accordance with CAN/CSA-A165, in exposed masonry and replace with undamaged units.
 - .2 Jointing:
 - .1 Allow joints to set just enough to remove excess water, then tool with round jointer to provide smooth, joints true to line, compressed, uniformly concave joints where concave joints are indicated.
 - .2 Strike flush joints concealed in walls and joints in walls to receive plaster, tile, insulation, or other applied material except paint or similar thin finish coating.
 - .3 Cutting:
 - .1 Cut out for electrical switches, outlet boxes, and other recessed or built-in objects.
 - .2 Make cuts straight, clean, and free from uneven edges.
 - .4 Building-In:
 - .1 Build in items required built into masonry.
 - .2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
 - .3 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.
 - .5 Wetting of bricks:
 - .1 Except in cold weather, wet bricks having initial rate of absorption exceeding 1 g/minute/1000 mm²: wet to uniform degree of saturation, 3 to 24 hours before laying, and do not lay until surface dry.
 - .2 Wet tops of walls built of bricks qualifying for wetting, when recommencing work on such walls.
 - .6 Support of loads:
 - .1 Use 21 MPa concrete to Section 03 30 00 - Cast-in-Place Concrete, where concrete fill is used instead of solid units.
 - .2 Use grout to CAN/CSA-A179 where grout is used instead of solid units.
 - .3 Install building paper below voids to be filled with concrete; keep paper 25 mm back from faces of units.
 - .7 Provision for movement:
 - .1 Leave 3 mm space below shelf angles.
 - .2 Leave 6 mm space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.
 - .3 Built masonry to tie in with stabilizers, with provision for vertical movement.

- .8 Loose steel lintels:
 - .1 Install loose steel lintels. Center over opening width.
- .9 Interface with other work:
 - .1 Cut openings in existing work as indicated.
 - .2 Openings in walls: reviewed by Consultant.
 - .3 Make good existing work. Use materials to match existing.

3.6 SITE TOLERANCES

- .1 Tolerances in notes to CAN/CSA-A371 apply.

3.7 SITE QUALITY CONTROL

- .1 Site Tests, Inspection:
- .2 Perform site inspection and testing in accordance with Section 01 45 00 - Quality Control.
- .3 Notify inspection agency minimum of 24 hours in advance of requirement for tests.

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.

3.9 PROTECTION

- .1 Temporary Bracing:
 - .1 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.
 - .2 Bracing approved by Consultant.
 - .3 Brace masonry walls as necessary to resist wind pressure and lateral forces during construction.
- .2 Moisture Protection:
 - .1 Keep masonry dry using waterproof, non-staining coverings that extend over walls and down sides sufficient to protect walls from wind driven rain, until completed and protected by flashing or other permanent construction.
 - .2 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor securely in position.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 CSA Group
 - .1 CSA A23.1/A23.2-[14], Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A179-[14], Mortar and Grout for Unit Masonry.
 - .3 CAN/CSA-A371-[14], Masonry Construction for Buildings.
 - .4 CAN/CSA-A3000-[13], Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .2 International Masonry Industry All-Weather Council (IMIAC)
 - .1 Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for masonry mortar and grout and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two (2) copies of WHMIS SDS in accordance with Section 01 35 30 - Health and Safety Requirements. Indicate VOC's mortar, grout, parging, colour additives and admixtures. Expressed as grams per litre (g/L).
- .3 Manufacturers' Instructions: submit manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control and requirements of Section 04 05 00 - Common Work Results for Masonry.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 60 00 - Material and Equipment and with manufacturer's written instructions.

- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect masonry mortar and grout packages from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

1.5 SITE CONDITIONS

- .1 Ambient Conditions: maintain materials and surrounding air temperature to:
 - .1 Minimum 5 degrees C prior to, during, and 48 hours after completion of masonry work.
 - .2 Maximum 32 degrees C prior to, during, and 48 hours after completion of masonry work.
- .2 Weather Requirements: CAN/CSA-A371.

Part 2 Products

2.1 MATERIALS

- .1 Use same brands of materials and source of aggregate for entire project.
- .2 Cement:
 - .1 Portland Cement: to CAN/CSA-A3000, Type GU - General use hydraulic cement (Type 10) gray colour.
 - .2 Masonry Cement: to CAN/CSA-A3002 and CAN/CSA-A179, Type S.
 - .3 Mortar Cement: to CAN/CSA-A3002 and CAN/CSA-A179, Type N.
 - .4 Packaged Dry Combined Materials for mortar: to CAN/CSA-A179, Type N, using gray colour cement.
- .3 Aggregate: supplied by one supplier.
 - .1 Fine Aggregate: to CAN/CSA-A179, manufactured sand.
 - .2 Course Aggregate: to CAN/CSA-A179.
- .4 Water: clean and potable.
- .5 Bonding Agent: latex type.
- .6 Polymer Latex: organic polymer latex admixture of butadiene-styrene type non-emulsifiable bonding admixture.

2.2 MORTAR MIXES

- .1 Mortar for interior masonry:

- .1 Load Bearing: type S based on proportion specifications.
- .2 Non-Load Bearing: N based on proportion specifications.

2.3 MORTAR MIXING

- .1 Use pre-blended, pre-coloured mortar prepackaged under controlled factory conditions. Ingredients batching limitations to within 1% accuracy.
- .2 Mix mortar ingredients in accordance with CAN/CSA-A179 in quantities needed for immediate use.
- .3 Maintain sand uniformly damp immediately before mixing process.
- .4 Using anti-freeze compounds including calcium chloride or chloride-based compounds is prohibited.
- .5 Adding air entraining admixture to mortar mix is prohibited.
- .6 Use a batch type mixer in accordance with CAN/CSA-A179.
- .7 Pointing mortar: prehydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour no more than 2 hours then remix with sufficient water to produce mortar of proper consistency for pointing.
- .8 Re-temper mortar only within two hours of mixing, when water is lost by evaporation.
- .9 Use mortar within 2 hours after mixing at temperatures of 32 degrees C, or 2-1/2 hours at temperatures under 10 degrees C.

2.4 GROUT MIXES

- .1 Bond Beams: grout mix 10 to 12.5 MPa strength at 28 days; 200-250 mm slump; premixed type in accordance with CSA A23.1/A23.2.
- .2 Lintels: grout mix 10 to 12.5 MPa strength at 28 days; 200-250 mm slump; premixed type in accordance with CSA A23.1/A23.2.
- .3 Grout: Minimum compressive strength of 12.5 MPa at 28 days. Maximum aggregate size and grout slump: CAN/CSA-A179.

2.5 GROUT MIXING

- .1 Mix batched and delivered grout in accordance with CSA A23.1/A23.2 transit mixed.
- .2 Mix grout ingredients in quantities needed for immediate use in accordance with CAN/CSA-A179 coarse grout.
- .3 Add admixtures in accordance with manufacturer's instructions; mix uniformly.
- .4 Using calcium chloride or chloride-based admixtures is prohibited.

2.6 MIX TESTS

.1 Testing Mortar Mix:

.1 Test mortar to requirements of Section 01 45 00 - Quality Control, and in accordance with CAN/CSA-A179, for proportion specification. Test prior to construction and during construction for:

- .1 Compressive strength.
- .2 Consistency.
- .3 Mortar aggregate ratio.
- .4 Sand/cement ratio.
- .5 Water content and water/cement ratio.
- .6 Air content.
- .7 Splitting tensile strength.

.2 Testing Grout Mix:

.1 Test grout to requirements of Section 01 45 00 - Quality Control, and in accordance with CAN/CSA-A179, for proportion specification. Test prior to construction and during construction for:

- .1 Compressive strength.
- .2 Sand/cement ratio.
- .3 Water content and water/cement ratio.
- .4 Slump.

Part 3 Execution

3.1 EXAMINATION

.1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for masonry installation in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate in presence of Consultant.
- .2 Inform Consultant of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 PREPARATION

- .1 Apply bonding agent to existing concrete surfaces.
- .2 Plug clean-out holes with block masonry units. Brace masonry for wet grout pressure.

3.3 CONSTRUCTION

- .1 Do masonry mortar and grout work in accordance with CAN/CSA-A179 except where specified otherwise.
- .2 Apply parging in uniform coating not less than total 10 mm thick , where indicated.

3.4 MIXING

- .1 Pointing mortar can be mixed using a regular paddle mixer. Only electric motor mixers are permissible. Mixers run on hydrocarbons are not permitted, due to fumes. Mixing by hand pre-approved by Consultant.
- .2 Clean mixing boards and mechanical mixing machine between batches.
- .3 Mortar: weaker than units it is binding.
- .4 Contractor to appoint one individual to mix mortar, for duration of project. In event that this individual is changed, mortar mixing must cease until new individual is trained, and mortar mix is tested.

3.5 MORTAR PLACEMENT

- .1 Install premix mortar to manufacturer's instructions.
- .2 Install mortar to requirements of CAN/CSA-A179.
- .3 Install mortar and grout to requirements of Section 04 05 13 Masonry Mortaring and Grouting.
- .4 Remove excess mortar from grout spaces.

3.6 GROUT PLACEMENT

- .1 Install grout in accordance with manufacturer's instructions.
- .2 Install grout in accordance with CAN/CSA-A179.
- .3 Work grout into masonry cores and cavities to eliminate voids.
- .4 Installing grout in lifts greater than 400 mm, without consolidating grout by rodding is prohibited.
- .5 Displacing reinforcement while placing grout is prohibited.

3.7 FIELD QUALITY CONTROL

- .1 Site Tests, Inspection: in accordance with Section 04 05 00 - Common Work Results for Masonry supplemented as follows:
 - .1 Test and evaluate mortar prior to construction and during construction in accordance with CAN/CSA-A179.
 - .2 Test and evaluate grout prior to construction and during construction to CAN/CSA-A179; test in conjunction with masonry unit sections specified.
- .2 Manufacturer's Field Services: in accordance with Section 04 05 00 - Common Work Results for Masonry.

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

- .1 Leave Work area clean at end of each day.
- .2 Remove droppings and splashings using clean sponge and water.
- .3 Clean masonry with low pressure clean water and soft natural bristle brush.
- .4 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.9 PROTECTION

- .1 Cover completed and partially completed work not enclosed or sheltered with waterproof covering at end of each work day. Anchor securely in position.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM A 36/A 36M-14, Standard Specification for Carbon Structural Steel.
 - .2 ASTM A 167-15, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .3 ASTM A 307-14, Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
 - .4 ASTM A 580/A 580M-16, Standard Specification for Stainless Steel Wire.
 - .5 ASTM A 641/A 641M-(R2014), Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire.
 - .6 ASTM A 666-15, Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.
 - .7 ASTM A 1022 16B, Standard Specification for Deformed and Plain Stainless Steel Wire and Welded Wire for Concrete Reinforcement.
- .2 Canadian Standards Association (CSA)
 - .1 CSA A23.1/A23.2-14 (R2015), Concrete Materials and Methods of Concrete Construction/Test Methods and Standard Practices for Concrete.
 - .2 CAN/CSA-A179-14, Mortar and Grout for Unit Masonry.
 - .3 CAN/CSA-A370-14, Connectors for Masonry.
 - .4 CAN/CSA-A371-14, Masonry Construction for Buildings.
 - .5 CSA G30.18-09 (R2014), Carbon Steel Bars for Concrete Reinforcement.
 - .6 CSA S304-14(R2015), Design of Masonry Structures.
 - .7 CSA W186-M1990(R2012), Welding of Reinforcing Bars in Reinforced Concrete Construction.
- .3 Reinforcing Steel Institute of Canada (RSIC)
 - .1 Reinforcing Steel Manual of Standard Practice, 2004.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for anchorage and reinforcing materials and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit two (2) copies of WHMIS SDS in accordance with Section 01 35 30 – Health and Safety.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Prince Edward Island, Canada.

- .2 Submit drawings detailing bar bending details, anchorage details lists and placement drawings
- .3 On placement drawings, indicate sizes, spacing, location and quantities of reinforcement and connectors.
- .4 Manufacturers' Instructions: submit manufacturer's installation instructions.

1.3 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control and requirements of Section 04 05 00 - Common Work Results for Masonry.

1.4 SITE MEASUREMENTS

- .1 Make site measurements necessary for proper fit of members.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect anchorage and reinforcing materials from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Bar reinforcement: Steel to CAN/CSA-A371 and CSA G30.18, Grade 400R stainless steel to ASTM A 167.
- .2 Connectors: to CAN/CSA-A370 and CSA S304.1.
- .3 Corrosion protection: to CSA S304.1, [galvanized] to CSA S304.1 and CAN/CSA-A370 Stainless steel to ASTM A 1022.

- .4 Fasteners: installed post-construction:
 - .1 Screw Shields and Plugs: lead, placed directly into solid masonry units.
 - .2 Bolts and Screws: size and type to suit application, locate where indicated.
 - .3 Nails: case-hardened cut or spiral nails, size and type to suit fastening application.
 - .4 Powder-Driven Fasteners: pin styles and lengths to suit fastening application in accordance with manufacturers use, load and hold recommendations.
 - .5 Adhesives: epoxies, mastics and contact cements for fastening applications, use in accordance with manufacturers' recommendations.
- .5 Ties: hot dip galvanized to CAN/CSA-A370 Table 5.2 steel finish.
 - .1 Corrugated to: CAN/CSA-A370.
 - .2 Unit ties, to CAN/CSA-A370: rectangular, fabricated from cold-drawn steel, size to suit application.
 - .3 Adjustable Unit Ties: to CAN/CSA-A370: proprietary type ties, type, style and size to suit application in accordance with manufacturer's recommendations.
 - .4 Joint Reinforcement Ties: CSA A371 with corrosion protection to CSA S304 and CSA A370:
 - .1 Single Wythe Joint Reinforcement: truss type:
 - .1 Steel wire, hot dip galvanized: to ASTM A 641, Class 3 after fabrication.
 - .2 Cold drawn steel wire.
- .6 Anchors: to CAN/CSA-A370:
 - .1 Conventional Anchors: type steel bolts with bent bar anchors plate anchors, shape L, sized to suit application.
- .7 Conventional Bolts:
 - .1 Bolts: to ASTM A 36, bar stock shop threaded, bent bar anchors, L shaped.
 - .2 Plate anchors: steel to ASTM A 36, weld square of circular steel plate perpendicular to axis of steel bar threaded on opposite end.
 - .3 Through bolt rods: to ASTM A 307 threaded rod or threaded ASTM A 36 bar stock.

2.2 FABRICATION

- .1 Fabricate reinforcing in accordance with CSA A23.1/A23.2 and Reinforcing Steel Manual of Standard Practice by Reinforcing Steel Institute of Canada.
- .2 Fabricate connectors in accordance with CAN/CSA-A370.
- .3 Obtain Consultant approval for locations of reinforcement splices other than shown on placing drawings.
- .4 Upon approval of Consultant, weld reinforcement in accordance with CSA W186.
- .5 Ship reinforcement and connectors (clearly identified) in accordance with drawings.

2.3 SOURCE QUALITY CONTROL

- .1 Upon request, provide Consultant with certified copy of mill test report of reinforcement steel and connectors, showing physical and chemical analysis, minimum five (5) weeks prior to commencing reinforcement work.
- .2 Upon request inform Consultant proposed source of supplied material.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for anchorage and reinforcing materials installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions remedied and after receipt of written approval to proceed Consultant.

3.2 PREPARATION

- .1 Direct and coordinate placement of metal anchors for masonry supplied to other Sections.

3.3 INSTALLATION

- .1 Supply and install masonry connectors and reinforcement in accordance with CAN/CSA-A370, CAN/CSA-A371, CSA A23.1/A23.2 and CSA S304.1 unless indicated otherwise.

3.4 BONDING AND TYING

- .1 Bond walls of two or more wythes using metal connectors in accordance with CSA S304.1, CAN/CSA-A371 and as indicated.
- .2 Tie masonry veneer to backing in accordance with National Building Code of Canada (NBC), CSA S304.1, CAN/CSA-A371 and as indicated.
- .3 Install unit, adjustable, single wythe and multiple wythe joint reinforcement where indicated and in accordance with CAN/CSA-A370 and CAN/CSA-A371.
 - .1 Bond walls of two or more wythes using metal connectors in accordance with CAN/CSA-A371 and as indicated.
 - .2 Install horizontal joint reinforcement 400 mm on centre.
 - .3 Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 400 mm each side of opening.
 - .4 Place joint reinforcement continuous in first and second joint below top of walls.
 - .5 Lap joint reinforcement ends minimum 150 mm.
 - .6 Connect stack bonded unit joint corners and intersections with strap anchors 400 mm on centre.

3.5 REINFORCED LINTELS AND BOND BEAMS

- .1 Reinforce masonry beams, masonry lintels and bond beams as indicated.
- .2 Place and grout reinforcement in accordance with CSA S304.1, CAN/CSA-A371, and CAN/CSA-A179.
- .3 Support and position reinforcing bars in accordance with CAN/CSA-A371.

3.6 GROUTING

- .1 Grout masonry in accordance with CSA S304.1, CAN/CSA-A371 and CAN/CSA-A179 and as indicated.

3.7 ANCHORS

- .1 Supply and install metal anchors in accordance with CAN/CSA-A370 and CAN/CSA-A371.

3.8 LATERAL SUPPORT AND ANCHORAGE

- .1 Supply and install lateral support and anchorage in accordance with CSA S304.1 and as indicated.

3.9 MOVEMENT JOINTS

- .1 Reinforcement not continuous across movement joints unless otherwise indicated.

3.10 FIELD BENDING

- .1 Do not field bend reinforcement and connectors except where indicated or authorized by Consultant.
- .2 When field bending authorized, bend without heat, applying slow and steady pressure.
- .3 Replace bars and connectors with cracks or splits.

3.11 FIELD QUALITY CONTROL

- .1 Site inspections in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Obtain Consultant approval of placement of reinforcement and connectors, prior to placing mortar.

3.12 FIELD TOUCH-UP

- .1 Touch up damaged and cut ends of epoxy coated or galvanized reinforcement steel and connectors with compatible finish to provide continuous coating.

3.13 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM E 336-11, Standard Test Method for Measurement of Airborne Sound Attenuation Between Rooms in Buildings.
- .2 CSA Group
 - .1 CAN/CSA-A165 Series-[04(R2009)], CSA Standards on Concrete Masonry Units consists: A165.1, A165.2, A165.3.
 - .2 CAN/CSA-A371-[04(R2009)], Masonry Construction for Buildings.
 - .3 CSA S304.1-[04(R2010)], Design of Masonry Structures.
- .3 National Research Council Canada (NRC)
 - .1 National Building Code of Canada [2015] (NBC).
- .4 South Coast Air Quality Management District (SCAQMD)
 - .1 SCAQMD Rule 1168-[05], Adhesive and Sealant Applications.
- .5 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S101-[07(R2010)], Standard Methods of Fire Endurance Tests of Building Construction and Materials.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for concrete masonry units and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 QUALITY ASSURANCE

- .1 Test Reports: submit certified test reports showing compliance with specified performance characteristics and physical properties, and in accordance with Section 04 05 00 - Common Work Results for Masonry.
- .2 Certificates: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Mock-ups:
 - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control and requirements of Section 04 05 00 - Common Work Results for Masonry supplemented as follows:
 - .1 Construct mock-up panel of interior concrete unit masonry construction 1200 x 1800 mm.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 60 00 – Material and Equipment and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
 - .1 Offload concrete unit masonry packages using equipment that will not damage the surfaces.
 - .2 Do not use brick tongs to move or handle masonry.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Do not double stack cubes of concrete unit masonry.
 - .3 Cover masonry units with non-staining waterproof membrane covering.
 - .4 Allow air circulation around units.
 - .5 Installation of wet or stained masonry units is prohibited.
 - .6 Keep concrete unit masonry in individual cardboard packaging provided by manufacturer until units are ready to be installed.
 - .7 Store and protect concrete unit masonry from nicks, scratches, and blemishes.
 - .8 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Standard concrete block units: to CAN/CSA-A165 Series (CAN/CSA-A165.1).
 - .1 Classification: H / 15 /A /M.
 - .2 Dimensions Nominal: 100, 150, 200, 240, 290, and 300 mm wide x 200 mm high x 400 mm long.
 - .3 Special shapes: provide bull-nosed double bull-nosed units for exposed corners. Provide purpose-made shapes for lintels, beams and bond beams. Provide additional special shapes as indicated.
- .2 Fire rated concrete block units: to CAN/CSA-A165 Series (CAN/CSA-A165.1) as modified below.
 - .1 Classification: H/15/B/M except as modified by fire resistance requirements specified below.
 - .2 Fire resistant characteristics: aggregate used in units and equivalent thickness of units to the National Building Code of Canada (NBC), and in accordance with CAN/ULC-S101, for fire-resistance ratings indicated.
 - .3 Size: modular.
 - .4 Special shapes: provide bull-nosed units for exposed corners. Provide purpose-made shapes for lintels and bond beams and provide additional shapes as indicated.

2.2 REINFORCEMENT

- .1 Reinforcement in accordance with Section 04 05 19 - Masonry Anchorage and Reinforcing.

2.3 CONNECTORS

- .1 Connectors in accordance with Section 04 05 19 - Masonry Anchorage and Reinforcing.

2.4 MORTAR MIXES

- .1 Mortar and mortar mixes in accordance with Section 04 05 13 - Masonry Mortar and Grouting.

2.5 GROUT MIXES

- .1 Grout and grout mixes in accordance with Section 04 05 13 - Masonry Mortar and Grouting.

2.6 CLEANING COMPOUNDS

- .1 Compatible with substrate and acceptable to masonry manufacturer for use on products.
- .2 Cleaning compounds compatible with concrete unit masonry and in accordance with manufacturer's written recommendations and instructions.

2.7 TOLERANCES

- .1 Tolerances for standard concrete unit masonry tolerances in accordance with CAN/CSA-A165.1, supplemented as follows:
 - .1 Maximum variation between units within specific job lot not to exceed 2 mm.
 - .2 No parallel edge length, width or height dimension for individual unit to differ by more than 2 mm.
 - .3 Out of square tolerance not to exceed 2 mm.
- .2 Tolerances for architectural concrete masonry units in accordance with CAN/CSA-A165.1, supplemented as follows:
 - .1 Maximum variation in length or height between units within specific job lot for specified dimension not to exceed 2 mm.
 - .2 No parallel edge length, width or height dimension for individual unit to differ by more than 2 mm.
 - .3 Out of square tolerance not to exceed 2 mm.
 - .4 Maximum variation in width between units within specific job lot for specified dimension not to exceed 2 mm.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for concrete unit masonry installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 PREPARATION

- .1 Protect adjacent finished materials from damage due to masonry work.

3.3 INSTALLATION

- .1 Concrete block units:
 - .1 Bond: running.
 - .2 Coursing height: 200 mm for one block and one joint.
 - .3 Jointing: concave where exposed or where paint or other finish coating is specified.
- .2 Special Shapes:
 - .1 Install special units to form corners, returns, offsets, reveals and indents without cut ends being exposed and without losing bond or module.
 - .2 Install reinforced concrete block lintels over openings in masonry where steel or reinforced concrete lintels are not indicated.
 - .3 End bearing: not less than 200 mm as indicated on drawings.
 - .4 Install special site cut shaped units.

3.4 REINFORCEMENT

- .1 Install reinforcing in accordance with Section 04 05 19 - Masonry Anchorage and Reinforcing.

3.5 CONNECTORS

- .1 Install connectors in accordance with Section 04 05 19 - Masonry Anchorage and Reinforcing .

3.6 MORTAR PLACEMENT

- .1 Place mortar in accordance with Section 04 05 13 - Masonry Mortar and Grouting.

3.7 GROUT PLACEMENT

- .1 Place grout in accordance with Section 04 05 13 - Masonry Mortar and Grouting.

3.8 CONSTRUCTION

- .1 Cull out masonry units, in accordance with CAN/CSA-A165 and reviewed range of colour samples, with chips, cracks, broken corners, excessive colour and texture variation.
- .2 Build in miscellaneous items such as bearing plates, steel angles, bolts, anchors, inserts, sleeves and conduits.
- .3 Construct masonry walls using running bond unless otherwise noted.
- .4 Build around frames previously set and braced. Fill behind hollow frames within masonry walls with mortar or grout and embed anchors.
- .5 Fit masonry closely against electrical and plumbing outlets so collars, plates and covers overlap and conceal cuts.
- .6 Install movement joints and keep free of mortar where indicated.
- .7 Hollow Units: spread mortar setting bed from outside edge of face shells. Gauge amount of mortar on top and end of unit to create full joints, equivalent to shell thickness. Avoid excess mortar.
- .8 Solid Units: apply mortar over entire vertical and horizontal surfaces. Avoid bridging of airspace between brick veneer and backup wall with mortar.
- .9 Ensure compacted head joints. Use full or face-shell joint as indicated.
- .10 Tamp units firmly into place.
- .11 Do not adjust masonry units after mortar has set. Where resetting of masonry is required, remove, clean and reset units in new mortar.
- .12 Tool exposed joints concave; strike concealed joints flush.
- .13 Tool joints after mortar has achieved initial set up.
- .14 Do not interrupt bond below or above openings.

3.9 REPAIR/RESTORATION

- .1 Upon completion of masonry, fill holes and cracks, remove loose mortar and repair defective work.

3.10 FIELD QUALITY CONTROL

- .1 Site Tests, Inspection: in accordance with Section 04 05 00 - Common Work Results for Masonry supplemented as follows:
 - .1 Concrete masonry units will be sampled and tested by independent testing agency appointed and paid by Consultant in accordance with CSA S304.1.
 - .2 Noise reduction between two rooms will be tested by independent testing agency appointed and paid Consultant in accordance with ASTM E 336.

- .3 Notify inspection agency minimum of 24 hours in advance of requirement for tests.
- .2 Manufacturer's Field Services: in accordance with Section 04 05 00 - Common Work Results for Masonry.

3.11 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Standard Concrete Unit Masonry:
 - .1 Allow mortar droppings on masonry to partially dry then remove by means of trowel, followed by rubbing lightly with small piece of block. Clean wall surface with suitable brush or burlap.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.12 PROTECTION

- .1 Brace and protect concrete unit masonry in accordance with Section 04 05 00 - Common Work Results for Masonry.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- .1 Steel Joists: Section 05 21 00
- .2 Metal Deck: Section 05 31 00

1.2 REFERENCES

- .1 ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 psi Tensile.
- .2 ASTM A 325, Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
- .3 CISC/CPMA 1-73a, A Quick-Drying, One-Coat Paint for Use on Structural Steel.
- .4 CISC/CPMA 2-75, A Quick-Drying, Primer for Use on Structural Steel.
- .5 CSA-G40.20, General Requirements for Rolled or Welded Structural Quality Steel.
- .6 CSA-G40.21, Structural Quality Steel.
- .7 ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- .8 CSA-S16, Consolidation: Limit States Design of Steel Structures.
- .9 CSA-S136, Design of Cold Formed Steel Structural Members.
- .10 CSA-W47.1, Certification of Companies for Fusion Welding of Steel.
- .11 CSA-W48, Filler Metals and Allied Materials for Metal Arc Welding.
- .12 CSA-W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .13 CSA-W59, Welded Steel Construction (Metal Arc Welding).

1.3 SHOP DRAWINGS

- .1 Submit erection drawings in accordance with Division 01. Shop Detail Drawings for individual pieces and for standard connections are not to be submitted.
- .2 Submit shop details of non-standard connections to be used in the connection of structural steel members. Identify on erection drawings the location of all non-standard connections.
- .3 On erection drawings, indicate member size, base plate elevations, anchor bolt size, all details and information necessary for assembly and erection purposes.
- .4 Ensure fabricator designed assemblies, components and connections, and drawings are stamped and signed by qualified professional engineer licensed in the Province of Construction.

1.4 DESIGN OF DETAILS AND CONNECTIONS

- .1 Design details and connections in accordance with requirements of CSA-S16 and CSA-S136 to resist forces, moments, shears and allow for movements indicated.
 - .2 If connection for shear only (standard connection) is required:
-

- .1 Select framed beam shear connections from an industry-accepted publication such as “Handbook of the Canadian Institute of Steel Construction”.
- .2 If shears are not indicated, select or design connections to support reaction resulting from maximum uniformly distributed load that can be safely supported by beam in bending, provided no concentrated loads act on beam. If concentrated loads act on beam, calculate loads or contact structural consultant for loads.
- .3 For non-standard connections submit sketches stamped and signed by qualified professional engineer licensed in Province of construction.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Structural steel rolled sections (beams, channels and angles) : to CSA-G40.21 Grade 350W.
- .2 Hollow structural sections: to ASTM A500 Grade C.
- .3 Plates and rod : Type 300W
- .4 Anchor bolts: to CSA-G40.21, Grade 300W
- .5 Bolts, nuts and washers: to ASTM A-325 and ASTM A-490
- .6 Shear Studs to CSA W59
- .7 Welding materials: to CSA-W48 and CSA-W59 and certified by Canadian Welding Bureau.
- .8 Shop paint: to CISC/CPMA 1-73a and 2-75 as applicable.
- .9 Hot dip galvanizing: Galvanize all structural steel exposed to weather and other steel as indicated on drawings to CSA-G164. Minimum zinc coating shall be 450 grams per square meter.
- .10 “Hump rods” for attachment of masonry walls to steel columns as detailed on structural drawings. Hump rods shall be 6 mm diameter rods welded to columns and shall be compatible with masonry connectors supplied by masonry contractor.
- .11 Anchor bolts through bottom flanges of steel beams and bottom chords of steel joists where steel beam/joist provides lateral support to masonry walls as detailed on structural drawings.
- .12 Angle framing welded to steel beams and joists to provide lateral restraint to top of masonry walls as detailed on structural drawings.

2.2 FABRICATION

- .1 Fabricate structural steel in accordance with CSA-S16, S136 and in accordance with reviewed shop drawings.
- .2 Camber steel beams where indicated on structural drawings.
- .3 Continuously seal members by continuous welds where indicated. Grind smooth.
- .4 Provide holes for attachment of other work where required.

- .5 Where finished surfaces of steel are to be left exposed to view, fabricate to AISC specifications for architecturally exposed steel including straightness. Remove mill marks, identification and surface imperfections.
- .6 Exposed welds to be continuous for length of each joint. Grind exposed welds smooth and flush.

2.3 SHOP PAINTING

- .1 For steel not to receive finish painting on site:
 - .1 Clean all members of loose mill scale, rust, oil, dirt, and other foreign matter, prepare and paint to CISC/CPMA 1-73. Red colour to be used.
 - .2 Apply one coat of paint in shop to all steel surfaces except:
Surfaces to be encased in concrete.
Surfaces and edges to be field welded.
- .2 For steel to receive finish painting on site:
 - .1 Clean all members of loose mill scale, rust, oil, dirt and other foreign matter, prepare and prime to CISC/CPMA 2-75. Grey primer to be used
 - .2 Apply one coat of primer in shop to all steel surfaces.
- .3 Hot dip galvanizing: Galvanize all structural steel exposed to weather and other steel as indicated on drawings to CSA-G164. Minimum zinc coating shall be 450 grams per square meter.

PART 3 - EXECUTION

3.1 GENERAL

- .1 Structural steel work: in accordance with CSA-S16 and CSA-S136.
- .2 Welding: in accordance with CSA-W59.
- .3 Companies to be certified under Division 1 or 2.1 of CSA-W47.1 for fusion welding of steel structures and/or CSA-W55.3 for resistance welding of structural components.
- .4 Installation of “hump rods” on steel columns and angle framing to provide lateral support to masonry walls as detailed on structural drawings. Loose anchor bolts for masonry support will be supplied by this section but installed by the masonry contractor.

3.2 MARKING

- .1 Mark materials in accordance with CSA-G40.20. Do not use die stamping.

3.3 ERECTION

- .1 Erect structural steel, as indicated and in accordance with CSA-S16, CSA-S136 and in accordance with reviewed erection drawings.
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- .2 Field cutting or altering structural members: to approval of Consultant.
- .3 Clean with mechanical brush and touch up shop primer to bolts, welds and burned or scratched surfaces at completion of erection.
- .4 Continuously seal members by continuous welds where indicated. Grind smooth.
- .5 Assume full responsibility for the integrity of structure during erection. Make necessary provision for all erection loads and for sufficient temporary bracing to maintain safe structure, plumb and in true alignment until completion of erection and installation of necessary permanent bracing.
- .6 Set column base plates and loose bearing plates with steel shims to proper elevation, true and level, ready for grouting-in.

3.4 FIELD QUALITY CONTROL

- .1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Design Builder.
- .2 Provide safe access and working areas for testing on site, as required by testing agency and as authorized by Consultant.
- .3 Design Builder will pay costs of testing.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- .1 Structural Steel Section 05 12 23
- .2 Metal Deck Section 05 31 00

1.2 REFERENCES

- .1 CISC/CPMA 1-73a, A Quick-Drying, One-Coat Paint for Use on Structural Steel.
- .2 CISC/CPMA 2-75, A Quick-Drying, Primer for Use on Structural Steel.
- .3 CSA-G40.20, General Requirements for Rolled or Welded Structural Quality Steel.
- .4 CSA-G40.21, Structural Quality Steel.
- .5 ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- .6 CSA-S16, Consolidation: Limit States Design of Steel Structures.
- .7 CSA-S136, Design of Cold Formed Steel Structural Members.
- .8 CSA-W47.1, Certification of Companies for Fusion Welding of Steel.
- .9 CSA-W48 Filler Metals and Allied Materials for Metal Arc Welding.
- .10 CSA-W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .11 CSA-W59, Welded Steel Construction (Metal Arc Welding).

1.3 SHOP DRAWINGS

- .1 Submit drawings stamped and signed by qualified professional engineer registered or licensed in province of construction.
- .2 On erection drawings, indicate relevant details such as joist mark, depth, spacing, bridging lines, bearing, anchorage and other details.
- .3 In shop details, provide particulars relative to joist geometry, framed openings, splicing details, bearing and anchorage. Include member size, properties, specified and factored member loads, and stresses under various loadings, deflection and camber.

1.4 DESIGN OF STEEL JOISTS AND BRIDGING

- .1 Design steel joists and bridging to carry loads indicated on drawings in accordance with CSA-S16 and CSA-S136.
 - .2 Design joists and anchorages for uplift forces as indicated.
 - .3 Design joists to transfer min 1000 lbs of lateral load to supporting beams.
 - .4 Ensure joists are manufactured to consider load effects due to fabrication, erection and handling.
-

- .5 Limit roof joist deflection due to specified Live Load to 1/240 of span and deflection due to specified Total Load to 1/180 of span unless noted on drawings.
- .6 Limit roof joist deflection due to specified Live Load to 1/360 of span and deflection due to specified Total Load to 1/240 of span where ceilings susceptible to cracking are suspended from the roof structure unless noted on drawings.
- .7 Limit floor joist deflection due to specified Live Load to 1/360 of span and deflection due to specified Total Load to 1/240 of span unless noted on drawings.
- .8 Limit roof and floor deflection due to specified Live Load to 1/1150 of span where joists support operable partitions unless noted otherwise by partition supplier.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Structural steel: to CSA-G40.21.
- .2 Welding materials: to CSA-W48 and CSA-W59.
- .3 Shop paint primer: to CISC/CPMA 1-73a and 2-75
- .4 Hot dip galvanizing: Galvanize all structural steel exposed to weather and other steel as indicated on drawings to CSA-G164. Minimum zinc coating shall be 450 grams per square meter.

2.2 FABRICATION

- .1 Fabricate steel joists and accessories as indicated in accordance with CSA-S16 and CSA-S136 and in accordance with reviewed shop drawings.
- .2 Weld in accordance with CSA-W59.
- .3 Provide top and bottom chord extensions where indicated and/or required.
- .4 Provide diagonal and/or horizontal bridging and anchorages as per CSA-S16 and CSA-S136.
- .5 Mark joists to indicate erection orientation and with identification corresponding to shop drawings.
- .6 Incorporate shoes of proper depths to suit elevations of bearings in each location.
- .7 Fabricate joists of uniform appearance in areas exposed to view.
- .8 Fabricate joists such that the intersection of the axes of the chord and end diagonals is located within the middle third of the supporting beam flange width.

2.3 SHOP PAINTING

- .1 For joists not to receive finish painting on site:
 - .1 Clean all members of loose mill scale, rust, oil, dirt and other foreign matter, prepare and paint to CISC/CPMA 1-73.
 - .2 Apply one coat of paint in shop to all steel surfaces except:
 - Surfaces to be encased in concrete.
 - Surfaces and edges to be field welded.

- .2 For joists to receive finish painting on site:
 - .1 Clean all members of loose mill scale, rust, oil, dirt and other foreign matter, prepare and prime to CISC/CPMA 2-75.
 - .2 Apply one coat of primer in shop to all steel surfaces.
- .3 Hot dip galvanizing: Galvanize all structural steel exposed to weather and other steel as indicated on drawings to CSA-G164. Minimum zinc coating shall be 450 grams per square meter.

PART 3 – EXECUTION

3.1 GENERAL

- .1 Structural steel work: in accordance with CSA-S16 and CAN/CSA-S136.
- .2 Welding: in accordance with CSA-W59.
- .3 Companies to be certified under Division 1 or 2.1 of CSA-W47.1 for fusion welding and/or CSAW55.3 for resistance welding.
- .4 Provide certification that all welded joints are qualified by Canadian Welding Bureau.

3.2 ERECTION

- .1 Erect steel joists and bridging in accordance with CSA-S16 and in accordance with reviewed erection drawings.
- .2 Complete installation of all bridging and anchorages before placing construction loads on joists.
- .3 Field cutting or altering joists or bridging that is not shown on shop drawings: to approval of Engineer.
- .4 Clean and touch up shop primer/paint to bolts, welds, burned or scratched surfaces at completion of erection.
- .5 Weld or bolt all joists to supporting structure.
- .6 Attachment of mechanical, electrical and other services to joists shall be by using approved clamp connectors. No drilling or cutting of the joist material is permitted.
- .7 Include the necessary equipment as required for erection and to comply with safety regulations.

3.3 FIELD QUALITY CONTROL

- .1 Inspection and testing of materials and workmanship will be carried out by testing laboratory designated by Design Builder.
- .2 Testing laboratory may inspect representative joists for integrity, accuracy of fabrication and soundness of welds. Consultant will determine extent of and identify all inspections.
- .3 Design Builder will pay costs of testing.

END OF SECTION

PART 1 - GENERAL

1.1 RELATED WORK

- .1 Structural Steel: Section 05 12 23
- .2 Steel Joists: Section 05 21 00

1.2 REFERENCES

- .1 CSA-S136, Design of Cold Formed Steel Structural Members.
- .2 CSA-W47.1, Certification of Companies for Fusion Welding of Steel.
- .3 CSA-W55.3, Resistance Welding Qualification Code for Fabricators of Structural Members Used in Buildings.
- .4 CSA-W59, Welded Steel Construction (Metal Arc Welding).
- .5 CAN/CGSB-1.181, Ready-Mixed Organic Zinc-Rich Coating.
- .6 ASTM A 653, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .7 CSSBI 10M, Standard for Steel Roof Deck.
- .8 CSSBI 12M, Standard for Composite Steel Deck.
- .9 CAN/CGSB-1.181, Ready Mixed Organic Zinc-Rich Coating

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Division 01.
- .2 Submit drawings stamped and signed by qualified professional engineer registered or licensed in province of construction.
- .3 Indicate details of temporary shoring of steel deck, such as location, time and duration of placement and removal of shoring for concrete fill decks.
- .4 Indicate deck plan, profile, dimensions, base steel thickness, metallic coating designation, connections to supports and spacings, projections, openings, reinforcement details and accessories.

1.4 DESIGN REQUIREMENTS

- .1 Design steel deck using limit states design in accordance with CSA S136 and, CSSBI 10M and CSSBI 12M.
 - .2 Steel deck and connections to steel framing to carry Dead, Live and other Loads including Lateral Loads, diaphragm action, composite deck action, and uplift as indicated.
 - .3 Deflection under specified Live Load not to exceed 1/240 of span, except that when plaster gypsum board ceilings are hung directly from deck, Live Load deflection not to exceed 1/360 of span.
-

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Zinc-iron Alloy (ZF) coated steel sheet: to ASTM-A653 structural quality with ZF75 coating, for interior surfaces not exposed to weather and where no finish painting is to occur. Where deck is to be painted on site, supply deck which has had the passivation treatment removed by either mechanical or chemical means. Refer to drawings for minimum base steel thickness.
- .2 Zinc (Z) coated steel sheet: to ASTM-A653 structural quality, passivated, for exterior surfaces exposed to weather or at other locations as noted on drawings. Where deck is to be painted on site, supply deck which has had the passivation treatment removed by either mechanical or chemical means. Refer to drawings for minimum base steel thickness. Minimum zinc coating shall be Z275.
- .3 Closures: in accordance with manufacturer's recommendations.
- .4 Cover plates, cell closures and flashings: In accordance with manufactures recommendations; Steel sheet with minimum base steel thickness to match deck material. Metallic coating same as deck material.
- .5 Primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .6 Acoustic insulation: fibrous glass 16 kilograms per cubic meter density profiled to suit deck flutes.
- .7 Primer: zinc rich, ready mix to CAN/CGSB-1.181.
- .8 Types of Decking
 - .1 Steel roof deck: Refer to drawings for minimum base steel thickness and depth of profile. Deck shall be non-cellular with interlocking side laps.
 - .2 Acoustic steel roof deck: Refer to drawings for minimum base steel thickness and depth of profile. Deck shall be perforated on vertical face of flutes and be non-cellular with interlocking side laps.
 - .3 Composite steel floor deck: Refer to drawings for minimum base steel thickness and depth of profile. Deck shall be non-cellular with interlocking side laps.

2.2 FABRICATION

- .1 Include in work of this section cover plates, cell closures, fasteners, stiffeners and accessories as required. Fabricate sheet metal accessories of same material and finish as deck.
- .2 Fabricate to meet specified requirements of CSA-S136 and to support superimposed loading as shown on Structural Drawings.
- .3 Form deck units to provide male and female interlocking side lap joints.
- .4 Fabricate units to provide for joints between abutting panel ends with 50 mm overlap, sized to provide smooth joint. End laps to occur over supports only.
- .5 Span deck units over at least three or more supports wherever possible. Increase thickness of metal to compensate for continuity wherever fewer than three supports may occur.
- .6 Incorporate reinforcing stiffeners for unsupported edges of metal deck.

PART 3 – EXECUTION

3.1 GENERAL

- .1 Structural steel work: in accordance with CSA-S136 and CSSBI 10M and CSSBI 12M.
- .2 Welding: in accordance with CSA-W59, except where specified otherwise.
- .3 Companies to be certified under Division 1 or 2.1 of CSA-W47.1 for fusion welding of steel and/or CSA-W55.3 for resistance welding.

3.2 ERECTION

- .1 Erect steel deck as indicated and in accordance with CSA-S136, CSSBI 10M and CSSBI 12M and in accordance with reviewed erection drawings.
- .2 Butt ends: to 3 mm gap. Install steel cover plates over gaps wider than 3 mm.
- .3 Lap ends: to 50 mm minimum.
- .4 Immediately after deck is permanently secured in place, touch up metallic coated top surface with compatible primer where burned by welding.
- .5 Prior to concrete placement, steel deck to be free of soil, debris, standing water, loose mill scale and other foreign matter.
- .6 Temporary shoring, if required, to be designed to support construction loads, wet concrete and other construction equipment. Do not remove temporary shoring until concrete attains 75% of its specified 28 day compression strength.
- .7 Place and support reinforcing steel as indicated.
- .8 Install interior cell closures in flutes intersecting vertical surfaces exposed to view, at tops of interior walls and partitions extended to deck.
- .9 Fasten deck to structural steel as indicated on structural drawings. Fasten sheets of deck to adjacent sheets of deck as indicated on structural drawings and as per deck manufacturer's specifications.

3.3 OPENINGS AND AREAS OF CONCENTRATED LOADS

- .1 No reinforcement is required for openings cut in deck which are smaller than 150 mm square.
- .2 For deck openings with any one dimension greater than 150 mm and for areas of concentrated load, reinforce in accordance with structural framing details indicated on structural drawings.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Wind/suction bearing formed steel stud for exterior wall assembly framing and interior framing supporting stone masonry interior finish.

1.2 REFERENCES

- .1 ASTM A307-10 - Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
- .2 ASTM A653/A653M-13 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .3 ASTM A792/A792M-10 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
- .4 ASTM C954-10 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
- .5 ASTM C955-11 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.
- .6 CAN/CGSB 1.181-99 - Ready-Mixed Organic Zinc-Rich Coating.
- .7 CAN/CGSB-7.1-98 - Lightweight Steel Wall Framing Components.
- .8 CSA-S16-09 - Design of steel structures.
- .9 CSA-S136-12 - North American Specification for the Design of Cold-Formed Steel Structural Members.
- .10 CAN/ULC-S101-07 - Standard Methods of Fire Endurance Tests of Building Construction and Materials.
- .11 CAN/CSA-A370-04 (R2009) - Connectors for Masonry.
- .12 CAN/CSA-A371-04 (R2014) - Masonry Construction for Buildings.
- .13 CSA-S304.1-04 (R2010) - Design of Masonry Structures.
- .14 CSA-W47.1-09 - Certification of Companies for Fusion Welding of Steel.
- .15 CSA-W55.3-08 (R2013) - Certification of Companies for Resistance Welding of Steel and Aluminum.
- .16 CSA-W59-13 - Welded Steel Construction (Metal Arc Welding).
- .17 CSSBI 51-06 - Lightweight Steel Framing Design Manual - 2nd Edition.
- .18 SSPC (The Society for Protective Coatings) - Steel Structures Painting Manual.

1.3 PERFORMANCE REQUIREMENTS

- .1 Maximum Allowable Deflection: 1:180 of span.
- .2 Wall Assembly:

- .1 Design to provide for movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
- .2 Design assembly to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
- .3 Seismic Loads: Design and size components to withstand seismic loads and sway displacement as calculated in accordance with code applicable at place of the Work.
- .4 Design stud system supporting masonry veneer to requirements of with veneer deflections limited to $L/600$.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate with other work having a direct bearing on work of this section.

1.5 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations and capacity.
- .3 Shop Drawings:
 - .1 Indicate component details, anchorage and type and location of fasteners and accessories or items required of related work.
 - .2 Indicate stud layout.
 - .3 Describe method for securing studs to tracks and for bolted framing connections.
 - .4 Provide calculations for loadings and stresses of specially fabricated framing stamped by Professional Structural Engineer in Prince Edward Island.

1.6 QUALITY ASSURANCE

- .1 Calculate structural properties of framing members to CSA-W59 and CSA-W47.1 requirements.
- .2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five (5) years documented experience.
- .3 Installer Qualifications: Installer specializing in performing the work of this section with minimum five (5) years documented experience and approved by the manufacturer. Contractor to submit names and work experience of approved installers to preform the work of this section.
- .4 Design structural elements under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at Project location.
- .5 Form, fabricate, install, and connect components to 51 - Lightweight Steel Framing Design Manual.

1.7 MOCK-UP

- .1 Section 01 43 00: Requirements for mock-up.
- .2 Materials of this section are to be included in an **Envelope Mock-up**.

- .3 Provide mock-up of exterior framed wall including interior and exterior finish specified in other sections. Coordinate with installation of associated envelope work.
- .4 Approved mock-up may not remain as part of the Work.

Part 2 Products

2.1 MANUFACTURERS

- .1 Bailey Metal Products Ltd
- .2 Other acceptable manufacturers offering functionally equivalent products.
 - .1 Mantane Construction Products Ltd.
 - .2 Industries Light Steel Inc.
 - .3 Acadia Drywall Supplies Ltd.
- .3 Substitutions: Refer to Section 01 62 00.

2.2 FRAMING MATERIALS

- .1 Framing Materials: Cold-rolled steel conforming to CSA-S136, Grade hot dipped galvanized, with metallic coating to ASTM A792/A792M, minimum coating thickness G90.

2.3 ACCESSORIES

- .1 Bracing, Furring, Bridging: Formed sheet steel, thickness determined by performance requirements specified.
- .2 Plates, Gussets, Clips: Formed sheet steel, thickness determined by performance requirements specified.
- .3 Welding Materials: CSA-W59.
- .4 Touch-Up Primer for Galvanized Surfaces: CAN/CGSB-1.181, zinc rich.

2.4 FASTENERS

- .1 Bolts, Nuts and Washers: ASTM A307, hot-dip galvanized to minimum requirements of CSSBI.
- .2 Self-drilling, Self-tapping Screws: Steel, hot dip galvanized to minimum requirements of CSSBI.
- .3 Anchorage Devices: Screws with sleeves and Powder actuated concrete fasteners are not permitted; hot-dip galvanized to minimum requirements of CSSBI.

2.5 FABRICATION

- .1 Fabricate assemblies of formed sections of sizes and profiles required.
- .2 Provide cut-outs centred in webs of members to accommodate services and through-the knockout style bridging.
- .3 Fit, reinforce, and brace framing members to suit design requirements.
- .4 Fit and assemble in largest practical sections for delivery to site, ready for installation.
- .5 Do welding to CSA-S136, and AWS D1.3, as applicable.

Part 3 Execution

3.1 EXAMINATION

- .1 Section 01 70 00: Verify existing conditions before starting work.
- .2 Verify that substrate surfaces are ready to receive work.
- .3 Verify that rough-in utilities are in proper location.

3.2 ERECTION OF STUD WORK

- .1 Install components to manufacturer's written instructions.
- .2 Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 24 inches on centre for bottom track and 14" on centre for top track. Coordinate installation of continuous bead of acoustic sealant with floor and ceiling tracks to maintain air/vapour barrier.
- .3 Place studs at 12 inches on centre; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using fastener method.
- .4 Construct corners using minimum three studs. Double stud wall openings, door jambs, and window jambs.
- .5 Erect load bearing studs one piece full length. Splicing of studs is not permitted.
- .6 Erect load bearing studs, brace, and reinforce to develop full strength, to achieve design requirements.
- .7 Coordinate placement of insulation in multiple stud spaces after erection.
- .8 Install intermediate studs above and below openings to align with wall stud spacing.
- .9 Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing. Use double track arrangement to allow 1/2" vertical deflection. Position stud screws to permit regular unobstructed movement.
- .10 Attach cross studs to studs for attachment of fixtures anchored to walls.
- .11 Install framing between studs for attachment of mechanical and electrical items, and to prevent stud rotation.
- .12 Touch-up field welds and damaged primed surfaces with primer.
- .13 Complete framing ready to receive sheathing.

3.3 ERECTION TOLERANCES

- .1 Maximum Variation from True Position: 1/4 in per 10 ft.
- .2 Maximum Variation of any Member from Plane: 1/8 in.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 ASTM A53/A53M Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- .2 ASTM A153/A153M Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
- .3 ASTM A 269M, Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
- .4 ASTM A307-10 Standard Specification for Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength.
- .5 ASTM D7083 Standard Practice for Preparation of Zinc (Hot-Dip Galvanized) Coated Iron and Steel Product and Hardware Surfaces for Powder Coating
- .6 CAN/CGSB 1.40 Anticorrosive Structural Steel Alkyd Primer.
- .7 CSA-G40.20-04/G40.21- General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steel.
- .8 CSA-W59 - Welded Steel Construction (Metal Arc Welding).
- .9 SSPC (The Society for Protective Coatings) - Steel Structures Painting Manual.

1.2 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Prince Edward Island, Canada.
 - .2 Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
 - .3 Indicate welded connections using standard welding symbols. Indicate net weld lengths.

1.3 QUALITY ASSURANCE

- .1 Welded Steel Construction: CSA-W59.

Part 2 Products

2.1 MATERIALS - STEEL

- .1 Steel Sections and Plates: CAN/CSA-G40.20/G40.21, Grade 350W.
- .2 Steel pipe: to ASTM A53/A53M.
- .3 Stainless steel tubing: to ASTM A 269, Type304 commercial grade seamless welded with AISI No. 4 finish.

- .4 Bolts, Nuts, and Washers: ASTM A307.
- .5 Welding Materials: Type required for materials being welded.
- .6 Welding Filler Material: CSA-W48.

2.2 FABRICATION

- .1 Fit and shop assemble items in largest practical sections, for delivery to site.
- .2 Fabricate items with joints tightly fitted and secured.
- .3 Continuously seal joined members by continuous welds.
- .4 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.
- .5 Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- .6 Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

2.3 FABRICATION TOLERANCES

- .1 Squareness: 3mm maximum difference in diagonal measurements.
- .2 Maximum Offset Between Faces: 1.5 mm.
- .3 Maximum Misalignment of Adjacent Members: 1.5 mm.
- .4 Maximum Bow: 3 mm.
- .5 Maximum Deviation from Plane: 3 mm.

2.4 FINISHES - STEEL

- .1 Prepare surfaces to be primed in accordance with SPCC SP 2.
- .2 Do not prime surfaces in direct contact with concrete or where field welding is required. Shop Prime paint items with one (1) coat, unless noted to be galvanized.
- .3 All architectural exterior carbon steel (outside of building thermal barrier) be galvanized after fabrication to ASTM A123/A123M. Zinc coating thickness minimum 1.25 oz/sq ft.
- .4 All architectural interior carbon steel (inside building thermal barrier) to received prime plus two coats of finish paint, per Section 09 91 10.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify that field conditions are acceptable and are ready to receive work.
- .2 Verify dimensions, tolerances, and method of attachment with other work.

3.2 PREPARATION

- .1 Clean and strip primed steel items to bare metal where site welding is required.

- .2 Supply steel items required to be embedded in masonry and cast into concrete with setting templates to appropriate sections.

3.3 INSTALLATION

- .1 Install items plumb and level, accurately fitted, free from distortion or defects.
- .2 Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- .3 Field weld components indicated on Drawings.
- .4 Perform field welding to CSA requirements. Welding to structural steel to be performed by Licensed Welders certified to CSA W47.1.
- .5 Obtain approval prior to site cutting or making adjustments not scheduled.
- .6 After erection, prime welds, abrasions, and surfaces not galvanized, except surfaces to be in contact with concrete.

3.4 ERECTION TOLERANCES

- .1 Maximum Variation from Plumb: 6 mm per story, non-cumulative.
- .2 Maximum Offset from True Alignment: 6 mm.
- .3 Maximum Out-of-Position: 6 mm.

3.5 SCHEDULE

- .1 Guardrails, pickets, and handrail supports:
 - .1 Carbon Steel to ASTM A29/A29M-20
 - .2 Design suitable structural steel support for safe usage.
- .2 Handrails:
 - .1 ASTM A 269, 304 stainless- steel.
 - .2 Design suitable structural steel support for safe usage.
- .3 Interior Roof Ladder:
 - .1 Carbon Steel to ASTM A29/A29M-20
 - .2 Design suitable structural steel support for safe usage.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Glass and metal guardrail system.

1.2 REFERENCES

- .1 ASTM A123/A123M-15 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .2 ASTM A500/A500M-13 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- .3 CSA-W59-13 - Welded Steel Construction (Metal Arc Welding).
- .4 SSPC (The Society for Protective Coatings) - Steel Structures Painting Manual.
- .5 ESR-3269 ICC-ES Evaluation Report, International Code Council Standards for Glass Balustrade Guard Rail Applications.
- .6 NAAMM Metal Finishes Manual; national Association of Architectural Metal Manufacturers.

1.3 PERFORMANCE REQUIREMENTS

- .1 Railing assembly, wall rails, and attachments to resist lateral force at any point without damage or permanent set.
- .2 Fabricate railing assembly, wall rails, and attachments to applicable code requirements.

1.4 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

1.5 CLOSEOUT SUBMITTALS

- .1 Section 01 78 10: Submission procedures.
- .2 Sustainable Design Closeout Documentation: supporting Targeted LEED credits.

1.6 QUALITY ASSURANCE

- .1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five (5) years documented experience.
- .2 Components and installation are to be in accordance with provincial and local building codes.
- .3 All components and fittings are furnished by the same manufacturer.
- .4 Perform welding to CSA-W59.

Part 2 Products

2.1 COMPONENTS

- .1 Guard Rail:
 - .1 Description: Glass guardrail mounted to 2x2 HSS painted vertical posts. Refer to drawings.
 - .1 Glass Attachment Clip: CRL Brushed Stainless Z-Series Square Type Radius Base Stainless-Steel Clamp for 13mm Glass: Product No. Z712BS. Four (4) clips per glass panel.
 - .1 Or alternate matching material, function, and aesthetic. Submit during time of tender for review and acceptance.
 - .2 Handrail: Painted steel 41mm OD continuous welded pipe rail mounted to 50x50 mm HSS vertical posts at 1500mm o/c maximum. Weld steel handrail support rod to face steel posts. Refer to drawings.
 - .3 Drink Rail: Where noted on drawings. Continuous 75x75x6 mm steel angle welded to top of 50x50 steel posts. Angle spans post to post and supporting a 2x6 wood drink rail. Blind-fasten wood drink rail to steel support angle with galvanized lag bolts 610mm o/c. Splice wood rail with Scarf joint at post centres with lag bolts immediately adjacent and to either side of splice joint.
 - .4 Glass: Refer to drawings for glass type by 08 80 50.
 - .5 Cap Railing:
 - .1 Profile: U-channel
 - .2 Dimensions: Width: 25mm; Height: 33.3mm
 - .3 Material: 304 Stainless Steel.
 - .4 Finish: Brushed.
 - .5 Accessories:
 - .1 Grey silicone;
 - .2 End caps;
 - .3 90-degree bends;
 - .4 135-degree bends.
 - .2 Glazing: Supplied and installed by Section 08 80 50.
 - .1 Temper glazing.

2.2 STEEL RAILING SYSTEM

- .1 Handrail: Steel Tubing: ASTM A501/A501M.
 - .1 41mm O/D painted steel tubing.
- .2 Drink Rail: 75x75x6 mm painted steel angle; welded joints.
- .3 Posts: 50x50 mm square painted steel tubing; welded joints.
- .4 Mounting: welded or bolted to steel beam support, no exposed fasteners.
- .5 Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.
- .6 Shop and Touch-Up Primer for Steel Components: SPCC-Paint 25, zinc oxide alkyd primer.

2.3 FABRICATION

- .1 Fit and shop assemble components in largest practical sizes for delivery to site.
- .2 Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- .3 Machine joint edges smooth and plane to produce hairline seams when site assembled; supply concealed sleeve connectors for joints.
- .4 Isolate dissimilar metals to prevent electrolytic action by applying primer to concealed surfaces of metal components
- .5 Provide anchors, plates and angles required for connecting railings to structure.
- .6 Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.
- .7 Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.
- .8 Interior Components: Continuously seal joined pieces by continuous welds.
- .9 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.
- .10 Accurately form components to suit stairs and landings to each other and to building structure.
- .11 Accommodate for expansion and contraction of members and building movement without damage to connections or members.
- .12 Coordinate installation of wood handrail with Section 06 10 53.

Part 3 Execution

3.1 EXAMINATION

- .1 Section 01 71 00: Verify existing conditions before starting work.
- .2 Verify that field conditions are acceptable and are ready to receive work.

3.2 PREPARATION

- .1 Clean and strip primed steel items to bare metal where site welding is required.

3.3 INSTALLATION

- .1 Install components plumb and level, accurately fitted, free from distortion or defects.
- .2 Anchor railings to structure with anchors, plates.
- .3 Field weld anchors as indicated on Shop Drawings. Touch-up welds with primer. Grind welds smooth.
- .4 Conceal bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

3.4 ERECTION TOLERANCES

- .1 Section 01 73 00: Tolerances.
- .2 Maximum Offset From True Alignment: 6 mm.
- .3 Maximum Out-of-Position: 6 mm.

3.5 CLEANING

- .1 Clean glazing surfaces after installation, complying with requirements contained in the manufacturer's instructions. Remove excess glazing sealant compounds, dirt or other substances.
- .2 Remove protective films from metal surfaces.
- .3 Clean railing surfaces with clean water and mild detergent. Do not use abrasive chemicals, detergents, or other implements that may mar or gouge the material.

3.6 PROTECTION

- .1 Institute protective measures required throughout the remainder of the construction period to ensure that all the materials do not incur any damage or deterioration.
- .2 Repair components damaged by subsequent construction activities in accordance with manufacturer's recommendations; replace damaged components that cannot be repaired to Architect's acceptance.

3.7 SCHEDULES

- .1 Perimeter glass railing at mezzanine level overlooking ice surface. Refer to plan for exact locations.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-11.3-M87, Hardboard.
 - .2 CAN/CGSB-71.26-M88, Adhesive for Field-Gluing Plywood to Lumber Framing for Floor Systems.
- .2 Canadian Wood Council
 - .1 Wood Design Manual 2010 (R2014) Edition
 - .2 Engineering Guide for Wood Frame Construction 2014
- .3 CSA Group (CSA)
 - .1 CSA B111-1974 (R2003), Wire Nails, Spikes and Staples.
 - .2 CSA O86-14 Engineered Design in Wood
 - .3 CSA O112.9-10, Evaluation of Adhesives for Structural Wood Products (Exterior Exposure).
 - .4 CSA O121-08(R2013), Douglas Fir Plywood.
 - .5 CSA O141-05(R2014), Softwood Lumber.
 - .6 CSA O151-09(R2014), Canadian Softwood Plywood.
 - .7 CSA O153-13, Poplar Plywood.
 - .8 CSA O325-07(R2012), Construction Sheathing.
- .4 National Lumber Grades Authority (NLGA)
 - .1 Standard Grading Rules for Canadian Lumber 2010.
- .5 National Research Council Canada (NRC)
 - .1 National Building Code of Canada 2015 (NBC).
- .6 Underwriters' Laboratories of Canada (ULC)
 - .1 CAN/ULC-S706-09, Standard for Wood Fibre Insulating Boards for Buildings.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for wood products and accessories and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Include manufacturer's pre-engineered floor, ceiling and roof joist span charts, and manufacturer's pre-engineered installation details.
 - .3 Submit certified test reports for prefabricated structural members from approved independent laboratory indicating compliance with specifications for specified performance characteristics and physical properties.

- .4 Submit CCMC Product Evaluation Report for engineered wood products.
- .5 Submit manufacturer's installation instructions.

1.3 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store materials off ground with moisture barrier at both ground level and as a cover forming a well-ventilated enclosure, with drainage to prevent standing water.
 - .3 Store wood I-beams and I-joists on edge.
 - .4 Stack, lift, brace, cut and notch engineered lumber products in strict accordance with manufacturer's instructions and recommendations.
 - .5 Store and protect architecturally exposed lumber from nicks, scratches, and blemishes.
 - .6 Replace defective or damaged materials with new.
 - .7 Store separated reusable wood waste convenient to cutting station and work areas.

Part 2 PRODUCTS

2.1 FURRING AND BLOCKING

- .1 Furring, blocking, nailing strips, grounds, rough bucks, , curbs, fascia backing and sleepers:
 - .1 S2S is acceptable.
 - .2 Board sizes: "Standard" or better grade.
 - .3 Dimension sizes: "Standard" light framing or better grade.
 - .4 Post and timbers sizes: "Standard" or better grade.

2.2 ACCESSORIES

- .1 General purpose adhesive: to CSA O112.9.
- .2 Nails, spikes and staples: to ASTM F 1667.
- .3 Bolts: 12.5 mm diameter unless indicated otherwise, complete with nuts and washers.
- .4 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.

- .5 Nailing discs: flat caps, minimum 25 mm diameter, minimum 0.4 mm thick, sheet metal, fibre, formed to prevent dishing. Bell or cup shapes not acceptable.
- .6 Roof sheathing H-Clips: formed "H" shape, thickness to suit panel material, extruded 6063-T6 aluminum alloy type approved by Consultant.
- .7 Fastener Finishes:
 - .1 Galvanizing: to ASTM A 123/A 123M use galvanized fasteners for exterior work.
 - .2 Proprietary corrosion resistant fasteners for treated lumber: as recommended by manufacturer for material and service conditions.
 - .3 Plated finish: use cadmium plated fasteners for interior work.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 SYSTEMS INTEGRATION

- .1 Install air barrier and vapour retarder sheeting around framing members to ensure continuity of protection and to lap and seal to main sheets.
- .2 Install insulation in exterior wall framing cavities that will not be accessible after completion of framing.
- .3 Install sill plate gasket in continuous lengths between concrete surfaces and wood framing.

3.3 FRAMING INSTALLATION

- .1 Install engineered framing and plant fabricated structural wood components, including all hangers, connectors and fasteners, in accordance with accepted shop drawings and manufacturers' instructions.
- .2 Install members true to line, levels and elevations, square and plumb.
- .3 Construct continuous members from pieces of longest practical length.
- .4 Install spanning members with "crown-edge" up.

- .5 Select exposed framing for appearance. Install lumber and panel materials so that grade-marks and other defacing marks are concealed or are removed by sanding where materials are left exposed.
- .6 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .7 Countersink bolts where necessary to provide clearance for other work.
- .8 Install specified panel product for each application.

3.4 FURRING AND BLOCKING

- .1 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, facings, fascia, soffit, siding , electrical equipment mounting boards, and other work as required.
- .2 Install furring to support siding applied.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Finish carpentry items.
- .2 Wood paneling and siding
- .3 Hardware and attachment accessories.

1.2 REFERENCES

- .1 AHA A135.4-2004 - Basic Hardboard.
- .2 ASTM E84-10b - Standard Test Method for Surface Burning Characteristics of Building Materials.
- .3 CSA-O121-08 - Douglas Fir Plywood.
- .4 CSA-O151-09 - Canadian Softwood Plywood.
- .5 CSA-O153-M1980 (R2008) - Poplar Plywood.
- .6 NPA A208.1-2009 - Particleboard.
- .7 NPA A208.2-2009 - Medium Density Fibreboard (MDF) for Interior Applications.
- .8 AWMAC - Architectural Woodwork Standards (AWS) – 1st Edition, 2009.
- .9 CHPVA (Canadian Hardwood Plywood and Veneer Association) - Official Grading Rules for Canadian Hardwood Plywood-2010.
- .10 NEMA LD3-2005 - High Pressure Decorative Laminates (HPDL).
- .11 NLGA (National Lumber Grades Authority) - Standard Grading Rules for Canadian Lumber, 2010 edition.
- .12 NHLA (National Hardwood Lumber Association).

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate with other work having a direct bearing on work of this section.
 - .2 Coordinate the work with electrical and plumbing rough-in, installation of associated and adjacent components.

1.4 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Product Data: Provide data on fire retardant treatment materials and application instructions.
- .3 Shop Drawings:
 - .1 Indicate materials, component profiles, fastening methods, jointing details, and accessories to a minimum scale of 1:5.
 - .2 Provide instructions for finish hardware.

1.5 QUALITY ASSURANCE

- .1 Perform work to AWMAC Custom quality.
- .2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five (5) years documented experience.

1.6 REGULATORY REQUIREMENTS

- .1 Conform to applicable code for fire retardant requirements.

1.7 DELIVERY, STORAGE, AND PROTECTION

- .1 Section 01 61 00: Transport, handle, store, and protect products.
- .2 Protect work from moisture damage.
- .3 Store and install materials indoors, in well ventilated areas with a constant but minimum temperature of 16 degrees C. and maximum moisture content of 12% when measured with a moisture metre.

Part 2 Products

2.1 LUMBER MATERIALS

- .1 Softwood Lumber: CSA-O141; Graded to AWMAC Custom installation; as noted species, circular sawn, maximum moisture content of 12%; flat grain.
- .2 Hardwood Lumber: NHLA, grade FAS; Graded to AWMAC Custom installation; Baltic Maple species, circular sawn, maximum moisture content of 5%; with flat grain.

2.2 SHEET MATERIALS

- .1 Softwood Plywood: CSA-0121; Graded to AWMAC Custom installation; Veneer core; SPF face species, Rotary cut, D2 grade or better
- .2 Hardwood Plywood: CHPVA Grade 1; Grade to AWMAC Custom installation; Veneer core, type of glue recommended for application; Maple face species, rotary cut, book matched end-to-end and side-to-side. Complete with 3mm (1/8 inch) solid maple edge banking.
- .3 Industrial Particleboard: NPA A208.1; composed of wood particles reduced to fibres; medium density; made with water resistant resin; of grade to suit application; sanded faces.
- .4 Medium Density Fibreboard (MDF): NPA A208.2; composed of wood fibres, medium density; sanded faces; of grade suitable for catalyzed vinyl finish.

2.3 EXTERIOR WOOD CLADDNG

- .1 All exterior wood wall cladding.
 - .1 See Section 07 46 23 – Wood Siding.

2.4 INTERIOR WOOD

- .1 All interior wood wall finish.
 - .1 Whitewashed Barn Board: 25x200x2440 (actual size), Square Edge, prefinished

- .2 Hockey Dressing Rooms
 - .1 38x140 Select SPF 2x6 wood plank benches; see details.
- .3 Pool Change Rooms
 - .1 38x 140 solid maple wood plank benches; see details.

2.5 ADHESIVE

- .1 Adhesive: Type recommended to suit application.

2.6 FASTENERS

- .1 Nails, Spikes and Staples - to CSA B111, hot dip galvanized for damp interior locations, plain finish elsewhere. Screws shall be parallel core type. Fasteners: Of size and type to suit application. Secure interior wood finish boards with finish nails or trim screws to steel studs.

2.7 ACCESSORIES

- .1 Wood Filler: Oil base, tinted to match surface finish colour.
- .2 Reveals and edges: J and X mouldings, Fry reglet or approved equals, as per details.
 - .1 Cut sheets to be supplied at time of shop drawings.

2.8 FINISHING

- .1 Any wood panelling or solid wood finish carpentry elements to be shop finished.

2.9 FABRICATION

- .1 Fabricate to AWMAC Custom standards.
- .2 Shop assemble work for delivery to site, permitting passage through building openings.
- .3 Shop prepare and identify components for book match grain matching during site erection.
- .4 When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

Part 3 Execution

3.1 EXAMINATION

- .1 Section 01 71 00: Verify existing conditions before starting work.
- .2 Verify that field measurements are as indicated.
- .3 Verify adequacy of backing and support framing.
- .4 Verify mechanical, electrical, and building items affecting work of this section are placed and ready to receive this work.

3.2 INSTALLATION

- .1 Scribe and cut carpentry as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects. Form joints to conceal shrinkage.
- .2 Fastening:
 - .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
 - .2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
 - .3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round cleanly cut hole and plug with wood plug to match material being secured.
- .3 Replace items of finish carpentry with damage to wood surfaces resulting from hammer depressions and other bruising.
- .4 Form joints to conceal shrinkage.
- .5 Torrefied wood shall be installed using hardware and procedures as specified by the manufacturer; with no exposed fasteners.

3.3 TYPICAL CONSTRUCTION

- .1 Fastening.
 - .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
 - .2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
 - .3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round cleanly cut hole and plug with wood plug to match material being secured.
 - .4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.
- .2 Standing and running trim.
 - .1 Butt and cope internal joints of baseboards to make snug, tight, joint. Cut right angle joints of casing and base with mitred joints.
 - .2 Fit backs of baseboards and casing snugly to wall surfaces to eliminate cracks at junction of base and casing with walls.
 - .3 Make joints in baseboard, where necessary using a 45° scarf type joint.
 - .4 Install door and window trim in single lengths without splicing.
- .3 Interior and exterior frames.
 - .1 Set frames with plumb sides and level heads and sills and secure.
- .4 Panelling.
 - .1 Secure panelling and perimeter trim using adhesive recommended for purpose by manufacturer. Fill nail holes caused by temporary fixing with filler matching wood in colour.
 - .2 Secure panelling and perimeter trim using concealed fasteners.

- .3 Secure panelling and perimeter trim using counter sunk screws plugged with matching wood plugs.

3.4 ERECTION TOLERANCES

- .1 Section 01 73 00: Execution Tolerances.
- .2 Maximum Variation from True Position: 3mm
- .3 Maximum Offset from True Alignment with Abutting Materials: 1.5mm

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Plastic Laminate Casework.
 - .2 Solid Surface countertops.
 - .3 Hardware typically furnished by casework manufacturer.
 - .4 Shelving.
 - .5 Structural supports incorporated into wood casework.

1.2 REFERENCES

- .1 Work in conformance with the Architectural Woodwork Manufacturer's Association of Canada quality standards manual (current edition at date of tender).
 - .1 If there is conflict between plans and/or specifications and AWMAC's STANDARDS (NAAWS), plans and specifications shall govern.

1.3 SUBMITTALS

- .1 Product Data: Manufacturer's specifications, data, and installation instructions for each manufactured product specified.
- .2 Shop Drawings:
 - .1 Submit shop drawings conforming to AWMAC's STANDARDS (NAAWS).
 - .2 Submit two copies, one of which will be returned with reviewed notations. Make corrections noted (if any), and distribute required copies prior to start of work
 - .3 On casework and countertop elevations show location of backing required for attachment within walls.
- .3 Samples:
 - .2 Submit three sample sets of finished samples of each species and cut of wood to be used. Veneer samples minimum 304 mm x 304 mm. Each sample set of three to represent range of color and grain expected.
- .4 Mockups:
 - .1 Provide mockups of one base cabinet, one wall hung cabinet, and one countertop. Base cabinet to have minimum one drawer. Mockup of material and finish to be provided. Approved mockup may be incorporated in the project.

1.4 QUALITY ASSURANCE

- .1 Work in accordance with Grade or Grades specified in AWMAC's STANDARDS (NAAWS).
- .2 Guarantee and Inspection Service:
 - .1 Architectural woodwork shall be manufactured and/or installed to the current AWMAC's STANDARDS (NAAWS) and shall be subject to an inspection at the factory and/or site by an appointed AWMAC Certified Inspector. Inspection costs shall be included in the tender price for this project. (Contact your local

AWMAC Chapter for details of inspection costs). Shop drawings submitted to the AWMAC Chapter office for review before work commences. Work that does not meet the AWMAC's STANDARDS (NAAWS), as specified, shall be replaced, reworked and/or refinished by the architectural woodwork contractor, to the approval of AWMAC, at no additional cost to the Owner.

- .2 If the woodwork contractor is an AWMAC manufacturer member in good standing, a two (2) year AWMAC Guarantee Certificate will be issued. The AWMAC Guarantee shall cover replacing, reworking and/or refinishing deficient architectural woodwork due to faulty workmanship or defective materials supplied and/or installed by the woodwork contractor, which may appear during two (2) year period following the date of issuance.
- .3 If the woodwork contractor is not an AWMAC Manufacturer member they shall provide the owner with a two (2) year maintenance bond, in lieu of the AWMAC Guarantee Certificate, to the full value of architectural woodwork contract.

.2 Woodwork Manufacturer Qualifications:

- .4 Member in Good Standing of AWMAC.
- .5 Minimum 5 years of production experience similar to this project, whose qualifications indicate ability to comply with requirements of this Section.
- .1 Minimum one project in past 5 years where value of woodwork within 20 percent of cost of woodwork for this Project.

1.5 PRE-INSTALLATION MEETING

- .1 Before framing completed hold a meeting with the contractor, casework manufacturer, casework installer, and framing sub-contractor.
 - .1 Review locations of backing required for casework installation as shown on casework shop drawings.
 - .2 Review method of attachment for backing to wall system as shown on architectural drawings.

1.6 DELIVERY STORAGE AND HANDLING

- .3 Deliver materials only when project ready for installation and clean storage area provided.
 - .1 Delivery of architectural millwork made only when area of operation enclosed, plaster and concrete work dry and area broom clean.
 - .2 Maintain indoor temperature and humidity within range recommended by AWMAC's STANDARDS (NAAWS) for location of project.

1.7 SCHEDULING

- .1 Coordinate fabrication, delivery, and installation with contractor and other applicable trades.

Part 2 Products

2.1 COMPONENTS

- .1 Lumber: In accordance with AWMAC's STANDARDS (NAAWS) Grade specified for product being fabricated.

- .2 Veneers: As required by AWMAC's STANDARDS (NAAWS) for its use and Grade specified.
- .3 Core:
 - .1 Particleboard meeting requirements of AWMAC's STANDARDS (NAAWS).
- .4 Plastic Laminate:
 - .1 NEMA LD-3 Grade required by AWMAC's STANDARDS (NAAWS) for its use.
- .5 Edgeband
 - .1 For Plastic Laminate Casework: PVC.
- .6 Adhesives Type I.
- .7 Hardware:
 - .1 Unless otherwise specified: Meeting requirements of AWMAC's STANDARDS (NAAWS) for grade specified
 - .2 Finish:
 - .1 Exposed hardware: stainless steel
 - .2 Semi exposed hardware: Manufacturer's standard finish.
 - .3 Pulls: 80mm Edge Pull.
 - .1 Richeleua 989880170 or similar
 - .4 Drawer Guides: 3/4 extension and full extension meeting requirements of AWMAC's STANDARDS (NAAWS) for type and size of drawer.
 - .1 Refer to drawings for location of full extension.
 - .5 Hinges: concealed European style hinges minimum 110 degree opening.
 - .1 110° CLIP top Blumotion Hinge or similar.
 - .2 Finish: brushed nickel
 - .6 Shelf Supports: recessed metal shelf standard and compatible supports.
 - .7 Locks
 - .1 Provide locks where shown on casework elevations.
 - .2 Each room keyed alike.
 - .1 Provide 2 keys per lock.
 - .2 Provide 2 master keys.

2.2 FABRICATION

- .1 General:
 - .1 Materials and methods of construction to meet requirements of AWMAC's STANDARDS (NAAWS) for grade or grades specified.
 - .1 If there is conflict between plans and/or specifications and AWMAC's STANDARDS (NAAWS), plans and specifications shall govern.
- .2 Plastic Laminate Casework:
 - .1 Grade: AWMAC's STANDARDS (NAAWS) Custom Grade as shown on plans.
 - .2 Construction Type: AWMAC's STANDARDS (NAAWS) construction type, Frameless.

- .3 Cabinet and door interface: flush overlay.
- .4 Exposed Surfaces High Pressure Decorative Laminate (HPDL), color, finish and pattern direction meeting requirements of AWMAC's STANDARDS (NAAWS) for Grade specified.
- .5 Exposed interior surfaces: HPDL matching exposed surfaces.
- .6 Semi-exposed surfaces: vertical grade laminate matching exposed surfaces.
- .7 Edgeband: PVC
 - .1 Edgeband at doors, drawer fronts, and false fronts: 1mm thick.
- .3 Drawers:
 - .1 Sides: Particle board with HPDL surfaces .
 - .2 Bottoms: Hardwood plywood of same species as drawer sides.
 - .3 Joinery: Meeting requirements of AWMAC's STANDARDS (NAAWS) for Grade specified.
Or
 - .1 Sides, front and back: Miter fold
 - .2 Drawer bottoms held in place with drawer hardware to sides and mechanically fastened to back and sub front
- .4 Solid Surface Countertops:
 - .1 Solid surface: 13mm thick.
 - .2 Back splashes: butt joint per details.
 - .3 Front edges: self-edge .
 - .4 Manufacturer
 - .1 Dupont; Product Solid Surfacing.
 - .2 Other acceptable manufacturers offering functionally and aesthetically equivalent products.
 - .1 WilsonArt; Product: Solid Surfacing.
 - .2 Formica; Product: Solid Surfacing
 - .3 Colour and Pattern selected by Consultant from standard range.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify mechanical, electrical, plumbing, HVAC and other building components, affecting work in this Section are in place and ready.

3.2 INSTALLATION

- .1 Install work in conformance with AWMAC's STANDARDS (NAAWS).
- .2 Conform to AWMAC's STANDARDS (NAAWS) Grade(s).
- .3 Secure all work in place, square, plumb, and level.
- .4 Fit and scribe work abutting other building components.
- .5 Countersink mechanical fasteners used at exposed and semi-exposed surfaces, excluding installation attachment screws and those securing cabinets end to end.

- .6 Cut equipment cutouts shown on plans using templates provided.

3.3 ADJUSTING & TOUCH UP

- .1 Adjust all moving and operating parts to function smoothly and correctly.
- .2 Fill and retouch all nicks, chips and scratches. Replace all un-repairable damaged items.

3.4 CLEANUP

- .1 Upon completion of installation, clean installed items of pencil and ink marks and broom clean the area of operation.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and installation for spray-applied asphalt for use as dampproofing on exterior surfaces of concrete foundation walls.

1.2 REFERENCE STANDARDS

- .1 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-37.3-M89, Application of Emulsified Asphalts for Dampproofing or Waterproofing.
 - .2 CAN/CGSB-37.5-M89, Cutback Asphalt Plastic Cement.
 - .3 CGSB 37-GP-6Ma-83, Asphalt, Cutback, Unfilled, for Dampproofing.
 - .4 CGSB 37-GP-12Ma-84, Application of Unfilled Cutback Asphalt for Dampproofing.
 - .5 CAN/CGSB-37.16-M89, Filled, Cutback, Asphalt for Dampproofing and Waterproofing.
 - .6 CGSB 37-GP-36M-76, Application of Filled Cutback Asphalts for Dampproofing and Waterproofing.
 - .7 CGSB 37-GP-37M-77, Application of Hot Asphalt for Dampproofing or Waterproofing.
- .2 Health Canada
 - .1 Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (SDS).

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for [bituminous dampproofing application] and include product characteristics, performance criteria, physical size, finish and limitations.
 - .2 Submit copies of WHMIS SDS in accordance with Section 01 35 43 - Environmental Procedures.
- .3 Manufacturer's Instructions: provide to indicate special handling criteria, installation sequence, cleaning procedures.

1.4 QUALITY ASSURANCE

- .1 Obtain primary dampproofing materials from single manufacturer and/or ensure materials ordered and supplied are compatible with one another.
- .2 Obtain secondary materials recommended by manufacturer and compatible with primary dampproofing materials.

- .3 Compatibility:
 - .1 Provide sheet membrane waterproofing manufacturer's written declaration confirming their product is compatible with the dampproofing material intended for the project.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store materials on supports to prevent deformation.
 - .3 Remove only in quantities required for same day use.
 - .4 Replace defective or damaged materials with new.

1.6 SITE CONDITIONS

- .1 Ambient Conditions: temperature, relative humidity, moisture content.
 - .1 Apply dampproofing materials only when surfaces and ambient temperatures are within manufacturers' prescribed limits.
 - .2 Do not proceed with Work when wind chill effect would tend to set bitumen before proper curing takes place.
 - .3 Maintain air temperature and substrate temperature at dampproofing installation area above 5 degrees C for 24 hours before, during and 24 hours after installation.
 - .4 Do not apply dampproofing in wet weather.
- .2 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.
- .3 Ventilation:
 - .1 Ventilate area of Work as directed by City Representative by use of approved portable supply and exhaust fans.
 - .2 Provide continuous ventilation during and after dampproofing application. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of dampproofing installation.

Part 2 Production

2.1 MATERIALS

- .1 Asphalt:

- .1 For application and curing at temperatures above 5 degrees C: to ASTM D1187, Type I and ASTM D1227, Type III, Class 1.
 - .1 Package label or bill of lading for bulk hot liquid asphalt must indicate type, flash point, equiviscous temperature range and final blowing temperature.
- .2 Sealing compound: plastic cutback asphalt cement to CAN/CGSB-37.5.
- .3 Asphalt primer: to CAN/CGSB-37.2.
- .4 Acceptable Products:
 - .1 700-01, by Henry Company.
 - .2 Dehydratine 75, by Euclid Chemical Company.
 - .3 Sealmastic Type I, by W.R. Meadows.

2.2 ACCESSORIES

- .1 Protection Board: as per Section 07 13 52.
- .2 Board Insulation: as per Section 07 21 13.
- .3 Foundation drainage: as per Civil design documents.
- .4 Joint Sealing Compound: as recommended by dampproofing manufacturer.
- .5 Primer: as recommended by dampproofing manufacturer.
- .6 Patching Compound: fibred mastic compound as recommended by dampproofing manufacturer.
- .7 Reinforcing Fabric: asphalt coated fabric as recommended by dampproofing manufacture, for use at inside/corners, changes in plane, penetrations, etc.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for bituminous dampproofing application installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 WORKMANSHIP

- .1 Keep hot asphalt:
 - .1 Below its flash point.

- .2 At or below its final blowing temperature.
- .3 Within its equiviscous temperature range at place of application.

3.3 PREPARATION

- .1 Before applying dampproofing:
 - .1 Protect and mask adjoining and surrounding exposed surfaces from being stained, spotted, coated or damaged by dampproofing materials.
 - .2 Seal exterior joints between foundation walls and footings, joints between concrete floor slabs and foundation, cold joints, and around penetrations through dampproofing with sealing compound and reinforcing fabric before applying dampproofing.
 - .3 Clean substrates, remove projections, fill voids, apply bond breakers (if required), and apply primer as recommended by dampproofing manufacturer.
 - .4 Coordinate work with installation of work of Section 07 13 52 – Modified Bituminous Sheet Waterproofing.

3.4 APPLICATION

- .1 Apply dampproofing to provide a continuous, uniform coating to entire exterior faces of foundation walls from 50mm below finish grade level to and including tops of foundation wall footings:
 - .1 Do not permit dampproofing to extend onto surfaces exposed to view in final construction.
 - .2 Reinforce changes in direction greater than 45 degrees at intersections, projecting surfaces, internal and external corners, changes in plane, and across construction joints, cracks and honeycombing; apply additional coat of dampproofing material to embed reinforcing fabric into primary dampproofing membrane; extend reinforcing fabric 200 mm to each side of areas requiring reinforcing.
 - .3 Allow for additional coats to achieve required coating.
 - .4 Provide sufficient drying time between successive coatings.
 - .5 Provide drying time according to manufacturer's recommendations before backfilling. Allow for a range of ambient temperatures and humidity.
- .2 Seal holes around pipes and other services passing through coating surfaces by using joint sealing compound applied in accordance with manufacturer's directions.

3.5 SCHEDULE

- .1 Apply continuous, uniform coating to entire exterior faces of foundation walls from 50mm below finished grade level to and including tops of foundation wall footings.
- .2 Apply continuous, uniform coating to exterior side of foundation walls enclosing rooms below finished grade. Include exterior portion of interior walls where floors in adjacent rooms are at different elevations.
- .3 Apply two additional coats of dampproofing to vertical corners and construction joints for a minimum width of 230 mm on each side, and all around and for 230 mm along pipes passing through walls.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.7 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by dampproofing application.
- .3 Protect finished surfaces from prolonged exposure to ultraviolet light by backfilling or other means within 24 to 48 hours, or as per manufacturer's recommendations.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 ASTM International Inc.
 - .1 ASTM C 726-05, Standard Specification for Mineral Fiber Roof Insulation Board.
 - .2 ASTM C 728-05, Standard Specification for Perlite Thermal Insulation Board.
 - .3 ASTM D 41-05, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
 - .4 ASTM D 448-03a, Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
 - .5 ASTM D 449-03, Standard Specification for Asphalt Used in Dampproofing and Waterproofing.
 - .6 ASTM D 2178-04, Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
 - .7 ASTM D 6162-00a, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
 - .8 ASTM D 6163-00e1, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.
 - .9 ASTM D 6164-05, Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- .2 Canadian General Standards Board (CGSB)
 - .1 CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
 - .2 CGSB 37-GP-56M-80b(A1985), Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
- .3 Canadian Roofing Contractors Association (CRCA)
 - .1 CRCA Roofing Specifications Manual-1997 .
- .4 CSA Group (CSA)
 - .1 CSA-A123.3-05, Asphalt Saturated Organic Roofing Felt.
 - .2 CSA-A123.4-04, Asphalt for Constructing Built-Up Roof Coverings and Waterproofing Systems.
 - .3 CSA A231.1/A231.2-06, Precast Concrete Paving Slabs/Precast Concrete Pavers.
- .5 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S701-05, Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
 - .2 CAN/ULC-S702.2-03, Standard for Mineral Fibre Thermal Insulation for Buildings.

- .3 CAN/ULC-S704-03, Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
- .4 CAN/ULC-S706-02, Standard for Wood Fibre Thermal Insulation for Buildings.

1.2 ADMINISTRATIVE REQUIREMENTS

- .1 Convene pre-installation meeting one week prior to beginning waterproofing Work, with Consultant to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with other building subtrades.
 - .4 Review manufacturer's installation instructions and warranty requirements.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide copies of most recent technical waterproofing components data sheets describing materials' physical properties and include product characteristics, performance criteria, physical size, finish and limitations.
 - .3 Manufacturer's Installation Instructions: indicate special precautions required for seaming the membrane.
 - .4 Manufacturer's field report: in accordance with Section 01 45 00 - Quality Control.
 - .1 Manufacturer's Field Reports:
 - .1 Submit manufacturer's written reports within 3 days of review, verifying compliance of Work, as described in Part 3.
 - .2 Reports: indicate procedures followed, ambient temperatures and wind velocity during application.
 - .2
- .5 System compatibility:
 - .1 Compatibility between components of this system and adjacent materials and systems is essential, including those of Section 07 11 13 – Bituminous Dampproofing. Provide written declaration to Consultant and City Representative.
 - .2 All components of this system must be purchased from a single source manufacturer.
- .6 Installer/Applicator:
 - .1 Contractor and installers specializing in application of sheet membrane waterproofing systems.
 - .2 Approved by the manufacturer.
- .7 Membrane Manufacturer:

- .1 Manufacturer must have a minimum of 15 continuous years in the manufacturer of the sheet materials for use as a waterproof membrane.
- .2 Manufacturer to have available in-house technical staff to assist the trade contractor in application of the products, field reviews during installation, and final inspection of the assembly.
- .3 Pre-installation meeting: prior to commencing work of this Section, manufacturer`s technical representative is to review procedures to be adopted, conditions under which the work will be done, and inspect the surfaces to receive the sheet waterproofing membrane in order that any alternate recommendations may be made should adverse conditions exist.
- .4 Verification of performance: manufacturer`s technical representative is to inspect the Work at intervals during the application and, on completion, submit written verifications of compliance with manufacturer`s recommendations, these specifications, and drawings.
- .8 Mock-ups:
 - .1 Submit mock-ups in accordance with Section 01 45 00 - Quality Control.
 - .2 Construct mock-up of sheet membrane waterproofing installation including one lap joint, one inside corner and one outside corner.
 - .3 Mock-up will be used to judge workmanship, substrate preparation, and material application.
 - .4 Locate where directed.
 - .5 Allow 48 hours for inspection of mock-up by Consultant and City Representative before proceeding with waterproofing work.
 - .6 When accepted, mock-up will demonstrate minimum standard of quality required for this work. Approved mock-up may remain as part of finished work.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions and section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements:
 - .1 Deliver materials in original, unopened containers or packaging clearly labelled with manufacturer`s name, brand name, instruction for use and all identifying numbers.
- .3 Storage and Handling Requirements:
 - .1 Safety: comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of all materials.
 - .2 Store materials in accordance with manufacturer=s written instructions.
 - .3 Store materials in a clean, dry area protected from water and direct sunlight.
 - .4 Store materials on supports to prevent deformation.
 - .5 Remove damaged and/or rejected materials from site.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for recycling in accordance with Section 01 74 22 - Construction and Demolition Waste Management.
- .2 Collect and separate for disposal paper, plastic, polystyrene and corrugated cardboard packaging material for recycling in accordance with Waste Management Plan.
 - .1 Ensure emptied containers are sealed and stored safely.
 - .2 Divert unused sheet membrane waterproofing materials, primers and mastics from landfill to recycling facility approved by the City Representative.

1.6 SITE CONDITIONS

- .1 Ambient Conditions
 - .1 Do not install waterproofing when temperature remains below -18 degrees C for torch application, or -5 degrees C for mop application.
 - .2 Minimum temperature for solvent-based adhesive is -5 degrees C.
 - .3 Install membrane on dry substrate, free of dew, water, snow and ice. Use only dry materials. Do not apply waterproofing in wet weather.
 - .4 Conduct preparation and application of membrane in well ventilated areas.

1.7 WARRANTY

- .1 For Work of this Section 12 months warranty period is extended to 60 months.
- .2 Provide a written warranty for labour, materials and workmanship for a period of five years after Substantial Performance of the work.
- .3 Warranty to include coverage of installed sheet waterproofing which fails to achieve watertight seal or any loss of adhesion.

Part 2 Products

2.1 PERFORMANCE CRITERIA

- .1 Waterproofing System: capable of resisting moisture/water head of 70 m and preventing moisture migration to interior.
- .2 Compatibility between components of waterproofing system is essential. Provide written declaration to Consultant stating that materials and components, as assembled in system, meet this requirement.

2.2 MEMBRANE

- .1 Prefabricated composite sheets:
 - .1 Sheet membrane comprised of rubberized asphalt integrally bonded to a film of high density cross laminated polyethylene membranes maintaining a minimum thickness of 1.5mm (60 mils) shall be provided in rolls with lap lines clearly marked.

- .2 The membrane shall incorporate a 6mm edge bead of rubberized asphalt running continuously along both sides of the roll.
- .3 Materials shall include rubber based, solvent dispensed primer from the same manufacturer.
- .4 Acceptable materials:
 - .1 Blueskin WP200 by Bakor.
 - .2 Bituthene 3000, by W.R. Grace.
 - .3 Colphene 1500, by Soprema.
 - .4 Carlisle QSC-701, by Carlisle Syntec.
 - .5 Aquabarrier FP by IKO Industries.
 - .6 Mel-Rol by W.R. Meadows.
- .5 Primer: solvent based, as recommended and supplied by the sheet membrane manufacturer.
- .6 Mastics: at termination and projections as recommended and supplied by membrane manufacturer.
- .7 Termination bar: Continuous aluminum, 3mm x 25mm x 25mm in size, pre-drilled for non-corrosive screw attachment at a maximum of 200mm centers; provide and install as recommended by membrane manufacturer.

2.3 FOUNDATION DRAINAGE

- .1 When a column of clear stone is not feasible to maintain free drainage to perimeter drainage system a composite drainage system is to be installed as per:
 - .1 Composite drainage system for vertical, below-grade application, approximately 10.2mm (0.4") thick, comprised of a three-dimensional, crush-proof, high-flow dimple type drainage core of impermeable polypropylene sheet, with a woven or non-woven filter fabric bonded to the top surface. Fabric to extend 100mm beyond the core.
 - .2 Acceptable products include:
 - .1 Hydrotech Hydrodrain 400.
 - .2 Tremco Drain 1000.
 - .3 Bakor DB6000 Drainage Board.
 - .4 Carlisle MiraDrain 9000.

2.4 OVERLAY/PROTECTION BOARD

- .1 Overlay/Protection Board: To ASTM D449 / D449M-03 Type 1., 25 mm asphalt impregnated fiberboard.

2.5 ADHESIVE

- .1 Adhesive for securing overlay board and insulation: Apply compatible adhesive to substrate and waterproofing/ dampproofing membrane, per manufacturer recommendations.

2.6 POLYSTYRENE INSULATION

- .1 Extruded polystyrene (XPS) insulation to [CAN/ULC-S701], Type 4, thickness [50] mm or as indicated on drawings, shiplapped edges.
- .2 Refer also to 07 21 13 – Board Insulation.

Part 3 Execution

3.1 QUALITY OF WORK

- .1 Comply with manufacturer’s written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions and data sheets.

3.2 ENVIRONMENTAL REQUIREMENTS

- .1 All membrane shall be installed at surface and ambient temperature of 5 degrees C or above, in dry weather conditions.
- .2 For applications below 5 degrees C consult membrane manufacturer’s technical representative for instructions and obtain Consultant approval before proceeding with Work.

3.3 SUBSTRATE EXAMINATION

- .1 Verification of conditions: examine all surfaces to receive the sheet membrane waterproofing to verify it is acceptable and proper for the application of the membrane.
- .2 Notify Consultant and City Representative in writing of any defects or unsatisfactory conditions.
- .3 Do not proceed with the installation of the waterproofing membrane until all defects have been corrected. Commencement of work will be taken as acceptance of the substrate conditions.

3.4 PREPARATION

- .1 Ensure all surfaces are clean, dry smooth, and free of depressions, voids, protrusions, unapproved curing compounds, form release agents and other surface contaminants.
- .2 Cast in-place concrete must be monolithic, smooth and free of voids, spalled areas, laitance, honeycombs and sharp protrusions.
- .3 Prepare and prime all surfaces to receive membrane application.
- .4 Coordinate installation with work of Section 07 11 13- Bituminous Dampproofing.

3.5 INSTALLATION OF MEMBRANE

- .1 Apply membrane to surfaces fully adhered in accordance with membrane manufacturer=s instructions.

- .2 Align and position self-adhering membrane over primed substrate, remove protective film and press firmly into place. Ensure minimum 150mm overlap at all end and side laps.
- .3 Corner details: double cover outside and inside corners, use 300mm wide initial strip of membrane centred on axis of corner. Follow with full width of sheet membrane to cover initial strip completely.
- .4 Roll membrane with a metal roller to ensure complete adhesion to substrate material.
- .5 Roll in two separate passes at 90 degrees to each other.
- .6 Caulk joints with mastic. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- .7 Inspect membrane installation meticulously and immediately. Holes and tears in the membrane must be repaired with sheet membrane waterproofing material. The repair must exceed the affected surface area by a minimum of 150mm. The membrane piece applied for the repair must be sealed around its edges with mastic.
- .8 At mud slabs extend beyond limits of walls to allow a minimum 200 mm overlap with vertical surfaces.
- .9 Ensure membrane is continuous with sub-slab waterproofing.

3.6 PROTECTION BOARD INSTALLATION

- .1 Install protection board in accordance with manufacturer's recommendations to cover and protect membrane.
- .2 Protect waterproofing membrane under sump and elevator pits, cisterns, etc. from damage during subsequent formwork and concrete activities using protection board as recommended by manufacturer.

3.7 BOARD INSULATION INSTALLATION

- .1 Install perimeter board insulation in accordance with manufacturer's written recommendations.
- .2 Ensure continuity of thermal envelope with systems above.

3.8 FOUNDATION DRAINAGE BOARD INSTALLATION

- .1 Install foundation drainage board system in accordance with manufacturer's written instructions and as indicated on drawings.
- .2 Ensure free flow of ground water to perimeter drainage system.

3.9 FIELD QUALITY CONTROL

- .1 Have manufacturer of products supplied under this Section review Work involved in handling, installation/application, protection and cleaning of its products, and submit written reports in acceptable format to verify compliance of Work with Contract.
- .2 Manufacturer's field services: provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .3 Schedule site visits to review Work at stages listed:
 - .1 After delivery and storage of products, and when preparatory Work on which Work of this Section depends is complete, but before installation begins.
 - .2 Once during progress of Work at 50% complete.
 - .3 Upon completion of Work, after cleaning is carried out.
- .4 Obtain reports within three days of review and submit to City Representative and Consultant.

3.10 CLEANING

- .1 Clean work in accordance with Section 01 74 11 - Cleaning.
- .2 Clean to Consultant's approval, soiled surfaces, spatters, and damage caused by work of this Section.
- .3 Check drains to ensure cleanliness and proper function, and remove debris, equipment and excess material from site.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 ASTM E96/E96M-10 - Standard Test Methods for Water Vapor Transmission of Materials.
- .2 CAN/ULC-S102-10 - Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .3 CAN/ULC-S701-11 - Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .4 CAN/ULC-S702-09 - Standard for Mineral Fibre Thermal Insulation for Buildings.
- .5 CAN/ULC-S704-11 - Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

1.2 SYSTEM DESCRIPTION

- .1 Materials of This Section: Provide thermal protection to air seal materials at building enclosure elements in conjunction with air barrier materials in Section 07 27 13.

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate with other work having a direct bearing on work of this section.
 - .2 Coordinate the work with Section 07 27 13 for installation of air seal materials.

1.4 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submittal procedures.
- .2 Product Data: Provide data on product characteristics, performance criteria, limitations.

1.5 SUBMITTALS FOR INFORMATION

- .1 Section 01 33 00: Submittal procedures.
- .2 Installation Data: Indicate special environmental conditions required for installation, installation techniques.
- .3 Manufacturer's Certificate: Certify Products meet or exceed specified requirements..

1.6 ENVIRONMENTAL REQUIREMENTS

- .1 Section 01 35 43: Environmental conditions affecting products on site.
- .2 Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

Part 2 Products

2.1 RIGID INSULATION MATERIALS

- .1 Extruded Polystyrene Insulation (XPS): to CAN/ULC-S701, Type 4; cellular type, conforming to the following:
 - .1 Compressive Strength: medium density 210 kPa (30 psi) as a minimum with high density 275 kPa (40 psi) where noted and subgrade.
 - .2 Thermal Resistance: as indicated on drawings.
 - .3 Board Thickness: as indicated on drawings.
 - .4 Board Edges: Square.
 - .5 Flame/Smoke Properties: to CAN/ULC-S102 .

2.2 SEMI-RIGID INSULATION MATERIALS

- .1 Mineral Fibre Insulation: ASTM C612 - 14 Mineral fibre (rock, slag, and glass), semi-rigid board, with the following characteristics:
 - .1 Thermal Resistance: as noted on drawings.
 - .2 Board Thickness: as noted on drawings.
 - .3 Board Edges: Square.
 - .4 Flame/Smoke Properties: to CAN/ULC-S102.

2.3 ADHESIVE MATERIALS

- .1 Adhesive: Type recommended by insulation manufacturer for application. Compatible with adjacent water and air barrier products.

2.4 ACCESSORIES

- .1 Protective Boards: 13mm thick.
 - .1 Use fibre board for subgrade protection of foundation insulation to avoid backfilling damage to rigid insulation. Apply in all instances.
 - .2 Use Cement board for above grade protection of board insulation. Start board 50 mm below grade. Apply a continuous cementitious parge over cement board and finish with primer plus two coats of 100% acrylic.

Part 3 Execution

3.1 EXAMINATION

- .1 Section 01 71 00: Verify existing conditions before starting work.
- .2 Verify that substrate, adjacent materials, and insulation boards are dry and ready to receive insulation and adhesive.
- .3 Verify substrate surface is flat, free of irregularities.

3.2 INSTALLATION - FOUNDATION PERIMETER

- .1 Apply manufacture recommended adhesive in three (3) continuous beads per board length.

- .2 Install boards on foundation wall perimeter, vertically.
 - .1 Place boards in a method to maximize contact bedding.
 - .2 Stagger side joints.
 - .3 Butt edges and ends tight to adjacent board and to protrusions.
- .3 Extend boards over expansion joints, unbonded to foundation wall on one (1) side of joint.
- .4 Cut and fit insulation tight to protrusions or interruptions to the insulation plane.
- .5 Immediately following application of board insulation, place protective boards over exposed insulation surfaces. Apply manufacturer recommended adhesive in five (5) continuous beads per board length.
 - .1 Install boards vertically from base of foundation to top of insulation.
 - .2 Butt board joints tight; stagger from insulation joints.

3.3 INSTALLATION - EXTERIOR WALLS

- .1 Install insulation boards over air barrier membrane starting at base of wall.
- .2 Place boards in a method to maximize contact bedding. Stagger end joints. Butt edges and ends tight to adjacent board and to protrusions.
- .3 Cut and fit insulation tight to protrusions or interruptions to the insulation plane.

3.4 INSTALLATION - CAVITY WALLS

- .1 Secure impale fasteners to substrate at a frequency of six (6) per insulation board.
- .2 Install boards horizontally between wall reinforcement.
- .3 Cut and fit insulation tight to protrusions or interruptions to the insulation plane.

3.5 INSTALLATION - UNDER CONCRETE SLABS

- .1 Place insulation under slab-on-grade after sub-base has been compacted.
- .2 Cut and fit insulation tight to protrusions or interruptions to the insulation plane.
- .3 Prevent insulation from being displaced or damaged while placing concrete slab.

3.6 PROTECTION OF FINISHED WORK

- .1 Do not permit work to be damaged prior to covering insulation.

3.7 SCHEDULES

- .1 Exterior Wall Insulation: Semi Rigid insulation.
- .2 Foundation Wall Insulation: XPS insulation, High density, Type IV; set with adhesive [or Thermo-mass system].
- .3 Under-slab Insulation: XPS insulation, High density, Type IV.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C 553-13, Standard Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .2 ASTM C 665-12, Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
 - .3 ASTM C 1320-10, Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
- .2 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S702-[2012], Standard for Mineral Fibre Insulation for Buildings.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for blanket insulation and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 INSULATION

- .1 Thermal Batt Insulation: CAN/ULC-S702 and ASTM C612, preformed mineral wool thermal insulation, water repellent and vapour permeable:
 - .1 Product, Semi Rigid Exterior wall: see Section 07 21 13
 - .2 Product, Batt Insulation: Roxul ComfortBatt
 - .3 Product, Curtain Wall Backpans: Roxul CurtainRock
 - .4 Thermal Resistance: as noted or illustrated on drawings.

- .5 Other acceptable manufacturers offering functionally equivalent products:
 - .1 Thermafibre, by Owens Corning
- .2 Acoustic Batt Insulation: CAN/ULC-S702 Type 1, preformed mineral fibre acoustic Insulation, water repellent and vapour permeable. Provides fire resistance to CAN/ULC-S114 and sound control to ASTM C423.
 - .1 Product, Semi Rigid Batt: Roxul AFB
 - .2 Other acceptable manufacturers offering functionally equivalent products:
 - .1 Thermafibre, by Owens Corning.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for blanket insulation application in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.

3.2 INSULATION INSTALLATION

- .1 Install insulation to maintain continuity of thermal protection to building elements and spaces and to ASTM C 1320.
- .2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .3 Do not compress insulation to fit into spaces.
- .4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from CSA B149.1 and CSA B149.2 vents.
- .5 Do not enclose insulation until it has been inspected and approved by Consultant.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Loose laid membrane with adhesive sealed joints.

1.2 REFERENCES

- .1 ASTM D412-06ae2 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension.
- .2 ASTM D624-00(2007) - Standard Test Method for Tear Strength of Conventional Vulcanized Rubber and Thermoplastic Elastomers.
- .3 ASTM D882-10 - Standard Test Method for Tensile Properties of Thin Plastic Sheeting.
- .4 ASTM D1004-09 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting.
- .5 ASTM D2240-05(2010) - Standard Test Method for Rubber Property—Durometer Hardness.
- .6 ASTM D4551-96(2008) e1 - Standard Specification for Poly Vinyl Chloride (PVC) Plastic Flexible Concealed Water-Containment Membrane.
- .7 ASTM E96/E96M-10 - Standard Test Methods for Water Vapor Transmission of Materials.
- .8 ASTM E1745-09 - Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
- .9 NRCA (National Roofing Contractors Association) - Waterproofing Manual.

1.3 PERFORMANCE REQUIREMENTS

- .1 Membrane: Capable of preventing moisture migration to interior.

1.4 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Product Data: Provide data for surface conditioner flexible flashings, joint seals, and crack sealants, with temperature range for application of membrane.
- .3 Shop Drawings: Indicate special joint or termination conditions and conditions of interface with other materials.

1.5 SUBMITTALS FOR INFORMATION

- .1 Section 01 33 00: Submission procedures.
- .2 Certificates: Certify that Products meet or exceed specified requirements.
- .3 Installation Data: Manufacturer's special installation requirement including special procedures and perimeter conditions requiring special attention.

1.6 CLOSEOUT SUBMITTALS

- .1 Section 01 78 00: Submission procedures.

- .2 Warranty Documentation: Submit manufacturer's warranty and ensure forms have been completed in City Representative's name and registered with manufacturer.

1.7 QUALITY ASSURANCE

- .1 Products of This Section: Manufactured to ISO 9000 certification requirements.
- .2 Perform Work in accordance with: Manufacturer's instructions.

1.8 MOCK-UP

- .1 Section 01 45 00: Requirements for mock-up.
- .2 Provide mock-up of membrane, with sealed joints, and connections, to represent finished work including internal and external corners, seam jointing, attachment method, counter flashing cover.
- .3 Locate where directed by City Representative.
- .4 Approved mock-up may remain as part of the Work.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Section 01 35 43: Environmental conditions affecting products on site.
- .2 Maintain ambient temperatures above 5 degrees C for twenty-four (24) hours before and during application and until liquid or mastic accessories have cured.

Part 2 Products

2.1 MANUFACTURERS

- .1 WR Meadows; Product: Perminator.
- .2 Other acceptable manufacturers offering functionally and aesthetically equivalent products.
- .3 Substitutions: Refer to Section 01 61 00.

2.2 MATERIALS

- .1 Moisture Barrier Membrane: multi-layer low density polyethylene (LDPE),.
 - .1 Membrane properties conforming to ASTM E 1745 Class A.
 - .2 Membrane lap and seal at joint and penetrations:
 - .1 Typical condition: 100 mm self adhesive polyethylene tape as recommended by membrane manufacturer.
 - .2 Additional conditions where required: Non-hardening, permanently flexible, high performance sealant as recommended by membrane manufacturer.
 - .3 Surface Cleaner: As recommended by membrane manufacturer, compatible with sheet membrane.
- .2 Adhesives, Thinner and Cleaner: As recommended by membrane manufacturer, compatible with sheet membrane.
- .3 Sealant: same type as used for joint seal tape.

- .4 Counter Flashings: bituminous type, where required, as specified in Section 07 62 00.

Part 3 Execution

3.1 EXAMINATION

- .1 Section 01 71 00: Verify existing conditions before starting work.
- .2 Verify substrate surfaces are durable; free of matter detrimental to adhesion or application of membrane and related components.

3.2 PREPARATION

- .1 Protect adjacent surfaces not designated to receive protection.
- .2 Clean and prepare surfaces to receive membrane in accordance with manufacturer's written instructions.
- .3 Do not apply membrane or related components to surfaces unacceptable to manufacturer.
- .4 Seal cracks and joints with sealant materials using depth to width ratio as specified in Section 07 92 00.

3.3 INSTALLATION - MEMBRANE

- .1 Roll out membrane. Minimize wrinkles and bubbles.
- .2 Overlap edges, ends, and joints minimum 150 mm and seal by contact sealant tape.
- .3 Seal joints and protrusions, permanently airtight and waterproof.
- .4 Reinforce membrane with multiple thicknesses of membrane material over static or moving joints.
- .5 Weather lap joints on sloped substrate in direction of drainage. Seal joints and seams.
- .6 Install flexible flashings and accessories:
- .1 Seal watertight to membrane.
 - .2 Seal to adjoining surfaces.
- .7 Extend membrane over intersecting surfaces at membrane perimeter minimum 150 mm.
- .8 Seal items protruding or penetrating through membrane.
- .9 Install counter flashing membrane material.

3.4 PROTECTION OF FINISHED WORK

- .1 Section 01 77 00: Protecting installed work.
- .2 Do not permit traffic over unprotected or uncovered membrane.
- .3 Protect membrane from damage by adhering protection boards. Scribe and cut boards around projections and interruptions.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Air leakage criteria for primary air seal building enclosure materials and assemblies.
- .2 Materials and installation methods supplementing primary air seal materials and assemblies.
- .3 Air seal materials to connect and seal openings, joints, and junctions between other air seal materials and assemblies.

1.2 REFERENCES

- .1 ASTM C920-14a - Standard Specification for Elastomeric Joint Sealants.
- .2 ASTM C1311-14 - Standard Specification for Solvent Release Sealants.
- .3 ASTM E283-04(2012) - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- .4 ASTM E330/E330M-14 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .5 NABA (National Air Barrier Association) - Air Barrier Quality Assurance Program (QAP).
- .6 SWRI (Sealant, Waterproofing and Restoration Institute) - Sealant and Caulking Guide Specification.

1.3 DEFINITIONS

- .1 Air Barrier: A continuous network of materials and joints providing air tightness, with adequate strength and stiffness to not deflect excessively under air pressure differences, to which it will be subjected in service. It can be comprised of a single material or a combination of materials to achieve the performance requirements.

1.4 PERFORMANCE REQUIREMENTS

- .1 Provide continuity of air seal materials and assemblies in conjunction with materials described in Section 07 92 00.
- .2 The Air Barrier system will be tested for air and water leakage and various stages during construction.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate with other work having a direct bearing on work of this section.
 - .2 Pre-installation Meetings: Convene two (2) weeks before starting work of this section.
 - .3 Sequencing: Sequence work to permit installation of materials in conjunction with related materials and seals.

1.6 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Product Data: Provide data on material characteristics, performance criteria, limitations, and manufacture's installation guidelines.

1.7 SUBMITTALS FOR INFORMATION

1.8 QUALITY ASSURANCE

- .1 Products of This Section: Manufactured to ISO 9000 certification requirements.
- .2 Perform Work in accordance with the NABA Air Barrier Quality Assurance Program.
- .3 Maintain one (1) copy of document on site.
- .4 Contractor Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five (5) years documented experience.
- .5 Applicator Qualifications: Individuals specializing in performing the work of this section with minimum three (3) years documented experience. Contractor to submit names and work experience of approved applicators to preform the work of this section.

1.9 MOCK-UP

- .1 Section 01 43 00: Requirements for mock-up.
- .2 Materials of this section are to be included in an **Envelope Mock-up**. The mockup is only applicable for tender packages incorporating building envelope construction work.
- .3 Envelope trades to construct typical exterior wall panel, (3 x 3 m) 10 x 10 ft, incorporating window frame, sill and head, insulation, air barrier building corner condition junction with roof membrane air seal; illustrating materials interface and seals.
- .4 Locate where directed by Consultant.
- .5 Approved mock-up may remain as part of the Work.

1.10 ENVIRONMENTAL REQUIREMENTS

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

Part 2 Products

2.1 SHEET MATERIALS

- .1 Sheet Seal Type 1: Self Adhered Wall/Roof Air Barrier. Self-adhesive rubberized asphalt bonded to sheet polyethylene, regular temperature, nominal total thickness of (1mm) 40 mil.
 - .1 Product: Blueskin SA, manufactured by Bakor.
 - .2 Other acceptable manufacturers offering functionally equivalent products.
 - .1 Product: Sopraseal Stick 1100 T, Manufactured by Soprema.
 - .2 Product: Perm-A-Barrier Wall Membrane, manufactured by Grace.

- .2 Sheet Seal Type 2: Self Adhered Thru-Wall Flashing. Self-adhesive rubberized asphalt bonded to sheet polyethylene, regular temperature, nominal total thickness of (1mm) 40 mil.
 - .1 Product: Blueskin TWF, manufacturing by Bakor.
 - .2 Other acceptable manufacturers offering functionally equivalent products.
 - .1 Product: Sopraseal WFM, Manufactured by Soprema.
 - .2 Product: Perm-A-Barrier Wall Flashing, Manufactured by Grace.

2.2 SEALANTS

- .1 Sealants: Refer to Sealants 07 92 00.

2.3 MASTICS AND TERMINATION SEALANTS

- .1 Mastic Adhesive Type 1: Bituminous mastic compatible with sheet seal and substrate, thick mastic of uniform knife grade consistency. Select product per recommendation by sheet membrane manufacturer.
- .2 Termination Sealant: Compatible with sheet seal and substrate, permanently non-curing. Select product per recommendation by sheet membrane manufacturer.

2.4 ACCESSORIES

- .1 Thinner and Cleaner for Butyl Neoprene Sheet: As recommended by sheet material manufacturer.
- .2 Attachments: Galvanized steel termination bars and anchors, (3 mm) 1/8 inch thick with waterproof sealant applied to top flange. Continuous termination bar for all Thru-wall Flashings attachments to vertical supporting face.
- .3 Steel Sheet Bridging: Galvanized steel, Z275 (90) zinc coating, (0.6 mm) 24 gauge thick core steel. Secure with flat head screws.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify surfaces and conditions are ready to accept the Work of this section.

3.2 PREPARATION

- .1 All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants. Fill spalled areas in substrate to provide an even plane. Strike masonry joints flush.
- .2 New concrete should be cured for a minimum of 14 days and must be dry before air/vapour barrier membranes are applied.
 - .1 Where curing compounds are used, provide clear resin based without oil, wax or pigments.
 - .2 Clean and prime substrate surfaces to receive adhesive to manufacturers written instructions.
 - .3 Install steel sheet bridging over cracks and joints exceeding 13mm. Secure with flat head screws.

3.3 INSTALLATION

- .1 Install materials to manufacturer's written instructions.
- .2 Adhesive or Primer for Sheet Type 1, 2.
 - .1 Apply adhesive or primer for self-adhering membrane at rate recommended by manufacturer.
 - .2 Apply to all areas to receive transition sheet and / or through-wall flashing membrane, as indicated on drawings by roller or spray and allow minimum 30-minute open time.
- .3 Transition Membrane (Self-Adhering)
 - .1 Align and position self-adhering transition membrane, remove protective film and press firmly into place. Ensure minimum 6 inch (150 mm) overlap at all end and side laps.
 - .2 Tie-in to window frames, aluminium screens, hollow metal door frames, spandrel panels, roofing system and at the interface of dissimilar materials as indicated in drawings.
 - .3 Promptly roll all laps and membrane with a counter top roller to effect seal.
 - .4 Ensure all preparatory work is complete prior to applying liquid applied air vapour barrier membrane.
- .4 Through-wall Flashing Membrane & Dampproof Course (Self-Adhering)
 - .1 Applications shall form a continuous flashing membrane and shall extend up a minimum of 200 mm up the back-up wall.
 - .2 At the end of each day's work seal the top edge of the membrane where it meets the substrate using liquid air seal mastic. Trowel apply a feathered edge to seal termination and shed water.
 - .3 Ensure through-wall flashing membrane extends fully to the exterior face of the exterior masonry veneer. At locations where flashing terminates or intersects wall openings including door frames, "end dam" flashing to protect openings and redirect water out. Trim off excess as directed by the Consultant.
 - .4 Apply dampproof coursing membrane over slabs on grade, prepare and prime surfaces, align and position membrane between slab and masonry block work.
 - .5 Align and position the leading edge of self-adhering through-wall flashing membrane with the front horizontal edge of the foundation walls, self angles and other substrates to be protected, partially remove protective film and roll membrane over surface and up vertically.
 - .6 Press firmly into place. Ensure minimum 150 mm overlap at all end and side laps. Promptly roll all laps and membrane to affect the seal.
 - .7 Ensure all preparatory work is complete prior to applying self-adhering through-wall flashing membrane.
 - .8 Ensure through-wall flashing membrane extends fully to the exterior face of the exterior masonry veneer. Trim off excess as directed by the Consultant.
- .5 Air Barrier Membrane (Self-Adhering)
 - .1 Apply self-adhering membrane complete and continuous to prepared and primed substrate in an overlapping shingle fashion and in accordance with manufacturer's recommendations and written instructions. Stagger all vertical joints.

- .2 Align and position self-adhering membrane, remove protective film and press firmly into place. Ensure minimum 150 mm overlap at all end and side laps. Promptly roll all laps and membrane with a counter top roller to affect the seal.
- .3 At the end of each day's work seal the top edge of the membrane where it meets the substrate using liquid air seal mastic. Trowel apply a feathered edge to seal termination and shed water.
- .4 Tie-in to window frames, aluminium screens, hollow metal door frames, spandrel panels, roofing system and at the interface of dissimilar materials as indicated in drawings. Refer to manufacturers' standard details.
- .5 Ensure all projections, including wall ties, are properly sealed with a sealant application of liquid air seal mastic.
- .6 Mechanically fasten membrane with securement bars to all window, door, louvers and curtain wall sections as recommended by membrane manufacturer where proper adhesion and bonding cannot be maintained, or where it is otherwise specified.
- .7 Membrane applied to the underside of substrate surfaces shall receive special attention on application to ensure maximum surface area adhesion is obtained.
- .6 Install steel sheet bridging as noted in drawings and over all cracks and joints exceeding 6 mm; seal with sheet seal. Secure with flat head screws.
- .7 Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

3.4 FIELD QUALITY CONTROL

- .1 Section 01 45 00: Field testing and inspection.
- .2 City Representative will engage inspection services for air barrier and material installation to NABA Air Barrier Quality Assurance Program.
- .3 Provide written inspection report to Consultant.
- .4 City Representative will provide inspection and testing reports for Contractor.
- .5 City Representative will engage a third-party to perform water infiltration tests of air barrier system installations to NABA Air Barrier Quality Assurance Program:
 - .1 The City Representative will pay the testing agent to perform five (5) air barrier assembly water test.
 - .2 Failed tests will require correction in air barrier system by contractor and retesting by the City Representative.
 - .3 Any failed test will cause one (1) additional air barrier assembly to be tested.
 - .4 The City Representative will pay for up to ten (10) water tests and retests in total. Any additional water test will be paid for by the contractor.

3.5 PROTECTION OF FINISHED WORK

- .1 Do not permit adjacent work to damage work of this section.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Steel faced, polyurethane (polyisocyanurate) insulated metal wall panels used as an insulated barrier wall.
- .2 Accessories including carrier rails, hat channel, fasteners, flashings, and perimeter trim.
- .3 Installation of Preformed Metal Siding.

1.2 REFERENCES

- .1 American Architectural Manufacturers Association (AAMA)
 - .1 AAMA 501.1: Standard Test Method for Metal Curtain Walls for water penetration using Dynamic Pressure.
 - .2 AAMA 501.2: Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls and Sloped Glazing Systems.
- .2 ASTM International
 - .1 ASTM A755: Standard Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products
 - .2 ASTM A924: Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process
 - .3 ASTM C273: Standard Test Method for Shear Properties of Sandwich Core Materials.
 - .4 ASTM C518: Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
 - .5 ASTM C920: Standard Specification for Elastomeric Joint Sealants
 - .6 ASTM D1621: Standard Test Method for Compressive Properties of Rigid Cellular Plastics
 - .7 ASTM D1622: Standard Test Method for Apparent Density of Rigid Cellular Plastics
 - .8 ASTM D1623: Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics
 - .9 ASTM D1929: Standard Test Method for Determining Ignition Temperature of Plastics
 - .10 ASTM D2126: Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
 - .11 ASTM D6226: Standard Test Method for Open Cell Content of Rigid Cellular Plastics.
 - .12 ASTM E72: Standard Test Methods of Conducting Strength Tests of Panels for Building Construction

- .13 ASTM E84: Standard Test Method for Surface Burning Characteristics of Building Materials
- .14 ASTM E283: Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
- .15 ASTM E330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference
- .16 ASTM E331: Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S101: Standard Methods of Fire Endurance Tests of Building Construction and Materials
 - .2 CAN/ULC-S102: Standard Method of Test for Surface Building Characteristics of Building Materials and Assemblies
 - .3 CAN/ULC-S127: Standard Corner Wall Method of Test for Flammability Characteristics of Non-Melting Building Materials
 - .4 CAN/ULC-S134: Fire Test of Exterior Wall Assemblies

1.3 QUALITY ASSURANCE

- .1 Products of This Section: Manufactured to ISO 9000 certification requirements.
- .2 Contractor Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten (10) years documented experience.
- .3 Installer Qualifications: Individuals authorized by the manufacture with a minimum of five (5) years experience with this type of construction, and documentation indicating successful completion of contracts for projects of similar size, scope and materials. Contractor to submit names and work experience of individuals to perform the work of this section.
- .4 Pre-Installation Meetings: Conduct pre-installation meeting one (1) week before work commences on site to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.4 SUBMITTALS

- .1 Submit in accordance with Section 01 33 00.
- .2 Submit product data sheets for wall panel materials. Include product characteristics and performance criteria.
- .3 Submit shop drawings, including elevation and sections of each condition, prior to fabrication. Shop drawings to include material type, metal thickness, erection procedures, installation clips and angles, fastener patterns, sealant details, accessories required, finish and manufacturer's installation suggestions.
 - .1 Assembly Analysis: Provide wall panel assembly calculations to verify panels will withstand the design wind loads indicated without detrimental effects or

deflection exceeding $L/180$. Include resistance to fastener pullout at rainscreen wall panels to barrier wall panel connections.

- .2 Shop drawings to be stamped by Registered Professional Engineer, licensed in the Province of construction.
- .4 Verification Samples: For each finish product specified, submit two full width panel sections, minimum 200 mm (8 inch) long, representing actual product, color, and construction.

1.5 MOCK-UPS

- .1 Perform in accordance with Section 01 45 00 Quality Assurance.
- .2 Fabricate to locations as directed by Consultant.
- .3 Mock-up to illustrate continuity of building envelope materials at the insulated wall panel and roof intersection.
- .4 Approved mock-up may remain as part of the Work.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver panel materials and components in manufacturer's original, unopened, undamaged packaging with identification labels intact.
- .2 Store wall panel materials on dry, level, firm, and clean surface. Stack no more than two bundles high. Elevate one end of bundle to allow moisture run-off, cover and ventilate to allow air to circulate and moisture to escape.

1.7 WARRANTY

- .1 Limited Warranty: Standard form in which manufacturer agrees to repair or replace items that fail in materials or workmanship within specified warranty period. The items covered by the warranty include structural performance including bond integrity, deflection and buckling.
 - .1 Warranty Period: Two (2) years from date of Substantial Completion, or 2 years and 3 months from the date of shipment from manufacturer's plant, whichever occurs first.

Part 2 Products

2.1 INSULATED METAL PANELS

- .1 Acceptable Products included:
 - .1 Metl-Span, Striated Wall Panel
 - .2 Vicwest, Striated Wall System
 - .3 Kingspan, K Series Striated Wall Panel
- .2 Accessories
 - .1 Fasteners: Concealed in panel joints, supplied by panel manufacturer.

- .1 Hex-head Self-tapping fasteners shall be stainless steel with neoprene washer.
- .2 Perimeter Trim: Fabricated perimeter trim shall be same gauge, material and coating color as exterior face of insulated barrier wall panel.
- .3 Concealed Sealants and Bedding Compounds: Butyl, in accordance with Section 07 92 00.
- .4 Spray Foam: Two-part urethane foam as recommended by manufacturer.
- .3 Panel Finishes
 - .1 Shop applied silicone modified polyester finish (SMP), minimum coating thickness 1.0 mils, two coat primer/finish process.

2.2 PREFORMED METAL SIDING

- .1 Supply and installation of Preformed Metal Siding is included within the scope of this Section.
- .2 Refer to Section 07 42 14 – Insulated Metal Wall Panels for product specification and execution.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine individual panels upon removing from the bundle; notify manufacturer of panel defects. Do not install defective panels.
- .2 Do not begin installation until defects in preceding work have been properly prepared.
- .3 Before installation examine alignment of substrate and notify Consultant in writing if substrate does not comply with requirements of panel installer.
- .4 Beginning of installation shall signify structure and adjacent conditions as being proper and acceptable.

3.2 INSTALLATION - INSULATED WALL PANEL

- .1 Install panels in accordance with manufacturer's written instructions and shop drawings. Allow for thermal movement.
- .2 Installation of panels shall be made in accordance with manufacturer's written procedures, accepted shop drawings, installation guidebook and manufacturer's handbook of construction details.
- .3 Install metal panels against full spread of trowel-applied butyl sealant applied over air barrier membrane transitions at roof, wall and foundation intersections, and other openings, to maintain continuity of the building envelope.
- .4 Install panels plumb, level, and true-to-line to dimensions and layout indicated on approved shop drawings.

- .5 Cut panels prior to installing, where indicated on shop drawings, using a power circular saw with fine tooth carbide tip blade per manufacturer's instructions. Personnel should wear respiratory and eye protection devices.
 - .1 Outside corners shall be field mitered, inside corners shall be butt jointed, and provide perimeter trim per manufacturers approved shop drawings and standard details.
- .6 Butyl Weather Barrier Sealant:
 - .1 Apply non-skinning butyl sealant as shown on shop drawings and manufacturer's installation instructions as necessary to establish the vapor barrier for the panels.
 - .2 Use non-skinning butyl tube sealant only for tight metal-to-metal contact.
 - .3 Do not use non-skinning butyl tube sealant to bridge gaps.
- .7 Carrier Rail Attachment:
 - .1 Attachment at panel joint: Place panel fasteners through pre-punched holes in carrier rails. Fasteners are concealed within the joint of the panel. Set fastener in Butyl Sealant. Secure carrier rail to structural supports.
 - .2 Secure opposite side of carrier rail, using manufacturer recommended expansion anchors, to barrier wall panel surface.
 - .3 Space fasteners as recommended by manufacturer or otherwise indicated on the approved shop drawings.
 - .4 Alter carrier rails as required to accommodate panel accessories per approved shop drawings and manufacturer's standard details.
- .8 Install perimeter trim for insulated barrier wall panels, where indicated and where trim will be concealed by rainscreen.
- .9 Sealant installation for exposed joints
 - .1 Clean and prime surfaces to receive exterior exposed sealants in accordance with sealant manufacturer's recommendations.
 - .2 Follow sealant manufacturer's recommendations for joint width-to-depth ratio, application temperature range, size and type of backer rod, and compatibility of materials for adhesion.
 - .3 Direct contact between butyl and silicone sealants shall not be permitted.
- .10 Apply spray foam to joints ¼ inch or larger where recommended by manufacturer.

3.3 INSTALLATION

- .1 Separate dissimilar metals as indicated on approved shop drawings.
- .2 Attach panels with fasteners into carrier rails and furring channels. Set fastener in Butyl Sealant.
- .3 Installation shall be in accordance with manufacturer's installation guidelines and recommendations.
- .4 Install panels plumb, level, and true-to-line to dimensions and layout indicated on approved shop drawings.

- .5 Cutting and fitting of panels shall be neat, square and true. Torch cutting is prohibited.

3.4 TRIM INSTALLATION

- .1 Flashing and trim shall be installed true and in proper alignment. Sealant shall be installed where indicated, without skips and voids, to ensure weather tightness and integrity of the vapour barrier.
- .2 Place trim and trim fasteners only as indicated per details on the approved shop drawings.
- .3 Field drill weep holes where appropriate in horizontal trim; minimum (1/4 inch) 6mm diameter at (24 inches) 610mm on center.
- .4 Place a continuous strip of butyl tube sealant between the inside back face of closure trims and interior panel faces for proper vapor seal.

3.5 FIELD QUALITY CONTROL

- .1 Testing shall be performed on Insulated Wall Panel prior to the installation of the Rainscreen Wall Panels.
- .2 Testing Agency: Owner shall engage an independent testing and inspection agency to perform field water tests (in accordance with AAMA 501.2) reports of findings.

3.6 CLEANING

- .1 Remove protective film immediately after installation.
- .2 Leave work areas clean, free from grease, finger marks and stains.
- .3 Replace damaged panels and other components of work which cannot be repaired by finish touch-up or similar minor repair.
- .4 After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.
- .5 Wipe finished surfaces of any filings caused by drilling or cutting to prevent rust staining.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Preformed metal composite material cladding, with related flashings and accessory components.
- .2 Supporting structure.

1.2 REFERENCES

- .1 ASME B18.2.2 - Square and Hex Nuts (Inch Series).
- .2 ASTM A653/A653M-09a - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .3 ASTM B209-06, Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .4 ASTM B221-06, Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- .5 ASTM C297, Standard Test Method for Tensile Strength on Flat Sandwich Constructions in Flatwise Plane.
- .6 ASTM E72-05 - Method for Conducting Strength Tests of Panels for Building Construction.
- .7 ASTM E84-10 - Test Method for Surface Burning Characteristics of Building Materials.
- .8 ASTM E283 - Standard test method for air infiltration.
- .9 ASTM E331 - Standard test method for water infiltration.
- .10 CAN/CGSB-19.13-M87 - Sealing Compound, One-component, Elastomeric, Chemical Curing.
- .11 CGSB-19-GP-14M (June 84) - Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.
- .12 CAN/ULC-S102-07 - Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .13 CAN/ULC-S126-06 - Method of Test for Fire Spread Under Roof-Deck Assemblies.
- .14 CAN/ULC-S710.1 - Thermal Insulation - Bead - Applied One Component Polyurethane Air Sealant Foam, Part 1: Material Specification.

1.3 SYSTEM DESCRIPTION

- .1 Panel: Metal panel system, including its support and attachments, shall be designed to resist positive and negative wind loads as calculated in the latest edition of the National Building Code of Canada and its supplement, using a 1/30 return period. Adequate stiffening shall be provided to prevent wind induced vibrations and fatigue problems.
- .2 Deflection Movement: Maximum deflection not to exceed L/180. The panel shall exhibit no permanent deformation when subject to these loads. Allowance shall be made in the panel design for movement within the system caused by deflection in the building structure.

- .3 Thermal Movement: Allowance shall be made for expansion and contraction of all parts of the metal panel assembly caused by surface temperatures varying from minus 40 degrees Celsius to plus 40 degrees Celsius. Such variation in temperature shall not cause buckling, stress on enclosed or adjoining materials or fasteners, or in any way impair the performance or appearance of the system.
- .4 Sub system design to incorporate a grid lock to eliminate rocking of the Z-bars on drywall or other support sub-wall systems.
- .5 Weep Drainage: Provide for positive drainage of condensation and water entering at joints to exterior face of wall in accordance with [NRC "Rain Screen Principles"]. Panels to have drainage holes in bottom of each panel measuring 10 mm (3/8") diameter on 16" centres, to AAMA 508.
- .6 Water Tightness: Exterior fascia and wall panels shall be designed to the rain screen principles as published by the National Research Council and prevent water infiltration into the interior systems. No panel joint caulking will be permitted.
- .7 System must have been successfully tested by an accredited testing facility to the ASTM E283 standard test method for air infiltration.
- .8 System must have been successfully tested by an accredited testing facility to the ASTM E331 standard test method for water infiltration.
- .9 No panel joint caulking will be permitted.
- .10 Fastening: Panel assembly shall be fastened to the building structure in a manner, which transmits all loads to the main structure without exceeding the capacity of any fastener.
- .11 Fire Resistance: Aluminum composite panel system shall be tested by an accredited testing facility, to The Standard Method of Fire Test of Exterior Wall Assemblies, CAN4-S134-M92 and be approved for use in non-combustible construction in accordance with the latest edition of the National Building Code of Canada, Article 3.1.5.5, Sentences (1) through (8).

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate with other work having a direct bearing on work of this section.
- .2 Pre-installation Meetings: Convene one (1) week before starting work of this section.

1.5 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Product Data: Provide electronic copy of product data indicating material physical properties.
- .3 Shop Drawings:
 - .1 Indicate dimensions, panel profile and layout, spans, joints, construction details, methods of anchorage, method and sequence of installation, flashing and accessories.
 - .2 Indicate details and special conditions at half scale.
 - .3 Indicate loads and calculations of maximum deflection at supports.

.4 Prepare Shop Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in Province where the Project is located.

.4 Samples: Submit one (1) panel samples, 300x300 mm (12x12 inch) in size showing jointing system, flashings, sheet facings with specified finish illustrating finish colour, sheen, and texture, flexible flashings, anchors and fasteners.

1.6 SUBMITTALS FOR INFORMATION

.1 Section 01 33 00: Submission procedures.

.2 Design and Performance Data: Indicate panel profile characteristics and dimensions, and structural properties of assembled panels.

.3 Laboratory Testing: Upon request, submit laboratory tests and methods used.

.4 Installation Data: Manufacturer's special installation requirements, including special handling criteria, installation sequence, and cleaning procedures.

1.7 QUALITY ASSURANCE

.1 Manufacturer: Company specializing in manufacturing the Products specified in this Section with a minimum of five (5) years experience.

.2 Installer Qualifications: Installers specializing in performing the work of this section with a minimum of five (5) years documented experience and approved by the manufacturer. Contractor to submit experience resumes of all installers performing work on site.

1.8 MOCK-UP

.1 Section 01 43 00: Requirements for mock-up.

.2 Construct 5 m² mock-up, including panel system, attachments to building frame, associated air seal materials, sealants and seals, related insulation, and accessories.

.3 Demonstrate component assembly including panel and glazing materials, attachments, anchors, and perimeter sealant.

.4 Locate where directed by Consultant.

.5 Approved mock-up may remain as part of the Work.

1.9 DELIVERY, STORAGE, AND PROTECTION

.1 Section 01 61 00: Transport, handle, store, and protect products.

.2 Protect prefinished materials during transportation, site storage and assembly to CSSBI standards.

.3 Deliver panels and accessories in original wrappings, bearing manufacturer and product names.

.4 Inspect panels upon delivery at site and immediately inform manufacturer of defects.

.5 Protect panels from accelerated weathering if stored beyond one (1) month by removing or venting sheet plastic shipping wrap; cover panels with woven fabric tarpaulins.

.6 Store materials in well ventilated areas, off ground with weather protection. Slope metal sheets to ensure drainage.

- .7 Store materials away from contaminating sources, fertilizers, chemical products or corrosive substances.

1.10 WARRANTY

- .1 Provide a five (5) year manufacturer's warranty for failure to meet specifications. Provide coverage for failure of finish and panel integrity.
- .2 Performance specification from steel suppliers will cover degradation of panel finish including colour fading caused by exposure to weather, defect in design.

Part 2 Products

2.1 MANUFACTURERS

- .1 Mitsubishi Plastics; Product: Alpolic, Dry Seal System.
- .2 Other acceptable manufacturers offering functionally and aesthetically equivalent products.
 - .1 Flynn Architectural; Product: Accumet.
 - .2 Aloca; Product: Reynobond.
- .3 Substitutions: Not permitted.

2.2 PANEL MATERIALS

- .1 Panel Type:
 - .1 Form modular panels from minimum 4mm prefinished composite aluminum sheet. The composite aluminum sheet will consist of two 0.51mm minimum aluminum skins bonded in a continuous process to a low-density polyethylene core.
 - .2 Aluminum skins to be alloy 3105 H25.
- .2 Panel Finish:
 - .1 Typical finish, unless noted otherwise:
 - .1 Factory applied Two coat 50% Kynar ® polyvinylidene fluoride (PVDF) resin.
 - .2 Colour: Selected by Consultant from Full range.

2.3 ACCESSORIES

- .1 Panel Supports and Anchorages: Steel sheet, hot-dip galvanized to ASTM A653/A653M Grade A Zinc coating to Z275 designation, 1.2mm (18 gauge), to dimensions and profiles indicated.
- .2 Fasteners:
 - .1 Fasteners to be stainless steel and concealed at all locations. Sufficient quantities of fasteners of the proper size for fastening of the work shall be provided.
- .3 Flashings:
 - .1 Wherever practical at corners, jambs and abutments, no flashings will be permitted. Panel design to include for these connections. Where flashings are unavoidable, use prefinished material to match composite sheet.

- .2 Exposed surfaces of aluminum extrusions to match colour and coating of panels.

2.4 FABRICATION

- .1 Shop fabricated panels to sizes and configurations indicated on the drawings, following panel material manufacturer's written instructions and recommendations.
- .2 Fabrication of component profiles on site is not permitted.
- .3 Form sections true to shape, accurate in size, square, and free from distortion or defects.
- .4 Fabricate with sharply cut edges, with no displacement of aluminum sheet or protrusion of core.
- .5 Panel Joints: fabricated for offset joint connections and secured using concealed fasteners.
- .6 Provide drainage holes at base of panels.
- .7 Where final dimensions cannot be established by field measurements, provide allowance for field adjustment as recommended by the fabricator.

Part 3 Execution

3.1 EXAMINATION

- .1 Section 01 71 00: Verify existing conditions before starting work.
- .2 Verify that framing members and structural alignment are within recommended tolerances and ready to receive panel system. Advise Consultant if conditions are not acceptable; do not install panels.

3.2 INSTALLATION

- .1 Install composite metal panel system on walls and soffits to manufacturer's written instructions.
- .2 Protect panel surfaces in contact with dissimilar metals cementitious materials with bituminous paint or tape. Allow to dry prior to installation.
- .3 Permanently fasten panel system to structural supports; aligned, level, and plumb, within specified tolerances.
- .4 Attach panels to structure without restricting movement caused by design loads and expansion and contraction of assembly.
- .5 Seal panels weathertight. For wet seal system refer to Section 07 92 00.
- .6 Attach flexible flashings to foundations as indicated.
- .7 Locate panel joints over supports.
- .8 Provide control joints where required, or as indicated.
- .9 Coordinate weathertight seal at roof, floor and at junctions with other wall construction. Maintain complete continuity of building envelope air barrier, vapour retarder, insulation and rain screen.
- .10 Trim panels with flashings, weep holes, transition sheets, flexible flashings and gap-filling insulation to attain specified system performance.

- .11 Provide weep holes and vents at each panel joint to drain water infiltrating system to exterior of building.
- .12 Provide metal flashings as indicated and integrated into panel system; Refer to Section 07 62 00.
- .13 Minimize thermal bridging with insulation and backup to prevent direct conduction through envelope.
- .14 Do not leave metal sheet flanges unfolded or exposed. Minimize site cutting.
- .15 Protect exposed surfaces of cuts with paint to match panel colour. Ensure site cuts are same quality as shop cuts.

3.3 ERECTION TOLERANCES

- .1 Maximum offset from true alignment between adjacent members butting or in line: 1.6 mm.
- .2 Maximum variation from plane or location indicated on drawings: 1.6 mm.
- .3 Joint width between panels: 12.7 mm.
- .4 Vertical alignment of panels: 1.6 mm.

3.4 CLEANING

- .1 Section 01 74 11: Cleaning installed work.
- .2 Remove excess sealant with solvent recommended by manufacturer.
- .3 Clean installation of residue and remove unused materials and products. Remove site cuttings from finish surfaces.
- .4 Clean and wash prefinished surfaces with mild soap and water; rinse with clean water.

3.5 PROTECTION

- .1 Protect finish of installed panels from damage during construction.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Flat board siding for walls.
- .2 Flat board siding for soffits.
- .3 Related trim, flashings, accessories, and fastenings.

1.2 REFERENCES

- .1 NLGA (National Lumber Grades Authority) - Standard Grading Rules for Canadian Lumber 2005.

1.3 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Product Data: Provide data indicating materials, component profiles, fastening methods, jointing details, sizes, surface texture, finishes and accessories.
- .3 Samples: Submit two (2) samples, 300 x 300 mm (12 x 12 inch) in size illustrating surface texture and finish.

1.4 SUBMITTALS FOR INFORMATION

- .1 Section 01 33 00: Submission procedures.
- .2 Installation Data: Manufacturer's special installation requirements.

1.5 CLOSEOUT SUBMITTALS

- .1 Section 01 78 10: Submission procedures.

1.6 QUALITY ASSURANCE

- .1 Products of This Section: Manufactured to ISO 9000 certification requirements.
- .2 Grade materials in accordance with the following:
 - .1 Lumber Grading: Certified by NLGA.

1.7 DELIVERY, STORAGE, AND PROTECTION

- .1 Section 01 61 00: Transport, handle, store, and protect products.
- .2 Store in ventilated areas with constant minimum temperature of 16 degrees C and maximum relative humidity of 55%.

1.8 WARRANTY

- .1 Warranty: Manufacturers standard warranty.

Part 2 Products

2.1 MANUFACTURERS

- .1 Thermalwood Canada; Product: Torrifed Ash.
- .2 Other acceptable manufacturers offering functionally and aesthetically equivalent products will be considered during tender period only.
- .3 Substitutions: Refer to Section 01 62 00.

2.2 MATERIALS

- .1 Torrefied Wood – thermally modified hardwood siding with the following properties:
 - .1 Dimensions: 22mm x 125mm
 - .2 Profile: Single Rabbet
 - .3 Species: Ash
 - .4 Finish: None

2.3 ACCESSORIES

- .1 Attachment: Concealed plastic clip system.
 - .1 Snap-to-it by Thermalwood Canada or similar.
- .2 Accessory Components: Trim, of same material and finish as siding.

Part 3 Execution

3.1 EXAMINATION

- .1 Section 01 70 00: Verify existing conditions before starting work.
- .2 Verify that substrate surfaces , wall openings , and framing are ready to receive work.

3.2 INSTALLATION - SIDING

- .1 Install siding and soffits to manufacturer's written instructions.

3.3 INSTALLATION - BOARD SIDING & SOFFIT

- .1 Mitre horizontal joints tight at 45 degrees. Mitre external and cope internal corners.
- .2 Install siding for natural shed of water.
- .3 Position cut ends over bearing surfaces. Sand cut edges smooth and clean.

- .4 Install corner strips, closures, trim.
- .5 Install metal flashings at sills head of wall openings.

3.4 ERECTION TOLERANCES

- .1 Maximum Variation From Level: 3 mm in 3000 mm.
- .2 Maximum Offset from Joint Alignment: 1.6 mm.

3.5 PREPARATION FOR SITE FINISHING

- .1 Sand cut edges smooth and set exposed fasteners.
- .2 Prepare wood per finish manufacturer's requirements. Remove any mill glaze where exists.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Sheathing over deck surface.
- .2 Vapour retarder.
- .3 Modified bituminous membrane roofing, flashings and membrane movement joints.

1.2 REFERENCES

- .1 CSA-O151-09 - Canadian Softwood Plywood (R2014).
- .2 CGSB 37-GP-56M-85 - Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
- .3 CAN/ULC-S107-10 - Methods of Fire Tests of Roof Coverings.
- .4 CAN/ULC-S701-11 - Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .5 CAN/ULC-S704-11 - Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
- .6 CAN/ULC S706-09 - Standard for Wood Fibre Insulating Boards for Buildings.
- .7 Province of Prince Edward Island Roofing Contractors Association – Roofing Specifications Manual.
- .8 CRCA (Canadian Roofing Contractors' Association) – CRCA Roofing Specifications Manual.
- .9 ULC - Building Materials Directory.

1.3 SYSTEM DESCRIPTION

- .1 Assembly and installation of components include two (2) ply membrane system, bitumen adhered, with granulated surface, vapour retarder insulation and protection board.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate with other work having a direct bearing on work of this section.
 - .2 Coordinate the work with the installation of associated metal flashings, as the work of this section proceeds.
- .2 Pre-installation Meetings:
 - .1 Convene one (1) week before starting work of this section.
 - .2 Review preparation and installation procedures and coordinating and scheduling required with related work.

1.5 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submittal procedures.

- .2 Product Data: Provide product data for membrane, flashing materials, vapour retarder, insulation, protective coating, and accessories.

1.6 QUALITY ASSURANCE

- .1 Perform Work to manufacturer's written instructions. Maintain one (1) copy of each document on site.
- .2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum twenty (20) years documented experience.
- .3 Installer Qualifications: Installer specializing in performing the work of this section with minimum ten (10) years documented experience and approved by the manufacturer.

1.7 REGULATORY REQUIREMENTS

- .1 FM: Roof Assembly Classification, Class 1 Construction, wind uplift requirement of 1-90, to FM 1-28 "Design Wind Loads".

1.8 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver products in manufacturer's original containers, dry, undamaged, seals and labels intact.
- .2 Store products in weather protected environment, clear of ground and moisture.
- .3 Stand roll materials on end.

1.9 ENVIRONMENTAL REQUIREMENTS

- .1 Section 01 35 43: Environmental Procedures.
- .2 Do not apply roofing membrane during inclement weather or when ambient temperatures are below manufacturers' written recommendations.
- .3 Do not apply roofing membrane to damp or frozen deck surface.
- .4 Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

1.10 WARRANTY

- .1 Section 01 78 00: Closeout Submittals.
- .2 Contractor's Warranty: Provide two (2) year warranty on roofing, dated from time of Substantial Performance.
- .3 Manufacturer's Warranty: Provide a ten (10) year (non-prorated) manufacturer's warranty (in the name of the client) to include coverage for failure to meet specified requirements, including damage resulting from failure to prevent penetration of water. The warranty shall include all necessary labour and materials to repair the roof system.

Part 2 Products

2.1 MEMBRANE MATERIAL

- .1 Membrane: CAN/CGSB-37-GP-56M, asphalt and polymer modifiers of styrene-butadiene-styrene (SBS) prefabricated sheet.

- .2 Base Sheet Membrane: non-woven polyester reinforcement, nominal thickness 2.2 mm.
 - .1 Application: Fully adhered:
 - .2 Both sides thermofusible plastic film.
- .3 Base Sheet Flashing: non-woven polyester reinforcement, nominal thickness 3 mm.
 - .1 Application: fully adhered:
 - .2 Both sides thermofusible plastic film.
- .4 Cap Sheet Membrane: non-woven polyester reinforcement and elastomeric bitumen SBS, nominal thickness 6 mm.
 - .1 Application: Fully adhered
 - .2 Top surface granule surfaced.
 - .3 Underside thermofusible plastic film.
- .5 Cap Sheet Flashing: non-woven polyester reinforcement and elastomeric bitumen SBS, nominal thickness 6 mm.
 - .1 Application: fully adhered:
 - .2 Top surface granule surfaced.
 - .3 Underside thermofusible plastic film.
- .6 Perimeter Strip Membrane: self-adhesive elastomeric bitumen membrane with non-woven polyester reinforcement.

2.2 BITUMEN MATERIALS

- .1 Asphalt: to CSA A123.4, Type III.
- .2 Asphalt Primer: CGSB-37-GP-9Ma.
- .3 Plastic Cement: CAN/CGSB-37.5, cutback asphalt type.
- .4 Adhesive: Membrane and flashing adhesive recommended by manufacturer.

2.3 DECK COVERING MATERIALS

- .1 Gypsum Sheathing: ASTM C1177/C1177M, water resistant silicone treated core, glass mat facing, 12.7 mm thick.

2.4 VAPOUR RETARDER

- .1 Modified Bitumen Membrane: To CGSB-37-GP-56M, reinforced with fibreglass mat, 90 g/sq m. top surface woven polyethylene, underside silicone film.

2.5 INSULATION

- .1 Insulation: CAN/ULC-S704 Type 1, Class 3, Polyisocyanurate rigid board, both faces finished with glass reinforced mat, with the following characteristics:
 - .1 Board Density: 2 kg /m3.
 - .2 Board Size: 1220 x 2440 flat.
 - .3 Thermal Resistance: R5.7 LTTR per inch.
 - .4 Board Edges: Square.

2.6 COVER BOARD

- .1 Cover Board: ASTM C 728, Type 2, High-density, perlite-based cover board with a polymerized asphalt emulsion coating.

2.7 FLASHINGS

- .1 Flexible Flashings: Same material as membrane; black colour.
- .2 Counter Flashings: prefinished metal, specified in Section 07 62 00.
- .3 Control or Expansion Joint Flashing: Sheet butyl, metal counter flashings and stainless steel materials, to CRCA construction details as required.

2.8 ACCESSORIES

- .1 Fibre Cant and Tapered Edge Strips: Asphalt impregnated wood fibreboard, preformed to configuration as detailed.
- .2 Fasteners: ASTM C1002, galvanized type, appropriate for purpose intended and approved by Factory Mutual and system manufacturer; length required for thickness of material with metal washers.
- .3 Sheathing Joint Tape: heat resistant type.
- .4 Sealants: as recommended by membrane manufacturer.
- .5 Strip Reglet Devices: galvanized; surface mounted, binder bars, maximum possible length per location, with attachment flanges.

Part 3 Execution

3.1 EXAMINATION

- .1 Section 01 73 00: Verify existing conditions before starting work.
- .2 Verify that surfaces and site conditions are ready to receive work.
- .3 Verify deck is clean and smooth, free of depressions, waves, or projections.
- .4 Verify deck surfaces are dry and free of snow or ice. Verify flutes of metal deck are clean and dry.
- .5 Verify roof openings, curbs, pipes, conduit, sleeves, ducts, and vents through roof are solidly set, and wood cant strips are in place.

3.2 PREPARATION -- METAL ROOF

- .1 Install deck sheathing onto the steel deck to Factory Mutual requirements, bulletin 1-28 for installation of boards to roof perimeters and corners, to meet 1-90.
- .2 Lay with long side at right angle to flutes; stagger end joints; provide support at ends.
- .3 Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface. Tape joints.

3.3 VAPOUR RETARDER APPLICATION

- .1 Primer: Apply primer to manufacturer's written instructions for system specified. Allow to dry.
- .2 Apply perimeter strips under cant strips and blocking to provide continuity of air barrier of envelope.

- .3 Install self-adhesive vapour barrier on to substrate, overlapping side and end laps to manufacturer's written recommendations. .
- .4 Begin work at bottom of slopes, unroll and align on substrate. Ensure all edges are supported.
- .5 Remove release sheet and adhere membrane, working in sections to avoid wrinkles in membrane.
- .6 Meet and overlap perimeter strip to air/vapour barrier on adjoining walls.

3.4 INSULATION APPLICATION

- .1 Install insulation to manufacturer's written instructions.
- .2 Ensure vapour retarder is clean and dry.
- .3 Mechanically fasten insulation to deck at full roof area to insulation manufacturer's written instructions.
- .4 Mechanically fasten boards over roof surface.
- .5 Place eight (8) fasteners per insulation board.
- .6 Minimum Total Insulation Thickness: as required.
- .7 Place boards at right angles to deck flutes with edges over flute surface for bearing support.
- .8 Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- .9 Apply no more insulation than can be covered with membrane in same day.

3.5 COVER BOARD APPLICATION

- .1 Install cover boards to manufacturer's written instructions.

3.6 MEMBRANE APPLICATION

- .1 Apply membrane and primer to manufacturer's written instructions.
- .2 Apply membrane; lap and seal edges and ends permanently waterproof.
- .3 Apply membrane smooth, free from air pockets, wrinkles, or tears. Ensure full bond of membrane to substrate.
- .4 Extend membrane up cant strips and minimum of 200 mm onto vertical surfaces.
- .5 Extend membrane over air/vapour barrier of wall construction and seal with mastic adhesive.
- .6 Seal membrane around roof protrusions and penetrations.
- .7 Provide waterproof cut-off to membrane at end of day's operation. Remove cut-off before resuming roofing.

3.7 FLASHINGS AND ACCESSORIES

- .1 Apply flexible sheet base flashings to seal membrane to vertical elements.
- .2 Complete installation of base sheet flashing prior to installing cap sheet membrane.

- .3 Install in accordance with manufacturer's recommendations, including the following instructions:
 - .1 Nail and torch base sheet flashing and torch cap sheet flashing onto substrate in 1000 mm wide strips. Secure to nailing at 100 mm on centre.
 - .2 Lap base sheet flashing to base sheet membrane minimum 150 mm and seal.
 - .3 Lap cap sheet flashing to cap sheet membrane 250 mm minimum and torch weld.
 - .4 Provide 75 mm minimum side lap and seal.
 - .5 Properly secure flashings to their support, without sags, blisters, fishmouths or wrinkles.
- .4 Coordinate installation of roof curbs and related flashings.
- .5 Seal flashings and flanges of items penetrating or protruding through the membrane.

3.8 CLEANING

- .1 Section 01 74 11 - Cleaning: Cleaning installed work.
- .2 In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.
- .3 Repair or replace defaced or disfigured finishes caused by work of this section.

3.9 PROTECTION OF FINISHED WORK

- .1 Protect building surfaces against damage from roofing work.
- .2 Where traffic must continue over finished roof membrane, protect surfaces.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Metal coping cap sill lintel parapet flashings.
- .2 Facias.
- .3 Metal counterflashings.

1.2 REFERENCES

- .1 ASTM A167-99 (2009) - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .2 ASTM A653/A653M-10 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .3 SMACNA - Architectural Sheet Metal Manual, 2012.
- .4 Canadian Roofing Contractor's Association (CRCA) Specifications Manual

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate with other work having a direct bearing on work of this section.
- .2 Pre-installation Meetings: Convene one (1) week before starting work of this section.

1.4 QUALITY ASSURANCE

- .1 Perform Work to SMACNA standard details and requirements. Maintain one (1) copy of document on site.
- .2 Fabricator Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five (5) years documented experience.
- .3 Installer Qualifications: Installer specializing in performing the work of this section with minimum three (3) years documented experience. Contractor to submit the name and experience profile for each installer proposed to work on site.

1.5 DELIVERY, STORAGE, AND PROTECTION

- .1 Section 01 60 00: Material and Equipment.
- .2 Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- .3 Prevent contact with materials which may cause discolouration or staining.

Part 2 Products

2.1 SHEET MATERIALS

- .1 Pre-Coated Galvanized Steel: ASTM A653/A653M, (Z275) G90 zinc coating designation; (0.6 mm) 24 gauge core steel. Shop pre-coated with modified silicone PVDF coating; colour to match adjacent cladding materials.

2.2 ACCESSORIES

- .1 Fasteners: Concealed fasteners, with soft neoprene washers galvanized steel.
- .2 Protective Backing Paint: Zinc Chromate Alkyd.
- .3 Sealant: specified in Section 07 92 00

2.3 FABRICATION

- .1 Form sections true to shape, accurate in size, square, and free from distortion or defects.
- .2 Fabricate cleats of same material as sheet, inter-lockable with sheet.
- .3 Form pieces in longest possible lengths.
- .4 Hem exposed edges on underside 13 mm; mitre and seam corners.
- .5 Fabricate corners from one piece with minimum 450 mm long legs; seam for rigidity, seal with sealant.
- .6 Fabricate vertical faces with bottom edge formed outward 6 mm and hemmed to form drip.
- .7 Fabricate flashings to allow toe to extend 50 mm over roofing surface. Return and brake edges.

2.4 FINISHES

- .1 Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 3 mils.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify roofing termination and base flashings are in place, sealed, and secure.

3.2 PREPARATION

- .1 Install starter and edge strips, and cleats before starting installation.
- .2 Install surface mounted reglets true to lines and levels. Seal top of reglets with sealant.

3.3 INSTALLATION

- .1 Conform to typical drawing details found in the current SMACNA - Architectural Sheet Metal Manual.
- .2 Secure flashings in place using concealed fasteners Use exposed fasteners only where permitted by City Representative.
- .3 Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
- .4 Seal metal joints watertight.

3.4 FIELD QUALITY CONTROL

- .1 Section 01 45 00: Field inspection.

- .2 Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Work Included: Provide factory-fabricated roof hatches and safety post for ladder access.

1.2 SUBMITTALS

- .1 Product Data: Submit manufacturer's product data.
- .2 Shop Drawings: Submit shop drawings including profiles, accessories, location, adjacent construction interface, and dimensions.
- .3 Warranty: Submit executed copy of manufacturer's standard warranty.

1.3 QUALITY ASSURANCE

- .1 Manufacturer: A minimum of 5 years' experience manufacturing similar products.
- .2 Installer: A minimum of 2 years' experience installing similar products.
- .3 Manufacturer's Quality System: Registered to ISO 9001:2008 Quality Standards including in-house engineering for product design activities.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver products in manufacturer's original packaging. Store materials in a dry, protected, well-vented area. Inspect product upon receipt and report damaged material immediately to delivering carrier and note such damage on the carrier's freight bill of lading.

1.5 WARRANTY

- .1 Provide warranty to include coverage for failure to meet specified requirements.
- .2 Manufacturer's Warranty: Provide manufacturer's standard warranty. Materials shall be free of defects in material and workmanship for a period of five years from the date of purchase. Should a part fail to function in normal use within this period, manufacturer shall furnish a new part at no charge.

Part 2 Products

2.1 MANUFACTURERS

- .1 Bilco.
- .2 Other acceptable manufacturers offering functionally and aesthetically equivalent products will be considered during tender period only.
- .3 Substitutions: Refer to Section 01 62 00.

2.2 ROOF HATCH

- .1 Furnish and install where indicated on plans metal roof hatch, size width: 36" (914mm) x length: 30 inch (762mm). Length denotes hinge side. The roof hatch shall be single leaf. The roof hatch shall be pre-assembled from the manufacturer.
 - .1 Performance characteristics:
 - .1 Curb shall be thermally broken to prevent heat transfer between interior and exterior surfaces.
 - .2 Cover shall be reinforced to support a minimum live load of 40 psf (195kg/m²) with a maximum deflection of 1/150th of the span or 20 psf (97kg/m²) wind uplift.
 - .3 Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
 - .4 Operation of the cover shall not be affected by temperature.
 - .5 Entire hatch shall be weather tight with fully welded corner joints on cover and curb.
 - .2 Cover: Aluminum extrusion with built in drainage channel and polycarbonate dome. Cover shall have a heavy extruded EPDM rubber gasket bonded to the cover interior to assure a continuous seal when compressed to the top surface of the curb.
 - .3 Curb: Shall be 12" (305mm) in height and of 11-gauge (2.3mm) aluminum. Interior and exterior surfaces shall be thermally broken to minimize heat transfer and to resist condensation. The curb shall be formed with a 5-1/2" (140mm) flange with 7/16" (11mm) holes provided for securing to the roof deck. The curb shall be equipped with an integral metal cap flashing of the same gauge and material as the curb, fully welded at the corners, featuring a flashing system, including stamped tabs, 6" (153mm) on center, to be bent inward to hold single ply roofing membrane securely in place.
 - .4 Curb insulation: Shall be 3" (75mm) thick polyisocyanurate with an R-value = 20.3 (U=0.279 W/m²K).
- .2 Lifting mechanisms: Manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe welded to the curb assembly.
- .3 Hardware:
 - .1 Heavy stainless steel pintle hinges shall be provided
 - .2 Cover shall be equipped with a spring latch with interior and exterior turn handles
 - .3 Roof hatch shall be equipped with interior and exterior padlock hasps.
 - .4 The latch strike shall be a stamped component bolted to the curb assembly.
 - .5 Cover shall automatically lock in the open position with a rigid hold open arm equipped with a 1" (25mm) diameter red vinyl grip handle to permit easy release for closing.
 - .6 Compression spring tubes shall be an anti-corrosive composite material and all other hardware shall be Type 316 stainless steel hardware.

- .7 Cover hardware shall be bolted into heavy gauge channel reinforcing welded to the underside of the cover and concealed within the insulation space.
- .4 Finishes: Factory finish shall be mill finish aluminum.
- .5 Acceptable Products:
 - .1 Bilco GS-50TB Roof Hatch
 - .2 Other acceptable manufacturers offering functionally equivalent products.
 - .1 Submit for review and approval prior to tender close, Refer to 01 61 00.

2.3 LADDER SAFETY POST

- .1 Furnish and install where indicated on plans ladder safety post. The ladder safety post shall be pre-assembled from the manufacturer.
- .2 Performance characteristics:
 - .1 Tubular post shall lock automatically when fully extended.
 - .2 Safety post shall have controlled upward and downward movement.
 - .3 Release lever shall disengage the post to allow it to be returned to its lowered position.
 - .4 Post shall have adjustable mounting brackets to fit ladder rung spacing up to 14" (356mm) on center and clamp brackets to accommodate ladder rungs up to 1-3/4" (44mm) in diameter.
 - .5 Post: Shall be manufactured of high strength square tubing. A pull up loop shall be provided at the upper end of the post to facilitate raising the post.
- .3 Balancing spring: A stainless steel spring balancing mechanism shall be provided to provide smooth, easy, controlled operation when raising and lowering the safety post..
- .4 Hardware: All mounting hardware shall be Type 316 stainless steel.
- .5 Finishes: Factory finish shall be mill finish aluminum.
- .6 Acceptable Products:
 - .1 Bilco, LU-1 LadderUp Safety Post
 - .2 Other acceptable manufacturers offering functionally equivalent products.
 - .1 Submit for review and approval prior to tender close, Refer to 01 62 00.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- .1 Install products in strict accordance with manufacturer's instructions and approved submittals. Locate roof hatch units level, plumb, and in proper alignment with adjacent work.
 - .1 Test units for proper function and adjust until proper operation is achieved.
 - .2 Repair finishes damaged during installation.
 - .3 Restore finishes so no evidence remains of corrective work.

3.3 ADJUSTING AND CLEANING

- .1 Clean exposed surfaces using methods acceptable to the manufacturer which will not damage finish.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (MSDS).
- .2 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S115, Fire Tests of Fire Stop Systems, latest edition.

1.2 DEFINITIONS

- .1 Fire Stop Material: device intended to close off opening or penetration during fire or materials that fill openings in wall or floor assembly where penetration is by cables, cable trays, conduits, ducts and pipes and poke-through termination devices, including electrical outlet boxes along with their means of support through wall or floor openings.
- .2 Single Component Fire Stop System: fire stop material that has Listed Systems Design and is used individually without use of high temperature insulation or other materials to create fire stop system.
- .3 Multiple Component Fire Stop System: exact group of fire stop materials that are identified within Listed Systems Design to create on site fire stop system.
- .4 Tightly Fitted: penetrating items that are cast in place in buildings of non-combustible construction or have "0" annular space in buildings of combustible construction.
 - .1 Words "tightly fitted" should ensure that integrity of fire separation is such that it prevents passage of smoke and hot gases to unexposed side of fire separation.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit ULC system for each penetration.
- .3 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet and include product characteristics, performance criteria, physical size, finish and limitations.
- .4 Mock-up:
 - .1 Construct mock-up for each type of penetration for approval.

1.4 QUALITY ASSURANCE

- .1 All firestop materials shall be from one manufacturer.
- .2 One installer shall install all fore-stopping on the project. Each trade shall not firestop their own work.
- .3 Fire-stopping is to be installed by a contractor who is primarily engaged in the business of installing firestop systems and is to be certified by the manufacturer of the firestop product.

- .4 Contractor must be a member of the Firestop Contractors International Association for at least the most recent two years or CFFM approved equivalent for at least 2 years prior to award of contract.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
 - .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Deliver, store and handle materials in accordance with manufacturer's written instructions.
 - .3 Deliver materials to the site in undamaged condition and in original unopened containers, marked to indicate brand name, manufacturer, ULC markings.
- .2 Storage and Protection:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Fire stopping and smoke seal systems: in accordance with CAN-ULC-S115.
 - .1 Asbestos-free materials and systems capable of maintaining effective barrier against flame, smoke and gases in compliance with requirements of CAN-ULC-S115 and not to exceed opening sizes for which they are intended.
 - .2 Fire stop system rating: One (1) hour fire rating for all electrical rooms.
- .2 Service penetration assemblies: systems tested to CAN-ULC-S115.
- .3 Service penetration fire stop components: certified by test laboratory to CAN-ULC-S115.
- .4 Fire-resistance rating of installed fire stopping assembly in accordance with NBC.
- .5 Fire stopping and smoke seals at openings intended for ease of re-entry such as cables: elastomeric seal.
- .6 Fire stopping and smoke seals at openings around penetrations for pipes, ductwork and other mechanical items requiring sound and vibration control: elastomeric seal.
- .7 Primers: to manufacturer's recommendation for specific material, substrate, and end use.
- .8 Water (if applicable): potable, clean and free from injurious amounts of deleterious substances.
- .9 Damming and backup materials, supports and anchoring devices: to manufacturer's recommendations, and in accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .10 Sealants for vertical joints: non-sagging.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 PREPARATION

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of materials.
 - .1 Ensure that substrates and surfaces are clean, dry and frost free.
- .2 Prepare surfaces in contact with fire stopping materials and smoke seals to manufacturer's instructions.
- .3 Maintain insulation around pipes and ducts penetrating fire separation without interruption to vapour barrier.
- .4 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

3.3 INSTALLATION

- .1 Install fire stopping and smoke seal material and components in accordance with manufacturer's certified tested system listing.
- .2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.
- .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .4 Tool or trowel exposed surfaces to neat finish.
- .5 Remove excess compound promptly as work progresses and upon completion.

3.4 FIELD QUALITY CONTROL

- .1 Inspections: notify Consultant when ready for inspection and prior to concealing or enclosing fire stopping materials and service penetration assemblies.

3.5 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.
- .2 On completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.
- .3 Remove temporary dams after initial set of fire stopping and smoke seal materials.

3.6 SCHEDULE

- .1 Fire stop and smoke seal at:
 - .1 Penetrations through fire-resistance rated gypsum board partitions and walls.
 - .2 Top of fire-resistance rated gypsum board partitions.

- .3 Intersection of fire-resistance rated gypsum board partitions.
- .4 Penetrations through fire-resistance rated floor slabs, ceilings and roofs.
- .5 Openings and sleeves installed for future use through fire separations.
- .6 Around mechanical and electrical assemblies penetrating fire separations.
- .7 All electrical boxes installed in fire-resistance gypsum board partitions.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Preparing substrate surfaces.
- .2 Sealant and joint backing.

1.2 REFERENCES

- .1 ASTM C509 - Standard Specification for Elastomeric Cellular Preformed Gasket and Sealing Material.
- .2 ASTM C834 - Standard Specification for Latex Sealants.
- .3 ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications.
- .4 ASTM C920 - Standard Specification for Elastomeric Joint Sealants.
- .5 ASTM C1184 - Standard Specification for Structural Silicone Sealants.
- .6 ASTM C1193 - Standard Guide for Use of Joint Sealants.
- .7 ASTM C1311- Standard Specification for Solvent Release Sealants.
- .8 ASTM C1330 - Standard Specification for Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.
- .9 ASTM C1401- Standard Guide for Structural Sealant Glazing.
- .10 ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .11 CGSB 19-GP-5M - Sealing Compound, One Component, Acrylic Base, Solvent Curing.
- .12 CGSB-19-GP-14M - Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing.

1.3 PERFORMANCE REQUIREMENTS

- .1 Sealant Design: Design structural sealant to withstand specified loads without breakage, loss, failure of seals, product deterioration, and other defects.

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate with other work having a direct bearing on work of this section.
 - .2 Coordinate the work with all sections referencing this section.

1.5 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission Procedures.
- .2 Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, colour availability.
- .3 Shop Drawings: Indicate sealant joints and dimensions, materials, structural bite, glue-line thickness, joint profile, and support framing.

1.6 SUBMITTALS FOR INFORMATION

- .1 Section 01 33 00: Submission Procedures.
- .2 Installation Data: Manufacturer's special installation requirements.
 - .1 Indicate special procedures, surface preparation, perimeter conditions requiring special attention, field quality control testing.

1.7 QUALITY ASSURANCE

- .1 Products of This Section: Manufactured to ISO 9000 certification requirements.
- .2 Perform work to sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- .3 Perform sealant application work to ASTM C1481 and ASTM C1193.
- .4 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with documented experience.
- .5 Applicator Qualifications: Installer specializing in performing the work of this section with documented experience.

1.8 ENVIRONMENTAL REQUIREMENTS

- .1 Section 01 35 45: Environmental Procedures.
- .2 Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.
- .3 VOC Limitations: for all materials supplied by this Section, the total VOC content must be less than or equal to 250 g/L, less water, when tested to ASTM D2369.
- .4 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada.

1.9 WARRANTY

- .1 Provide a four (4) year extended warranty to include coverage for failure to meet specified requirements.
- .2 Warranty: Include coverage for replacements parts and labour.

Part 2 Products

2.1 SEALANTS

- .1 Siliconized Interior Acrylic Latex Sealant (Type S1): ASTM C834, Type OP, Grade NT; single component, non-staining, non-bleeding, non-sagging; colour as selected.
 - .1 Use: General purpose interior and exterior caulking and as a back-bedding glazing compound. Acoustical seal in the construction of interior walls, ceilings and floors. Suitable for use on vinyl, aluminum and wood siding as well as on bathroom and kitchen fixtures.
 - .2 Elongation Capability +/- 25%.
 - .3 Product: Tremflex 834, manufactured by Tremco.

- .1 Acceptable Alternate Product: PECORA AC-20+silicone; or similar by DowDuPont, 3M, or other sealant manufactures products submitted for review and acceptance during tender period.
- .2 High-modulus Silicone Sealant (Type S2): ASTM C920-14 - Standard Specification for Elastomeric Joint Sealants., Type S, Grade NS, Class Class 50, Use NT, M, G, A, O; single component, moisture curing, non-staining, non-bleeding, non-sagging; colour: as selected
 - .1 Product: Spectrem 1, manufactured by Tremco.
 - .1 Acceptable Alternate Product: PECORA 890NST; or similar by DowDuPont, 3M, or other sealant manufactures products submitted for review and acceptance during tender period.
- .3 Medium-modulus Silicone Sealant (Type S3): ASTM C920-14 - Standard Specification for Elastomeric Joint Sealants.; Type S, Grade NS; Class 50; Use NT, M, G, A, and O; single component, non-sagging, non-staining, non-bleeding, paintable; colour: as selected
 - .1 Use: Two-sided structural glazing; Perimeter and weather seals; Cap, heel and toe beads; Curtain wall or window joints. Used on substrates such as aluminum, glass, steel, painted metal, plastic, stone, concrete and brick. All structural glazing applications must be reviewed and approved by manufacturer prior to application.
 - .2 Product: Spectrem 2, manufactured by Tremco.
 - .1 Acceptable Alternate Product: PECORA 895NST; or similar by DowDuPont, 3M, or other sealant manufactures products submitted for review and acceptance during tender period.
- .4 Single Component Urethane Sealant (Type S4): ASTM C920, Type S, Grade NS, Class 50, Uses T, NT and I; Immersible, single-component, non-sag, traffic-and nontraffic-use, urethane joint sealant.
 - .1 Use: Expansion and control joints, precast concrete panel joints, perimeter caulking (windows, door, panels), aluminum, masonry and vinyl siding.
 - .2 Product: Dymonic 100, manufactured by Tremco.
 - .1 Acceptable Alternate Product: PECORA; or similar by DowDuPont, 3M, or other sealant manufactures products submitted for review and acceptance during tender period.
- .5 Single Component Urethane Sealant (Type S5): ASTM C920 Type S, Grade NS, Class 25, Uses NT, M, A, O; single component, moisture curing, nonstaining, non-bleeding, color as selected.
 - .1 Uses: Expansion and control joints in pre-cast tilt-up concrete, curtain wall joints and perimeter caulking around windows and doors.
 - .2 Product: Dymonic, manufactured by Tremco.
 - .1 Acceptable Alternate Product: PECORA Dynatrol I-XL; or similar by DowDuPont, 3M, or other sealant manufactures products submitted for review and acceptance during tender period.
- .6 Multi-Component Urethane Sealant (Type S6): ASTM C920 Type M, Grade P, Class 25, Uses T; self leveling, multi-component, chemical curing, non-staining, nonbleeding, color as selected.

- .1 Uses: A self-leveling joint sealant for use in any traffic rated horizontal expansion or control joint. Used in parking garages, plazas, terrace decks, floors and sidewalk joints.
- .2 Product: THC 900/901, manufactured by Tremco;
 - .1 Acceptable Alternate Product: PECORA or similar by DowDuPont, 3M, or other sealant manufactures products submitted for review and acceptance during tender period.
- .7 Synthetic Rubber Sealant (Type S7): single component, non-skinning, non-hardening synthetic rubber sealant.
 - .1 Uses: Acoustical sealing of drywall partitions, corridors and party walls. This sealant also is used as a lap joint and perimeter sealant for polyethylene vapor barriers over fiberglass batt or other insulations and may be used in contact with polystyrene.
 - .2 Product: Acoustical Sealant, manufactured by Tremco.
 - .1 Acceptable Alternate Product: PECORA AIS-919; or similar by DowDuPont, 3M, or other sealant manufactures products submitted for review and acceptance during tender period.
- .8 Sanitary Silicone Sealant (Type S8): ASTM C920, Type S, Grade NS, use NT, G, A, and O; single component, acetoxo curing, non-sagging, non-staining, mildew resistant; colour as selected.
 - .1 Uses: A weathertight seal to glass, metal, porcelain, ceramic and most painted surfaces. Clear with fungicide for use in bathrooms, spas and similar applications where joints need protection against fungi and bacteria.

2.2 ACCESSORIES

- .1 Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- .2 Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- .3 Joint Backing: ASTM C1330; round, closed cell polyethylene foam rod; oversized 30 to 50% larger than joint width.
- .4 Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.
- .5 Masking tape: Non-staining, non-absorbent type compatible with sealant and adjacent surfaces.
- .6 Setting Blocks and Spacers: Compatible with silicone sealant and recommended by sealant manufacturer.

2.3 COLOURS

- .1 Unless indicated otherwise, in respective technical specification sections, colour selection is to be by Consultant, from standard range.

Part 3 Execution

3.1 EXAMINATION

- .1 Section 01 71 00: Examination and Preparation. Verify existing conditions before starting work.
- .2 Verify that joint openings and substrate surfaces are clean, dry, and free of frost and ready to receive work.
- .3 Verify that joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

- .1 Remove loose materials and foreign matter which might impair adhesion of sealant.
- .2 Clean and prime joints to sealant manufacturer's written instructions.
- .3 Perform preparation to sealant manufacturer's written instructions.
- .4 Protect elements surrounding the work of this section from damage or disfiguration.

3.3 INSTALLATION

- .1 Install sealant to sealant manufacturer's written instructions.
- .2 Measure joint dimensions and size materials to achieve 2:1 width/depth ratios.
- .3 Install joint backing to achieve a neck dimension no greater than 1/3 of the joint width.
- .4 Install bond breaker where joint backing is not used.
- .5 Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- .6 Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- .7 Tool joints as detailed concave.

3.4 CLEANING

- .1 Section 01 74 22 - Construction and Demolition Waste Management.
- .2 Clean adjacent soiled surfaces.

3.5 PROTECTION OF FINISHED WORK

- .1 Remove masking tape and excess sealant.
- .2 Protect sealants until cured, remove temporary glass supports.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Pressed steel door frames.
- .2 Hollow metal doors.
- .3 Exterior Interior glazed light frames.
- .4 Louvres.

1.2 REFERENCES

- .1 ASTM A653/A653M-10 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .2 ASTM C578-10a - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation.
- .3 ASTM C591-09 - Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation.
- .4 ASTM C665-06 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
- .5 ASTM C1289-10 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
- .6 ASTM E90-09 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- .7 ASTM E413-10 - Classification for Rating of Sound Insulation.
- .8 CAN4-S104-M80 (R1985) - Fire Tests of Door Assemblies.
- .9 CAN4-S105-85 (R1992) - Fire Door Frames Meeting the Performance Required by CAN4-S104.
- .10 CAN/ULC-S701-11 - Standard for Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .11 CAN/ULC-S702-09 - Standard for Mineral Fibre Thermal Insulation for Buildings.
- .12 CAN/ULC-S704-11 - Standard for Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
- .13 CSA-G40.20-04/G40.21-04 (R2009) - General Requirements for Rolled or Welded Structural Quality Steel/ Structural Quality Steel.
- .14 CSA-W59-03 (R2008) - Welded Steel Construction (Metal Arc Welding).
- .15 CSDMA (Canadian Steel Door Manufacturers Association).
 - .1 Recommended Dimensional Standards for Commercial Steel Doors and Frames, 2000.
 - .2 Selection and Usage Guide for Commercial Steel Doors and Frames, 2009.
- .16 DHI A115.16-1994 - Installation Guide For Doors And Hardware.
- .17 NFPA 80 - Standard for Fire Doors and Other Opening Protectives, 2010 Edition.

- .18 NFPA 252 - Fire Tests of Door Assemblies (2008 Edition).

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:

- .1 Coordinate with other work having a direct bearing on work of this section.
.2 Coordinate the work with frame opening construction, door, and hardware installation.

- .2 Sequencing: Sequence installation to ensure hardware wiring connections are achieved in an orderly and expeditious manner.

1.4 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submittal Procedures.

- .2 Product Data: Indicate door and frame configurations and finishes, location of cut-outs for hardware reinforcement.

- .3 Shop Drawings:

- .1 Indicate frame elevations, reinforcement, anchor types and spacing, location of cut-outs for hardware, and finish.
.2 Indicate door elevations, internal reinforcement, closure method, and cut-outs for glazing, louvers, and finishes.

1.5 SUBMITTALS FOR INFORMATION

- .1 Section 01 33 00: Submittal Procedures.

- .2 Installation Data: Manufacturer's special installation requirements.

- .3 Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

- .1 Conform to requirements of CSDMA.

- .2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five (5) years documented experience.

1.7 REGULATORY REQUIREMENTS

- .1 Fire Rated Door and Frame Construction: Labelled and listed to CAN4-S104 and NFPA 252.

- .2 Installed Door and Frame Assembly: Conform to NFPA 80 for fire rated class as scheduled.

1.8 DELIVERY, STORAGE, AND PROTECTION

- .1 Section 01 61 00: Transport, handle, store, and protect products.

- .2 Remove doors and frames from wrappings or coverings upon receipt on site and inspect for damage.

- .3 Store in vertical position, spaced with blocking to permit air circulation between components.

- .4 Store materials on planks or dunnage, out of water and covered to protect from damage.

- .5 Clean and touch up scratches or disfigurement caused by shipping or handling with zinc-rich primer.

1.9 WARRANTY

- .1 Provide extended warranty to include coverage for failure to meet specified requirements, to the following term:
 - .1 Exterior Doors: Four (4) Years
 - .2 Interior Doors: Four (4) Years
- .1 Provide warranty to include coverage for failure to meet specified requirements.

Part 2 Products

2.1 MATERIALS

- .1 Sheet Steel: Galvanized steel to ASTM A653/A653M, commercial grade (CS), Type B.
 - .1 Exterior Doors: coating designation G90 (Z275).
 - .2 Interior Doors: Coating designation G40 (Z120).
- .2 Reinforcement channel: To CSA G40.20/G40.21, Type 44W, coating designation to ASTM A653/A653M, ZF75 (A25).

2.2 DOOR CORE MATERIALS

- .1 Honeycomb Core: Structural small cell 25.4 mm (1 inch) maximum kraft paper honeycomb; weight 36.3 kg (80 lb) per ream minimum, density 16.5 kg/cu m (1.03 lbs/cu ft) minimum, sanded to required thickness.
- .2 Polystyrene Core: ASTM C578, Type 1, rigid extruded fire retardant, closed cell board, density 16 kg/cu m (1.0 lbs/cu ft) thermal value minimum of RSI 1.0 (R 5.9) per door.
- .3 Polyisocyanurate Core: ASTM C591, Type I, rigid modified polyisocyanurate, closed cell board, 32 kg/cu m (2.0 lbs/cu ft), thermal value minimum of RSI 1.9 (R 11) per door.

2.3 ADHESIVES

- .1 Cores and Steel Components: Heat resistant, structural reinforced epoxy, resin based adhesive.
- .2 Lock Seam: Reinforced epoxy resin, high viscosity, thixotropic sealant.

2.4 PRIMERS

- .1 Primer: Rust inhibitive touch-up only.

2.5 ACCESSORIES

- .1 Door Silencers: Single stud rubber/neoprene.
- .2 Exterior Top Caps: Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.
- .3 Frame Thermal Breaks: Rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19MA.

- .4 Removable Glazing Stops: Formed galvanized steel channel, minimum 16 mm (5/8 inch) high, accurately fitted, butted at corners and fastened to frame sections with counter-sunk tamper proof sheet metal screws.
- .5 Bituminous Coating: Fibred asphalt emulsion.
- .6 Weatherstripping: Specified in Section 08 71 10 - Door Hardware – Common Requirements.

2.6 FABRICATION - DOORS

- .1 Exterior Doors: Laminated core construction.
- .2 Interior Doors: Laminated core construction.
- .3 Longitudinal Edges: mechanically interlocked, tack welded with no visible edge seams.
- .4 Mortised, blanked, reinforced, drilled and tapped for templated hardware, in accordance with templates provided by hardware supplier.
- .5 Reinforce for surface mounted hardware, anchor hinges, thrust pivots, pivot reinforced hinges, or non-templated hardware.
- .6 Top and Bottom Channels: Inverted, recessed, welded steel channels.
- .7 Exterior Door: Flush PVC top caps.
- .8 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.

2.7 LAMINATED CORE CONSTRUCTION

- .1 Exterior Doors: Both face sheets 1.6 mm 16 gauge steel, with polyisocyanurate core, laminated under pressure to face sheets.
- .2 Interior Doors: Both face sheets 1.2 mm 18 gauge steel with honeycomb core or polystyrene core (for fire rated doors up to 3 hours), laminated under pressure to face sheets.

2.8 FABRICATION - FRAMES

- .1 Exterior Frames: 2.0 mm 14 gauge thick base metal thickness.
 - .1 Welded or knock-down frame types may be used for fire rated openings up to and including 3 hours. Gypsum board slip on types may only be used for openings rated less than 3 hours.
 - .2 Frames: Welded type construction thermally broken.
 - .3 Transom Frames, Sidelight and Window Assemblies: Welded type construction thermally broken.
- .2 Interior Frames: 1.6 mm 16 gauge thick base metal thickness.
 - .1 Door Frames and Window Assemblies: Welded type construction.
 - .2 Transom Frames: welded type construction.
 - .3 Sidelight Assemblies: Welded type construction.
- .3 Transom Bars for Glazed Lights: Fixed type, of same profiles as jamb and head.
- .4 Mortised, blanked, reinforced, drilled and tapped for templated hardware, in accordance with templates provided by hardware supplier. Provide mortar guard boxes.

- .5 Reinforce frames wider than 1200 mm with roll formed steel channels fitted tightly into frame head, flush with top.
- .6 Prepare frames for silencers. Provide three (3) single silencers for single doors and mullions of double doors on strike side. Provide two (2) single silencers on frame head at double doors without mullions.
- .7 Attach fire rated label to each fire rated door unit.
- .8 Fabricate frames to suit masonry wall coursing with 75 mm head member.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify that opening sizes and tolerances are acceptable, check floor area within path of door swing for flatness.
- .2 Verify doors and frames are correct size, swing, rating and opening number.
- .3 Remove temporary shipping spreaders.

3.2 INSTALLATION

- .1 Install doors and frames to CSDMA.
- .2 Install fire-rated doors and frames in accordance with NFPA 80, and local authority having jurisdiction.
- .3 Coordinate with masonry , gypsum board , and concrete wall construction for anchor placement.
- .4 Coordinate installation of glass and glazing.
- .5 Coordinate installation of doors and frames with installation of hardware specified in Section 08 71 10.
- .6 Set frames plumb, square, level and at correct elevation.
- .7 Secure anchorages and connections to adjacent construction.
- .8 Brace frames rigidly in position while building-in. Install wood spreaders at third points of frame rebate height to maintain frame width. Provide vertical support at centre of head for openings exceeding 1200 mm in width.
- .9 Remove wood spreaders after frames have been built-in.
- .10 Make allowance for deflection to ensure structural loads are not transmitted to frame product.
- .11 Install doors, and hardware in accordance with hardware templates and manufacturer's instructions.
- .12 Adjust operable parts for correct clearances and function.
- .13 Install louvers, glazing and door silencers.
- .14 Install roll formed steel reinforcement channels between two abutting frames. Anchor to structure and floor.

3.3 ERECTION TOLERANCES

- .1 Maximum Diagonal Distortion: 3mm measured with straight edges, crossed corner to corner.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Pre-finished aluminum doors, frames, and windows for interior use.

1.2 REFERENCES

- .1 Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
- .2 AAMA 603.8 - Performance Requirements and Test Procedures for Pigmented Organic Coatings on Extruded Aluminum.
- .3 AAMA 607.1 - Guide Specification and Inspection Methods for Clear Anodize Finishes for Architectural Aluminum.
- .4 AAMA 608.1 - Guide Specification and Inspections Methods for Electrolytically Deposited Color Anodic Finished for Architectural Aluminum.
- .5 AAMA 609 & 610-02 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum.
- .6 ASTM B221 - Standard specification for aluminum and aluminum-alloy extruded bars, rods, wire, profiles, and tubes.
- .7 NAAMM - "Metal Finishes Manual for Architectural and Metal Products".
- .8 ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
- .9 ANSI A117.1 - Accessible and Usable Buildings and Facilities.
- .10 ICC/IBC - International Building Code.

1.3 SUBMITTALS

- .1 Submit under the provisions of Section 01 30 00.
- .2 Product Data: For each type of product indicated. Include construction details, material descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.
- .3 Templates: Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the interior aluminum door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
- .4 Shop Drawings: Include the following:
 - .1 Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - .2 Locations of reinforcement and preparations for hardware.
 - .3 Details of each different wall opening condition. Include requirements for steel framing at partitions for fit and securing of frames, partition widths and tolerances, direction of framing members, clips and attachments.
 - .4 Details of anchorages, joints, field splices, and connections.
 - .5 Details of accessories.

- .6 Details of moldings, removable stops, and glazing.
- .7 Elevations of each door design.
- .8 Details of doors, including vertical and horizontal edge details and metal thicknesses.
- .9 Details of preparations for power, signal, and control systems.
- .5 Samples for Verification: Provide at the request of architect, prepared Samples as indicated below:
 - .1 Framing Member: 12 inches long.
 - .2 Corner Fabrication: 12-by-12-inch-long, full-size window corner, including full-size sections of extrusions with factory-applied color finish.
 - .3 Aluminum chips in full range manufacturer's standard finishes for architect's color selection.
- .6 Interior Aluminum Door and Frame Schedule: Use same designations indicated on Drawings. Coordinate with Door Hardware schedule and glazing.
- .7 Informational Submittals
 - .1 Certificates of Compliance: Submit any product test report or information necessary to indicate compliance with this specification section.

1.4 QUALITY ASSURANCE

- .1 Source Limitations: Obtain interior aluminum frames and doors through one source from a single qualified manufacturer.
- .2 Manufacturer Qualifications: A firm experienced in the manufacturing of interior aluminum framing systems and doors with a minimum five (5) years successful in-service performance providing product similar to those indicated for this project, including pre-engineering and pre-fabricating all components of aluminum framing systems and doors.
- .3 Installer Qualifications: An experienced installer with a minimum five years (5) experience who has completed aluminum framing systems and door installations similar in material, design, and extent to those indicated for this project and whose work has resulted in construction with a record of successful in-service performance.
- .4 Aesthetic Effects: Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.
- .5 Fire-Rated Door Assemblies: 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 (neutral pressure at 40" above sill) or UL 10C.
 - .1 Provide labels permanently fastened on each frame or door within size limits established by NFPA and the testing authority.
- .6 Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Label each individual glazed lite.
- .7 Smoke-Control Door Assemblies: Comply with NFPA 105.

- .8 Pre-Installation Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing interior aluminum frames and doors and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.5 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver interior aluminum frames and doors individually protective wrapped within cartons and marked for the corresponding scheduled opening. Do not bulk pack frames.
- .2 Inspect frames upon delivery for damage.
 - .1 Repair minor damage to pre-finished products as recommended by manufacturer.
 - .2 Replace frames that cannot be satisfactorily repaired.
- .3 Store interior aluminum frames and doors at Project site under cover and as near as possible to final installation location. Do not use covering material that will cause discoloration of aluminum finish.

1.6 PROJECT CONDITIONS

- .1 Field Measurements: Verify actual dimensions of interior aluminum frame openings by field measurements before fabrication and indicate measurements on Shop Drawings submittals.
- .2 Do not install aluminum frames and doors until area of work has been completely enclosed and interior is protected from the elements.
- .3 Maintain temperature and humidity in areas of installation within reasonable limits, as close as possible to final occupancy standards. If necessary, provide artificial heating, cooling and ventilation to maintain required environmental conditions.

1.7 WARRANTY

- .1 Provide manufacturer's written warranty against defects in materials and workmanship upon final completion and acceptance of Work in this section.
 - .1 Warrant framing and door finishes against defects and excessive fading and non-uniformity in color for a period of 5 years.

Part 2 Products

2.1 MANUFACTURERS

- .1 Kawneer, Inframe
 - .1 Other acceptable manufacturers offering functionally and aesthetically equivalent products.
 - .1 PC350
 - .2 Frameworks
- .2 Substitutions: Refer to Section 01 62 00.

2.2 MATERIALS

- .1 Extruded Aluminum: ASTM B 221 alloy 6063-T5 or alloy and temper required to suit structural and finish requirements.

2.3 INTERIOR ALUMINUM FRAMES

- .1 Provide interior aluminum framing components complying with dimensions, profiles, and relationships to adjoining work of components as indicated on Drawings. Provide frames that are adjustable for partition types and throat openings, or that are fitted to each partition type, meeting the throat opening and required clearances per frame manufacturer's recommendations. Reinforce for specified hinges, strikes, and closers.
- .2 Framing System: Provide frames with the following characteristics:
 - .1 Rectilinear design.
 - .2 1-1/2 inch face profile.
 - .3 Snap on trim:
 - .1 1-1/2 inch. (Extended Lip Strike Plate Required)
 - .4 0.070 inch rabbet wall thickness.
 - .5 Standard throat sizes (drywall partition thickness): 3-1/2", 3-3/4", 4-5/8", 4-7/8", 5-1/4", 5-1/2", 6-1/8" and 7-1/4".
 - .6 Adjustable throat frames expandable from 2-7/8" up to 8-3/8".
- .3 Glass Trim: Extruded aluminum, not less than 0.062 inch thick, designed for glass thickness indicated with removable snap-in casing trim, glazing stops, and door stops without exposed fasteners.

2.4 ACCESSORIES

- .1 Fasteners: Aluminum, nonmagnetic, stainless-steel or other noncorrosive metal fasteners compatible with frames, stops, panels, reinforcement plates, hardware, anchors, and other items being fastened.
- .2 Door Silencers: Manufacturer's standard continuous mohair, wool pile, or vinyl seals.
- .3 Glazing Gaskets: Manufacturer's standard extruded or molded plastic, to accommodate glazing thickness indicated.
- .4 Glazing: Comply with requirements in Division 08 Section, "Glazing."
- .5 Hardware: As specified in Division 08 Section, "Door Hardware".

2.5 FABRICATION

- .1 Frame Construction
 - .1 Factory pre-engineer and pre-cut interior aluminum frame components to the greatest extent practical. Linear glazing components fabricated in the field are not allowed. Allow for 2 inches excess vertical length for scribing to suit floor conditions. Machine jambs and prepare for hardware, with concealed plates, drilled and tapped as required, fastened in frame with concealed screws.
 - .2 Provide concealed corner reinforcements and alignment clips for precise joints at butt or mitered connections.
 - .3 Hardware Preparation: Factory interior aluminum frames to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tap-

ping according to the Door Hardware Schedule and templates as specified in Division 08 Section, "Door Hardware."

- .1 Reinforce frames to receive surface mounted door hardware. Machine jambs and prepare for hardware, with concealed reinforcement plates, drilled and tapped as required and fastened within frame with concealed screws.
 - .2 Locate hardware as indicated.
 - .3 Coordinate locations of conduit, wiring boxes, and power transfers for electrical connections with Division 26 Sections.
 - .4 Fabricate frames for glazing with removable stops to allow glazing replacement without dismantling frame.
 - .5 Fabricate all components to allow secure installation without exposed fasteners.
- .2 Door Construction
- .1 Factory pre-engineer aluminum doors and components to the greatest extent practical.
 - .2 Hardware Preparation: Factory interior aluminum doors to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates as specified in Division 08 Section, "Door Hardware."
 - .1 Reinforce doors to receive surface mounted door hardware. Machine and prepare for hardware, with concealed reinforcement plates, drilled and tapped as required and fastened within door with concealed screws.
 - .2 Locate hardware as indicated.
 - .3 Coordinate locations of conduit and power transfers for electrical connections with Division 26 Sections.
 - .3 Clearances for Non-Fire-Rated Door Frames: Not more than 1/8 inch at jambs and heads, not more than 1/4 inch between pairs of doors. Not more than 3/4 inch at bottom.
 - .4 Fabricate kits for glazing with removable stops to allow glazing replacement without dismantling.
- .3 Aluminum Finishes
- .1 General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products' for recommendations for apply and designated finishes. Exposed surfaces to be free of scratches and other serious blemishes.
 - .2 Factory finish extruded frame components so that any part exposed to view upon completion of installation will be uniform in finish and color.
 - .3 Clear anodic coating: Comply with AAMA 607.1.
 - .1 Class 2, AAM12C22A31 clear anodized coating, 0.4-0.7 mil thickness minimum.

Part 3 Execution

3.1 EXAMINATION

- .1 Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- .2 Verify wall thickness does not exceed standard tolerances allowed by specified frame throat sizes.
- .3 General Contractor to verify the accuracy of dimensions given to frame and door manufacturer for pre-cut openings.
- .4 Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- .1 General: Install and set interior aluminum frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
 - .1 At fire-protection-rated openings, install frames according to NFPA 80.
- .2 Install frame components in the longest possible lengths with no component less than 48 inches.
 - .1 Fasten to suspended ceiling grid at 48 inches on center maximum, using #6 sheet metal screws or other fasteners approved by frame manufacturer.
 - .2 Use concealed installation clips to produce tightly fitted and aligned splices and connections.
 - .3 Secure clips to extruded main-frame components and not to snap-in or trim members.
 - .4 Do not use screws or other fasteners exposed to view when installation is complete.

3.3 ADJUSTING AND CLEANING

- .1 Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition.
- .2 Clean exposed frame surfaces promptly after installation, using cleaning methods recommended by frame manufacturer and according to AMMA 609 & 610.
- .3 Touch up marred areas so that touch up is not visible from a distance of 48 inches. Remove and replace frames that cannot be satisfactorily repaired.

3.4 PROTECTION

- .1 Provide protection as required to assure that frames will be without damage or deterioration upon substantial completion of the project.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Wood doors; flush and flush glazed configuration; non-rated.

1.2 REFERENCES

- .1 ASTM E413-10 - Classification for Rating of Sound Insulation.
- .2 AWMAC - Architectural Woodwork Standards (AWS) – 1st Edition, 2009.
- .3 CHPVA (Canadian Hardwood Plywood and Veneer Association).

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:
 - .1 Coordinate with other work having a direct bearing on work of this section.
 - .2 Coordinate the work with door opening construction, door frame and door hardware installation.

1.4 SUBMITTALS FOR REVIEW

- .1 Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- .2 Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria.

1.5 SUBMITTALS FOR INFORMATION

- .1 Installation Data: Manufacturer's special installation requirements.

1.6 QUALITY ASSURANCE

- .1 Perform work in accordance with AWMAC Quality Standards, Custom Grade.
- .2 Finish doors in accordance with AWMAC Quality Standards to finish identified in schedule.
- .3 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five (5) years documented experience and a member in good standing with AWMAC.

1.7 DELIVERY, STORAGE, AND PROTECTION

- .1 Section 01 61 00: Transport, handle, store, and protect products.
- .2 Package, deliver, and store doors in accordance with AWMAC.
- .3 Accept doors on site in manufacturer's packaging. Inspect for damage.
- .4 Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

1.8 WARRANTY

- .1 Provide extended warranty to include coverage for failure to meet specified requirements, to the following term:
 - .1 Interior Doors: Five (5) years.
 - .2 Include coverage for warping beyond specified installation tolerances, telegraphing core construction, delamination of veneer, and defective materials.

Part 2 Products

2.1 DOOR LEAF TYPES

- .1 Interior Doors: 19mm (1 $\frac{3}{4}$ inch) thick; solid core construction, rated as indicated.

2.2 DOOR LEAF CONSTRUCTION

- .1 Core (Solid, Non-Rated): AWMAC Section 1300, Type PC - Particleboard.

2.3 DOOR FACING

- .1 High-Pressure Decorative Laminate Plastic Laminate Facing (Interior): NEMA LD-3, Grade HGS Type, 3.2 mm thick, satin finish.
 - .1 Colour: selected from standard wood colour product range.

2.4 ADHESIVE

- .1 Facing Adhesive: Type II - water resistant.

2.5 ACCESSORIES

- .1 Glazing Stops: Wood Permanent, rectangular shape, mitred corners; prepared for countersink style finish nail and wood filler.

2.6 FABRICATION

- .1 Fabricate non-rated doors in accordance with AWMAC Quality Standards requirements.
- .2 Provide lock blocks at top of door for closer and lock edge for hardware reinforcement.
- .3 Vertical Exposed Edge of Stiles: Of same species as veneer facing, transparent finish.
- .4 Fit door edge trim to edge of stiles after applying veneer facing.
- .5 Bond edge banding to cores.
- .6 Factory machine doors for finish hardware in accordance with hardware requirements and dimensions. Do not machine for surface hardware. Provide solid blocking for through bolted hardware.
- .7 Factory fit doors for frame opening dimensions identified on shop drawings.
- .8 Provide edge clearances in accordance with AWMAC.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify that opening sizes and tolerances are acceptable.
- .2 Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

3.2 INSTALLATION

- .1 Install non-rated doors in accordance with AWMAC Quality Standards requirements.
- .2 Install fire rated doors to NFPA 80.
- .3 Trim non-rated door width by cutting equally on both jamb edges.
- .4 Trim door height by cutting bottom edges to a maximum of $\frac{3}{4}$ inch. Trim fire door height at bottom edge only, in accordance with fire rating requirements.
- .5 Machine cut for hardware.
- .6 Coordinate installation of doors with installation of frames specified in Section 08 12 16 and 08 11 13 and hardware specified in Section 08 71 10.
- .7 Install door louvres plumb and level.

3.3 INSTALLATION TOLERANCES

- .1 Section 01 73 00: Refer to tolerances.
- .2 Conform to AWMAC requirements for fit and clearance tolerances.
- .3 Conform to AWMAC Section 1300 requirements for maximum diagonal distortion.

3.4 ADJUSTING

- .1 Adjust door for smooth and balanced door movement.
- .2 Adjust closer for full closure.

3.5 SCHEDULES

- .1 Refer to door schedule on drawings for location of product.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Aluminum doors and frames.
- .2 Vision glass and insulated metal glass infill panels.
- .3 Door hardware.
- .4 Perimeter sealant.

1.2 REFERENCES

- .1 AA (Aluminum Association) DAF 45-2003 - Designation System for Aluminum Finishes.
- .2 AAMA CW-DG-1-96 (R2005) - Aluminum Curtain Wall Design Guide Manual.
- .3 AAMA CWG-1-89 (R2004) - Installation of Aluminum Curtain Walls.
- .4 AAMA CW-10-04 - Care and Handling of Architectural Aluminum from Shop to Site.
- .5 AAMA 501-05 - Methods of Test for Exterior Walls.
- .6 AAMA 501.1-05 - Standard Test Method for Water Penetration of Windows, Curtain Walls and Doors Using Dynamic Pressure.
- .7 AAMA 611-98 - Voluntary Specifications for Anodized Architectural Aluminum.
- .8 AAMA 2603-02 - Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
- .9 AAMA 2605-05 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- .10 AAMA RPC-00 - Rain Penetration Control.
- .11 AAMA SFM-1-87 (Reissued 2002) - Aluminum Store Front and Entrance Manual.
- .12 ASTM A36/A36M-08 - Standard Specification for Carbon Structural Steel.
- .13 ASTM A123/A123M-09 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
- .14 ASTM A653/A653M-10 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .15 ASTM B209M-07 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .16 ASTM B221M-07 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
- .17 ASTM E283-04 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

- .18 ASTM E330-02(2010) - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .19 ASTM E331-00(2009) - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
- .20 ASTM E1105-00 (2008) - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference.
- .21 CAN/CGSB 1.40-97 - Anticorrosive Structural Steel Alkyd Primer.
- .22 CAN/CGSB 1.181-99 - Ready-Mixed Organic Zinc-Rich Coating.

1.3 SYSTEM DESCRIPTION

- .1 Aluminum entrances and storefront system includes tubular aluminum sections with supplementary internal support framing, shop fabricated, factory finished, vision glass, insulated metal panel infill glass infill, related flashings, anchorage and attachment devices.
- .2 System Assembly: Site assembled.

1.4 PERFORMANCE REQUIREMENTS

- .1 System Design: Design and size components to withstand dead loads and live loads caused by positive and negative wind loads acting normal to plane of wall as measured in accordance with ASTM E330.
- .2 Deflection: Limit mullion deflection to flexure limit of glass of span; with full recovery of glazing materials.
- .3 System Assembly: Accommodate without damage to components or deterioration of seals, movement within system, movement between system and peripheral construction, dynamic loading and release of loads, deflection of structural support framing.
- .4 Air Infiltration: Limit air infiltration through assembly to (0.3 l/s/sq m) 0.06 cfm/min/sq ft of wall area, measured at a reference differential pressure across assembly of (75 Pa) 1.57 psf as measured to ASTM E283.
- .5 Vapour Seal: Limit vapour seal with interior atmospheric pressure of (25 mm) sp, 22 degrees C), 40% RH without seal failure. Maintain continuous air barrier throughout assembly, primarily in line with inside pane of glass and heel bead of glazing compound.
- .6 Water Leakage: None, when measured to AAMA 501.1.
- .7 Expansion / Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 95 degrees C over a 12 hour period without causing detrimental effect to system components and anchorage.
- .8 System Internal Drainage: Drain water entering joints, condensation occurring in glazing channels, or migrating moisture occurring within system, to the exterior by a weep drainage network.

1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination:

- .1 Coordinate with other work having a direct bearing on work of this section.
 - .1 Coordinate the Work with installation of vapour retarder firestopping air barrier components or materials.
 - .2 Pre-Installation Meeting: Convene one (1) week before starting work of this section.

1.6 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, [door hardware and internal drainage details].
- .3 Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work and expansion and contraction joint location and details.
- .4 Design Data: Provide framing member structural and physical characteristics.

1.7 CLOSEOUT SUBMITTALS

- .1 Section 01 78 10: Submission procedures.
- .2 Warranty Documentation: Submit manufacturer warranty and ensure forms have been completed in City Representative's name and registered with manufacturer.

1.8 QUALITY ASSURANCE

- .1 Products of This Section: Manufactured to ISO 9000 certification requirements.
- .2 Perform Work in accordance with AAMA SFM-1.
- .3 Conform to requirements of NBCC code for accessibility.
- .4 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten (10) years documented experience.
- .5 Installer Qualifications: Installer specializing in performing the work of this section with minimum five (5) years documented experience and approved by the manufacturer. Contractor to submit names and experience of individuals performing the work of this section.
- .6 Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed at the place where the Project is located.

1.9 MOCK-UP

- .1 Section 01 45 00: Quality Assurance, requirements for mock-up.
- .2 Materials of this section are to be included in an Automatic Entrance Mockup.
- .3 Provide 10 sq.m mock-up including perimeter glazing members, intermediate glazed joints, intermediate exterior mullions vision glass light, and insulated infill panel and glass Assemble to illustrate component assembly including glazing materials, weep drainage system, attachments, anchors, and perimeter sealant.
- .4 Locate where directed.
- .5 Approved mock-up may remain as part of the Work.

1.10 DELIVERY, STORAGE, AND PROTECTION

- .1 Section 01 61 00: Transport, handle, store, and protect products.
- .2 Handle Products of this section in accordance with AAMA CW-10.
- .3 Protect finished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.

1.11 ENVIRONMENTAL REQUIREMENTS

- .1 Section 01 35 26: Environmental conditions affecting products on site.
- .2 Do not install sealants when ambient temperature is less than 5 degrees C during and 48 hours after installation.

1.12 WARRANTY

- .1 Section 01 78 00: Closeout Submittals.
- .2 Correct defective Work within a four (4) year period after Substantial Completion.
- .3 Warranty: Include coverage for complete system for failure to meet specified requirements.
- .4 Provide four (4) year extended warranty for glazed units.

Part 2 Products

2.1 MANUFACTURERS

- .1 Exterior (Vestibule) Framing Product
 - .1 Refer to Section 08 43 00 –Aluminum Stick-Built Curtainwall.
- .2 Interior (Vestibule) Framing Product
 - .1 Commdoor; Product: 1450
 - .2 Other acceptable manufacturers offering functionally [and aesthetically] equivalent products.
 - .1 Kawneer; Product: 451.
 - .2 Anotec; Product: Series 60 I.
 - .3 Substitutions: Refer to Section 01 62 00.
- .3 Interior Swing Door Product
 - .1 Door manufacturer to match glazing frame manufacturer.
 - .2 Interior Door Type 1:
 - .1 Alumicor; Product: Canadiana Series, 600B; or,
 - .2 Functionally and aesthetically similar product by alternate Interior (Vestibule) Framing product manufacturer.
 - .1 Commdoor; Product: 175
 - .3 Interior vestibule doors to match aesthetic style of exterior vestibule doors.
- .4 Exterior Entrance Frame Product: Refer to Section 08 43 00 –Aluminum Stick-Built Curtainwall;.

- .5 Exterior Swing Door Product
 - .1 Door manufacture to match, or be accepted by, the glazing frame manufacture.
 - .2 Thermally broken doors.
 - .3 Exterior Door Type 1
 - .1 Alumicor; Product: Thermaporte 7700 Series, T600B ; or,
 - .2 Functionally and aesthetically similar product by alternate aluminum curtainwall framing manufacturer.
 - .1 Commdoor; Product: 4200

2.2 MATERIALS

- .1 Extruded Aluminum: ASTM B221/B221M.
- .2 Sheet Aluminum: ASTM B209/ASTM B209M.
- .3 Fasteners: Stainless steel.

2.3 COMPONENTS

- .1 Flashings: (1.5 mm) 1/16 in thick aluminum ; secured with concealed fastening method; finish to match mullion sections where exposed.
- .2 Firestopping: Specified in Section 07 84 00.
- .3 Air Barrier: Specified in Section 07 27 13.

2.4 GLASS AND GLAZING MATERIALS

- .1 Glass and Glazing Materials: As specified in Section 08 80 50.

2.5 SEALANT MATERIALS

- .1 Sealant and Backing Materials:
 - .1 Perimeter Sealant: Type as specified in Section 07 92 00.
 - .2 Sealant Used Within System (Not Used for Glazing): Type as specified in Section 07 92 00.

2.6 HARDWARE

- .1 Refer to Section 08 71 10 – Door Hardware Common Requirements. Hardware supplied and installed by this contractor.
- .2 Aluminum threshold supplied and installed by this contractor.
 - .1 Aluminum threshold full-width, thermally-broken, ADA compliant.
 - .2 Depth: to cover concrete slab joint between interior and exterior.
 - .3 Seal aluminum threshold to slab with neoprene sill gasket or mastic to prevent direct contact with concrete and provide a continuous water-seal.
 - .4 Secure threshold to slab with colour matched non-corrosive anchors.
- .3 Weatherstripping supplied and installed by this contractor.
 - .1 Continuous seal at head and jamb
 - .1 Frame mounted adjustable seal.
 - .2 Seal material to be heat and UV-resistant silicone.

- .2 Continuous seal at door bottom
 - .1 Nylon brush seal

2.7 FABRICATION

- .1 Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal.
- .2 Accurately fit and secure joints and corners. Make joints flush, hairline, and weatherproof.
- .3 Prepare components to receive anchor devices. Fabricate anchors.
- .4 Arrange fasteners and attachments to conceal from view.
- .5 Reinforce interior horizontal head rail to receive blind track brackets and attachments.
- .6 Prepare components with internal reinforcement for door hardware and door operator hinge hardware.
- .7 Reinforce framing members for imposed loads.

2.8 FINISHES

- .1 Clear Anodic Coating: AAMA 611.
 - .1 Location: Interior and exterior exposed aluminum surfaces.
- .2 Concealed Steel Items:
 - .1 Primed with iron oxide paint.
- .3 Apply two (2) coats of bituminous paint to concealed aluminum surfaces in contact with cementitious or dissimilar materials.
- .4 Shop and Touch-Up Primer for Steel Components: CAN/CGSB-1.40.
- .5 Touch-Up Primer for Galvanized Steel Surfaces: CAN/CGSB-1.181.
- .6 Extent of Finish:
 - .1 Apply factory coating to all surfaces exposed at completed assemblies.
 - .2 Apply finish to surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
 - .3 Apply touch-up materials recommended by coating manufacturer for field application to cut ends and minor damage to factory applied finish.

Part 3 Execution

3.1 EXAMINATION

- .1 Section 01 71 00: Verify existing conditions before starting work.
- .2 Verify dimensions, tolerances, and method of attachment with other work.
- .3 Verify wall openings and adjoining air and vapour seal materials are ready to receive work of this Section.

3.2 INSTALLATION

- .1 Install wall system in accordance with AAMA CWG-1.

- .2 Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- .3 Provide alignment attachments and shims to permanently fasten system to building structure.
- .4 Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- .5 Provide thermal isolation where components penetrate or disrupt building insulation.
- .6 Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- .7 Coordinate attachment and seal of perimeter air barrier materials.
- .8 Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
- .9 Install flashings and seal to air barrier.
- .10 Set thresholds in bed of mastic and mechanically fastened to substrate.
- .11 Install hardware using manufacture templates. Refer to Section 08 71 00 for installation requirements.
- .12 Install glass and infill panels in accordance with Section 08 80 50, to glazing method required to achieve performance criteria.
- .13 Install perimeter sealant to method required to achieve performance criteria in accordance with Section 07 92 00.
- .14 Cut (25 mm) 1" diameter hole at top of frame for installation of door contacts where required. Coordinate location with Section 08 71 00 Door Hardware and Electrical Contractor.

3.3 ERECTION TOLERANCES

- .1 Maximum Variation from Plumb: (1.5 mm/ m) 1/16 in/ yd non-cumulative or (1.5 mm/ 3 m) 1/16 in 10 ft, whichever is less.
- .2 Maximum Misalignment of Two Adjoining Members Abutting in Plane: (0.8 mm) 1/32 in.

3.4 FIELD TEST AND QUALITY CONTROL

- .1 The City Representative may engage the services of an independent inspection and testing company to carry out inspection and testing of work of this Section.
- .2 Field Quality Control
 - .1 An inspection program for window wall shall comply with the general requirements.
 - .2 Visual review of glass edges for chips, crushes, spalls and of edge seals for lack of continuity, exposed spacers.
 - .3 Review of substructure framing installation (studs, girts, starter channels)
 - .4 Verification of proper insulation, air and vapour barrier installation
 - .5 Checks of all interface and termination seals against other elements.

- .6 Checks of the continuity of air and vapour barriers for continuity, penetrations and correct orientation.
- .3 Field Testing:
 - .1 Test criteria for field tests shall be reduced to 80% of the design specification and design criteria.
 - .1 A test will receive a Pass or Fail based on testing criteria.
 - .2 Three (3) test locations will be selected by testing company. If a Pass is achieved at each test location, the testing will end.
 - .3 If a test location receives a Fail, the testing will be repeated at the location until a Pass is achieved. The contractor will repair the curtainwall system as needed for re-testing.
 - .4 Each time a test location Fails one (1) additional test location will be selected for testing.
 - .5 Testing will continue until all test locations achieve a Pass.
 - .4 Field Quality Control Report
 - .1 A quality control report will be prepared by the independent inspection and testing company. The contractor will correct all reported deficiencies in the product system.
- 3.5 ADJUSTING**
 - .1 Adjust operating hardware for smooth operation.
- 3.6 CLEANING**
 - .1 Section 01 74 00: Cleaning installed work.
 - .2 Remove protective material from pre-finished aluminum surfaces.
 - .3 Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
 - .4 Remove excess sealant by method acceptable to sealant manufacturer.
- 3.7 PROTECTION OF FINISHED WORK**
 - .1 Protect finished Work from damage.

END OF SECTION

Part 1 General

1.1 WORK INCLUDED

- .1 Provide labour, materials, products and services to design, fabricate, supply and install stick-built curtain wall assemblies specified herein.
- .2 The work of this Section shall include supply and install prefinished aluminum framed glazed stick-built curtain wall including insulating glass unit at vision panels, spandrel glass; including all prefinished metal flashings, corner post etc.
- .3 The work in above-mentioned Zones shall include, but is not necessarily limited to the following:
 - .1 Dual sealed, thermally broken, pressure equalized, compartmentalized stick-built cladding systems as required and /or specified herein and indicated on Drawings.
 - .2 Compartmentalized spandrel panels, including cavity wall insulation, drainage/pressure equalization holes and galvanized metal air vapour barrier work as required and / or specified herein and indicated on Drawings.
 - .3 Horizontal and vertical expansion joints, c/w flexible membrane, cover plate assemblies (stainless steel or as otherwise noted), accessories, adhesives and sealant: between Curtainwall assemblies and adjacent wall and roof materials.
 - .4 Tested and approved firestopping between back of curtain wall and edge of slab complete with galvanized steel sheet sealed to the slab where required to meet acoustic criteria.
 - .5 Pre-finished aluminum formed components at termination and closure points as indicated and required to meet design requirements.
 - .6 Out-of-sequence infill areas and overlaps with other trades as defined and coordinated by Contractor.
 - .7 Fixing plates, brackets and assemblies required for complete installation including embeds. Coordinate embed installation. Monitor installation work done by others.
 - .8 Fire containment system at spandrels and firesafing and smoke seal between concrete floor assembly and curtain wall, including mechanical safing clips.
 - .9 Protective film on interior horizontal mullions and vertical and horizontal mullions and removal of same film.
 - .10 Swing doors, access doors / stick-built curtains, within wall assemblies and lobby systems, including all preparation to receive finish hardware, supply and installation of such hardware except cylinders and door contacts supplied by others.
 - .11 Exterior entrance and vestibule Doors and Frames in accordance with Drawings and Schedules, c/w all required powered openers/closers, maglocks, sensors and call buttons mounted on stand-alone internal and external pedestals. Provide concealed wire-ways and any local reinforcing to external frames and doors which are to have security devices.

1.2 REFERENCE

- .1 AAMA/WDMA/CSA/101/I.S.2/A440 – North American Fenestration Standard/ Specification for stick-built curtains, doors and skylights

- .2 American Association Manual for Aluminum design guideline
- .3 CAN/CSA-S157-05 – Strength Design in Aluminum ASTM E 283 – Standard test method for determining rate of air leakage through exterior stick-built curtains, curtain walls and doors under specified pressure differences across the specimen
- .4 CAN/CGSB-12.2—M89 for Glass
- .5 ASTM E1300-16 - Standard Practice for Determining Load Resistance of Glass in Buildings
- .6 ASTM E 331 – Standard test method for water penetration of exterior stick-built curtains, skylights, doors and curtain walls by uniform static air pressure difference
- .7 ASTM E 501.1 - Standard test method for water penetration of exterior stick-built curtains, curtain walls and doors using dynamic air pressure
- .8 ASTM E 330/E330M-14 – Standard test method for structural performance of exterior stick-built curtains, door, skylights and curtain walls by uniform static air pressure difference
- .9 ASTM E 501.5 – Standard test method for thermal cycling of exterior walls
- .10 AAMA 501.4 – Recommended static test method for evaluating curtain wall and storefront systems subjected to seismic and wind induced inter-story drifts
- .11 AAMA 501.7 – Recommended static test method for evaluating stick-built curtains, stick-built curtain wall, curtain wall and storefront systems subjected to vertical inter-story movements
- .12 ASCE/SEI 7-10 – Minimum design loads for buildings and other structures
- .13 ASTM E1105 – Standard test method for field determination of water penetration of installed exterior stick-built curtains, skylights, doors and curtain wall
- .14 CAN/ULC S134 – Standard method of fire test of exterior wall assemblies
- .15 CAN/CGSB-82.1-M89 for Sliding Doors
- .16 CAN/CGSB-82.5-M for Swing Doors

1.3 DESIGN RESPONSIBILITY

- .1 Minor dimension adjustments to that shown may be made in the proposed design in the interest of fabrication or erection methods or techniques, provided that the design intent and the intent of the specifications are maintained.

1.4 ENVIRONMENTAL CONDITIONS

- .1 Winter interior conditions of 21°C at 35% relative humidity down to 0°C exterior temperature then reducing on a sliding scale to 20% relative humidity at winter design exterior temperature.
- .2 Winter exterior temperature -18°C at 24 km/h wind.
- .3 Summer interior conditions of 24.5°C.
- .4 Summer exterior conditions of 33°C.

1.5 DESIGN CRITERIA - GENERAL

- .1 Comply with the design and performance requirements of the applicable building code and as specified, and design and engineer the work accordingly.
- .2 Work of this Section designed by a Consultant Prince Edward Island registered Professional Engineer with at least ten years of experience with the design of similar structures,
- .3 Assumptions have been made as to the magnitude, direction and points of application of the loads imposed on the structure by the building envelope assemblies. This information is available from the Consultant and the stick-built curtain wall assembly should conform to any limitations imposed.
- .4 Include cladding, glazing, insulation, air/vapour barriers, metal trims, closures, fascias, flashings, vents, anchorage, fixings, reinforcing, and related items of work to provide a complete cladding system to meet the design criteria.
- .5 Design building envelope assemblies, members and their connections to withstand, within acceptable deflection limitations as specified, their own weight, the weight of the glass, loads imposed by the motion of operable elements, the loads imposed by the stick-built curtain washing equipment and the maximum design loads and combination of loads due to snow, rain, ice, seismic loads, the pressure and suction of wind and internal pressure.
- .6 Exterior stick-built curtain wall assemblies are to be pre-glazed stick-built modular system.
- .7 The rain screen principle including provisions for pressure equalization and compartmentalization is to be used for all stick-built curtain wall elements and assemblies.
- .8 Locate sealants, air/vapour seals, thermal breaks, thermal separations, drainage slots on the shop drawings as specified in this Section and all stick-built curtain wall joinery is to be sealed.
- .9 Glazed stick-built curtain wall systems shall be designed to accommodate estimated structural long and short-term movements of the building. The structure will deform under the influence of transient and sustained loadings.
- .10 Vent spandrel cavities to the outside air to adequately reduce heat build-up.
- .11 Glass units shall withstand thermal stresses. Glass units shall also withstand thermal stresses created by shadowing of exterior components or assembly and elevated interstitial space temperatures.
- .12 Labels of all types shall not be visible on the finished work, except where identification of safety glass as required by code.
- .13 Stick-built curtain wall design and installation shall accommodate installation of construction hoist bays at designated locations, including tie-ins from the hoist assembly and completion of stick-built curtain wall installation upon removal of the hoist.

1.6 DESIGN CRITERIA - WIND LOAD

- .1 Provide design based on IBC Table 1609.3.1; or minimum design pressure of ± 1.5 kPa.
- .2 Consider ASCE/SEI 7 for increasing designation as height increases above grade where applicable.

1.7 DESIGN CRITERIA - STRUCTURAL

- .1 Design aluminum elements in accordance with CAN3-S157 or American Association Manuel.
- .2 Design glass to applicable requirements of CAN/CGSB-12.20 or AAMA E1300. Design glass not to exceed a statistical probability of failure of 8 units per 1000 units representing a safety factor of 2.5.
- .3 Elastic deflection limits for mullions: $L/175$ of the span vertically, under design loading for spans less than or equal to 4110mm; $L/240 + 6\text{mm}$ for spans greater than 4110mm.
- .4 Deflection limits for sheet metal air/vapour barriers including back-pans shall be $L/60$ of short span.
- .5 No permanent deformation, disengagement or breakage, of any cladding component shall occur under loading equal to 1.5 times the design loads. Permanent deformation is defined as deflection without recovery exceeding $L/1000$.
- .6 Provide safety glass as required to meet the building code requirements.
- .7 Design integrated stick-built curtain washing tie backs to resist loads generated by stick-built curtain washing stage not less than 2.67kN (600 Lb) applied in any direction.
- .8 Fixed stick-built curtain shall meet performance class AW-PG60 when tested in accordance with AAMA/WDMA/CSA 101 I.S.2/A440 and CSA A440SI-09.
- .9 Operable stick-built curtain shall meet performance class AW-PG60 when tested in accordance with AAMA/WDMA/CSA 101 I.S.2/A440 and CSA A440SI-09.

1.8 DESIGN CRITERIA - RAIN SCREEN PRINCIPLE

- .1 Provide for positive drainage of water entering cladding systems provided under this Section, to exterior face of building in accordance with NRC "Rain Screen Principle".
- .2 Incorporate "Rain Screen" design principles including but not limited to.
- .3 Compartmentalization seals to be air and watertight capable of supporting design air pressure differences.
- .4 Provide positive drainage at compartment seals.

1.9 DESIGN CRITERIA – AIR INFILTRATION

- .1 Static pressure air infiltration: Air infiltration through the completed portions of the cladding systems shall not exceed 0.06 CFM/ft² for Fixed and 0.10 CFM/ft² for operable stick-built curtain at 300 Pa static pressure difference when tested in accordance with ASTM E283.

1.10 DESIGN CRITERIA – WATER, VAPOUR AND MOISTURE

- .1 No uncontrolled water other than condensation on interior surface of any component at a pressure difference of 700Pa when tested in accordance with ASTM E331.

1.11 DESIGN CRITERIA - THERMAL

- .1 Stick-built curtain wall to sustain thermal movement at 140°F when tested in accordance with AAMA 501.5; without causing buckling stress on glass, joint seal failure and undue stress on structural elements.

- .2 Thermal performance of the glazing shall be simulated using simulation software Unitized curtain by Lawrence Berkley Laboratories (LBL), or similar. Thermal performance of the framing shall be simulated using THERM by LBL or similar.
- .3 Maximum estimated U values for the stick-built curtain wall including glass, framing and edge effects when simulated per NFRC standards using LBL thermal simulation software; shall be 2.10 W/m²K (0.38 BTU/h·ft²·F) for fixed vision stick-built curtain manufactured unit, 2.56 W/m²K (0.45 BTU/h·ft²·F) for operable stick-built curtain manufactured unit, 0.750 W/m²K (0.13 BTU/h·ft²·F) for spandrel manufactured unit. Conditions are based on winter design night-time air temperatures.

1.12 DESIGN CRITERIA – SEISMIC AND STORY DRIFT

- .1 Building classification based on IBC Table 1604.5.
- .2 Seismic design category from IBC Table 1613.5.6(1) or Table 1613.5.6(2).
- .3 Horizontal story-drift (Elastic) of $\pm 0.75''$ when tested in accordance with AAMA 501.04-09.
- .4 Inter-story vertical displacement of $\pm 0.375''$ when tested in accordance with AAMA 501.07-11.
- .5 Seismic horizontal movement (Inelastic) of $\pm 2.5''$ when tested in accordance with AAMA 501.04-09.

1.13 DESIGN CRITERIA – ACOUSTIC

- .1 Sound transmission class (STC) of the stick-built curtain wall system shall not be less than 32, when tested to ASTM E90.

1.14 SUBMITTALS

- .1 Shop drawings bearing seal and signature of registered, licensed professional engineer.
- .2 Submit 3 colour samples on actual substrates (3" by 3"), indicating color expected in finished work.
- .3 Submit 3 samples of 12" by 12" insulating glass unit for consultant's approval.
- .4 Hardware samples for consultant's approval.
- .5 Operation and maintenance procedures for care and cleaning of the stick-built curtain wall system.
- .6 Executed warranties; signed by manufacturer authorized individual excluding installation.

1.15 QUALITY ASSURANCE

- .1 The firm producing and executing the work of this section shall have a minimum of Ten consecutive years of experience in work of similar scope and nature to that specified.
- .2 The work of this section shall be installed and adjusted by experienced workers in accordance with specified standards, manufacturer's published directions and Consultant reviewed shop drawings.
- .3 The Stick-built curtain Wall Contractor shall be prepared to prove to the City Representative's satisfaction, that he has adequate facilities and skilled personnel suitable for the design, engineering, detailing, fabricating and installation of stick-built curtain wall assemblies.

- .4 Glass and glazing work under this section shall conform to the Insulating Glass Manufacturers Association and to the recommendations of the glass and sealed glazing unit manufacturers.
- .5 Qualified Installers: Completed five projects, minimum of similar magnitude using systems similar to systems specified here in last three years. Furnish reference list of completed projects for review and verification.

1.16 MOCK-UP

- .1 Section 01 45 00: Quality Assurance, requirements for mock-up.
- .2 Provide (10 sq.m) 100 sq.ft mock-up including perimeter glazing members, intermediate glazed joints, intermediate exterior mullions vision glass light, and insulated infill panel and glass Assemble to illustrate component assembly including glazing materials, weep drainage system, attachments, anchors, and perimeter sealant.
- .3 Locate where directed.
- .4 Approved mock-up may remain as part of the Work.

1.17 DELIVERY, STORAGE, HANDLING

- .1 Store material in location and manner to avoid damage. Stack to prevent bending.
- .2 Store aluminum materials and components in clean, dry location, away from uncured concrete and masonry.
- .3 Do not use adhesive papers or sprayed coatings which will become bonded when exposed to the sun. Remove temporary protection after installation or as per manufacturer instructions. Do not leave coating residue on any surface.

1.18 WARRANTY

- .1 Warrant the work of this Section against defects in materials and workmanship for a period of 2 years. Warrant that work will be water and weather tight, structurally sound and free from distortion and deformation under load.
- .2 Warrant the insulating glass and glass seal against defects for period of 5 years. Warrant that the insulating glass units be free from material obstruction of vision as a result of dust or film formation on the internal glass surfaces by any cause, under normal conditions, other than extrinsic glass breakage, but including breakage due to thermal shock and temperature differential due to inherent glass or glazing faults.
- .3 Warrant the spandrel glass against defects for period of 5 years. Warrant that the spandrel glass is free from any visual defects by any cause other than extrinsic glass breakage but including breakage due to thermal shock and temperature differential due to inherent glass or glazing faults.
- .4 Warrant the aluminum stick-built curtain frame finish against defects for period of 10 years.
- .5 Misuse or abuse of the product will not be covered by warranty.

Part 2 Products

2.1 MANUFACTURERS

- .1 Acceptable manufacturers: Product of manufacturers listed below meeting indicated standards and specified manufacturer's product data characteristics, except as modified below, are acceptable for use, subject to approval of product and samples.
- .2 Manufacturer:
 - .1 Commodore: 8200 Curtain wall system.
 - .2 Other manufactures offering comparable products include:
 - .1 Kawneer; Product: 1600 UT System 1 .
 - .2 Alumicor; Thermal Wall 2600
 - .3 Anotec. 3400 Series

2.2 MATERIALS

- .1 Extrusions: ASTM B221. 6061T6 & T5 and 6063 - T6 & T5 aluminum alloy.
- .2 Aluminum sheet for break metal: ASTM B209, 5005-H34 aluminum alloy, minimum 0.08" thickness.
- .3 Fasteners: (a) Concealed: Zinc plated carbon steel (b) Exposed: AGC2000 or equivalent corrosion resistant coated steel fasteners (c) Stainless Steel fasteners as per manufacturer standard.
- .4 Sealant: Non-skinning type; colour to match the finish is exposed.
- .5 Setting blocks: EPDM or silicone as per manufacturer standard, 85±5 Shore durometer.
- .6 Gaskets: EPDM as per manufacturer standard

2.3 FINISHES

- .1 Colour Anodic Coating: AAMA 611, Class I, AA-M12C22A44.
 - .1 Colour: Clear.
 - .2 Location: Interior and exterior exposed aluminum surfaces.

2.4 MANUFACTURED UNITS

- .1 Framing System: Aluminum stick-built curtain system consisting extruded aluminum section of 6061-T5/T6, 6063-T5/T6 aluminum alloy; designed with rain screen, pressure equalized principle.
- .2 Glazing Units: Refer to Section 08 80 50 - Glass and Glazing.
- .3 Doors: Refer to Section 08 41 13 - Aluminum Frame Entrances.

2.5 FABRICATION

- .1 Fabricate in accordance with final reviewed shop and erection drawings and approved samples.
- .2 As far as practical, execute fitting and assembly in the shop with the various parts or assemblies ready for erection at the building site.
- .3 Fabricate members to the profiles shown on the Drawings.

Part 3 Execution

3.1 EXAMINATION

- .1 Before commencing installation, examine the work of other Sections to which work of this Section will be attached.
- .2 Report immediately in writing to the Consultant all discrepancies in accuracy and suitability which will adversely affect the work of this Section. Report surfaces left unacceptable by other trades to the Consultant before commencing installation.

3.2 PREPARATION

- .1 Supply anchorage devices and inserts to the appropriate trades where required for building in or casting-in-place and instruct as to proper location and position.
- .2 Ensure that masonry and concrete surfaces to receive sealants are dry, firm, sound, smooth, suitable for bond, and free from loose material, projections, ice, frost, slick, grease, oil and other matter detrimental to bond.

3.3 INSTALLATION

- .1 Acceptable Installers:
 - .1 Installers for stick-built curtain wall should have minimum of five (5) years of experience with similar projects.
 - .2 Installers for stick-built curtain wall must be qualified and experienced to meet the criteria per manufacturer's requirement.
 - .3 Installers for stick-built curtain wall must satisfy indicated standards and criterion listed in Quality Assurance section above.
 - .4 Pre-installation meeting must be held to discuss installation sequence to ensure manufacturer's criteria is satisfied.
 - .5 Questions regarding stick-built curtain wall shop drawings, layout, anchoring, waterproofing etc. are to be raised prior to commencing of subjected work, by way of RFI process.
- .2 General:
 - .1 Erect all work plumb and true and in proper alignment and relationship to established lines and grades.
 - .2 Devices for anchoring the frame assemblies shall have sufficient adjustment to permit correct and accurate alignment. After alignment, positively secure anchorage devices to prevent movement other than those designed for expansion and contraction. Take into consideration climatic conditions prevailing at time of installation.
 - .3 Coordinate work of this Section with and provide connection for compartmentalization as provided under other Sections.
 - .4 Provide thermal insulation and air/vapour barriers compatible and continuous with adjacent thermal and air/vapour barrier systems.
 - .5 Ensure a uniform, continuous thermal and vapour barrier effect. Where adjacent insulation and vapour barriers are to be provided under other Sections, coordinate the work such that thermal and vapour barrier continuity is achieved.
 - .6 Isolate metal air/vapour barriers with thermal breaks and spacers.

- .7 Gun-apply a continuous bead of sealant to all joints and air/vapour barrier junctions with adjacent construction. Liberally butter screw fastenings with sealant.
 - .8 Supply and install flexible, continuous membrane and gasket air/vapour barrier seals between work of this Section and adjacent construction, and at deflection and expansion connections, where required. Apply membrane to concrete and masonry with adhesive and retain with continuous aluminum or galvanized steel plates or bars and non-corrosive mechanical fasteners.
 - .9 Provide airtight seals at penetrations in air/vapour barriers.
 - .10 Adhere stick clips for insulation to metal air/vapour barriers at 305 mm o/c both ways.
 - .11 Cut insulation as required and fit snugly to penetrations, obstructions, openings and corners. Butt insulation boards tightly. Cut out back of board insulation as required to accommodate substrate irregularities and build up over cut out areas on the other side as required to ensure thermal barrier uniformity unless otherwise indicated or approved.
 - .12 Press insulation boards firmly and tightly to barrier or substrate impaling them on clips without bending clips. Butt insulation boards tightly at joints. Install retainers to clips.
 - .13 Fill irregular shaped voids within assemblies with fibrous packing insulation to maintain continuity of thermal barrier.
 - .14 Supply and install flexible sheet waterproofing membrane at each slab edge, copings and parapets. Lap, adhere, and seal joints in membrane in accordance with recommendations of the membrane manufacturer to provide a watertight, continuous membrane.
- .3 Sealants:
- .1 Seal joints between frame assemblies and adjacent construction except where specified to be done under other Sections, and within glazed assemblies where required to maintain weather tightness and integrity of air/vapour barrier.
 - .2 Ensure that ambient and surface temperatures and joint conditions are suitable for the materials to be installed.
 - .3 Ensure that surfaces to be sealed are sound, dry and free from dirt, water, frost, loose scale, corrosion, or other contaminants which may adversely affect the performance of the sealant materials. Remove protective oil coatings or films and other oil or grease films.
 - .4 Install joint filler strips as backup for sealant to provide optimum joint profile, but not less than 6mm depth of sealant bead.
 - .5 If recommended by the manufacturer of the sealant materials, prime joints to prevent staining, or to assist the bond.
 - .6 Use sufficient pressure to fill all voids and joints full. Sealants shall bond to all sides of joint except where filler material is used. Where filler material is used, sealant shall bond to both sides of joints and shall not adhere to the filler material.
 - .7 Ensure that the correct sealant depth is maintained.
 - .8 Sealant installations shall be a full bead free from air pockets and embedded impurities and having smooth surfaces, free from ridges, wrinkle and sags.
 - .9 After joints have been filled, tool them neatly to a slightly concave surface finish.

3.4 FIELD TEST AND QUALITY CONTROL

- .1 The City Representative may engage the services of an independent inspection and testing company to carry out inspection and testing of work of this Section.
- .2 Field Quality Control
 - .1 An inspection program for stick-built curtain wall shall comply with the general requirements.
 - .2 Visual review of glass edges for chips, crushes, spalls and of edge seals for lack of continuity, exposed spacers.
 - .3 Review of substructure framing installation (studs, girts, starter channels)
 - .4 Verification of proper insulation, air and vapour barrier installation
 - .5 Checks of all interface and termination seals against other elements.
 - .6 Checks of the continuity of air and vapour barriers for continuity, penetrations and correct orientation.
- .3 Field Testing:
 - .1 Test criteria for field tests shall be reduced to 80% of the design specification and design criteria.
 - .1 A test will receive a Pass or Fail based on testing criteria.
 - .2 Three (3) test locations will be selected by testing company. If a Pass is achieved at each test location, the testing will end.
 - .3 If a test location receives a Fail, the testing will be repeated at the location until a Pass is achieved. The contractor will repair the curtainwall system as needed for re-testing.
 - .4 Each time a test location Fails one (1) additional test location will be selected for testing.
 - .5 Testing will continue until all test locations achieve a Pass.
- .4 Field Quality Control Report
 - .1 A quality control report will be prepared by the independent inspection and testing company. The contractor will correct all reported deficiencies in the product system.

3.5 CLEANING

- .1 General Cleaning:
 - .1 Keep installed work clean as work progresses.
 - .2 Clean and make good surfaces soiled or otherwise damaged in connection with the work of this Section. Replace finishes or materials that cannot be satisfactorily touched up, cleaned or which have been damaged by improper cleaning materials and techniques.
 - .3 Remove concrete and alkali wash-offs on surfaces to prevent etching of glass, metal, and finishes.
 - .4 Remove temporary protective materials, labels, and coatings.
 - .5 At completion of the work of this Section, remove all debris, equipment and excess material resulting from the work of this Section from the site.
- .2 Final Cleaning:

- .1 At completion of the work of this Section, remove all debris, equipment and excess material resulting from the work of this Section from the site.
- .2 Avoid using sharp edges, blades or any tools having sharp edges.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 Canadian Steel Door and Frame Manufacturers' Association (CSDFMA).
- .2 CSDFMA Canadian Metric Guide for Steel Doors and Frames (Modular Construction): standard hardware location dimensions.
 - .1 Canadian General Standards Board (CGSB).
 - .2 ANSI/BHMA A156.1-2021, Butts and Hinges.
 - .3 ANSI/BHMA A156.2-2017, Locks and Latches.
 - .4 ANSI/BHMA A156.3-2020, Exit Devices.
 - .5 ANSI/BHMA A156.4-2019, Door Control-Closers.
 - .6 ANSI/BHMA A156.5-2020, Cylinders and Input Devices for Locks.
 - .7 ANSI/BHMA A156.6-2021, Architectural Door Trim.
 - .8 ANSI/BHMA A156.7-2016, Hinge Templates.
 - .9 ANSI/BHMA A156.8-2021, Door Control-Overhead Stops and Holders.
 - .10 ANSI/BHMA A156.13-2017, Mortise Locks.
 - .11 ANSI/BHMA A156.14-2019, Sliding and Folding Doors.
 - .12 ANSI/BHMA A156.15-2021, Release Devices-Closer Holder Electromagnetic.
 - .13 ANSI/BHMA A156.16-2018, Auxiliary Hardware.
 - .14 ANSI/BHMA A156.18-2020, Materials and Finishes.
 - .15 ANSI/BHMA A156.19-2019, Power Assist and Low Energy Power Operated Doors.
 - .16 ANSI/BHMA A156.21-2019, Thresholds.
 - .17 ANSI/BHMA A156.22-2021, Door Gasketing.
 - .18 ANSI/BHMA A156.25-2018, Electrified Locking Devices.
 - .19 ANSI/BHMA A156.26-2021, Continuous Hinges.
 - .20 ANSI/BHMA A156.31-2019, Electric Strikes and Frame Mounted Actuators.

1.2 SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Samples:
 - .1 Submit samples, when requested, in accordance with Section 01 33 00 - Submittal Procedures.
 - .2 Identify each sample by label indicating applicable specification paragraph number, brand name and number, finish, and hardware package number.
 - .3 After approval samples will be returned for incorporation in the Work.
- .3 Hardware List:
 - .1 Submit contract hardware list in accordance with Section 01 33 00 - Submittal Procedures.

- .1 Submit per standard DHI format for finish hardware schedules, Indicate specified hardware, including make, model, material, function, size, finish and other pertinent information.
- .2 Manufacturer's Instructions:
 - .1 Submit manufacturer's installation instructions.
- .3 Closeout Submittals
 - .1 Provide operation and maintenance data for door closers, locksets, door holders, electrified hardware, and fire exit hardware for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.3 QUALITY ASSURANCE

- .1 Regulatory Requirements:
 - .1 Hardware for doors in fire separations and exit doors certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .3 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .4 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

- .1 Packing, Shipping, Handling and Unloading:
 - .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
 - .2 Package each item of hardware including fastenings, separately or in like groups of hardware, label each package as to item definition and location.
- .2 Storage and Protection:
 - .1 Store finishing hardware in locked, clean and dry area.

1.5 WASTE DISPOSAL AND MANAGEMENT

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Dispose of corrugated cardboard, polystyrene, and plastic packaging material in appropriate on-site bin for recycling in accordance with site waste management program.

1.6 MAINTENANCE

- .1 Extra Materials:
 - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Provide operation and maintenance data for door closers, locksets, door holders and fire exit devices for incorporation into manual.

- .1 Brief maintenance staff regarding proper care, cleaning and general maintenance of door hardware items.
- .2 Supply two sets of wrenches for door closers, locksets, and fire exit hardware.
- .3

Part 2 Products

2.1 HARDWARE ITEMS

- .1 Use one manufacturer's products only for all similar items.
- .2 Alternate hardware product manufacturers must submit for review and approval prior to tender close.

2.2 DOOR HARDWARE

- .1 Butts and hinges:
 - .1 Butts and hinges: to CAN/CGSB-69.18, designated by letter A and numeral identifiers, followed by size and finish, listed in Hardware Schedule.
 - .2 Butt hinges on exterior doors and locked doors opening out shall have non-removable pins (NRP) and doors equipped with door closers, or in high traffic areas, shall have ball bearing (BB) hinges.
 - .3 Continuous hinges shall be Grade 1, heavy duty, geared-type, single section, full mortise, and UL 10C listed and approved. Hinges shall provide full height door support with 2" knuckles and nylon bearings (32) at each separation for quiet, smooth and self-lubricating operation. Hinge material to be 6063-T6 Clear Anodized Aluminum, and support door weight up to 450 lbs. Hinges shall have symmetrical hole pattern and minimum of 21 fasteners on each leaf, and be non-handed. Finish to be Clear Aluminum - 628.
- .2 Locks and latches - mortise:
 - .1 Mortise locks and latches: to ANSI/BHMA A156.13-2017, Series 1000 mortise lock, Grade 1 operational and Grade 1 security, ULC Listed for A label doors, with all functions available in one size case;
 - .2 Mortise locks shall have a full ¾" throw two-piece mechanical anti-friction latchbolt, a one-piece stainless steel 1" throw deadbolt, and handing of locks shall be reversible without disassembly of the lock case.
 - .3 Lever handle trim must have concealed through bolt mounting, and the levers are to be solid cast, curved design with a return to the door face. All locks are to have heavy duty cast mounting plates, threaded hub and locking nut, and stainless-steel interlocking spindle. Levers to have vandal-resistant free-wheeling handles on exterior doors. Lever handle design to be Dane.
- .3 Roses or Escutcheons: Round design 'A', as listed in schedule.
 - .1 Normal strikes: box type, lip projection not to exceed 19mm beyond jam.
- .4 Cylinders: SFIC Core keyed 7-pin, keyway to match existing keyway system.
 - .1 Finish to be Satin Chrome Plated - 626.
 - .2 Locks and latches - cylindrical:

- .3 Locksets and latchsets are to be heavy duty cylindrical, lever type, and meet ANSI Grade 1 or 2, A156.2-2011, A117.1 Accessibility, and ULC requirements. Supply vandal proof lever handle trim on exterior doors, or where specified.
- .4 Lever handle trim must have concealed through bolt mounting, and the levers are to be solid cast with a return to the door face. All locks are to have heavy duty cast mounting plates, threaded hub and locking nut, and stainless steel interlocking spindle. Lever handle design to be Dane.
- .5 Provide 20mm latch throw for pairs of labeled doors, or where specified.
- .6 Roses or Escutcheons: Round design 87mm O.D., as listed in schedule.
- .7 Normal strikes: box type, lip projection not to exceed 6mm beyond jam.
- .8 Cylinders: SFIC Core keyed 7-pin, keyway to match existing keyway & keying system.
- .9 Finish to be Satin Chrome Plated - 626.
- .5 Exit Devices:
 - .1 To be heavy duty, Grade 1, rim or vertical rod, surface or concealed type, pushbar design, wide stile, to meet ANSI, ULC, NFPA and ADA certification, to have thru-bolted trim, to be field reversible, and sizeable, and with hex key dogging. All lever trims to be free-wheeling, vandal-resistant, and all devices to have ¾" throw deadlocking latchbolts.
 - .2 Finish to be Satin Chrome 626, for complete devices and trim. Functions and trims to be as listed in Hardware Schedule.
 - .3 Door Closers and Accessories:
 - .1 Door controls (closers): to meet or exceed ANSI A156.4 Grade 1 requirements; to be heavy-duty cast aluminum bodies with adjustable spring power and have separate valves for latching, closing and backcheck control. All closer arms to be forged steel with power adjustment arm bracket.
 - .2 All closers are to be non-sized to suit door and opening, and to have full covers with finish 689. Brackets, shoes, and plates are to be included for proper mounting of closers. All closers shall have minimum 25 - year warranty.
- .6 Overhead stops/holders:
 - .1 Door controls (overhead stops/holders): to meet or exceed ANSI A156.8 Grade 1 requirements; to be heavy duty slide track type with heavy duty shock absorber spring and non-metal slide block and shock block, non-handed.
 - .2 Type 304 stainless steel material in stainless steel 630 finish.
- .7 Power Door Operators:
 - .1 Power assist and low energy power operated doors: to CAN/CGSB-69.35.; to meet ANSI A117.1, A156.19, and ADA requirements; heavy duty, complete with corrosion resistant coating, for exterior door use.
 - .2 All operators are to meet ANSI A156.19 Grade 1, ADA, UBC 7.2, and UL10C requirements; to be heavy duty electromechanical powered system, adjustable spring size, multi-function, with valve adjustable sweep and latch closing speeds, and back check cushioning.
 - .3 Operator features to include digital control box, dual independent program memories, on-board diagnostics, on-board power supply, plug & play sensors,

- “No Destruct” drive system, electronic circuit protection, visual function indicators, and programming mode.
- .4 To have adjustable delay time, opening time/opening force, safety slow/stop, auto reverse/closing, and electric lock delay opening angle and door width selector, and be finished in 689.
- .5 Acceptable Materials:
- .1 LCN 9540 Series
- .2 Horton 4100 Series
- .3 Besam 200i Series
- .8 Auxiliary hardware; door stops:
- .1 ANSI/BMHA A156.16-1989, designated by letter and numeral identifiers, as listed in Hardware Schedule, finished to 626.
- .1 Floor stops, dome type, cast brass, finished 626.
- .2 Wall stops, convex or concave, cast brass, finished 626.
- .3 Flush Bolts, metal door type, cast brass, finished 626.
- .9 Auxiliary locks:
- .1 To meet ANSI A156.16 -1989 requirements, to be heavy-duty and finished in 626.
- .2 Cylinders: Security type, rim or mortise type, finished to 626, for installation in deadlocks provided with special doors as listed in Hardware Schedule.
- .10 Architectural door trim:
- .1 To meet ANSI A156.6-1994 requirements, type 304 stainless steel, finished 630.
- .2 Door protection plates: kick plate type 304 stainless steel, 1.27 mm thick stainless steel, finished to 630.
- .3 Push plates: type 304 stainless steel, 1.27 mm thick stainless steel, finished to 630.
- .4 Push/Pull units: type 304 stainless steel, 25.4 mm thick stainless steel, finished to 630AM.
- .11 Auxiliary hardware; electric strikes:
- .1 To meet ANSI A156.5-1992 Grade 1 requirements, to meet ULC, Burglary-Resistant and Fire Door and Frame certifications. Finish to be 630.
- .12 Door bottom seal:
- .1 Heavy duty, door seal of extruded aluminum frame and solid closed cell neoprene seal, surface mounted, adjustable, automatic retract mechanism when door is open, clear anodized finish.
- .13 Thresholds:
- .1 By Section 08 34 73.
- .2 100/127mm wide x full width of door opening, extruded aluminum, serrated surface, with thermal break of rigid PVC, clear anodized finish.
- .14 Weather/Acoustic stripping:
- .1 Head and jamb seal:

- .2 Extruded aluminum frame and solid closed cell neoprene insert, clear anodized finish.
- .3 Adhesive backed santoprene material.
- .15 Door bottom sweeps:
 - .1 Extruded aluminum frame with closed cell neoprene or nylon brush insert, clear anodized finish.

2.3 MISCELLANEOUS HARDWARE

- .1 Indexed key control system: to CAN/CGSB-69.21, designated by letter E and numeral identifiers, to be wall mounted single panel system, type double tag, color enamel paint finish, with capacity for 100 keys.

2.4 FASTENINGS

- .1 Use only fasteners provided by manufacturer. Failure to comply may void warranties and applicable licensed labels.
- .2 Supply screws, bolts, expansion shields and other fastening devices required for satisfactory installation and operation of hardware.
- .3 Exposed fastening devices to match finish of hardware.
- .4 Where pull is scheduled on one side of door and push plate on other side, supply fastening devices, and install so pull can be secured through door from reverse side. Install push plate to cover fasteners.
- .5 Use fasteners compatible with material through which they pass.

2.5 KEYING

- .1 All locksets, deadlocks, and exit device trims to have SFIC Core type cylinders to suit, and be keyed to a new factory registered master key system. Doors and locks to be keyed differently, keyed alike, master keyed or grandmaster keyed as directed. Prepare detailed keying schedule in conjunction with Consultant.
- .2 Provide three (3) change keys for every lock/cylinder on the project.
- .3 Provide six (6) Grand Master keys, Sub-master keys, Control keys.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Furnish manufacturers' instructions for proper installation of each hardware component.
- .2 Furnish metal door and frame manufacturers with complete instructions and templates for preparation of their work to receive hardware.

3.2 INSTALLATION

- .1 Install hardware to standard hardware location dimensions in accordance with Canadian Metric Guide for Steel Doors and Frames (Modular Construction) prepared by Canadian Steel Door and Frame Manufacturers' Association.
- .2 Where door stop contacts door pulls, mount stop to strike bottom of pull.

- .3 Remove construction cores when directed by Consultant; install permanent cores and check operation of locks.

3.3 ADJUSTING

- .1 Adjust door hardware, operators, closures and controls for optimum, smooth operating conditions, safety and for weather tight closure.
- .2 Lubricate hardware, operating equipment and other moving parts.
- .3 Adjust door hardware to provide tight fit at contact points with frames.

3.4 CLEANING

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Clean hardware with damp rag and approved non-abrasive cleaner, and polish hardware in accordance with manufacturer's instructions.
- .3 Remove protective material from hardware items where present.
- .4 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

3.5 SCHEDULE

Hardware Set # H-1 - Pair Doors # 100-1; Each to have:

2 Continuous Hinges Ives 027XY x 2413mm x EPT Prep. - 628
1 ELR Exit Device Falcon RX-MEL-25-V-NL-OP-718C-CON x 2438mm dr. ht. - 626
1 ELR Exit Device Falcon MEL-25-V-EO x 2438mm dr. ht. - 626
1 Rim Cylinder Falcon 953-6-BDC x 35 mm x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626
2 Door Pulls Ives 8190HD-2 x 25mm/305mm c. to c. x Type "A" Mtg. - 630
1 Automatic Door Operator LCN 9563 LONG2 (PUSH) (Simult. Pair) x HDR2-72 - 689
1 Door Interface Relay Camden CX-12 PLUS
2 Conc. O/H Door Stops G-J 104S - 630
2 Electric Power Transfer Von Duprin EPT-10 x CON - SP28
1 Power Supply Schlage PS904 x 900-4RL x 900-BBK (Two (2) doors)
1 Low-rise Threshold DraftSeal DS4000LA - 101mm x 1828mm - AL
2 Door Position Switches GE Interlogix # 1078W DPDT UL - G
Weatherstrip & door sweep by door supplier
Access Control, Card Reader, Controller, T-Rex RTE Detectors (2) - Division 28
Wire, Conduit & Connection by Electrical - Division 26

Hardware Set # H-2 - Pair Doors # 100-2; Each to have:

2 Continuous Hinges Ives 027XY x 2413mm x EPT Prep. - 628
1 ELR Exit Device Falcon MEL-25-V-NL-OP-718C-CON x 2438mm dr. ht. - 626
1 ELR Exit Device Falcon MEL-25-V-EO x 2438mm dr. ht. - 626
1 Rim Cylinder Falcon 953-6-BDC x 35 mm x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626

2 Door Pulls Ives 8190HD-2 x 25mm/305mm c. to c. x Type "A" Mtg. - 630
2 Door Closers Falcon SC71 RwPA - T/J mtg. - 689
2 Mounting Plates Falcon SC70-18 - 689
2 Conc. O/H Door Stops G-J 104S - 630
2 Electric Power Transfers Von Duprin EPT-10 x CON - SP28
1 Power Supply Schlage PS904 x 900-4RL x 900-BBK (Two (2) doors)
1 Low-rise Threshold DraftSeal DS4000LA – 101mm x 1828mm - AL
2 Door Position Switches GE Interlogix # 1078W DPDT UL - G
Weatherstrip & door sweep by door supplier
Access Control, Card Reader, Controller – Division 28
Wire, Conduit & Connection by Electrical – Division 26

Hardware Set # H-3 - Pair Doors # 102-1; Each to have:

2 Continuous Hinges Ives 027XY x 2413mm - 628
1 Exit Device Falcon 25-V-NL-OP-718C-CON x 2438mm dr. ht. - 626
1 Exit Device Falcon 25-V-EO x 2438mm dr. ht. - 626
1 Rim Cylinder Falcon 953-6-BDC x 35 mm x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd – 626
2 Door Pulls Ives 8190HD-2 x 25mm/305mm c. to c. x Type "A" Mtg. - 630
2 Door Closers Falcon SC71 RwPA - T/J mtg. x RHR dr. - 689
2 Mounting Plates Falcon SC70-18 - 689
2 Conc. O/H Door Stops G-J 104S - 630
1 Low-rise Threshold DraftSeal DS4000LA – 101mm x 1828mm - AL
2 Door Position Switches GE Interlogix # 1078W DPDT UL - G
Weatherstrip & door sweep by door supplier

Hardware Set # H-4 - Pair Doors # 102-2; Each to have:

2 Continuous Hinges Ives 027XY x 2413mm x EPT Prep. - 628
1 ELR Exit Device Falcon RX-MEL-25-V-NL-OP-718C-CON x 2438mm dr. ht. - 626
1 ELR Exit Device Falcon MEL-25-V-EO x 2438mm dr. ht. - 626
1 Rim Cylinder Falcon 953-6-BDC x 35 mm x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd – 626
2 Door Pulls Ives 8190HD-2 x 25mm/305mm c. to c. x Type "A" Mtg. - 630
1 Automatic Door Operator LCN 9563 LONG2 (PUSH) (Simult. Pair) x HDR2-72 - 689
1 Door Interface Relay Camden CX-12 PLUS
2 Conc. O/H Door Stops G-J 104S - 630
2 Electric Power Transfers Von Duprin EPT-10 x CON - SP28
1 Power Supply Schlage PS904 x 900-4RL x 900-BBK (Two (2) doors)
1 Low-rise Threshold DraftSeal DS4000LA – 101mm x 1828mm - AL
2 Door Position Switches GE Interlogix # 1078W DPDT UL - G
Weatherstrip & door sweep by door supplier
Access Control, Card Reader, Controller, T-Rex RTE Detectors (2) – Division 28
Wire, Conduit & Connection by Electrical – Division 26

Hardware Set # H-5 - Single Door # 106-2; Each to have:

1 Continuous Hinge Ives 027XY x 2413mm x EPT Prep - 628

1 ELR Exit Device Falcon RX-MEL-25-R-NL-OP-718C-CON x 914mm dr. - 626
1 Rim Cylinder Falcon 953-6-BDC x 35 mm x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626
1 Door Pull Ives 8190HD-2 x 1" x 12" c. to c. x Type "O" Mtg. - 630
1 Automatic Door Operator LCN 9542 LONG (Long Push) x HL/B-36" - 689
1 Door Interface Relay Camden CX-12 PLUS
1 Conc. O/H Door Stop G-J 104S - 630
1 Power Supply Schlage PS902 x 900-2RS x 900-BBK
1 Low-rise Threshold DraftSeal DS4000LA - 101mm x 914mm - AL
1 Door Position Switch GE Interlogix # 1078W DPDT UL - G
Weatherstrip & door sweep by door supplier
Access Control, Card Reader, Controller, T-Rex RTE Detectors (2) - Division 28
Wire, Conduit & Connection by Electrical - Division 26

Hardware Set # H-6 - Single Door # 111-1; Each to have:

3 Hinges Ives 5BB1 114 x 114 NRP - 630
1 Lever Lockset Falcon T511BDC-Dane x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626
1 Door Closer Falcon SC71 Rw/PA T/J Mtg. - 689
1 Mounting Plate Falcon SC70-18 - 689
1 Kickplate Ives 8400B4E- 254 x 883mm - 630
1 Surf. O/H Door Stop G-J 904S - 630
1 Mounting Bracket Ives MB2 - to suit (O/H stop brkt.) - 689
1 Threshold DraftSeal DS178N x 934mm - Alum
1 Set Door Seal Draftseal DS141CT x 5202mm - AL
1 Door Sweep Draftseal DS138C x 934mm - AL

Hardware Set # H-7 - Single Doors # 113-1, 114-1, 115-1; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 630
1 C/R Deadlock Falcon D111BDC x UL x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626
1 Push Plate Ives 8200- 152 x 406 mm - 630
1 Door Pull Ives 8302-0- 254 mm x 152 x 406 mm plate - "O" mtg. - 630
1 Automatic Door Operator LCN 9531 STDTRKARM (Pull) x HDR-36" - 689
2 Full Length Actuator Switches LCN 8310-836T - 630
1 Kickplate Ives 8400B4E- 254 x 863 mm - 630
1 Door Stop (Floor) Ives FS439 - 626
1 Threshold DraftSeal DS5000 x 914mm - Alum
1 Set Door Seal Draftseal DS130CR x 5182mm - AL
1 Door Sweep Draftseal DS138C x 914mm - AL
1 Keyswitch** Schlage 653-14 x L2 - 630
1 Mortise Cylinder Falcon C987-6-BDC x 35mm x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626
** Keyswitch disables ADO / exterior FLAS

Hardware Set # H-8 - Pairs Exterior Exit Doors # 123-1, 123-2, 136-1, 136-2, 201-2; Each to have:

6 Hinges Ives 5BB1 114 x 101 NRP- 630
1 V/R Exit Device Falcon 25-V-NL-OP x 718C (RHR Dr.) - 626
1 V/R Exit Device Falcon 25-V-EO (LHR Dr.) - 626
1 Rim Cylinder Falcon C953-6-BDC x 35mm x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd – 626
2 Door Closers Falcon SC71 Rw/PA-REG x SC70-18 Mtg. Plate (LHR dr.) - 689
2 Kickplates Ives 8400B4E- 254 x 863mm - 630
2 Surf. O/H Door Stops G-J 904S - 630
2 Mounting Brackets Ives MB2 – to suit - 689
1 Threshold DraftSeal DS178A x 1829mm - Alum
1 Set Door Seal Draftseal DS141CT x 6097mm - AL
2 Door Sweeps Draftseal DS138C x 914mm - AL

Hardware Set # H-8-A - Single Exterior Door # 133-5; Each to have:

3 Hinges Ives 5BB1 114 x 101 NRP - 630
1 Lever Lockset Falcon T581BDC-Dane x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd – 626
1 Door Closer Falcon SC71 Rw/PA-REG x SC70-18 Mtg. Plate - 689
1 Kickplate Ives 8400B4E- 254 x 863mm - 630
1 Surf. O/H Door Stop G-J 904S - 630
1 Mounting Bracket Ives MB2 – to suit - 689
1 Threshold DraftSeal DS178A x 914mm - Alum
1 Set Door Seal Draftseal DS141CT x 5182mm - AL
1 Door Sweep Draftseal DS138C x 914mm - AL
1 Door Position Switch GE Interlogix # 1078W DPDT UL – G
1 Electric Strike Von Duprin 6400 FSE x 12/24 V - 630
1 Power Supply Von Duprin PS902 x 900-2RS x 900-BBK
Access Control, Card Reader, Controller – Division 28
NOTE: Wiring, conduit, and hook-up by Section 26 - Electrical

Hardware Set # H-9 - Pair Exterior Doors # 134-1; Each to have:

6 Hinges Ives 5BB1 114 x 101 NRP - 630
1 Set C/L Flush Bolts Ives FB51P x UL (LHR Dr.) - 626
1 Lever Lockset Falcon T581BDC-Dane x #23981152 L/B x Temp. Const. Core (RHR Dr.) - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd – 626
2 Door Closers Falcon SC71 Rw/PA-REG x SC70-18 Mtg. Plate - 689
2 Kickplates Ives 8400B4E- 254 x 863mm - 630
2 Surf. O/H Door Stops G-J 904S - 630
2 Mounting Brackets Ives MB2 – to suit - 689
1 Threshold DraftSeal DS177A x 1829mm - Alum
1 Set Door Seal Draftseal DS141CT x 6097mm - AL
2 Door Sweeps Draftseal DS138C x 914mm - AL
1 Set Astragals Draftseal DS163C x 2134mm (2 pcs) - AL

Hardware Set # H-10 - Single Exterior Door # 135-2; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 630
1 Lever Lockset Falcon T581BDC-Dane x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626
1 Door Closer Falcon SC71 Rw/PA REG - 689
1 Kickplate Ives 8400B4E- 254 x 863 mm - 630
1 Door Stop (Floor) Ives FS439 - 626
1 Threshold DraftSeal DS178N x 914mm - Alum
1 Set Door Seal Draftseal DS141CT x 5670mm - AL
1 Door Sweep Draftseal DS138C x 914 mm - AL

Hardware Set # H-11 - Single Exterior W/R Doors # 138, 139; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 630
1 Mortise Lever Lockset Falcon MA641BDC-Dane-TCC x Occ. Ind. AE55012-OC - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626
1 Door Closer Falcon SC71 Rw/PA REG - 689
1 Kickplate Ives 8400B4E- 254 x 863 mm - 630
1 Door Stop (Floor) Ives FS439 - 626
1 Threshold DraftSeal DS178N x 914mm - Alum
1 Set Door Seal Draftseal DS141CT x 5670mm - AL
1 Door Sweep Draftseal DS138C x 914 mm - AL
1 Door Position Switch GE Interlogix # 1078W DPDT UL - G
1 Electric Strike Von Duprin 6400 FSE x 12/24 V - 630
1 Power Supply Von Duprin PS902 x 900-2RS x 900-BBK (2 doors)
Access Control, Card Reader, Controller - Division 28
NOTE: Wiring, conduit, and hook-up by Section 26 - Electrical

Hardware Set # H-12 - Pair Exterior Doors # 155-1; Each to have:

2 Continuous Hinges Ives 027XY x 2413mm x CCTL - 628
1 Exit Device Falcon 25-V-NL-OP-718C-CON x 2390mm dr. ht. - 626
1 Exit Device Falcon 25-V-EO x 2390mm dr. ht. - 626
1 Rim Cylinder Falcon 953-6-BDC x 35 mm x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626
2 Door Pulls Ives 8190HD-2 x 25mm/305mm c. to c. x Type "A" Mtg. - 630
2 Door Closers Falcon SC71 RwPA - T/J mtg. x RHR dr. - 689
2 Mounting Plates Falcon SC70-18 - 689
2 Conc. O/H Door Stops G-J 104S - 630
1 Low-rise Threshold DraftSeal DS4000LA - 4" x 36" - AL
2 Door Position Switches GE Interlogix # 1078W DPDT UL - G
Weatherstrip & door sweep by door supplier

Hardware Set # H-13 - Single Exterior Exit Door # 217; Each to have:

3 Hinges Ives 5BB1 114 x 101 NRP- 630
1 Rim Exit Device Falcon 25-R-EO - 626
1 Door Closer Falcon SC71 Rw/PA-REG x SC70-18 Mtg. Plate - 689
1 Kickplate Ives 8400B4E- 254 x 863mm - 630
1 Surf. O/H Door Stop G-J 904S - 630
1 Mounting Bracket Ives MB2 - to suit - 689

1 Threshold DraftSeal DS178A x 914mm - Alum
1 Set Door Seal Draftseal DS141CT x 5182mm - AL
1 Door Sweep Draftseal DS138C x 914mm - AL

Hardware Set # H-14 - Pair Doors # 100-3; Each to have:

2 Continuous Hinges Ives 027XY x 2413mm - 628
2 Dummy Push Bars Falcon 250DT x 921mm dr. width - 626
2 Door Pulls Ives 8190HD-2 x 25mm/305mm c. to c. x Type "O" Mtg. - 630
1 Automatic Door Operator LCN 9563 LONG2 (PUSH) (Simult. Pair) x HDR2-73 - 689
2 Conc. O/H Door Stops G-J 104S - 630
Weatherstrip & door sweep by door supplier
T-Rex RTE Detectors (2) – Division 28
Wire, Conduit & Connection by Electrical – Division 26

Hardware Set # H-15 - Pair Doors # 100-4; Each to have:

2 Continuous Hinges Ives 027XY x 2413mm x EPT Prep. - 628
2 Dummy Push Bars Falcon 250DT x 921mm dr. width - 626
2 Door Pulls Ives 8190HD-2 x 25mm/305mm c. to c. x Type "A" Mtg. - 630
2 Door Closers Falcon SC71 RwPA - T/J mtg. - 689
2 Mounting Plates Falcon SC70-18 - 689
2 Conc. O/H Door Stops G-J 104S - 630
Weatherstrip & door sweep by door supplier

Hardware Set # H-16 - Pair Doors # 102-3; Each to have:

2 Continuous Hinges Ives 112XY x 2108mm - 628
2 Exit Devices Falcon 25-V-L-BE x 510-BE-Dane x LBR x 914/2134mm dr. - 626
2 Door Pulls Ives 8190HD-2 x 25mm/305mm c. to c. x Type "A" Mtg. - 630
2 Door Closers Falcon SC71 RwPA - REG mtg. - 689
2 Conc. O/H Door Stops G-J 104S - 630
Weatherstrip & door sweep by door supplier

Hardware Set # H-17 - Pair Doors # 102-4; Each to have:

2 Continuous Hinges Ives 112XY x 2108mm - 628
1 Exit Device Falcon 25-V-L-BE x 510-BE-Dane x LBR x 914/2134mm dr. - 626
1 Exit Device Falcon 25-V-L-BE x 510-BE-Dane x LBR x 914/2134mm dr. - 626
2 Door Pulls Ives 8190HD-2 x 25mm/305mm c. to c. x Type "O" Mtg. - 630
2 Door Closers Falcon SC71 RwPA - REG mtg. x RHR dr. - 689
2 Conc. O/H Door Stops G-J 104S - 630
Weatherstrip & door sweep by door supplier

Hardware Set # H-18 - Pair Doors # 102-5; Each to have:

6 Hinges Ives 5BB1 114 x 101 - 630

2 Dummy Push Bars Falcon 250DT x 914mm dr. width - 626
2 Door Pulls Ives 8190HD-2 x 25mm/305mm c. to c. x Type "O" Mtg. - 630
1 Automatic Door Operator LCN 9563 LONG2 (PUSH) (Simult. Pair) x HDR2-72 - 689
2 Kickplates Ives 8400B4E- 254 x 863mm - 630
2 Door Stops (Floor) Ives FS439 - 626
1 Set Door Seal DraftSeal DSS66D x 6097mm - BR
2 Door Sweeps DraftSeal DS149CNB x 914mm - AN
T-Rex RTE Detectors (2) – Division 28
Wire, Conduit & Connection by Electrical – Division 26

Hardware Set # H-19 - Single Doors # 103-1, 104, 110, 210; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 652
1 Lever Lockset Falcon K511BDC-Dane x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd – 626
1 Door Closer Falcon SC81 Rw/PA-REG FC - 689
1 Kickplate Ives 8400B4E- 254 x 863mm - 630
1 Door Stop (Floor) Ives FS439 - 626
1 Set Door Seal Draftseal DS66D x 5182mm - BR

Hardware Set # H-20 - Single Door # 103-2; Each to have:

3 D/A Spring Hinges Bommer 3029 152 x 114 - 626
1 Deadlock Falcon D141BDC x UL x Temp. Const. Core (RH Dr.) - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd – 626
2 Push Plates Ives 8200- 152 x 406 mm - 630
1 Door Pull Ives 8103-6 x T/B mtg. - 630
2 Kickplates Ives 8400B4E- 254 x 863mm - 630
2 Door Stops (Floor) Ives FS439 - 626

Hardware Set # H-21 - Single Doors # 105, 117; Each to have:

1 Continuous Hinge Ives 112XY x 2108mm - 628
1 Lever Lockset Falcon K511BDC-Dane x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd – 626
1 Door Closer Falcon SC81 Rw/PA-REG FC - 689
1 Door Stop (Floor) Ives FS439 - 626
Weatherstrip & door sweep by door supplier

Hardware Set # H-22 - Pairs Doors # 106-1, 155-2; Each to have:

6 Hinges Ives 5BB1 4 ½ x 4 - 652
1 Exit Device Falcon 25-V-L x 511L-Dane x LBR x 914mm dr. (RHR Dr.) - 626
1 Exit Device Falcon 25-V-EO x LBR x 914mm dr. (LHR Dr.) - 626
2 Door Closers Falcon SC71 RwPA - P/A mtg. - 689
2 Kickplates Ives 8400B4E- 254 x 863mm - 630
2 Door Stops (Floor) Ives FS439 - 626
1 Set Door Seal DraftSeal DSS66D x 6097mm - BR

2 Door Sweeps DraftSeal DS149CNB x 914mm - AN

Hardware Set # H-23 - Pair Doors # 107; Each to have:

6 Hinges Ives 5BB1 4 ½ x 4 NRP - 652
1 Set C/L Flush Bolts Ives FB51P x UL x LH dr. - 630
1 Lever Lockset Falcon T581BDC-Dane-SFIC-RH dr. x 3/4" L/B#23981152 - 626
1 SFIC Permanent Core Best 1C7A2 – 0 bitted - 626
2 Door Closers Falcon SC71 RwPA - T/J mtg. x TB/SN - 689
2 Mounting Plates Falcon SC70-18PA - 689
2 O/H Door Stops G-J 904S - 652
2 Mounting Brackets Ives MB2 – to suit - 689
1 Set Door Seal DraftSeal DS130CR x 6097mm - AN
2 Door Sweeps DraftSeal DS138CN x 914mm - AN
1 Set Astragals DraftSeal DS163 x 2134mm (2 pcs.) - AN
1 Door Bar Coordinator Ives COR52 x Filler Bar FL20 - 689

Hardware Set # H-24 - Single W/R Doors # 108, 207; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 630
1 Lever Lockset Falcon MA581BDC-Dane x less strike x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd – 626
1 Automatic Door Operator LCN9531 STDTRKARM (Pull) x HDR-36 - 689
2 Full Length Actuator Buttons LCN 8310-836T x B/F logos - 630
1 Kick Plate Ives 8400B4E-254 x 863mm - 630
1 Door Stop (Floor) Ives FS439 - 626
1 Set Door Seal Draftseal DS66D x 5182mm - BR
1 Electric Strike Von Duprin 6211 Fail Safe x 12/24 V - 630
1 B/F Washroom Door Control Package Camden CX-WC-11-7 (CX-33)
1 Power Supply Von Duprin PS902 x 900-4R x 900-BBK
NOTE: Wiring, conduit, and hook-up by Section 26 - Electrical

Hardware Set # H-25 - Single Doors # 109, 159; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 652
1 Lever Privacy Lockset Falcon K301S-Dane x E/K - 626
1 Door Closer Falcon SC81 RwPA REG - FC - 689
1 Kickplate Ives 8400B4E- 254 x 863mm - 630
1 Door Stop (Floor) Ives FS439 - 626
1 Set Door Seal DraftSeal DSS66D x 5182mm - BR

Hardware Set # H-26 - Single Doors # 111-2, 206-2, 216-1; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 652
1 Lever Passage Set Falcon K101S-Dane x UL - 626
1 Door Closer Falcon SC81 Rw/PA REG FC - 689
1 Kickplate Ives 8400B4E- 254 x 863mm - 630
1 Door Stop (Floor) Ives FS439 - 626

1 Set Door Seal DraftSeal DSS66D x 5182mm - BR

Hardware Set # H-26-A - Single Door # 206-1; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 652
1 Lever Passage Set Falcon K101S-Dane x UL - 626
1 Automatic Door Operator LCN 9131 STDTRKARM (Pull) x MC-27 - 689
2 Full Length Actuator Switches LCN 8310-836T - 630
1 Kickplate Ives 8400B4E- 254 x 863mm - 630
1 Door Stop (Floor) Ives FS439 - 626
1 Set Door Seal DraftSeal DSS66D x 5182mm - BR
1 Electric Strike Von Duprin 6400 FSE x 12/24 V - 630
1 Power Supply Von Duprin PS902 x 900-2RS x 900-BBK
NOTE: Wiring, conduit, and hook-up by Section 26 - Electrical

Hardware Set # H-27 - Single Doors # 112-1, 112-2, 118-2, 130-1; Each to have:

2 Hinges Ives 5BB1 114 x 101 - 652
1 Lever Lockset Falcon K581BDC-Dane x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626
1 Door Stop (Floor) Ives FS439 - 626

Hardware Set # H-28 - Single Doors # 113-2, 114-2, 115-2; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 630
1 Push Plate Ives 8200- 152 x 406 mm - 630
1 Door Pull Ives 8302-0- 254 mm x 152 x 406 mm plate - "O" mtg. - 630
1 Automatic Door Operator LCN 9131 STDTRKARM (Pull) x MC-27 - 689
2 Full Length Actuator Switches LCN 8310-836T - 630
1 Kickplate Ives 8400B4E- 254 x 863mm - 630
1 Door Stop (Floor) Ives FS439 - 626

Hardware Set # H-29 - Single Doors # 113-3, 114-3, 115-3; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 630
1 C/R Deadlock Falcon D111BDC x UL x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626
1 Push Plate Ives 8200- 152 x 406 mm - 630
1 Door Pull Ives 8302-0- 254 mm x 152 x 406 mm plate - "O" mtg. - 630
1 Automatic Door Operator LCN 9131 STDTRKARM (Pull) x MC-27 - 689
2 Full Length Actuator Switches LCN 8310-836T - 630
1 Kickplate Ives 8400B4E- 254 x 863mm - 630
1 Door Stop (Floor) Ives FS439 - 626
1 Set Door Seal Draftseal DSS66D x 5182mm - AL
1 Keyswitch** Schlage 653-14 x L2 - 630
1 Mortise Cylinder Falcon C987-6-BDC x 35mm x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626
** Keyswitch disables ADO / exterior FLAS

Hardware Set # H-30 - Single Doors # 118-1, 128-1, 128-2, 137, 140; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 630
1 Lever Lockset Falcon K581BDC-Dane x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626
1 Door Closer Falcon SC81 Rw/PA-REG FC - 689
1 Kickplate Ives 8400B4E- 254 x 863mm - 630
1 Door Stop (Floor) Ives FS439 - 626
1 Set Door Seal Draftseal DS66D x 5182mm - BR

Hardware Set # H-31 - Single Doors # 119, 122, 126, 129, 131-1, 132-1; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 630
1 C/R Deadlock Falcon D111BDC x UL x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626
1 Push Plate Ives 8200- 152 x 406 mm - 630
1 Door Pull Ives 8302-0- 254 mm x 152 x 406 mm plate - "O" mtg. - 630
1 Door Closer Falcon SC81 Rw/PA-P/A mtg. - FC - 689
1 Kickplate Ives 8400B4E- 254 x 863mm - 630
1 Door Stop (Floor) Ives FS439 - 626
1 Set Door Seal Draftseal DS66D x 5670mm - BR

Hardware Set # H-32 - Pairs Doors # 127, 158; Each to have:

6 D/A Spring Hinges Bommer 3029 152 x 114 - 626
4 Push Plates Ives 8200- 152 x 406 mm - 630
4 Kickplates Ives 8400B4E- 254 x 811mm - 630
4 Door Stops (Floor) Ives FS439 - 626

Hardware Set # H-33 - Pair Doors # 133-2; Each to have:

6 Hinges Ives 5BB1 4 ½ x 4 NRP - 630
1 Set C/L Flush Bolts Ives FB51P x UL x LHR dr. - 630
1 Lever Lockset Falcon T581BDC-Dane-SFIC-RHR dr. x 3/4" L/B#23981152 - 626
1 SFIC Permanent Core Best 1C7A2 - 0 bitted - 626
2 Door Closers Falcon SC71 RwPA - REG mtg. x TB/SN - 689
2 O/H Door Stops G-J 904S - 652
2 Mounting Brackets Ives MB2 - to suit - 689
1 Set Door Seal DraftSeal DS130CR x 6097mm - AN
2 Door Sweeps DraftSeal DS138CN x 914mm - AN
1 Set Astragals DraftSeal DS163 x 2134mm (2 pcs.) - AN
1 Door Bar Coordinator Ives COR52 x Filler Bar FL20 - 689

Hardware Set # H-34 - Single Doors # 133-3, 154; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 630
1 Lever Lockset Falcon K511BDC-Dane x Temp. Const. Core - 626

1 Permanent I/C Core Falcon C606 I/C core x MK'd – 626
1 Door Closer Falcon SC81 Rw/PA-REG FC - 689
1 Kickplate Ives 8400B4E- 254 x 863mm - 630
1 Door Stop (Floor) Ives FS439 - 626
1 Set Door Seal Draftseal DS66D x 5182mm - BR
1 Door Sweep DraftSeal DS149CNB x 914mm - AN

Hardware Set # H-35 – O/H Shutter Fire Door # 133-4; Each to have:

All door hardware completed by O/H door supplier.

Hardware Set # H-36 - Single Doors # 135-1, 163, 169; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 630
1 Lever Lockset Falcon K581BDC-Dane x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd – 626
1 Door Closer Falcon SC81 Rw/PA-REG FC - 689
1 Kickplate Ives 8400B4E- 254 x 863mm - 630
1 Door Stop (Floor) Ives FS439 - 626
1 Set Door Seal Draftseal DS66D x 5670mm - BR
1 Door Sweep DraftSeal DS149CNB x 914mm - AN

Hardware Set # H-37 - Single Doors # 141, 142, 148, 149; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 630
1 Lever Lockset Falcon K581BDC-Dane x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd – 626
1 Kickplate Ives 8400B4E- 254 x 863mm - 630
1 Door Stop (Floor) Ives FS439 - 626
1 Set Door Seal Draftseal DS66D x 5182mm - BR

Hardware Set # H-38 - Single Doors # 150, 151; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 630
1 Deadlock Falcon D141BDC x UL x Temp. Const. Core - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626
1 Push Plate Ives 8200- 152 x 406 mm - 630
1 Door Pull Ives 8302-0- 254 mm x 152 x 406 mm plate - “O” mtg. - 630
1 Door Closer Falcon SC81 Rw/PA-P/A mtg. - FC - 689
1 Kickplate Ives 8400B4E- 254 x 863mm - 630
1 Door Stop (Floor) Ives FS439 - 626
1 Set Door Seal Draftseal DS66D x 5670mm - BR

Hardware Set # H-39 - Single Doors # 146, 152, 204; Each to have:

3 Hinges Ives 5BB1 114 x 101 - 652
1 Lever Lockset Falcon K581BDC-Dane x Temp. Const. Core - 626

- 1 Permanent I/C Core Falcon C606 I/C core x MK'd – 626
- 1 Kickplate Ives 8400B4E- 254 x 863mm - 630
- 1 Door Stop (Floor) Ives FS439 - 626
- 1 Set Door Seal Draftseal DS66D x 5182mm - BR

Hardware Set # H-40 - Single Door # 168; Each to have:

- 3 Hinges Ives 5BB1 114 x 101 - 652
- 1 Lever Lockset Falcon K581BDC-Dane x Temp. Const. Core - 626
- 1 Permanent I/C Core Falcon C606 I/C core x MK'd – 626
- 1 Door Closer Falcon SC81 Rw/PA-REG FC - 689
- 1 Kickplate Ives 8400B4E- 254 x 863mm - 630
- 1 Door Stop (Floor) Ives FS439 - 626
- 1 Set Door Seal Draftseal DS66D x 5182mm - BR
- 1 Door Sweep DraftSeal DS149CNB x 914mm - AN

Hardware Set # H-41 - Pair Doors # 201-1; Each to have:

- 6 Hinges Ives 5BB1 4 ½ x 4 - 630
- 1 V/R Exit Device Falcon F-25-V-L x 511L-Dane x 914/2134mm dr. x RHR dr - 626
- 1 V/R Exit Device Falcon F-25-V-EO x 914/2134mm dr. x LHR dr. - 626
- 1 Mortise Cylinder Falcon 987-6-BDC x 35mm x Temp. Const. Core - 626
- 1 Permanent I/C Core Falcon C606 I/C core x MK'd – 626
- 2 Door Pulls Ives 8190HD-2 x 25mm/305mm c. to c. x Type “A” Mtg. - 630
- 2 Door Closers Falcon SC71 RwPA – P/A mtg. - 689
- 2 Kickplates Ives 8400B4E- 254 x 863mm x 8401 TAPE - 630
- 2 Door Stops (Floor) Ives FS439 - 626
- 1 Set Door Seal DraftSeal DSS66D x 6097mm - BR
- 2 Door Sweeps DraftSeal DS149CNB x 914mm - AN
- 1 Set Astragals Draftseal DS163C x 2134mm (2 pcs) - AL
- 1 Low-rise Threshold DraftSeal DS4000LA – 101 x 1829mm - AL

Hardware Set # H-42 - Pair Doors # 202-2; Each to have:

- 6 Hinges Ives 5BB1 114 x 101 - 652
- 2 Dummy Push Bars Falcon 250DT x 914mm dr. width - 626
- 2 Door Pulls Ives 8190HD-2 x 25mm/305mm c. to c. x Type “O” Mtg. - 630
- 1 Automatic Door Operator LCN 9542 LONG (Long Push) x HDR-36” x RHR dr. - 689
- 2 Full Length Actuator Switches LCN 8310-836T - 630
- 1 Door Closer Falcon SC71 RwPA - T/J mtg. x LHR dr. - 689
- 1 Mounting Plate Falcon SC70-18 - 689
- 2 Kickplates Ives 8400B4E- 254 x 863mm - 630
- 2 Door Stops (Floor) Ives FS439 - 626
- 1 Set Door Seal DraftSeal DSS66D x 6097mm - BR
- 2 Door Sweeps DraftSeal DS149CNB x 914mm - AN
- Wire, Conduit & Connection by Electrical – Division 26

Hardware Set # H-43 - Pair Doors # 212-1; Each to have:

6 Hinges Ives 5BB1 114 x 101 - 652
2 Flush Bolts Ives FB458 x 305 mm x UL (LHR Dr.) - 626
1 Lever Lockset Falcon T581BDC-Dane x #23981152 L/B x Temp. Const. Core (RHR Dr.) - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626
1 Door Closer Falcon SC81 SS FC (RHR Dr.) - 689
1 Surf. O/H Door Stop G-J 904S (LHR Dr.) - 652
1 Set Door Seal Draftseal DSS66D x 6097mm - BR
2 Door Sweeps Draftseal DS138C x 914mm - AL
1 Set Astragals Draftseal DS137C x 2134 mm (2 pcs) - AL

Hardware Set # H-44 - Pair Doors # 213; Each to have:

6 Hinges Ives 5BB1 114 x 101 - 652
2 Flush Bolts Ives FB458 x 305 mm x UL (RH Dr.) - 626
1 Lever Lockset Falcon T511BDC-Dane x #23981152 L/B x Temp. Const. Core (LH Dr.) - 626
1 Permanent I/C Core Falcon C606 I/C core x MK'd - 626
1 Door Closer Falcon SC81 Rw/PA REG FC (LH Dr.) - 689
2 Kickplates Ives 8400B4E- 254 x 863 mm - 630
1 Surf. O/H Door Stop G-J 904S (RH Dr.) - 652
1 Door Stop (Floor) Ives FS439 - 626
1 Set Door Seal Draftseal DSS66D x 6097mm - BR
2 Door Sweeps Draftseal DS138C x 914mm - AL
1 Set Astragals Draftseal DS137C x 2134mm (2 pcs) - AL

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Glazing for sections referencing this section for Products and installation.
- .2 Glass and glazing for Curtainwall, Entrances, Windows, Doors, Vestibule Screens, Hollow Metal work
- .3 Frameless Mirrors.

1.2 REFERENCES

- .1 ANSI Z97.1-2009 - Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.
- .2 ASTM C542-05 - Standard Specification for Lock-Strip Gaskets.
- .3 ASTM C864-05 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers.
- .4 ASTM C920-11 - Standard Specification for Elastomeric Joint Sealants.
- .5 ASTM C1036-06 - Standard Specification for Flat Glass.
- .6 ASTM C1048-04 - Standard Specification for Heat-Treated Flat Glass—Kind HS, Kind FT Coated and Uncoated Glass.
- .7 ASTM C1172-09e1 - Standard Specification for Laminated Architectural Flat Glass.
- .8 ASTM C1193-09 - Standard Guide for Use of Joint Sealants.
- .9 ASTM C1503-08 - Standard Specification for Silvered Flat Glass Mirror.
- .10 ASTM D412-06ae2 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension.
- .11 ASTM D1149-07 - Standard Test Methods for Rubber Deterioration-Cracking in an Ozone Controlled Environment.
- .12 ASTM D2240-05(2010) - Standard Test Method for Rubber Property—Durometer Hardness.
- .13 ASTM E84-10b - Standard Test Method for Surface Burning Characteristics of Building Materials.
- .14 ASTM E283-04 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- .15 ASTM E330-02(2010) - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .16 CAN/CGSB 12.1-M90 - Tempered or Laminated Safety Glass.
- .17 CAN/CGSB 12.2-M91 - Flat, Clear Sheet Glass.
- .18 CAN/CGSB 12.3-M91 - Flat, Clear Float Glass.
- .19 CAN/CGSB 12.4-M91 - Heat Absorbing Glass.

- .20 CAN/CGSB 12.8-97 - Insulating Glass Units.
- .21 CAN/CGSB 12.9-M91 - Spandrel Glass.
- .22 CAN/CGSB 12.10-M76 - Glass, Light and Heat Reflecting.
- .23 CAN/CGSB 12.11-M90 - Wired Safety Glass.
- .24 CAN/CGSB 12.13-M91 - Patterned Glass.
- .25 CAN/CGSB 12.20-M89 - Structural Design of Glass for Buildings.
- .26 CGSB 19-GP-5M-84 - Sealing Compound, One Component, Acrylic Base, Solvent Curing.
- .27 IGMAC (Insulating Glass Manufacturers Association of Canada) - IGMAC Certification Program for the CGSB 12.8 standard.
- .28 IGMA (Insulating Glass Manufacturers Alliance).
- .29 LSGA (Laminators Safety Glass Association) Laminated Glass Design Guide 2000.

1.3 PERFORMANCE REQUIREMENTS

- .1 Provide glass and glazing materials for continuity of building enclosure vapour retarder and air barrier:
 - .1 In conjunction with materials described in Sections 07 92 00 & 07 27 13.
 - .2 To utilize the inner pane of multi-pane sealed units for the continuity of the air barrier and vapour retarder seal.
 - .3 To maintain a continuous air barrier and vapour retarder throughout the glazed assembly from glass pane to heel bead of glazing sealant.
- .2 Size glass to withstand dead loads and positive and negative live loads acting normal to plane of glass as measured to ASTM E330 .

1.4 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: Convene one (1) week before starting work of this section.

1.5 SUBMITTALS FOR REVIEW

- .1 Product Data on Glass Types Specified: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
- .2 Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colours.
- .3 Samples: Submit samples (300 x 300 mm) 12 x 12 inch in size, providing an example of coloration.
- .4 Samples: Submit (150 mm) 6 inch long bead of glazing sealant, colour.

1.6 QUALITY ASSURANCE

- .1 Products of This Section: Manufactured to ISO 9000 certification requirements.
- .2 Perform Work in accordance with GANA Glazing Manual and IGMAC for glazing installation methods.

- .3 Installer Qualifications: Installer specializing in performing the work of this section with minimum five (5) years documented experience and approved by the manufacturer. Contractor to submit names and experience of individuals performing the work of this section.

1.7 ENVIRONMENTAL REQUIREMENTS

- .1 Do not install glazing when ambient temperature is less than 5 degrees C.
- .2 Maintain minimum ambient temperature before, during and twenty-four (24) hours after installation of glazing compounds.

1.8 WARRANTY

- .1 Provide a four (4) year extended warranty to include coverage for sealed glass units from seal failure, inter-pane dusting or misting, and replacement of same.
- .2 Provide a four (4) year extended warranty to include coverage for delamination of laminated glass and replacement of same.

Part 2 Products

2.1 FLAT GLASS MATERIALS

- .1 CF (Clear Float Glass): CAN/CGSB-12.3 M91, Guardian Clear, 6mm unless noted otherwise.
- .2 HS (Heat Strengthened Glass): CAN/CGSB-12.9, Type 2, Class A 6mm Clear, unless noted otherwise. Tempering shall be performed using the horizontal tong-free method. If roller lines are apparent within acceptable limits as specified, they shall be in horizontal direction after installation.
- .3 TP (Tempered Glass): CAN/CGSB-12.1, , Type 2, Class B, Clear, 6mm unless noted otherwise. Tempering shall be performed using the horizontal tong-free method. If roller lines are apparent within acceptable limits as specified, they shall be in horizontal direction after installation.
- .4 SG (Spandrel Glazed): CAN/CGSB-12.1, Tempered Glass (TP) glass with opaque black coating on surface No.2; total unit thickness of 6 mm.

2.2 INSULATED GLASS UNITS

- .1 GL-1: Double Glazed Insulating Glass Unit: CAN/CGSB-12.8, double pane; outer pane: 6 mm HS glass with SunGuard SN 68 on surface No.2; 13 mm inter-pane space filled with argon gas with black closed-cell polymer foam warm edge; inner pane of 6 mm TP glass, seal glass with elastomer; total unit thickness of 25 mm.
- .2 GL-2: Insulated Glass Units with Frit Pattern: CAN/CGSB-12.8, double pane, outer pane of TP glass, inner pane of TP; Solarban 60 + Low E coating on No.2 surface; Clear Dot Pattern Ceramic Frit (40% Coverage) on No. 3 surface - Viraspan or Prel-Design; 13 mm inter-pane space filled with argon gas, closed cell polymer foam warm edge, unit sealed with elastomer; total unit thickness of 25 mm.

- .3 GL-3: Double Glazed Insulating Glass Unit, Skylight: CAN/CGSB-12.8, double pane; outer pane of TP glass, inner pane laminated of GL-5 glass; Suncool 50/25 on No. 2 surface within unit; 0.060 polyvinyl-butyl membrane bonded interlayer within inner pane; 13 mm inter-pane space filled with argon gas; with closed cell polymer foam warm edge, seal glass with elastomer; total unit thickness of 25 mm.

2.3 SAFETY GLASS UNITS

- .1 GL-4: Tempered (Safety) Glass Guardrails: Type 2, Class B. 13 mm UC, TP glass.
- .2 GL-5: Laminated (Security) Glass Units: Type 1, Class B. double-layer; outer pan of 4.5 mm CF glass, inner pan of 4.5 mm CF glass, with 1.52mil polyvinyl-butyl membrane bonded interlayer.

2.4 GLAZING COMPOUNDS

- .1 Sealant: in accordance with Section 07 92 00 Joint Sealants.

2.5 GLAZING ACCESSORIES

- .1 Lock Strip Gaskets: ASTM C542, ozone-resistant neoprene compound, with lock-strip (zipper) component that friction-fits into position to retain glass pane/unit, H-shape, tensile strength of (14 MPa) 2000 psi tested to ASTM D412, Durometer hardness of 75 tested to ASTM D2240, sized to accommodate glass thickness.
- .2 Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10-15 Shore A durometer hardness tested to ASTM D2240; coiled on release paper; 13 mm size; black colour.
- .3 Glazing spline: ASTM C864, Option I, Resilient H-shaped extruded shape to suit glazing channel retaining slot; black colour.
- .4 Smoke Removal Unit Targets: Adhesive targets affixed to glass to identify glass units destined for smoke control.

2.6 SOURCE QUALITY CONTROL AND TESTS

- .1 Testing and reporting will be carried out by an independent testing agency selected by the Consultant.
- .2 Coordinate and assist testing agency and allow access to the Work.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify that openings for glazing are correctly sized and within tolerance.
- .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.2 PREPARATION

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.

- .4 Install sealant in accordance with manufacturer's written instructions.

3.3 GLAZING METHODS

- .1 Verify that selected sealants and glazing tapes are compatible.
- .2 Perform glazing as required by frame manufacturer to achieve specified performance criteria.
- .3 Completed exterior glazed assemblies to provide full perimeter air and vapour seal to the glazed frames and be pressure equalized.

3.4 FIELD QUALITY CONTROL

- .1 Section 01 45 00: Quality Control, Field inspection.
- .2 Inspector will monitor quality of glazing.

3.5 CLEANING

- .1 Remove glazing materials from finish surfaces.
- .2 Remove labels after Work is complete.
- .3 Clean glass and adjacent surfaces.

3.6 PROTECTION OF FINISHED WORK

- .1 After installation, mark pane with an 'X' by using removable plastic tape or paste. Do not mark heat absorbing or reflective glass units.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 Aluminum Association (AA)
 - .1 AA DAF 45-03(R2009), Designation System for Aluminum Finishes.
- .2 American Society for Testing and Materials (ASTM)
 - .1 ASTM C 475-02(2015), Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
 - .2 ASTM C 514-04(2014), Standard Specification for Nails for the Application of Gypsum Board.
 - .3 ASTM C 557-03(2009)e1, Standard Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
 - .4 ASTM C 840-16, Standard Specification for Application and Finishing of Gypsum Board.
 - .5 ASTM C 954-15, Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (mm) to 0.112 in. (mm) in Thickness.
 - .6 ASTM C 1002-14, Standard Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
 - .7 ASTM C 1047-14a, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
 - .8 ASTM C 1177/C 1177M-13, Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
 - .9 ASTM C 1178/C 1178M-13, Standard Specification for Glass Mat Water-Resistant Gypsum Backing Board.
 - .10 ASTM C 1280-13a, Standard Specification for Application of Gypsum Sheathing.
 - .11 ASTM C1396/C1396M-14a, Standard Specification for Gypsum board.
- .3 Association of the Wall and Ceilings Industries International (AWCI)
 - .1 AWCI Levels of Gypsum Board Finish-GA-214-2015.
- .4 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
- .5 Green Seal Environmental Standards (GS)
 - .1 GS-11-2008, 2nd Edition, Paints and Coatings.
- .6 Underwriters' Laboratories of Canada (ULC)

- .1 CAN/ULC-S102-10, Standard Method of Test of Surface Burning Characteristics of Building Materials and Assemblies.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for gypsum board assemblies and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address and applicable standard designation.
- .3 Exercise care in unloading gypsum board materials shipment to prevent damage.
- .4 Storage and Handling Requirements in accordance with ASTM C 840-16:
 - .1 Store gypsum board assembly materials level flat indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect gypsum board assemblies from nicks, scratches, and blemishes.
 - .3 Protect gypsum board from direct exposure to rain, snow, sunlight, or other excessive weather conditions.
 - .4 Protect ready mix joint compounds from freezing, exposure to extreme heat and direct sunlight.
 - .5 Protect from weather, elements and damage from construction operations.
 - .6 Handle gypsum boards to prevent damage to edges, ends or surfaces.
 - .7 Protect prefinished aluminum surfaces with strippable coating. Do not use adhesive papers or sprayed coatings which bond when exposed to sunlight or weather.
 - .8 Replace defective or damaged materials with new.

1.4 QUALITY ASSURANCE

- .1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with documented experience.
- .2 Installer Qualifications: Installer specializing in performing the work of this section with minimum documented experience and approved by the manufacturer.
- .3 Contractor to submit names and work experience of approved installers to preform the work of this section.
- .4 Handling Gypsum Board: Comply with GA-801.

1.5 AMBIENT CONDITIONS

- .1 Maintain temperature 10 °C minimum, 21 °C maximum for 48 hours prior to and during application of gypsum boards and joint treatment, and for 48 hours minimum after completion of joint treatment.
- .2 Apply board and joint treatment to dry, clean, frost free surfaces.
- .3 Ventilation: ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

Part 2 Products

2.1 MATERIALS

- .1 Standard Interior Partitions: to ASTM C1396/C1396M-14 regular, 12.7 and 15.9 mm thick and Type X, 15.9 mm thick, 1200 mm wide x maximum practical length, ends square cut, edges squared.
- .2 Gypsum sheathing board: to ASTM C1396/C1396M-14, regular, 12.7 mm thick and Type X, 12.7 mm thick, 1200 mm wide x maximum practical length.
- .3 Backing board and core board: to ASTM C1396/C1396M-14 regular, 12.7 mm thick, squared edges.
- .4 Interior Water-resistant board: to ASTM C1396/C1396M-14 regular, 12.7 mm thick and Type X, 12.7 mm thick, 1200 mm wide x maximum practical length.
- .5 Exterior Glass mat water-resistant gypsum backing board: to ASTM C 1178/C 1178M-13, 12.7 mm thick, 1200 mm wide x maximum practical length.
- .6 Impact Resistant Glass mat gypsum substrate sheathing: to ASTM C 1177/C 1177M-13, 15.9 mm thick, 1200 mm wide x maximum practical length.

2.2 ACCESSORIES

- .1 Gypsum Board Fasteners: ASTM C1002, Type S12.
- .2 Metal furring runners, hangers, tie wires, inserts, and anchors: to CSA A82.30 galvanized.
- .3 Gypsum board furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.
- .4 Resilient gypsum board furring: 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.
- .5 Steel drill screws: to ASTM C 1002-14.
- .6 Stud adhesive: to CAN/CGSB-71.25.
- .7 Laminating compound: as recommended by manufacturer, asbestos-free.

- .8 Casing beads, corner beads, control joints and edge trim: to ASTM C 1047, metal, zinc-coated by electrolytic process, 0.5 mm base thickness, perforated flanges, one piece length per location.
 - .1 GA-216; Trimtex: 093 Expansion Bead
- .9 Shadow mould: 35 mm high, snap-on trim, of 0.6 mm base steel thickness galvanized sheet pre-finished in satin enamel, white colour.
 - .1 GA-216; Trimtex: L-bead, Reveal/shadow bead, F Bead as noted.
- .10 Sealants: in accordance with Section 07 92 00 - Joint Sealants.
- .11 Polyethylene: to CAN/CGSB-51.34, Type 2.
- .12 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self-sticking permanent adhesive on one face, lengths as required.
- .13 Joint compound: to ASTM C 475, asbestos-free.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for gypsum board assembly installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 ERECTION

- .1 Do application and finishing of gypsum board to ASTM C 840-16 except where specified otherwise.
- .2 Do application of gypsum sheathing to ASTM C 1280-13a.
- .3 Erect hangers and runner channels for suspended gypsum board ceilings to ASTM C 840-16 except where specified otherwise.
- .4 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .5 Install work level to tolerance of 1:1200.
- .6 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles.
- .7 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.

- .8 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.
- .9 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.
- .10 Install wall furring for gypsum board wall finishes to ASTM C 840-16, except where specified otherwise.
- .11 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
- .12 Furr duct shafts, beams, columns, pipes and exposed services where indicated.
- .13 Erect drywall resilient furring transversely across studs, spaced maximum 600 mm on centre and not more than 150 mm from ceiling/wall juncture. Secure to each support with [25] mm drywall screw.
- .14 Install 150 mm continuous strip of 12.7 mm gypsum board along base of partitions where resilient furring installed.

3.3 APPLICATION

- .1 Apply gypsum board after bucks, anchors, blocking, sound attenuation, electrical and mechanical work have been approved.
- .2 Apply single layer gypsum board to metal furring or framing using screw fasteners, laminating adhesive for second layer. Maximum spacing of screws 300mm on centre.
 - .1 Single-Layer Application:
 - .1 Apply gypsum board on ceilings prior to application of walls to ASTM C 840-16.
 - .2 Apply gypsum board on walls vertically or horizontally, providing sheet lengths that will minimize number of board edges or end joints.
 - .2 Double-Layer Application:
 - .1 Install gypsum board for base layer and exposed gypsum board for face layer.
 - .2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.
 - .3 Apply base layers at right angles to supports unless otherwise indicated.
 - .4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.
- .3 Exterior Soffits and Ceilings: install exterior gypsum board perpendicular to supports; stagger end joints over supports. Install with 6 mm gap where boards abut other work.
- .4 Apply water-resistant gypsum board where wall tiles to be applied and adjacent to slop sinks. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.

- .5 Apply 12 mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, openings, in partitions where perimeter sealed with acoustic sealant.
- .6 For two-ply gypsum board installations, apply board using laminating adhesive on base layer of gypsum board.
- .7 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.
- .8 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.
- .9 Install gypsum board with face side out.
- .10 Do not install damaged or damp boards.
- .11 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

3.4 INSTALLATION

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm on centre or use contact adhesive for full length, where applicable.
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.
- .4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.
- .5 Install shadow mould at gypsum board/ceiling juncture [as indicated]. Minimize joints; use corner pieces and splicers.
- .6 Construct control joints of preformed units set in gypsum board facing and supported independently on both sides of joint.
- .7 Provide continuous polyethylene dust barrier behind and across control joints.
- .8 Locate control joints where indicated and/or at changes in substrate construction or at approximate 10 m spacing on long corridor runs at approximate 15 m spacing on ceilings.
- .9 Install control joints straight and true.
- .10 Ensure that screws or nails are properly applied in process of attaching gypsum board to framing without damaging of gypsum board edges and ends.

- .11 Construct expansion joints as detailed, at building expansion and construction joints. Provide continuous dust barrier.
- .12 Install expansion joint straight and true.
- .13 Install cornice cap where gypsum board partitions do not extend to ceiling.
- .14 Fit cornice cap over partition, secure to partition track with two rows of sheet metal screws staggered at 300 mm on centre.
- .15 Splice corners and intersections together and secure to each member with 3 screws.
- .16 Install access doors to electrical and mechanical fixtures specified in respective sections.
 - .1 Rigidly secure frames to furring or framing systems.
- .17 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.
- .18 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with AWCI Levels of Gypsum Board Finish:
 - .1 Levels of finish:
 - .1 Level 2: embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable.
 - .1 For use where water resistant gypsum backing board is used as a substrate for tile.
 - .2 Level 4: embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
 - .1 For typical gypsum wall board assemblies.
 - .3 Level 5: embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; apply a thin skim coat of joint compound to entire surface; surfaces smooth and free of tool marks and ridges.
 - .1 For continuous gypsum board walls and partitions exposed to natural light that are more than 4000 mm in height or 7,000 mm in width, or where infilling or abutting an existing partition have a level 5 or plaster finish.
- .19 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
- .20 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board, invisible after surface finish is completed.
- .21 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.

- .22 Completed installation smooth, level or plumb, free from waves and other defects and ready for surface finish.
- .23 Apply one coat of white primer sealer over surface to be textured. When dry apply textured finish in accordance with manufacturer's instructions.
- .24 Mix joint compound slightly thinner than for joint taping.
- .25 Apply thin coat to entire surface using trowel or drywall broad knife to fill surface texture differences, variations or tool marks.
- .26 Allow skim coat to dry completely.
- .27 Remove ridges by light sanding or wiping with damp cloth.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
 - .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.6 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by gypsum board assemblies installation.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C 645-14e1, Standard Specification for Nonstructural Steel Framing Members.
 - .2 ASTM A 653/A 653M-07, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvanized) by the Hot-Dip Process.
 - .3 ASTM C 754-15, Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .2 Underwriter's Laboratories (UL) Environmental Standards
 - .1 UL-2768-2011, Architectural Surface Coatings.
 - .2 , Surface Coatings – Recycled Water-Borne. UL-2760-2011
- .3 The Master Painters Institute (MPI)
 - .1 Architectural Painting Specification Manual – [current edition].
 - .1 MPI #26, Primer, Galvanized Metal, Cementitious.

1.2 QUALITY ASSURANCE

- .1 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten (10) years documented experience.
- .2 Installer Qualifications: Company specializing in performing the work of this section with minimum three (3) years documented experience and approved by the manufacturer.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 – Common Product Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect metal framing from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Non-load bearing channel stud framing: to ASTM C 645, 63, 92, 152, 203 mm stud size, roll formed from 0.53 and 0.91 mm thickness hot dipped zinc-coated (galvanized) steel sheet in accordance with ASTM A 653, Z180, for screw attachment of gypsum board.
 - .1 Knock-out service holes at 460 mm centres.
- .2 Floor and ceiling tracks: to ASTM C 645, in widths to suit stud sizes, and as follows:
 - .1 Slotted Deflection Track for Fire Separations: Premanufactured slotted top runner with 63 mm down standing legs and having 6 mm wide x 38 mm high slots spaced at 25 mm on centre along length of runner; tested and certified for use in fire rated wall construction.
 - .2 Double Runner Deflection Track: Outside runner using 75 mm flanges; inner runner 33 mm; maintaining 25 mm minimum deflection space.
 - .3 Deep Leg Deflection Track: Top runner having 75 mm down standing legs; maintaining 13 mm minimum deflection space.
 - .4 Base Runner: Bottom track with 33 mm upstanding legs.
- .3 Furring Channels: Commercial steel sheet in accordance with ASTM A 653, Z180, hot dipped zinc-coated (galvanized), as follows:
 - .1 Hat Shaped, Rigid Furring Channels: ASTM C 645, 0.75 mm thickness x 22 mm deep.
 - .2 Resilient Furring Channels: 0.46 mm thickness x 13 mm deep members designed to reduce sound transmission having asymmetrical face attached to single flange by a slotted leg (web).
- .4 Metal channel stiffener: 38 x 13 mm size, 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.
- .5 Furring and Bracing Members: Of same material as studs; thickness to suit purpose.
- .6 Fasteners: self drilling, self tapping screws.
- .7 Sheet Metal Backing: 0.91 mm thick (20 gauge), galvanized steel for reinforcement of opening.
- .8 Acoustical sealant: in accordance with Section 07 92 00 - Joint Sealants.
- .9 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self sticking adhesive on one face, lengths as required.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for non-structural metal framing application in accordance with manufacturer's written instructions.

- .1 Visually inspect substrate in presence of Consultant.
- .2 Inform Consultant of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 ERECTION

- .1 Erect partitions in accordance with framing requirements of ASTM C 754.
- .2 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.
- .3 Install damp proof course under stud shoe tracks of partitions on slabs on grade.
- .4 Place studs vertically a maximum of 600 mm on centre, unless noted otherwise, and not more than 50 mm from abutting walls, and at each side of openings and corners.
 - .1 Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- .5 Erect metal studding to tolerance of 1:1000.
- .6 Attach studs to bottom track using pop rivets.
- .7 Co-ordinate simultaneous erection of studs with installation of service lines. Align web openings when erecting studs.
- .8 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
- .9 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified.
 - .1 Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.
- .10 Install heavy gauge single jamb studs at openings.
- .11 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs.
 - .1 Secure track to studs at each end, in accordance with manufacturer's instructions.
 - .2 Install intermediate studs above and below openings in same manner and spacing as wall studs.
- .12 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
- .13 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.
- .14 Install steel studs or furring channel between studs for attaching electrical and other boxes.

- .15 Extend partitions to ceiling height except where noted otherwise on drawings.
- .16 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs.
 - .1 Use 50 mm leg ceiling tracks. Use double track slip joint as drawn or indicated 09 21 16- Gypsum Board Assemblies.
- .17 Install continuous insulating strips to isolate studs from uninsulated surfaces.
- .18 Install two continuous beads of acoustical sealant insulating strip under studs and tracks around perimeter of sound control partitions.

3.3 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.4 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by non-structural metal framing application.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)
 - .1 ANSI A108.1-99, Specification for the Installation of Ceramic Tile (Includes ANSI A108.1A-C, 108.4-.13, A118.1-.10, ANSI A136.1).
 - .2 CTI A118.3-92, Specification for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive (included in ANSI A108.1).
 - .3 CTI A118.4-92, Specification for Latex Cement Mortar (included in ANSI A108.1).
 - .4 CTI A118.5-92, Specification for Chemical Resistant Furan Resin Mortars and Grouts for Tile Installation (included in ANSI A108.1).
 - .5 CTI A118.6-92, Specification for Ceramic Tile Grouts (included in ANSI A108.1).
 - .6 ANSI A137.1:2021, American National Standards Specifications For Ceramic Tile
- .2 American Society for Testing and Materials International (ASTM)
 - .1 ASTM C 144-04, Specification for Aggregate for Masonry Mortar.
 - .2 ASTM C 207-06, Specification for Hydrated Lime for Masonry Purposes.
 - .3 ASTM C 847-06, Specification for Metal Lath.
 - .4 ASTM C 979-05, Specification for Pigments for Integrally Coloured Concrete.
- .3 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
 - .2 CGSB 71-GP-22M-78(AMEND.), Adhesive, Organic, for Installation of Ceramic Wall Tile.
 - .3 CAN/CGSB-25.20-95, Surface Sealer for Floors.
- .4 CSA Group (CSA)
 - .1 CSA A123.3-05, Asphalt Saturated Organic Roofing Felt.
 - .2 CAN/CSA-A3000-03(R2006), Cementitious Materials Compendium (Consists of A3001, A3002, A3003, A3004 and A3005).
- .5 Terrazzo Tile and Marble Association of Canada (TTMAC)
 - .1 Tile Specification Guide 09 30 00 2006/2007, Tile Installation Manual.
 - .2 Tile Maintenance Guide 2000.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Include manufacturer's information on:

- .1 Ceramic tile, marked to show each type, size, and shape required.
 - .2 Chemical resistant mortar and grout (Epoxy and Furan).
 - .3 Cementitious backer unit.
 - .4 Dry-set cement mortar and grout.
 - .5 Divider strip.
 - .6 Elastomeric membrane and bond coat.
 - .7 Reinforcing tape.
 - .8 Levelling compound.
 - .9 Latex cement mortar and grout.
 - .10 Commercial cement grout.
 - .11 Organic adhesive.
 - .12 Slip resistant tile.
 - .13 Waterproofing isolation membrane.
 - .14 Fasteners.
- .2 Provide samples in accordance with Section 01 33 00 - Submittal Procedures.
- .1 Base tile: submit duplicate, Full-tile sample panels of each colour, texture, size, and pattern of tile.
 - .2 Floor tile: submit duplicate, Full-tile mm sample panels of each colour, texture, size, and pattern of tile.
 - .3 Trim shapes, bullnose cap and cove including bullnose cap and base pieces at internal and external corners of vertical surfaces, each type, colour, and size.

1.3 QUALITY ASSURANCE

- .1 Quality Assurance Submittals:
- .2 Manufacturer's Instructions: manufacturer's installation instructions.
- .3 Manufacturer's Field Reports: manufacturer's field reports specified.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Packing, shipping, handling and unloading:
- .2 Deliver, store and handle materials in accordance with Section 01 60 00 – Material and Equipment.

1.5 AMBIENT CONDITIONS

- .1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12 degrees C for 48 hours before, during, and 48 hours after, installation.
- .2 Do not install tiles at temperatures less than 12 degrees C or above 38 degrees C.
- .3 Do not apply epoxy mortar and grouts at temperatures below 15 degrees C or above 25 degrees C.

1.6 MAINTENANCE

- .1 Extra Materials:

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide minimum 2% of each type and colour of tile required for project for maintenance use. Store where directed.
- .3 Maintenance material same production run as installed material.

Part 2 Products

2.1 FLOOR TILE

- .1 FT1 and FT 2 Ceramic tile: to ANSI A137.1:2021, Type Full-body Porcelain, Class V, R 10, 610x610x9 and 305x610x9 mm size, rectified edges, slip resistant surface.
 - .1 Product: Olympic Unglazed Porcelain Tile.
 - .1 Alternates to be submitted at time of tender.
 - .2 Colour: Selected by Consultant from standard range.
 - .3 Base: Matching coved tile base.
 - .4 Pattern: As per drawings.
- .2 FT3 Ceramic tile: to ANSI A137.1:2021, Type Full-body Porcelain, Class V, R 13, 610x610x9 and 305x610x9 mm size, rectified edges, non slip resistance surface.
 - .1 Product: Olympic Unglazed Porcelain Tile.
 - .1 Alternates to be submitted at time of tender.
 - .2 Colour: Selected by Consultant from standard range.
 - .3 Base: Matching coved tile base.
 - .4 Pattern: As per drawings.

2.2 WALL TILE

- .1 CT1 Ceramic tile: to ANSI A137.1:2021, Type 5, Class R4, 100 x 305 x 9 mm size, cushioned on all edges, matt glazed surface,
 - .1 Colour: Selected by Consultant from standard range.
 - .2 Base: Matching square tile base.
 - .3 Pattern: As per drawings.

2.3 BASE TILE

- .1 Base: square type, size, colour and texture to match adjacent flooring material.

2.4 GROUT AND ADHESIVE MATERIALS

- .1 Manufacturers:
 - .1 Kiesel; Product: tile setting materials.
 - .2 Acceptable alternate manufacturers include:
 - .1 TEC; Product: tile setting materials.
 - .2 Mapei; Product: tile setting materials.
- .2 Colouring Pigments:

- .1 Pure mineral pigments, lime-proof and nonfading, complying with ASTM C 979.
 - .2 Colouring pigments to be added to grout by manufacturer.
 - .3 Job coloured grout are not acceptable.
 - .4 Use in Commercial Cement Grout, Dry-Set Grout, and Latex Cement Grout.
- .3 Latex Modified Cement Grout: to CTI A118.6; fast curing, high early strength, polymer-modified, stain resistant, sanded mix for floors, unsanded mix for walls and floors with polished tiles commercial tile grout.
- .1 Adhesive Materials: ANSI A118.4, Latex Modified, Portland cement, sand, latex additive and water.
 - .1 Thinsset mortar - Walls: Kiesel Servorlight
 - .2 Thinsset mortar - Floors: Kiesel Servoflex-Trio - SuperTec
 - .2 Grout: ANSI A118.6, Alumina cement tile grout, colour as selected from standard range.
 - .1 Kiesel, Servoperl Royal
 - .3 Primer: Solvent free, acrylic base primer.
 - .1 Keisel Okatmos UG-30
 - .4 Patching/Skimming/Mortar Bed Compound: Cement based; polymer modified.
 - .1 Keisel Servocret RS

2.5 ACCESSORIES

- .1 Waterproof Membrane: ANSI A118.10, Sheet Membrane:
 - .1 Kerdi Membrane by Schluter Systems, No substitutions. Provide Sealing strips, Pre-moulded corners, pre-cut penetration pieces and all accessories recommended by Manufacturer.
 - .2 Bonding adhesive between Kerdi Components; Schluter Kerdi-Fix.
- .2 Tile Trims: Aluminum, sized to suit tile, provide end caps, inside and outside corners
 - .1 Schluter or similar:
 - .1 Type 1: Schiene
 - .2 Type 2: Trep G Stair Edge Profile
 - .3 Type 3: Dilex KSN, 7/16" wide
 - .4 Type 4: Reno-U
 - .5 Type 5: Rondec-Step
 - .6 Type 6: Reno Ramp
 - .7 Type 7: Rondec
 - .8 Type 8: Rondec -DB, top of tile base
- .3 Sealer: CAN/CGSB-25.20, Type 2 (water based), as recommended by manufacturer.
- .4 Transition Strips: purpose made metal extrusion; stainless steel type.
- .5 Reducer Strips: purpose made metal extrusion; stainless steel type; maximum slope of 1:2.

- .6 Prefabricated Movement Joints: purpose made, having a Shore A Hardness not less than 60 and elasticity of plus or minus 40 percent when used in accordance to TTMAC Detail 301EJ.
- .7 Sealant: in accordance with Section 07 92 00 - Joint Sealants.
- .8 Floor sealer and protective coating: to CAN/CGSB-25.20, Type 2 to tile and grout manufacturers recommendations.

2.6 PATCHING AND LEVELLING COMPOUND

- .1 Cement base, acrylic polymer compound, manufactured specifically for resurfacing and leveling concrete floors. Products containing gypsum are not acceptable.
- .2 Have not less than the following physical properties:
 - .1 Compressive strength, 25 MPa.
 - .2 Tensile strength, 7 MPa.
 - .3 Flexural strength, 7 MPa.
 - .4 Density, 1.9.
- .3 Capable of being applied in layers up to 50 mm thick, being brought to feather edge, and being trowelled to smooth finish.
- .4 Ready for use in 48 hours after application.

2.7 CLEANING COMPOUNDS

- .1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.
- .2 Materials containing acid or caustic material are not acceptable.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 WORKMANSHIP

- .1 Perform Ceramic Tile work in accordance with TTMAC Tile Installer Technical Handbook 2018-2019, except where specified otherwise.
- .2 Apply tile or backing coats to clean and sound surfaces.
- .3 Fit tile around corners, fitments, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.

- .4 Maximum surface tolerance 1:800.
- .5 Make joints between tile uniform and approximately 1.5 mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.
- .6 Lay out tiles so perimeter tiles are minimum 1/2 size.
- .7 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .8 Make internal angles square, external angles square [with stainless steel exterior edge trim.
- .9 Install divider or transition strips at junction of tile flooring and dissimilar materials.
- .10 Allow minimum 24 hours after installation of tiles, before grouting.
- .11 Clean installed tile surfaces after installation and grouting cured.
- .12 Make control joints per TTMAC guidelines when joints are not indicated on drawings. Make joint width same as tile joints. Fill control joints with sealant in accordance with Section 07 92 00 - Joint Sealants. Keep building expansion joints free of mortar and grout.

3.3 FLOOR SEALER AND PROTECTIVE COATING

- .1 Apply in accordance with manufacturer's instructions.

3.4 CLEANING

- .1 Proceed in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C 423-09, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - .2 ASTM E 580/E 580M-14 Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions.
 - .3 ASTM C 635/C 635M-13a, Standard Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
 - .4 ASTM C 636/C 636M-08, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
 - .5 ASTM E 1264-14, Standard Classification for Acoustical Ceiling Products.
 - .6 ASTM E 1414/E 1414M 11ae1 Standard Test Method for Sound Attenuation between Rooms Sharing a Common Ceiling Plenum.
 - .7 ASTM E 1477-98a(2013), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
 - .8 ASTM F 1667-15 Standard Specification for Driven Fasteners: Nails, Spikes and Staples.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-51.34-M86, Vapour Barrier, Polyethylene Sheet, for Use in Building Construction and Amendment No. 1 1988.
- .3 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (SDS).
- .4 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-2003, Surface Burning Characteristics of Building Materials and Assemblies.

1.2 COORDINATION

- .1 Do not begin erection of ceiling suspension system until work above ceiling has been inspected by Consultant.

1.3 PRE-INSTALLATION MEETING

- .1 Convene pre-installation meeting one week prior to beginning work of this Section with Consultant to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with work of other sections.

- .4 Review manufacturer's installation instructions and warranty requirements.
- .5 Review accepted shop drawings for installation requirements.

1.4 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for acoustical suspension, acoustic panels, acoustic tiles, and system accessories. Include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit reflected ceiling plans for special grid patterns as indicated.
 - .2 Indicate lay-out, insert and hanger spacing and fastening details, splicing method for main and cross runners, location of access splines change in level details, access door dimensions, and locations and acoustical unit support at ceiling fixture lateral bracing and accessories.
- .4 Delegated Design Submittals:
 - .1 Submit delegated design shop drawings stamped and signed by professional engineer registered or licensed in Prince Edward Island, Canada.
 - .2 Indicate components and installation methods to conform to specified seismic design and construction requirements of Contract Documents and in general accordance with ASTM E 580/E 580M.
 - .3 Include supporting details, treatment of cross runners, main runners, and wall closures at terminal ends, suspension wire, lateral force bracing, light fixtures and services within the ceiling, seismic isolation joints and partition bracing.
- .5 Samples:
 - .1 Submit for review and acceptance of each component specified or necessary for complete installation. Include technical descriptive data.
 - .2 Submit duplicate samples of each component proposed for use in each type of ceiling suspension system.
 - .3 Submit duplicate full size 150 mm x 100 mm samples of each type of acoustical unit.

1.5 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit operation and maintenance data for acoustical suspension for incorporation into manual.
- .3 Submit final certificate from design professional responsible for delegated detail design of ceiling indicating conformity with accepted shop drawings.

1.6 MAINTENANCE MATERIALS

- .1 Provide extra acoustical units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide acoustical units amounting to 2% of gross ceiling area for each pattern and type of acoustical panel, suspension system and trim required for project, minimum 1 complete factory-sealed package of each.
- .3 Ensure extra materials are from same production run as installed materials.
- .4 Deliver extra materials for each type of acoustical unit in original unopened packages clearly identified, including colour and texture.
- .5 Deliver to City Representative, upon completion of the work of this section.

1.7 CERTIFICATIONS

- .1 Fire-resistance rated suspension system: certified by a Canadian Certification Organization accredited by Standards Council of Canada.
- .2 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements. Include certification of sustainable requirements.

1.8 MOCK-UPS

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Construct mock-up 10 m² minimum of each type acoustical ceiling assembly including one inside corner and one outside corner . Ceiling system mock-up to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, acoustical unit installation, seismic reinforcing.
- .3 Construct mock-up where directed.
- .4 Allow 24 hours for inspection of mock-up by Consultant before proceeding with ceiling work.
- .5 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work.

1.9 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials flat, indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.

- .2 Store and protect acoustical ceiling panels suspension grid components from nicks, scratches, and blemishes.
- .3 Replace defective or damaged materials with new.
- .4 Store extra materials required for maintenance, where directed by City Representative.
- .4 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling or disposal in accordance with Section City Representative.

1.10 ENVIRONMENTAL REQUIREMENTS

- .1 Permit wet work to dry before beginning to install.
- .2 Maintain uniform minimum temperature of 15 degrees C and humidity of 20- 40% before and during installation.
- .3 Store materials in work area 48 hours prior to installation.

Part 2 Products

2.1 DESIGN CRITERIA

- .1 Design Requirements:
 - .1 Intermediate duty system to ASTM C 635/ASTM C635M.
 - .2 Maximum deflection: 1/360th of span to ASTM C 635/ASTM C635M deflection test.
- .2 Seismic design requirements:
 - .1 Design acoustical ceiling installation to resist effects of earthquake motions under seismic design conditions specified in Contract Documents. Provide components as necessary to implement design.

2.2 ACOUSTICAL CEILING SUSPENSION

- .1 Acoustical Ceiling Suspension system ASC-1: non- fire rated, made up as follows:
 - .1 Two (2) directional exposed tee bar grid for Acoustic Panels type ACT-1.
 - .2 Size: 23.8 mm
 - .3 Trims: edge Trims and wall angles as required
 - .4 Wire: As recommended by manufacturer
- .2 Basic materials for suspension system: commercial quality cold rolled steel zinc coated.
- .3 Exposed tee bar grid components: shop painted satin sheen white. Components die cut. Main tee with double web, rectangular bulb and 25 mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection.
- .4 Hanger wire: galvanized soft annealed steel wire:

- .1 3.6 mm diameter for access tile ceilings.
- .5 Hanger inserts: purpose made.
- .6 Accessories: splices, clips, wire ties, retainers and wall moulding flush, to complement suspension system components, as recommended by system manufacturer.
- .7 Seismic components and accessories: in accordance with accepted shop drawings.

2.3 ACOUSTICAL CEILING PANELS

- .1 Acoustical Panel ACT-1 to ASTM E 1264 and as follows.
 - .1 Type: Clean Room Vinyl Faced Acoustic Panel, Smooth textured acoustical panel, Class 10M-100M (ISO 7).
 - .2 Noise Reduction Coefficient (NRC) designation of 0.55.
 - .3 Sound Absorption Average (SAA) of 0.9 to ASTM C 423.
 - .4 Ceiling Attenuation Class (CAC) rating 35, in accordance with ASTM E 1414.
 - .5 Edge type square.
 - .6 Colour: white.
 - .7 Thickness: 16 mm.
 - .8 Pattern: refer to drawings.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify conditions of substrates previously installed under other Sections or Contracts are acceptable for acoustical ceiling tile and track installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 INTERFACE WITH OTHER WORK

- .1 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

3.3 SUSPENSION SYSTEM INSTALLATION

- .1 Comply with manufacturer's written installation instructions and recommendations, including product technical bulletins, product carton installation instructions, and data sheets.
- .2 Install suspension system in accordance with accepted shop drawings, and ASTM C 636/C 636M except where specified otherwise.

- .3 Lay out system according to reflected ceiling plan.
- .4 Finished ceiling system to be square with adjoining walls and level within 1:1000.
- .5 Secure hangers to overhead structure using attachment methods acceptable to Consultant.
- .6 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees.
- .7 Ensure suspension system is coordinated with location of related components. Provide carrying channels as necessary to bridge at unavoidable interference between suspension system and other work above ceiling.
- .8 Install wall moulding to provide correct ceiling height.
- .9 Completed suspension system to support super-imposed loads, such as lighting fixtures diffusers grilles and speakers.
- .10 Support at light fixtures diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .11 Interlock cross member to main runner to provide rigid assembly.
- .12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.
- .13 Install access splines to provide 10 % ceiling access.
- .14 Expansion joints:
 - .1 Erect two main runners parallel, 25 mm apart, on building expansion joint line. Lay in strip of acoustic tile/board, , 25% narrower than space between 2 'T' bars.
 - .2 Supply and install "Z" shaped metal trim pieces at each side of expansion joint. Design to accommodate plus or minus 25 mm movement and maintain visual closure. Finish metal components to match adjacent exposed metal trim. Provide backing plates behind butt joints.
- .15 Install perimeter trim at floating installations securely anchored to suspension system, in accurate alignment with adjacent assemblies. Install curved trim members in smooth curves to radius indicated.

3.4 ACOUSTICAL CEILING PANEL INSTALLATION

- .1 Install lay-in acoustical panels in ceiling suspension system in accordance with manufacturer's instructions and as indicated.
- .2 Install fibrous acoustical media and spacers over entire area above suspended metal panels.
- .3 In fire rated ceiling systems, secure lay-in panels with hold-down clips and protect over light fixtures, diffusers, air return grilles and other appurtenances according to Certification Organizations design requirements.

3.5 SITE QUALITY CONTROL

- .1 Arrange for periodic site visits by design professional responsible for delegated ceiling design work to review installed work for conformity to design.
- .2 Arrange for periodic site visits by manufacturer's representative to review installed work for conformity to manufacturer's installation instructions and recommendations.
- .3 Submit written site reports by to Consultant within 3 days of visit.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .1 Touch up scratches, abrasions, voids and other defects in painted surfaces.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 22 - Construction and Demolition Waste Management.

3.7 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by acoustical suspension installation.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Suspended Metal Panel Ceiling and Suspension System.

1.2 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM C 423-09, Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - .2 ASTM E 580/E 580M-14 Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions.
 - .3 ASTM C 635/C 635M-13a, Standard Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
 - .4 ASTM C 636/C 636M-08, Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.
 - .5 ASTM E 1264-14, Standard Classification for Acoustical Ceiling Products.
 - .6 ASTM E 1414/E 1414M 11ae1 Standard Test Method for Sound Attenuation between Rooms Sharing a Common Ceiling Plenum.
 - .7 ASTM E 1477-98a (2013), Standard Test Method for Luminous Reflectance Factor of Acoustical Materials by Use of Integrating-Sphere Reflectometers.
 - .8 ASTM F 1667-15 Standard Specification for Driven Fasteners: Nails, Spikes and Staples.
- .2 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (SDS).
- .3 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102-2003, Surface Burning Characteristics of Building Materials and Assemblies.

1.3 COORDINATION

- .1 Do not begin erection of ceiling suspension system until work above ceiling has been inspected by Consultant.

1.4 PRE-INSTALLATION MEETING

- .1 Convene pre-installation meeting one week prior to beginning work of this Section with Consultant to:
 - .1 Verify project requirements.
 - .2 Review installation and substrate conditions.
 - .3 Co-ordination with work of other sections.
 - .4 Review manufacturer's installation instructions and warranty requirements.

- .5 Review accepted shop drawings for installation requirements.

1.5 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for suspension system, metal panels, and system accessories. Include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit reflected ceiling plans for special grid patterns as indicated.
 - .2 Indicate lay-out, insert and hanger spacing and fastening details, splicing method for main and cross runners, location of access splines change in level details, access door dimensions, and locations and acoustical unit support at ceiling fixture lateral bracing and accessories.
- .4 Design Submittals:
 - .1 Indicate components and installation methods to conform to specified seismic design and construction requirements of Contract Documents and in general accordance with ASTM E 580/E 580M.
 - .2 Include supporting details, treatment of cross runners, main runners, and wall closures at terminal ends, suspension wire, lateral force bracing, light fixtures and services within the ceiling, seismic isolation joints and partition bracing.
- .5 Samples:
 - .1 Submit for review and acceptance of each component specified or necessary for complete installation. Include technical descriptive data.
 - .2 Submit duplicate samples of each component proposed for use in each type of ceiling suspension system.

1.6 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit operation and maintenance data for acoustical suspension for incorporation into manual.
- .3 Submit final certificate from design professional responsible for delegated detail design of ceiling indicating conformity with accepted shop drawings.

1.7 MAINTENANCE MATERIALS

- .1 Provide extra panel units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide extra panel units amounting to 2% of gross ceiling area for each pattern and type of panel, suspension system and trim required for project, minimum 1 complete factory-sealed package of each.
- .3 Ensure extra materials are from same production run as installed materials.

- .4 Deliver extra materials for each type of unit in original unopened packages clearly identified, including colour and texture.
- .5 Deliver to City Representative, upon completion of the work of this section.

1.8 CERTIFICATIONS

- .1 Certifications: submit product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements. Include certification of sustainable requirements.

1.9 MOCK-UPS

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Construct mock-up 10 m² minimum of each type metal ceiling assembly including one inside corner and one outside corner . Ceiling system mock-up to show basic construction and assembly, treatment at walls, recessed fixtures, splicing, interlocking, finishes, unit installation, seismic reinforcing. Locate mock-up where directed by Consultant.
- .3 Allow 24 hours for inspection of mock-up by Consultant before proceeding with ceiling work.
- .4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of the finished work.

1.10 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials flat, indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect acoustical ceiling panels suspension grid components from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
 - .4 Store extra materials required for maintenance, where directed by Consultant.
- .4 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling or disposal in accordance with Section 01 74 19 – Construction/Demolition Waste Management and Disposal.

1.11 ENVIRONMENTAL REQUIREMENTS

- .1 Permit wet work to dry before beginning to install.

- .2 Maintain uniform minimum temperature of 15 degrees C and humidity of 20- 40% before and during installation.
- .3 Store materials in work area 48 hours prior to installation.

Part 2 Products

2.1 MANUFACTURERS

- .1 Armstrong; Product: Metal Works
- .2 Other acceptable manufacturers offering functionally and aesthetically equivalent products.
 - .1 Chicago Metallic
 - .2 Hunter Douglas Contract
 - .3 CCG
- .3 Substitutions: Refer to Section 01 62 00.

2.2 TYPES

- .1 Type 1: Linear
 - .1 Acoustics: NRC: 0.70, Micro perforated metal with black insulated filler
 - .2 Format: 16 x 100 x 2440
 - .3 Edge: Square with extended flange
 - .4 Colour & Finish: simulated wood, select by Consultant from full range.
- .2 Type 2: Blades
 - .1 Acoustics: Micro perforated metal with black insulated filler
 - .2 Format: 25 x 100 x 2440
 - .3 Edge: Caps on both ends
 - .4 Colour & Finish: simulated wood, select by Consultant from full range.

2.3 DESIGN CRITERIA

- .1 Design Requirements:
 - .1 Maximum deflection: 1/360th of span to ASTM C 635/ASTM C635M deflection test.
- .2 Seismic design requirements:
 - .1 Design metal ceiling installation to resist effects of earthquake motions under seismic design conditions specified in Contract Documents. Provide components as necessary to implement design.

2.4 ACOUSTICAL CEILING SUSPENSION

- .1 Acoustical Ceiling Suspension system ASC-1: non- fire rated, made up as follows:

- .1 Two (2) directional suspension system.
 - .2 Exposed Width: 15 mm
 - .3 Trims: edge trims and wall angles as required
 - .4 Wire: As recommended by manufacturer.
 - .5 Material: commercial quality cold rolled steel with G90 galvanized coating and baked-on polyester paint finish.
 - .6 Colour: Selected by Consultant from standard range.
- .2 Hanger inserts: purpose made.
 - .3 Accessories: splices, clips, wire ties, retainers and wall moulding flush, to complement suspension system components, as recommended by system manufacturer.
 - .4 Seismic components and accessories: in accordance with accepted shop drawings.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify conditions of substrates previously installed under other Sections or Contracts are acceptable for acoustical ceiling tile and track installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 INTERFACE WITH OTHER WORK

- .1 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

3.3 SUSPENSION SYSTEM INSTALLATION

- .1 Comply with manufacturer's written installation instructions and recommendations, including product technical bulletins, product carton installation instructions, and data sheets.
- .2 Install suspension system in accordance with accepted shop drawings, and ASTM C 636/C 636M except where specified otherwise.
- .3 Lay out system according to reflected ceiling plan.
- .4 Finished ceiling system to be square with adjoining walls and level within 1:1000.
- .5 Secure hangers to overhead structure using attachment methods acceptable to Consultant.
- .6 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees.

- .7 Ensure suspension system is coordinated with location of related components. Provide carrying channels as necessary to bridge at unavoidable interference between suspension system and other work above ceiling.
- .8 Install wall moulding to provide correct ceiling height.
- .9 Completed suspension system to support super-imposed loads, such as lighting fixtures diffusers grilles and speakers.
- .10 Support at light fixtures diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .11 Interlock cross member to main runner to provide rigid assembly.
- .12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.
- .13 Install access splines to provide 10 % ceiling access.
- .14 Expansion joints:
 - .1 Erect two main runners parallel, 25 mm apart, on building expansion joint line. Lay in strip of acoustic tile/board, , 25% narrower than space between 2 'T' bars.
 - .2 Supply and install "Z" shaped metal trim pieces at each side of expansion joint. Design to accommodate plus or minus 25 mm movement and maintain visual closure. Finish metal components to match adjacent exposed metal trim. Provide backing plates behind butt joints.
- .15 Install perimeter trim at floating installations securely anchored to suspension system, in accurate alignment with adjacent assemblies. Install curved trim members in smooth curves to radius indicated.

3.4 METAL CEILING PANEL INSTALLATION

- .1 Install lay-in metal panels in ceiling suspension system in accordance with manufacturer's instructions and as indicated.
- .2 Install fibrous acoustical media and spacers over entire area above suspended metal panels.

3.5 SITE QUALITY CONTROL

- .1 Arrange for periodic site visits by design professional responsible for delegated ceiling design work to review installed work for conformity to design.
- .2 Arrange for periodic site visits by manufacturer's representative to review installed work for conformity to manufacturer's installation instructions and recommendations.
- .3 Submit written site reports by designer to Consultant within 3 days of visit.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - Cleaning.

- .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 00 - Cleaning.
 - .1 Touch up scratches, abrasions, voids and other defects in painted surfaces.
- .3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

3.7 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by acoustical suspension installation.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM D412: Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers—Tension.
 - .2 ASTM D2047: Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as measured by the James Machine.
 - .3 ASTM D2240: Standard Test Method for Rubber Property (Durometer Hardness).
 - .4 ASTM D3389: Standard Test Method for Coated Fabrics Abrasion Resistance (Rotary Platform Abrader).
 - .5 ASTM E662: Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials.
 - .6 ASTM F386: Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces.
 - .7 ASTM F410: Standard Test Method for Wear Layer Thickness of Resilient Floor Coverings by Optical Measurement.
 - .8 ASTM F710: Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring.
 - .9 ASTM F925: Standard Test Method for Resistance to Chemicals of Resilient Flooring.
 - .10 ASTM F970: Standard Test Method for Static Load Limit.
 - .11 ASTM F1514: Standard Test method for Measuring Heat Stability of Resilient Flooring by Color Change.
 - .12 ASTM F1515: Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Change.
 - .13 ASTM F1869: Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 - .14 ASTM F2170: Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
 - .15 ASTM F2199: Standard Test Method for Determining Dimensional Stability of Resilient Floor Tile after Exposure to Heat.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for resilient sheet flooring and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Samples:

- .1 Submit duplicate 300 x 300 mm sample pieces of sheet material, 300 mm long base,.

1.3 CLOSEOUT SUBMITTALS

- .1 Section 01 78 00: Refer to submission procedures.
- .2 Operation and Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- .1 Extra Materials:
 - .1 Provide extra materials of resilient sheet flooring and adhesives in accordance with Section 01 78 00 - Closeout Submittals.
 - .2 Provide 10 m2 of each colour, pattern and type flooring material required for project for maintenance use.
 - .3 Extra materials one piece and from same production run as installed materials.
 - .4 Identify each roll of sheet flooring and each container of adhesive.
 - .5 Deliver to City Representative, upon completion of the work of this section.
 - .6 Store where directed by City Representative.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 60 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect specified materials from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

1.6 QUALITY ASSURANCE

- .1 Products of This Section: Manufactured to ISO 14000 certification requirements.
- .2 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum five (5) years documented experience.
- .3 Installer Qualifications: Company specializing in performing the work of this section with minimum five (5) years documented experience and approved by the manufacturer.

1.7 MOCK-UP

- .1 Provide mock-up of Resilient Floor system, including all associated materials for suitable installation.

- .2 Size: Approximately 10m2 in a room to be selected by Consultant.
- .3 Approved mock-up may remain as part of the competed work.

1.8 SITE CONDITIONS

- .1 Ambient Conditions:
 - .1 Maintain air temperature and structural base temperature at flooring installation area above 20 degrees for 48 hours before, during and 48 hours after installation.

Part 2 Products

2.1 VINYL FLOORING MANUFACTURERS

- .1 Armstrong; Product: Luxury Vinyl Tile product line.
- .2 Other acceptable manufacturers offering functionally and aesthetically equivalent products.
 - .1 Polyflor; Product: Luxury Vinyl Tile product line.
- .3 Substitutions: Not permitted.

2.2 VINYL FLOORING MATERIALS

- .1 Type RF3 and RF4:
 - .1 Solid Vinyl Floor Tile conforming to the requirement of ASTM F 1700.
 - .2 Type: I - PVC binder content 90%.
 - .3 Grade: 1.
 - .4 Backing: B-non-foam plastic .
 - .5 Composition: Heterogeneous
 - .6 Finish: UV-cured urethane coating
 - .7 Pattern: embossed
 - .8 Texture: printed to simulate wood plank flooring.
 - .9 Pattern and Colour: from manufactures full product range selected by Consultant.
 - .10 Thickness: 2 mm.
 - .11 Width: 150mm nominal
 - .12 Length:1220 mm nominal
 - .13 Slip Resistance:
 - .1 A minimum of R10 in accordance with AS 4586 Slip Resistance Classification of New Pedestrian Surface Materials Appendix D Oil/Wet Ramp Test.
- .2 Type RF5:
 - .1 Heterogeneous Sheet vinyl with backing conforming to the requirements of ASTM F1303

- .2 Type: I - PVC binder content 90%.
- .3 Grade: 1.
- .4 Backing: B-non-foam plastic .
- .5 Composition: Heterogeneous
- .6 Finish: UV-cured urethane coating
- .7 Pattern: embossed
- .8 Pattern and Colour: from manufactures full product range selected by Consultant.
- .9 Thickness: 2 mm.
- .10 Width: 2 m (minimum)
- .11 Length: 30 m (minimum)
- .12 Slip Resistance:
 - .1 A minimum of R10 in accordance with AS 4586 Slip Resistance Classification of New Pedestrian Surface Materials Appendix D Oil/Wet Ramp Test.
- .13 Seam Adhesive:
 - .1 As recommended by the resilient flooring manufacturer.
- .3 Resilient base: ASTM F1861, Type TP, Group 1, Style A (sculptured) continuous, top set, complete with premoulded end stops and external corners:
 - .1 Type: rubber.
 - .2 Style: sculptured with reveal.
 - .3 Thickness: 6 mm.
 - .4 Height: 114mm.
 - .5 Lengths: cut lengths minimum 2400 mm.
 - .6 Colour: selected from full range by Consultant.
 - .7 Location: Where all sheet vinyl flooring abutments walls.

2.3 RUBBER FLOORING

- .1 Manufactures
 - .1 Mondo; Product: Ramflex and Sportflex M
 - .2 Other acceptable manufacturers offering functionally and aesthetically equivalent products.
 - .3 Substitutions: Refer to Section 01 61 00. To be submitted for review and approved during tender period.
- .2 Materials
 - .1 Type RF1 and RF2: Recycled rubber floor with colored EPDM rubber granules bound with a polyurethane binder;
 - .1 Pattern: Allow for 10-30% two color speckle with black background. Color selected from standard range by Consultant.
 - .2 Thickness: 9.5mm.
 - .3 Square cut and fully adhered (glued), use manufacturer's recommended adhesives.

- .4 Acceptable products: Mondo Ramflex or similar approved alternate at time of tender.
- .2 Type RF6: Vulcanized rubber flooring
 - .1 Pattern: Solid
 - .2 Colour: Color selected from standard range by Consultant.
 - .3 Thickness: 8mm.
 - .4 Square cut and fully adhered (glued), use manufacturer's recommended adhesives.
 - .5 Acceptable products: Mondo Sportflex M or similar approved alternate at time of tender.

2.4 ACCESSORIES

- .1 Primers and adhesives: of types recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade.
- .2 Sub-floor filler and leveller: white premix latex requiring water only to produce cementitious paste as recommended by flooring manufacturer for use with their product.
- .3 Underlayment: Provide glue-down cushion underlayment at Multi-purpose Room 106. Use manufacturer approved product only.
- .4 Metal edge strips:
 - .1 Aluminum extruded, smooth, mill finish with lip to extend under floor finish, shoulder flush with top of adjacent floor finish.
- .5 Edging to floor penetrations: aluminum type recommended by flooring manufacturer.
- .6 Sealer and wax: type recommended by resilient flooring material manufacturer for material type and location.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for resilient sheet flooring installation in accordance with manufacturer's written instructions.
 - .1 Inform Consultant unacceptable conditions immediately upon discovery.
 - .2 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 SITE VERIFICATION OF CONDITIONS

- .1 Ensure concrete floors are clean and dry by using test methods recommended by flooring manufacturer.

3.3 PREPARATION

- .1 Seal concrete slab to resilient flooring manufacturer's printed instructions.

3.4 APPLICATION: FLOORING

- .1 Provide high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to outside. Do not let contaminated air recirculate through district or whole building air distribution system. Maintain extra ventilation for at least 1 month following building occupation.
- .2 Apply adhesive uniformly using recommended trowel. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .3 Lay flooring with seams parallel to building lines to produce a minimum number of seams. Border widths minimum 1/3 width of full material.
- .4 Run sheets in direction of traffic. according to manufacturer's printed instructions.
- .5 Heat weld seams of linoleum sheet flooring in accordance with manufacturer's printed instructions.
- .6 As installation progresses, and after installation roll flooring with 45 kg minimum roller to ensure full adhesion.
- .7 Cut flooring around fixed objects.
- .8 Install feature strips and floor markings where indicated. Fit joints tightly.
- .9 Terminate flooring at centreline of door in openings where adjacent floor finish or colour is dissimilar.
- .10 Install metal edge strips at unprotected or exposed edges where flooring terminates.

3.5 APPLICATION: BASE

- .1 Lay out base to keep number of joints at minimum.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.
- .6 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .7 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles.
- .8 Use toeless type base where floor finish will be carpet, coved type elsewhere.
- .9 Install toeless type base before installation of carpet on floors.
- .10 Heat weld base in accordance with manufacturer's printed instructions.

3.6 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.
 - .1 Clean flooring and base surfaces to flooring manufacturer's printed instructions.

3.7 PROTECTION

- .1 Protect new floors from time of final set of adhesive until final inspection.
- .2 Prohibit traffic on floor for 48 hours after installation.
- .3 Use only water-based coating for linoleum.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Wall and ceiling system cementitious wood fibre acoustic plank panels.

1.2 REFERENCES

- .1 American Society for Testing and Materials (ASTM)
 - .1 ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - .2 ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials
 - .3 ASTM E2768-11(2018) Standard Test Method for Extended Duration Surface Burning Characteristics of Building Materials
 - .4 ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Moderate Seismic Restraint
 - .5 ASTM C636 / C636M - 19 Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels
 - .6 ASTM C 754 Installation of Steel Framing Members to Receive Screw-Attached Gypsum Board
 - .7 ASTM E 1264 Classification for Acoustical Ceiling Products
 - .8 ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
- .2 Nation Building Code of Canada
- .3 ASHRAE Standard 62.1-2004, "Ventilation for Acceptable Indoor Air Quality"

1.3 SYSTEM DESCRIPTION

- .1 Direct attached cementitious wood fibre acoustic (wall or ceiling) systems.

1.4 SUBMITTALS

- .1 Product Data: Submit manufacturer's technical data for each type of ceiling or wall required.
- .2 Samples: Minimum 150mm x 150 mm samples of specified cementitious wood fibre acoustic panels.
- .3 Shop Drawings: Layout and details of direct-attach acoustic panels unit, show locations of items to be coordinated with the installation.
- .4 Certifications: Showing compliance with UL/ULC testing specifications and Acoustical Performance testing to A, D-20, C-20, and C-40 methods.
- .5 If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance as specified in Section 2.2, subcontractor shall be required to send material from every production run appearing on

the job, finished as intended to be installed, to an independent or NVLAP approved laboratory for testing, at the architect's or owner's discretion. All products not conforming to manufacturer's current published values must be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

1.5 QUALITY ASSURANCE

- .1 Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.
- .2 Fire Performance Characteristics: Identify acoustical ceiling components with appropriate ULC markings.
- .3 Surface Burning Characteristics: Class A. Flame Spread Index 25 or less and Smoke Developed Index 50 or less when tested in accordance with CAN/ULC S102.
- .4 Direct-attach Cementitious Wood Fibre panels may obstruct or skew the planned fire sprinkler water distribution pattern through possibly delay or accelerate the activation of the sprinkler or fire detection systems by channeling heat from a fire either toward or away from the device. Installers to consult NFPA 13 and/or Prince Edward Island Build Code for guidance where automatic fire detection and suppression systems are present.
- .5 Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.6 DELIVERY, STORAGE & HANDLING

- .1 Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.
- .2 Provide labels indicating brand name, style, size and thickness.
- .3 Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.
- .4 Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.7 ENVIRONMENT

- .1 Environmental Requirements:
 - .1 Do not install ceiling panels until building is closed in and HVAC system is operational.
 - .2 Locate materials onsite at least 72 hours before beginning installation to allow materials to reach temperature and moisture content equilibrium.
- .2 Maintain the following conditions in areas where acoustical materials are to be installed 72 hours before, during and after installation:
 - .1 Relative Humidity: 25 - 85%.

.2 Uniform Temperature: 0 - 49 degrees C.

1.8 WARRANTY

.1 Provide manufacturer's standard product warranty.

1.9 MAINTENANCE

.1 Extra Materials: Deliver extra materials to City Representative. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

.1 Furnish quantity of full-size units equal to five (5) percent of amount installed in each type or colour installed.

Part 2 Products

2.1 MANUFACTURER

.1 Armstrong World Industries, Product: Tectum Panels with Suspension System and Accessories.

.1 Other acceptable manufacturers offering functionally and aesthetically equivalent products will be considered during tender period only.

.2 Substitutions: Refer to Section 01 62 00.

2.2 CEILING PANELS

.1 Product: Tectum® Direct-Attached

.2 Properties:

.1 Acoustical Panels Type AP-1:

.2 Surface Texture: Coarse

.3 Composition: Aspen wood fibers bonded with inorganic hydraulic cement

.4 Finish: Surface appearance shall be consistent from panel to panel

.5 Color: Custom Color Grey selected from full range.

.6 Size: Standard Ceiling planks at 305x2440.

.7 Thickness: Standard 25mm

.8 Edge Profile: Square

2.3 METAL SUSPENSION SYSTEMS

.1 Suspended gypsum board grid. Refer to 09 51 13 – Acoustical Panel Ceilings.

Part 3 Execution

3.1 EXAMINATION

- .1 Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

3.2 PREPARATION

- .1 Measure each wall area and establish layout of wall units. Coordinate panel layout with mechanical and electrical fixtures.
- .2 Coordination: Furnish layouts for preset inserts, clips, and other ceiling anchors whose installation is specified in other sections.
- .3 Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.

3.3 INSTALLATION

- .1 Install Panels in accordance manufacturer's installation instructions.

3.4 ADJUSTING AND CLEANING

- .1 Replace damaged and broken Panels.
- .2 Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove any that cannot be successfully cleaned and or repaired. Replace with new product to eliminate evidence of damage.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Paint coatings and stains.
- .2 Surface preparation.
- .3 Field application.

1.2 RELATED SECTIONS

- .1 Section 05 50 00 - Metal Fabrications: Shop primed items.

1.3 REFERENCES

- .1 AWWA (American Water Works Association) - C218-02 - Standard for Coating the Exterior of Aboveground Steel Water Pipelines & Fittings.
- .2 AWWA (American Water Works Association) - D102-06 - Coating Steel Water Storage Tanks.
- .3 MPI (Master Painters Institute) – Architectural Painting Specifications Manual.
- .4 NACE (National Association of Corrosion Engineers).
- .5 SSPC (The Society for Protective Coatings) (formerly SSPC - Steel Structures Painting Council) - Steel Structures Painting Manual.

1.4 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Product Data: Provide data on all finishing products.
- .3 Samples: Submit two (2) samples, 300x300 mm (12 x 12 inch) in size illustrating selected colours and textures for each colour selected.

1.5 SUBMITTALS FOR INFORMATION

- .1 Section 01 33 00: Submission procedures.
- .2 Installation Data: Manufacturer's special installation requirements indicating special surface preparation procedures, substrate conditions requiring special attention.

1.6 CLOSEOUT SUBMITTALS

- .1 Section 01 78 00: Submission procedures.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- .1 Section 01 78 46: Maintenance and extra material requirements.
- .2 Extra Stock Materials:
 - .1 Provide four (4) litres (one (1) gallon) of each type to Owner.
 - .2 Label each container with colour, type, texture, room locations, in addition to the manufacturer's label.

1.8 QUALITY ASSURANCE

- .1 Products of This Section: Manufactured to ISO 9000 certification requirements.
- .2 Conform to CPCA – Specification Manual.
- .3 Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum ten (10) years documented experience.
- .4 Installer Qualifications: Workers specializing in performing the work of this section with minimum five (5) years documented experience and approved by the manufacturer. Contractor to submit names and work experience of approved installers to preform the work of this section.

1.9 MOCK-UP

- .1 Section 01 43 00: Quality Assurance.
- .2 Provide 3 x 3 m field sample panel, illustrating coating colour, texture, and finish.
- .3 Provide mock-up room completely finished.
- .4 Locate where directed by Consultant.
- .5 Approved mock-up may remain as part of the Work.

1.10 DELIVERY, STORAGE, AND PROTECTION

- .1 Section 01 61 00: Transport, handle, store, and protect products.
- .2 Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- .3 Container label to include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, colour designation, and written instructions for mixing and reducing.
- .4 Store paint materials at minimum ambient temperature of 7 degrees C and a maximum of 32 degrees C, in ventilated area, and as required by manufacturer's written instructions.

1.11 ENVIRONMENTAL REQUIREMENTS

- .1 01 35 29 - Health and Safety Procedures: Environmental conditions affecting products on site.
- .2 Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- .3 Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- .4 Minimum Application Temperatures for Latex Paints: 7 degrees C for interiors; 10 degrees C for exterior; unless required otherwise by manufacturer's written instructions.
- .5 Minimum Application Temperature for Varnish Finishes: 18 degrees C for interior or exterior, unless required otherwise by manufacturer's written instructions.
- .6 Provide lighting level of 860 lx (80 ft candles) measured mid-height at substrate surface.

Part 2 Products

2.1 MANUFACTURERS

- .1 Benjamin Moore.
- .2 Other acceptable manufacturers offering functionally and aesthetically equivalent products.
 - .1 ICI.
 - .2 PPG.
- .3 Products to meet: CAN/CGSB 85.100.

2.2 ADDITIONAL MATERIALS

- .1 Coatings: Ready mixed, except field catalyzed coatings. Process pigments to a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating; good flow and brushing properties; capable of drying or curing free of streaks or sags.
- .2 Accessory Materials: Linseed oil, shellac, turpentine, paint thinners and other materials not specifically indicated but required to achieve the finishes specified, of commercial quality.
- .3 Patching Materials: Latex filler.
- .4 Fastener Head Cover Materials: Latex filler.

2.3 FINISHES

- .1 Refer to schedule at end of section for surface finish and colour schedule.

Part 3 Execution

3.1 EXAMINATION

- .1 Section 01 71 00: Verify existing conditions before starting work.
- .2 Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- .3 Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- .4 Test shop applied primer for compatibility with subsequent cover materials.
- .5 Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
 - .1 Plaster and Gypsum Wallboard: 12%.
 - .2 Masonry, Concrete, and Concrete Unit Masonry: 12%.
 - .3 Interior Wood: 15%.
 - .4 Exterior Wood: 15%.
 - .5 Concrete Floors: 2.5% , or per coating manufacturer.

3.2 PREPARATION

- .1 Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

- .2 Correct defects and clean surfaces which affect work of this section. Remove existing coatings that exhibit loose surface defects.
- .3 Seal with shellac and seal marks which may bleed through surface finishes.
- .4 Impervious Surfaces: Remove mildew by scrubbing with solution of tri-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- .5 Aluminum Surfaces Scheduled for Paint Finish: Remove surface contamination by steam or high-pressure water. Remove oxidation with acid etch and solvent washing. Apply etching primer immediately following cleaning.
- .6 Asphalt, Creosote, or Bituminous Surfaces Scheduled for Paint Finish: Remove foreign particles to permit adhesion of finishing materials. Apply compatible sealer or primer.
- .7 Insulated Coverings: Remove dirt, grease, and oil from canvas and cotton.
- .8 Concrete Floors: Remove contamination; acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.
- .9 Gypsum Board Surfaces: Fill minor defects with filler compound. Spot prime defects after repair.
- .10 Galvanized Surfaces: Remove surface contamination and oils and wash with solvent. Apply coat of etching primer.
- .11 Concrete and Unit Masonry Surfaces Scheduled to Receive Paint Finish: Remove dirt, loose mortar, scale, salt or alkali powder, and other foreign matter. Remove oil and grease with a solution of tri-sodium phosphate; rinse well and allow to dry. Remove stains caused by weathering of corroding metals with a solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.
- .12 Plaster Surfaces: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.
- .13 Uncoated Steel and Iron Surfaces: Remove grease, mill scale, weld splatter, dirt, and rust. Where heavy coatings of scale are evident, remove by [hand] [power tool] wire brushing or sandblasting; clean by washing with solvent. Apply a treatment of phosphoric acid solution, ensuring weld joints, bolts, and nuts are similarly cleaned. Spot prime paint after repairs.
- .14 Shop Primed Steel 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. Prime metal items including shop primed items.
- .15 Interior Wood Items Scheduled to Receive Paint Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats.
- .16 Interior Wood Items Scheduled to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats.
- .17 Exterior Wood Scheduled to Receive Paint 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.

- .18 Exterior Wood Scheduled to Receive Transparent Finish: Remove dust, grit, and foreign matter; seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes with tinted exterior calking compound after sealer has been applied. Remove millglaze.
- .19 Glue-Laminated Beams: Prior to finishing, wash surfaces with solvent, remove grease and dirt.
- .20 Wood and Metal Doors Scheduled for Painting: Seal top and bottom edges with primer.

3.3 APPLICATION

- .1 Apply products to manufacturer's written instructions.
- .2 Do not apply finishes to surfaces that are not dry.
- .3 Apply each coat to uniform finish.
- .4 Apply each coat of paint slightly darker than preceding coat unless otherwise approved.
- .5 Sand wood lightly between coats to achieve required finish.
- .6 Vacuum clean surfaces free of loose particles. Use tack cloth just prior to applying next coat.
- .7 Allow applied coat to dry before next coat is applied.
- .8 Where clear finishes are required, tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.
- .9 Prime concealed surfaces of interior and exterior woodwork with primer paint.
- .10 Prime concealed surfaces of interior woodwork scheduled to receive stain or varnish finish with gloss varnish reduced 25% with mineral spirits.

3.4 FINISHING MECHANICAL AND ELECTRICAL EQUIPMENT

- .1 Refer to Division 23 and 26 for schedule of colour coding and identification banding of equipment, duct work, piping, and conduit.
- .2 Paint shop primed equipment.
- .3 Paint shop prefinished items occurring at interior areas.
- .4 Remove unfinished louvres, grilles, covers, and access panels on mechanical and electrical components and paint separately.
- .5 Prime and paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, except where items are prefinished.
- .6 Paint interior surfaces of air ducts, and convector and baseboard heating cabinets that are visible through grilles and louvres with one (1) coat of flat black paint, to visible surfaces. Paint dampers exposed behind louvres, grilles, and convector and baseboard cabinets to match face panels.
- .7 Paint exposed conduit and electrical equipment occurring in finished areas.
- .8 Paint both sides and edges of plywood backboards for electrical and telephone (1) equipment before installing equipment.
- .9 Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.5 CLEANING

- .1 01 74 11 - Cleaning: Cleaning installed work.
- .2 Collect waste material which may constitute a fire hazard, place in closed metal containers and remove daily from site.

3.6 SCHEDULE - SHOP PRIMED ITEMS FOR SITE FINISHING

- .1 Metal Fabrications: Exposed surfaces of lintels all interior steel fabrications.
- .2 Metal Stairs: Exposed surfaces of stringers and exposed vertical risers.

3.7 SCHEDULE - COLOURS

- .1 Refer to drawings for Room Finish Paint Schedule.

3.8 SCHEDULE – PAINTING & COATINGS

- .1 Generally, colours will be selected from manufacturer's standard lines.
- .2 Generally, exterior miscellaneous metals, door frames and flashings will each be one colour or to match adjacent finishes.
- .3 Generally, interior steel door frames, miscellaneous metals and similar trim each shall be one colour or to match adjacent surfaces.
- .4 Hardwood doors, MDF paneling and trims, and wood trims shall receive clear finish.
- .5 The following titles and code numbers refer to the CPCA Architectural Painting Specification Manual, for type of coating, grade, named products and their manufacturers.
 - .1 Exterior Low Contact Galvanized Metals - Including galvanized flashings, exposed deck, ductwork, hoods, fans, access hatches, etc. unless pre-painted.
 - .1 EXT 5.3A Latex, Semi-Gloss Finish, Premium Grade.
 - .1 1st coat - Cementitious primer.
 - .2 2nd coat - Latex.
 - .3 3rd coat - Latex.
 - .2 Exterior Galvanized Metals - High Contact - including doors, frames, bollards, hand rails, guard railings, etc.
 - .1 EXT. 5.3D - Polyurethane Pigmented; Premium Grade; G3 "Eggshell" finish
 - .1 1st coat - Vinyl Wash Primer
 - .2 2nd coat - Epoxy
 - .3 3rd coat - Polyurethane
 - .4 4th coat – Polyurethane
 - .3 Interior Concrete
 - .1 INT 3.2C – Epoxy, Gloss Level 3
 - .1 1st Coat - Epoxy Block Filler
 - .2 2nd Coat - Epoxy
 - .3 3rd Coat - Epoxy

- .4 Interior Concrete Unit Masonry - Latex
 - .1 INT 4.2A Latex Premium Grade, Gloss Level 3
 - .1 1st Coat - Latex Block Filler
 - .2 2nd Coat - Latex
 - .3 3rd Coat - Latex

- .5 Interior Concrete Unit Masonry - HS Epoxy
 - .1 INT 4.2R Epoxy High Solids - Low Gloss
 - .1 Manufacturer: Sika; Product: Duroplast 150
 - .1 No Substitutions.
 - .2 1st Coat - Epoxy Block Filler
 - .3 2nd Coat - Epoxy High Build (low gloss)
 - .4 3rd Coat - Epoxy High Build (low gloss)

- .6 Interior Miscellaneous Metal, Steel Deck and Exposed Structural Members not subject to high contact - including steel cabinets; control panels, convectors, registers, pipes, steel joists, etc. that are not already factory finished to the final colour scheme.
 - .1 INT 5.1E Alkyd. Commercial Grade.
 - .1 Prime coating by steel supplier - ensure it is compatible with the finish paints.
 - .2 1st coat - Alkyd Metal Primer
 - .3 2nd coat - Alkyd

- .7 Interior Metal Surfaces Subject to High Contact - including doors, frames, handrails, guardrails, and ladders.
 - .1 INT 5.3C Alkyd (over cementitious primer). Premium Grade. Gloss Level 4
 - .1 Prime coating by supplier - ensure it is compatible with the finish paints.
 - .2 1st coat - Cementitious Primer
 - .3 2nd coat - Alkyd
 - .4 3rd coat - Alkyd

- .8 Interior Galvanized Metal - Including exposed mechanical ducts, exposed steel deck and acoustical deck.
 - .1 INT 5.3C Alkyd (over cementitious primer). Premium Grade
 - .1 Prime coating by supplier - ensure it is compatible with the finish paints.
 - .2 1st coat - Cementitious Primer
 - .3 2nd coat - Alkyd
 - .4 3rd coat - Alkyd

- .9 Interior Woodwork I - Clear Finish

Wood Doors and Frames, Moldings, etc.

- .1 INT. 6.3K - Polyurethane Varnish; Premium Grade; G4 "Satin" Finish.
 - .1 1st coat - Polyurethane Varnish - reduced
 - .2 2nd coat - Polyurethane Varnish
 - .3 3rd coat - Polyurethane Varnish

.10 Interior Woodwork II - Clear Finish

Wood Panelling and Casework

- .1 INT. 6.3Q - Waterborne Varnish Clear, Premium Grade, G5-Semigloss.
 - .1 1st coat - Waterborne Varnish
 - .2 2nd coat - Waterborne Varnish
 - .3 3rd coat - Waterborne Varnish

.11 Gypsum Board I- including all gypsum board, unless indicated otherwise.

Vertical Surfaces:

- .1 INT 9.2B - High Performance Architectural Latex; Premium Grade; Gloss Level 3
 - .1 1st coat - Latex Primer Sealer
 - .2 After the prime coat have Drywaller review their work and repair all major problems.
 - .3 2nd coat - HIPAC Latex
 - .4 3rd coat - HIPAC Latex

.12 Gypsum Board II- including all gypsum board, unless indicated otherwise.

Vertical Surfaces:

- .1 INT 9.2B - High Performance Architectural Latex; Premium Grade; Gloss Level 2
 - .1 1st coat - Latex Primer Sealer
 - .2 After the prime coat have Drywaller review their work and repair all major problems.
 - .3 2nd coat - HIPAC Latex
 - .4 3rd coat - HIPAC Latex

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Interior and exterior signage.

1.2 REFERENCES

- .1 NFPA 701 – Standard Method of Fire Tests for Flame Propagation of Textiles and Films.
- .2 ADA – Barrier Free compliant.
- .3 National Building Code of Canada, 2015.
- .4 Prince Edward Island Building Code, 2015.
- .5 CSA B561-12 Accessible Design for the Built Environment

1.3 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-installation Meetings: Convene one (1) week before starting work of this section.

1.4 SUBMITTALS FOR REVIEW

- .1 Shop Drawings
 - .1 Submit shop drawings indicating materials, thicknesses, sizes, finishes, colours, construction details, removable and interchangeable components, and schedule of signs. Do not proceed with manufacture and delivery of items affected by submittals
 - .1 Submit drawn-to-scale details for lettering indicating word and letter spacing for all signs listed in signage schedule. Notify City Representative in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
 - .2 Submit product data for all fasteners, clips, anchors, low VOC adhesives, and all related accessories for signage and installation of signage.
 - .3 Confirm all submitted material is approved by Consultant prior to fabrication of signage.
 - .2 Supplier’s responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant’s review.
 - .3 Keep one reviewed copy of each submission on site.
- .2 Samples/ Mock-ups:
 - .1 Submit one sample of each of the listed signage types for Consultant review. Sample can be mounted in building as an in-situ mock-up and can be incorporated into the final work based on Consultant approval.

1.5 CLOSEOUT SUBMITTALS

- .1 Cleaning and Maintenance Instructions.
 - .1 The Supplier is to provide all required Maintenance Data for all items included in their Work.
 - .2 The materials are to be organized, indexed and provided in both electronic and hard copy (three copies) form, to be delivered to the City Representative prior to final inspection.
 - .3 The Maintenance data is to be clear and well organized for easy on-screen viewing, and with all inapplicable information removed.
 - .4 Include instructions for cleaning agents and methods, precautions against detrimental agents, and recommended schedule for cleaning and maintenance.
- .2 A complete list of key contacts is to be included for the Supplier and any sub-contractors.
- .3 A final schedule of all items delivered for the project is to be included.
 - .1 Provide information on materials and finishes, with product data, catalogue numbers, and colour and texture designations. Include information for re-ordering items or components.

1.6 QUALITY ASSURANCE

- .1 Fabricator Qualifications: Company specializing in fabricating Products specified in this section with minimum five (5) years documented experience.
- .2 All materials shall be new and applied, connected, installed, erected, cleaned and conditioned in accordance with the instructions of the applicable Manufacturer, Fabricator, Supplier or Distributor. Materials and workmanship shall be of the specified quality or better.

1.7 MOCK-UP

- .1 Samples for Consultant review can be mounted in building as an in-situ mock-up and can be incorporated into the final work based on Consultant approval.

1.8 WARRANTY

- .1 The Contractor shall guarantee that all materials and workmanship, including installation, to be free from defects for a minimum of one year from the date of acceptance of the work by the City Representative. The appearance of such defects shall be corrected or replaced at the Contractor's expense to the satisfaction of the City Representative.
- .2 Any materials supplied by the Contractor and manufactured by others shall be supplied with said Manufacturer's warranty with the Contractor acting as the Agent.

Part 2 Products

2.1 MATERIALS

- .1 Interior Door Name Signage: Shall be made from engraved plastic, 1/16" thick, metallic brushed aluminum front with a solid black core.

- .2 Interior door frames to received door number on jamb (refer to door schedule) – sized as recommended by manufacturer. Engraved lumicor – white with black letter.
- .3 Exterior Signage: TBA

2.2 GENERAL FABRICATION REQUIREMENTS

- .1 All signage to be in accordance with Barrier Free requirements
- .2 All signage to meet CSA B651-12 Accessible Design for the Built Environment

Part 3 Execution

3.1 EXAMINATION

- .1 Verify existing conditions before starting work. See information on Site Visit time and date in Notice to Bidders.
- .2 Verify the condition of all intended surfaces and adjacent structures intended for the mounting, support and placement of signage.

3.2 INSTALLATION

- .1 Erect and secure signs plumb and level at locations and elevations indicated in drawings.
- .2 Comply with sign manufacturer's installation and approved shop drawings.
- .3 Mechanical attachment:
 - .4 To concrete or solid masonry, use lag screws and expansion bolts or screws and fibre plugs, as appropriate for stresses involved.
 - .5 To hollow masonry, use toggle bolts or equivalent.
 - .6 To steel, use bolts with nut and lock washers, self-tapping screws, as appropriate for stresses and metal thicknesses.
 - .7 To gypsum board assemblies, use zinc coated, self-drilling drywall anchors, and associated fasteners. Coordinate size and location of anchor mounting and fastener requirements as defined by the signage manufacturer.
 - .8 To solid wood, plywood, or wood veneered acoustic panels use wood screws, as appropriate for stresses and material thicknesses.
 - .9 Fabricate special fasteners as required for installation conditions.
 - .10 Mechanical fasteners and methods of attachment subject to Consultant's approval. Obtain Consultant approval before fixing to structural steel.
 - .1 Adhesives, such as double-sided tape or low VOC adhesives are only permitted upon approval of a Consultant.

3.3 CLEANING

- .2 Section 01 74 11 - Cleaning: Cleaning installed work.

3.4 SCHEDULES

- .1 Refer to signage schedule below: TBA

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 ASTM International
 - .1 ASTM A 480/A 480M -14a, Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting, Sheet, and Strip.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-71.20-M88, Adhesive, Contact, Brushable.
- .3 CSA Group
 - .1 CSA B651-12, Accessible Design for the Built Environment.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS)
 - .1 Material Safety Data Sheets (SDS).

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for [plastic toilet compartments] and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Submit 2copies of WHMIS SDS in accordance with Section 01 35 29 - Health and Safety Requirements.
- .4 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Prince Edward Island, Canada.
- .5 Indicate fabrication details, plans, elevations, hardware, and installation details.
- .6 Samples:
 - .1 Submit duplicate 300 x 300mm samples of panel showing finish on both sides, two finished edges and core construction.
 - .2 Submit duplicate representative samples of each hardware item, including brackets, fastenings and trim.

1.3 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.

- .3 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect specified materials from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MATERIALS

- .1 Solid plastic toilet partitions.
 - .1 Colour and Finish: Selected by Consultant from full range.
- .2 Panel Height:
 - .1 Standard Height.
 - .1 Door/Panel Height: 1470 mm.
 - .2 Floor Clearance: 305 mm.
- .3 Headrails: 1.65 mm thick, clear anodized, extruded aluminum, anti grip design.
- .4 Pilaster shoe: 0.8 mm stainless steel , 75mm high.
- .5 Attachment: stainless steel tamper proof type screws and bolts.

2.2 COMPONENTS

- .1 Hinges:
 - .1 Heavy duty, non-lubricating.
 - .2 Material/finish: stainless steel casting.
 - .3 Swing: inward.
 - .4 Return movement: gravity, non-rising.
 - .5 Adjustable to hold door open at any angle up to 90 degrees.
 - .6 Emergency access feature.
- .2 Latch set: surface mounted, combination latch, door-stop, keeper and bumper, stainless steel,.
- .3 Wall and connecting brackets: stainless steel extrusion or casting.
- .4 Coat hook: combination hook and rubber door bumper, stainless steel.
- .5 Door pull: Barrier-free type suited for out swinging doors, stainless steel.
- .6 Privacy Style Partitions: No sightlines with gap-free interlocking doors and stiles routed to allow overlap to prevent line-of-sight into the toilet compartment. Privacy strips fastened or adhered onto the partition material are not acceptable.

2.3 FABRICATION

- .1 Doors, panels and screens: 25mm thick, composite solid plastic panels, to sizes indicated.
- .2 Pilasters: 32mm thick, constructed same as door, to sizes indicated.
- .3 Provide formed and closed edges for doors, panels and pilasters.
 - .1 Mitre and weld corners and grind smooth.
- .4 Provide internal reinforcement at areas of attached hardware and fittings.
 - .1 Temporarily mark location of reinforcement for grab bars.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for plastic toilet compartments installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.2 INSTALLATION

- .1 Ensure supplementary anchorage, if required, is in place.
- .2 Do work in accordance with CSA B651.

3.3 ERECTION

- .1 Partition erection:
 - .1 Install partitions secure, plumb and square.
 - .2 Leave 12 mm space between wall and panel or end pilaster.
 - .3 Anchor mounting brackets to masonry or concrete surfaces using screws and shields: to hollow walls using bolts and toggle type anchors, to steel supports with bolts in threaded holes.
 - .4 Attach panel and pilaster to brackets with through type sleeve bolt and nut.
 - .5 Provide for adjustment of floor variations with screw jack through steel saddles made integral with pilaster. Conceal floor fixings with stainless steel shoes.
 - .6 Provide templates for locating threaded studs through finished ceilings.
 - .7 Equip each door with hinges, latch set, and each stall with coat hook mounted on partition wall, mounting heights 1500 mm. Adjust and align hardware for proper function. Set door open position at 30 degrees to front. Install door bumper door mounted, type integrated with coat hook.
 - .8 Equip out swinging doors with door pulls on inside and outside of door in accordance with CSA B651.

- .9 Install hardware grab bars.
- .2 Floor supported and overhead braced partition erection:
 - .1 Attach pilasters to floor with pilaster supports and level, plumb, and tighten installation with levelling device.
 - .2 Secure pilaster shoes in position.
 - .3 Secure headrail to pilaster face with not less than two fasteners per face.
 - .4 Set tops of doors parallel with overhead brace when doors are in closed position.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 ASTM International (ASTM)
 - .1 ASTM A 167-99(2009), Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
 - .2 ASTM B 456-03, Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium.
 - .3 ASTM A 653/A 653M-09, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
 - .4 ASTM A 924/A 924M-09, Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
- .2 Canadian General Standards Board (CGSB)
 - .1 CAN/CGSB-1.81-M90, Air Drying and Baking Alkyd Primer for Vehicles and Equipment.
 - .2 CAN/CGSB-1.88-92, Gloss Alkyd Enamel, Air Drying and Baking.
 - .3 CGSB 31-GP-107MA-90, Non-inhibited Phosphoric Acid Base Metal Conditioner and Rust Remover.
- .3 CSA Group (CSA)
 - .1 CAN/CSA-B651-04, Accessible Design for the Built Environment.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and data sheets and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Prince Edward Island of Canada.
 - .2 Indicate size and description of components, base material, surface finish inside and out, hardware and locks, attachment devices, description of rough-in-frame, building-in details of anchors for grab bars.

1.3 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for toilet and bath accessories for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- .1 Tools:

- .1 Provide special tools required for assembly, disassembly or removal for toilet and bath accessories in accordance with requirements specified in Section 01 78 00 - Closeout Submittals.
- .2 Deliver special tools to City Representative.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect toilet and bathroom accessories from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 MANUFACTURES

- .1 Acceptable Manufactures include:
 - .1 Watrous
 - .2 American Specialties
 - .3 Bobrick

2.2 MATERIALS

- .1 Stainless steel sheet metal: to ASTM A 167, Type 304, with satin finish.
- .2 Stainless steel tubing: Type 304, satin finish, commercial grade, seamless welded, 1.2 mm wall thickness.
- .3 Fasteners: concealed screws and bolts hot dip galvanized, exposed fasteners to match face of unit. Expansion shields fibre, lead or rubber as recommended by accessory manufacturer for component and its intended use.

2.3 COMPONENTS

- .1 A1: Straight Grab Bars - Bobrick Model B- 5806 Series or similar.
- .2 A2: 90-degree Angled Grab Bars - Bobrick Model B- B-6898.99 Series or similar.
- .3 A3: Single Jumbo-Roll Surface-Mounted Toilet Tissue Dispenser - Bobrick Model B-2890 or similar.
- .4 A4: Sanitary Napkin Disposal - Bobrick Model B-5270 or similar.

- .5 A5: Double Robe hook- Bobrick Model B-76727 or similar.
- .6 A6: Frameless Glass Mirror – 6mm thick, conceal fastener, flush mounted. Size per drawings.
- .7 A7: Automatic Wall-Mounted Foam Soap Dispenser - Bobrick Model B-2013 or similar.
- .8 A8: Semi-Recessed Paper Towel Dispenser/Waste Receptacle - Bobrick Model B-38032 or similar.
- .9 A9: Electrical Hair dryer (see electrical)
- .10 A10: Baby Change Table with Bag Hook.
 - .1 Bobrick: KB310-SSWM Horizontal Stainless Steel Surface-Mounted.
 - .2 Bobrick: 310-54-KIT Stainless Bag Hook,
- .11 A11: Stainless Steel Shelf: 455mm long x 205mm wide, 18-gauge (1.2mm), type 304 stainless steel, satin finish. 19mm return edge; front edge is hemmed for safety. Brackets are 16-gauge (1.6mm), surface mounted, . Bobrick B-298 x 18.
- .12 A12: Folding Shower Seat - Bobrick Model B-5181 or similar.
- .13 A13: Recessed Heavy-Duty Soap Dish and Bar– Bobrick B-4390
- .14 A14: Reversible Folding Shower Seat – Bobrick B-5181
- .15 A15: Shower Curtain and Rod
 - .1 Shower curtain: anti-bacterial fire resistive self-extinguishing vinyl laminated fabric shower curtain. Provide curtain hold-back hook and chain at each curtain. Bobrick B204-03
 - .2 Shower rods: [25] mm diameter x 1.2 mm wall thickness [38] mm diameter x 2 mm wall thickness stainless steel tubing of required length with satin chrome finished flanges, 12 shower curtain hooks and curtain hold-back hook and chain. Shower rod material and anchorage to withstand downward pull of 0.9 kN. Bobrick B207, B204-01

2.4 FABRICATION

- .1 Weld and grind joints of fabricated components flush and smooth. Use mechanical fasteners only where approved.
- .2 Wherever possible form exposed surfaces from one sheet of stock, free of joints.
- .3 Brake form sheet metal work with 1.5 mm radius bends.
- .4 Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- .5 Back paint components where contact is made with building finishes to prevent electrolysis.

- .6 Hot dip galvanized concealed ferrous metal anchors and fastening devices to CAN/CSA-G164.
- .7 Shop assemble components and package complete with anchors and fittings.
- .8 Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates, details and instructions for building in anchors and inserts.
- .9 Provide steel anchor plates and components for installation on studding and building framing.

2.5 FINISHES

- .1 Remove all manufacturer stickers or logos exposed to view.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrates and surfaces to receive toilet and bathroom accessories previously installed under other Sections or Contracts are acceptable for product installation in accordance with manufacturer's instructions prior to toilet and bathroom accessories installation.
- .2 Inform Consultant of unacceptable conditions immediately upon discovery.
- .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval from Consultant.

3.2 INSTALLATION

- .1 Install and secure accessories rigidly in place as follows:
 - .1 Stud walls: install steel back-plate to stud prior to plaster or drywall finish. Provide plate with threaded studs or plugs.
 - .2 Hollow masonry units, existing plaster or drywall: use toggle bolts drilled into cell or wall cavity.
 - .3 Solid masonry, marble, stone or concrete: use bolt with lead expansion sleeve set into drilled hole.
 - .4 Toilet and shower compartments: use male to female through bolts.
- .2 Install grab bars on built-in anchors provided by bar manufacturer.
- .3 Use tamper proof screws/bolts for fasteners.
- .4 Fill units with necessary supplies shortly before final acceptance of building.

3.3 ADJUSTING

- .1 Adjust toilet and bathroom accessories components and systems for correct function and operation in accordance with manufacturer's written instructions.

- .2 Lubricate moving parts to operate smoothly and fit accurately.

3.4 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.5 PROTECTION

- .1 Protect installed products and components from damage during construction.
- .2 Repair damage to adjacent materials caused by toilet and bathroom accessories installation.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 Conform to the requirements stated in General Conditions and Supplementary General Conditions and General Requirements of this Specification and all addenda.
- .2 Furnish all materials, labour, equipment and services for the miscellaneous specialties Work to the full intent of the drawings and as specified herein.

1.2 ALLOWANCE TOLERANCES

- .1 Fabricate work of this Section within tolerances specified for work into which it is built.

1.3 PRODUCT DELIVERY, STORAGE AND HANDLING

- .1 Package or crate, and brace products to prevent distortion in shipment and handling. Label packages and crates and protect finish surfaces by sturdy wrappings.

Part 2 Products

2.1 TACTILE GROUND SURFACE INDICATORS

- .1 Provide tactile warning indicators where indicated on drawings.
 - .1 28mm diameter studs
 - .2 Studs to be secured to concrete substrate with hidden mechanical fastening system.
 - .3 Use plastic studs where applied over vinyl finished flooring.
 - .4 Used stainless steel studs where applied over polished concrete finished floor.

2.2 LOCKERS

- .1 Locker L1 size to be 254mm W x 355mm D x 1830 mm H.
 - .1 Standard of Acceptance: Heavy Duty, Hadrian "Gladiator", GSS Eclipse II, or approved equal.
- .2 Back-to-back lockers to have single top and end panels. All lockers to have sloped tops.
- .3 Colours: colour selection will be from manufacturer's standard colour range. Frames and doors will be different colours.
- .4 Locker Numbering: each door to have high strength black plastic or metal laminated number plate secured with rivets. Lockers will be numbered consecutively from 1-up for each room.
- .5 Locker split to be 60% full size, 40% half size; locker manufacturer to provide shop drawing of layout for approval.
- .6 Lockers shall be fastened to wall behind every third unit.

- .7 Locker Quantities and base detail as noted on plan views

2.3 COMMON MISCELLANEOUS SPECIALITY RESULTS

- .1 Provide reinforcing, fastenings, and anchorage required for building-in of products.
- .2 Insulate between dissimilar metals, and metal and masonry materials to prevent electrolysis with bituminous paint to meet specified requirements of CAN/CGSB 1.108, or with methacrylate lacquer, 1-GP-159 if exposed to view.
- .3 Prime Paint on Steel: Finishing shall meet specified requirements of CAN/CGSB 1.40 for oil alkyd type structural steel primer, 1-GP-48 for steel marine primer, 1-GP-121 for vinyl wash primer, CISC/CPMA 1-73a for single coat or CISC/CPMA 2-75 for top-coating, as applicable for specified finish treatments.
- .4 Specified materials are minimum acceptable quality. Manufacturer's standards exceeding specified quality will be accepted.

Part 3 Execution

3.1 INSTALLATION

- .1 Supplier shall provide information and templates required for installation of work of this Section, and assist or supervise, or both, the setting of anchorage devices and construction of other work incorporated with products specified in this Section in order that they function as intended.
- .2 Install work to meet manufacturer's recommended specifications, true, tightly fitted, and level or flush to adjacent surfaces, as suitable for installation.
- .3 Products shall not have attached plates, nor shall they be imprinted or labelled with manufacturer's name or trademark unless approved by Consultant.

3.2 ADJUSTMENT AND CLEANING

- .1 Verify that installed products function properly, and adjust them accordingly to ensure satisfactory operation.
- .2 Refinish damaged or defective work so that no variation in surface appearance is discernible. Refinish work at site only if approved by Consultant.

END OF SECTION

Part 1 General

1.1 SUBMITTALS FOR INFORMATION SECTION INCLUDES

- .1 Section includes recessed floor grilles and frames

1.2 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Shop Drawings: Provide data indicating floor grille characteristics, component dimensions, and materials. Illustrate:
 - .1 Items penetrating floor grilles and frames, including door control devices.
 - .2 Divisions between grille sections.
 - .3 Perimeter floor moldings and adjacent finishes.
- .3 Samples: Submit one sample, approximately 150x150 mm in size illustrating pattern, colour, finish, and edging.

1.2 REFERENCE DOCUMENTS

- .4 American Society for Testing and Materials (ASTM):
 - .1 ASTM B 221-93 Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes
 - .2 ASTM A 276-92 Standard Specification for Stainless and Heat-Resisting Steel Bars and Shapes.
 - .3 AAMA 606.1 Voluntary Guide Specifications and Inspection Methods for Integral Color Anodic Finishes for Architectural Aluminum.
 - .4 AAMA 607.1 Voluntary Guide Specifications and Inspection Methods for Clear Anodic Finishes for Architectural Aluminum.

1.3 SEQUENCING AND SCHEDULING

- .1 If product is to be recessed, coordinate with concrete work so that products are available for placing integrally with floor slabs.

1.3 SUBMITTALS FOR REVIEW

- .1 Section 01 33 00: Submission procedures.
- .2 Shop Drawings: Provide data indicating floor grille characteristics, component dimensions, and materials.
- .3 Samples: Submit one (1) sample, 150x150 mm (6x6 inch) in size illustrating pattern, colour, finish, and edging.

1.4 CLOSEOUT SUBMITTALS

- .1 Section 01 33 00: Submission procedures.
- .2 Installation Data: Manufacturer's special installation requirements.

1.5 CLOSEOUT SUBMITTALS

- .1 Section 01 78 00: Submission procedures.
- .2 Operation and Maintenance Data: Include cleaning instructions, stain removal procedures and regular servicing.

1.6 WARRANTY

- .1 Floor mats and frames shall be fabricated free of defects in materials and workmanship in accordance with the General Conditions, and the manufacturer shall offer a five (5) year warranty against defects in materials and workmanship.
 - .1 Provide manufacturer's written warranty.
 - .2 Repair defects, or replace with new materials, faulty materials or fabrication developed during the warranty period at no expense to City Representative.

Part 2 Products

2.1 MANUFACTURER

- .1 KN Crowder; Product: Kenagrille FG-11
- .2 Other acceptable manufacturers offering functionally and aesthetically equivalent products.
 - .1 Bolar; Product: BA-125
 - .2 Amarco; Product: G-550
 - .3 Construction Specialties; Pedigrid G8-SA-M-LB

2.2 MATERIALS

- .1 Aluminum Foot Grilles
 - .1 Aluminum rail treadbars; to 6061-T6
 - .1 T-extrusion
 - .2 Dimensions: Nominal 13x32mm
 - .3 Finish: Mill
 - .4 Sound reduction cushioning.
 - .2 Fasteners and rods: Non-corrosive screws, rods and anchors for securing frames together and to floors.
- .2 Stainless Steel Foot Grilles
 - .1 Stainless steel rail treadbars: to ASTM A276, Type 304.
- .3 Frame:
 - .1 Cast-in-place aluminum frame.
 - .2 Recessed Frame: Welded mitred corners, satin or mill finish.
 - .3 Depth: Nominal 32 mm.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify field measurements are as instructed by the manufacturer indicated on shop drawings.
- .2 Vacuum clean floor recess.
- .3 Substrate must be flat and level to tolerance of no more than 3mm in 3 m.
- .4 Examine areas and conditions under which Work is to be performed and identify conditions detrimental to proper or timely completion
 - .1 Do not proceed with the installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- .1 Metal Foot Grilles
 - .1 Install products in accordance with manufacturer's instructions, at locations shown and with top of products level with adjoining finished flooring where applicable.
 - .2 Coordinate top of product surfaces with swinging doors to provide under-door clearance.
 - .1 Provide necessary shims, spacers, and anchorages for proper location and secure attachment of frames to concrete.

3.3 PROTECTION

- .1 Upon completion of frame installations, provide temporary filler of plywood or fiberboard in grate recesses, and cover frames with plywood protective flooring.
- .2 Maintain protection until construction traffic has ended and Project is near time of Substantial Completion.
- .3 Install product when no further wheeled construction traffic will occur and wet type operations including painting and decorating are complete.

3.4 INSTALLATION TOLERANCES

- .1 Maximum gap between recessed frame and grille: 3 mm.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 The Contractor shall provide and perform all full-inclusive, preventative elevator maintenance services as described in this Section.
- .2 Provide labour, materials, products, equipment, and services necessary for the full maintenance of the elevating devices included in this project for the periods specified by other sections of this specifications.
- .3 The Services shall be performed by the Contractor in accordance with all applicable laws, rules, codes and regulations of any government or regulatory/industry Authority Having Jurisdiction (AHJ), and in a professional manner.
- .4 Maintain, repair, or replace all equipment, assemblies, mechanical and electrical parts as described throughout this section.
- .5 Equipment:

Vertical Wheelchair Lift as per Section 14 42 16

1. Simmons Sports Centre (Charlottetown, PEI)

1.2 WORK NOT INCLUDED

- .1 Do not maintain, repair, or replace:

Elevator car finishes, handrails, floor coverings, hoist way enclosure, hoist way door and frame finishes, and door sills,

Conduit and wiring external to the hoist ways and machine rooms.
- .2 Submit to the Owner's Representative proposals for repair or replacement of parts damaged by malicious action of others or for alterations and additions not covered by the maintenance contract but required by the inspecting authorities, all of which are excluded from the maintenance contract.

1.3 RELATED SECTIONS

- .1 Section 14 42 16 – Vertical Wheelchair Lift

1.4 REFERENCES

- .1 Canadian Standards Association (CSA).

CSA B-44.2, Maintenance Requirements and Intervals for Elevators, Dumbwaiters, Escalators and Moving Walks (latest edition).

Latest edition of the ASME A17.1/CSA B44 Safety Code for Elevators and Escalators.

Latest edition of the CSA B355 Lifts for Persons with Physical Disabilities, including Annex B requirements

.2 Government of Prince Edward Island

Prince Edward Island Elevators and Lifts Act, Chapter E-5 - R.S.P.E.I. 1974, Cap. E-4, s.3.

1. Contractor's License or an Installer's Registration to the applicant, in accordance with the regulations. 2008,c.12,s.2.

Elevators and Lifts General Regulations - R.S.P.E.I. 1974, Cap. E-4, s.2/

Occupational Health and Safety Act, RSPEI 1988, c O-1.01.

Prince Edward Island Building Code Act and Regulations.

.3 Provincial Occupational Health and Safety legislation

Occupational Health and Safety Act, RSPEI 1988, c O-1.01

.4 Health Canada/Workplace Hazardous Materials Information System (WHMIS 2015).

Safety Data Sheets (SDS) for all products used.

1.5 DEFINITIONS

- .1 The term "Owner", as used herein, refers to the Owner's authorized agent or representative as designated to the Contractor in writing.

- .2 The term "Consultant", as used herein, refers to refers to the elevator Consultant (Solucore Atlantic Inc.) who shall be representing the Owner.

- .3 The term "Elevator Contractor" or "Contractor", as used herein, refers to any person, partners, firm, or corporation having a contract with the Owner to furnish labour and materials for the execution of the work (Service) herein described.

- .4 The term "Contract" and "Agreement" as used herein, shall be interchangeable in this section with respect to the scope of work.

- .5 The term "Inspecting Authorities", as used herein, refers to authorized agents of governments (AHJ) charged with the responsibility of carrying out periodic inspections and tests on vertical transportation equipment.

- .6 The term "Service" is the performance of the all full-inclusive, preventative elevator maintenance services as described in this specification.

- .7 The term "Provide", as used herein, means to supply labour and material needed to maintain the elevating Device(s).

- .8 The term "Elevator", "Lifts" or "Device", as used herein, means a licensed vertical transportation equipment as defined by the ASME A17.1/CAN/CSA B44 and B355. The

term "Elevator" used herein refers all elevating Equipment (elevators and lifts) specified in this section.

- .9 The term "Code" or "Standards", as used herein, refers to all applicable provincial and federal codes, statutes, and regulations governing Elevators.
- .10 Any terms in the Specifications that are not otherwise defined shall have the definitions as given in the latest edition of the Code or Standards (as hereinafter defined) as applicable, including where applicable, the latest supplements, for elevators, dumbwaiters, escalators and moving walks.
- .11 All terms in the specifications that are not otherwise defined shall have the definitions as given in the latest edition of the ASME A17.1/CSA B44, CSA B355 and the CSA B44.2

1.6 QUALITY ASSURANCE

- .1 The Contractor shall maintain the Elevators with a view to minimizing wear and tear on the equipment and minimizing the shut-down time and frequency of breakdowns.
- .2 The Contractor shall maintain all of the Elevators in the Building(s) to the latest Code Section 8.6 including all pertinent and required schedules and timing as required under the Code and AHJ.
- .3 Comply with all existing laws, codes, rules, and regulations set forth by all appropriate AHJ in the location where work is performed.
- .4 Perform all Work as specified herein and in accordance with the latest edition of the ASME 17.1/CSA B44, CSA B355 and the CSA B44.2. Where conflicts occur, the interpretation of the Owner shall prevail.
- .5 Maintain the equipment at all times in the same or better condition as at the commencement of the maintenance work.
- .6 Only certified elevator mechanics are to be employed in the performance of the work outlined in this specification while such elevator(s) is licensed and/or registered for public use.
- .7 The Contractor acknowledges and agrees that the Owner is relying on the skill and expertise of the Contractor in the provision of the Services. As such, the Contractor shall perform the services in accordance with the level of skill and standard of quality expected of service companies in the industry and in accordance with any and all applicable Codes and qualifications as required by the applicable provincial legislation in the province in which the work is to be performed.

1.7 HEALTH & SAFETY

- .1 The Contractor shall be solely responsible for safety on the site and for compliance with the rules, regulations and practices required by the applicable health and safety legislation, and shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Services.

- .2 OH&S. The Contractor shall be designated as the following terms according to the following for purposes of the applicable Provincial Occupational Health and Safety legislation
- .3 Accident Reporting. In the event of an injury to any person working on or using the equipment, the Contractor shall take whatever action is necessary and appropriate in the circumstances to aid the injured person, and to prevent further injury to others, then advise the Owner immediately giving a verbal report, then submit to the Owner within twelve (12) hours of the accident signed written reports from each of the maintenance personnel involved. Where required, notification shall be provided to the AHJ as per the Provincial Act.
- .4 Workplace Safety. Neither the Contractor nor its agents or employees are covered by the Owner under the following applicable Provincial Workplace Safety and Insurance legislation, as detail by the provincial Workers Compensation Act.

1.8 DOCUMENTATION

- .1 Building Log: Complete required entries for building log systems.

- .2 Elevator Logbook:

A maintenance log in a permanently bound journal having pre-numbered pages shall be provided for each piece of equipment.

Indicate in the journal the following information: date, time, name of maintenance person, regular maintenance, regular time call back, over time call back, action taken, work completed, and further repairs required.

The maintenance log is the property of the Owner.

Maintain the log current, at a location specified by the Owner's Representative, and available for inspection by the Owner's Representative at any time.

Make entries in ink, legibly, consecutively and without blanks.

- .3 Time Tickets:

Submit to the Owner's Representative on a monthly basis computer printouts or copies of time sheets showing the work done with detail of the portion of the regular maintenance completed.

Submit time tickets for each callback detailing the cause of the callback and the action taken.

The above information may also be available on the contractor's computer-based system.

- .4 Manuals:

Supply to the maintenance personnel a manual describing proper maintenance procedures and methods of maintaining the equipment in proper order.

Prior to the start of the maintenance contract give three copies of this manual to the Owner's Representative so that its staff may better describe and report problems that arise.

If, in the course of the maintenance contract, changes are made to this manual, supply to the Owner's Representative revised copies of the manual.

.5 Electrical Diagrams:

Provide a set of schematic electrical diagrams covered in clear plastic and mounted on the machine room wall.

If, in the course of the maintenance contract, changes are made to the wiring or control, supply to the Owner's Representative two sets of marked-up prints of the altered schematics and field wiring diagrams showing the changes.

.6 Monthly Report: In the first week of each month provide the Owner's Representative with a written report detailing call backs (cause and correction) and the total number of hours that equipment was not available for the Owner's Representative's use due to service problems, repairs, or maintenance work.

.7 Yearly Report: Each year, on the anniversary date of the contract, submit to the Owner's Representative a report consisting of the following terms:

A complete summary of the activity for the year including, but not limited to, call backs, repair work, complaints.

A certification that the various items as listed above were checked at the specified times and that they were found to be functioning correctly or, if not functioning correctly, notations of the problems and the corrective action taken.

An evaluation of the standard of maintenance for the year as compared to prior years and to the Standards of the industry for similar installations.

Provide as part of this contract any report required by the elevator inspection authority (AHJ) with regard to application for renewal of annual elevator license/permit is to be provided to the Owner 30 days prior to elevator license/permit renewal date.

.8 Equipment Status Reports:

Advise the Owner's Representative each year on the anniversary date of the contract of the expected future life and the value assigned for replacement of the major components.

Advise the Owner's Representative six months prior to the end of the contract of the expected future life and the value assigned for replacement of the major components term, and rebate to the Owner's Representative an amount to compensate for the percentage wear over the term of the contract.

1.9 TERMS AND CONDITIONS

.1 Subcontracting and assignment of Work:

.2 Do not subcontract or assign portions of the Contract without the written consent of the Owner.

.3 Do not assign any payment due or to become due as a result of this contract without the written consent of the Owner.

.4 Discounts on Work: An overall discount of five (5%) percent shall apply and be shown on all invoices for all work completed (labour and materials) outside the scope of this Contract but performed on the equipment covered by this Contract, including but not restricted to the following:

Extra repair

Extra examinations

Abnormal cleaning as a result of building retrofit construction

Material and labour resulting from misuse or vandalism.

.5 If a device is shutdown or taken out of regular service, due to unscheduled equipment failure or malfunction and for more than two (2) weeks:

The Contractor shall communicate the nature of the problem to the Owner in writing and provide a proposed remedy with schedule for returning the Equipment back into service.

A discount, withhold or refund for the time the equipment is out of service shall apply, to a maximum of the time remaining on the total Agreement value.

.6 Provide minimum visits and labour as stated in MAINTENANCE SERVICE INTERVALS clause of this section.

.7 Utilization of a Maintenance Control Program (MCP) for the elevator and lifts must adhere to the minimum requirements stated MAINTENANCE SERVICE INTERVALS clause of this section.

.8 Personnel: Maintenance personnel to present a neat appearance and shall maintain movement in the building within the requirements of the work. All employees and agents of the Contractor shall, at all times, wear attire or uniforms which are appropriate and suitable, clearly displaying the Contractor's name or logo, for the due performance of the Services.

1.10 AGREEMENT, TERM & RENEWAL

.1 The Contractor shall provide the Services for the specified Term in other sections of this specification.

1.11 OWNER'S RIGHT TO COMPLETE WORK

- .1 The Owner reserves the right to correct any defective work and to deduct the cost of such work from moneys owing on the Contract.
- .2 The Owner reserves the right to withhold payment in the event of non-performance or to pay only for that portion of the work that has been executed.
- .3 The Owner will give reasonable notice in writing prior to taking such action unless the defective work or non-performance prejudices the safety of the installation.

1.12 TERMINATION OF SERVICE

- .1 In the event that the Services are not performed to the satisfaction of the Owner, or at all, or in the event that the Contractor becomes insolvent or adjudged bankrupt or makes a general assignment for the benefit of creditors, the Owner shall be entitled to terminate the Service, without prejudice to any other right or remedy the Owner may have.
- .2 The Owner may elect to cancel the contract prior to its normal termination, when:

If the maintenance is not executed in accordance with this Section, as evidenced by the report of a recognized independent elevator consultant, and

If within four weeks of written notice, the necessary corrective action has not been completed; and

If there is a continuing failure to perform as evidenced by more than two negative reports in any twelve (12) month period with no positive or neutral reports in the same twelve-month period. (A negative report is one which defines the level of contract performance as less than 95% of the specified requirements.)
- .3 In the event of such cancellation, the Owner may elect to use another contractor to restore the equipment to the requirements of this Section and to withhold from the Fee or Monthly Instalment an amount sufficient and reasonable to cover the cost of engaging a third party to rectify any deficiencies or complete the Services.
- .4 The Owner reserves the right to cancel the Contract upon one month's written notice if there is a significant change in the circumstances of the contract (e.g. a change in ownership of the equipment, a major modernization of the equipment, a change in ownership of the maintenance company).

1.13 SCHEDULING

- .1 Advise the Owner's Representative at least two weeks prior to scheduled repair work, outside of the regular maintenance procedure.
- .2 Advise the Owner's Representative immediately of any non-scheduled repair work requiring equipment to be removed from service.
- .3 Communicate the status of repairs to the Owner's Representative at the beginning and close of the normal working day.

.4 In the case of repairs, advise and discuss with the Owner's Representative the merits of continuing in overtime to completion of the repair, and proceed with such overtime work when authorized in writing by the Owner's Representative.

.5 Where possible, indicate the time required for completion of repairs.

1.14 PROTECTION OF SAFETY DEVICES

.1 At no time shall the equipment be permitted to operate while any of the safety devices, mechanical or electrical are inoperative.

.2 In the event that any of the emergency safety devices such as final limits, safety operated switches, governor switches, overspeed devices, car safeties, are activated while the equipment is in use by the public submit a written report to the Owner's Representative detailing the incident and the corrective action taken.

1.15 PERFORMANCE REQUIREMENTS

.1 Maintain the equipment in substantially new condition.

.2 Maintain the performance, as a minimum substantially new condition

.3 Maintain the elevator so that the:

.1 Elevator carries its rated load at its rated speed within the ratings of the machine.

.2 Controls stop the elevator under any condition of load from full speed in the down direction within the normal stopping distance of the car without shock or jar.

.4 Do not change any of the elevator adjustments in such a way as to lead to a de-rating of the performance.

.5 Do not:

Increase the door open pause times without written instructions from the Owner's Representative.

Decrease the door operating speed.

Change the brake spring setting.

Change the brake lift setting.

Decrease the acceleration.

Decrease the deceleration.

Change the contract speed.

- .6 Do not, in the course of routine maintenance or troubleshooting, re-adjust any of those settings, which affect the performance of the equipment.
- .7 Should it appear that some setting has changed, or some problem has arisen such as to alter the performance of the equipment, arrange that a qualified adjuster with the appropriate tools, manuals and training make the necessary re-adjustments in an organized, systematic way.
- .8 Do not allow ad hoc adjustments to the equipment.

1.16 SERVICE REQUIREMENTS

- .1 **Safety Inspections:** Carry out instructions of the inspecting authorities within the period of time allowed by the authorities or, if no period is designated, within 30 days of notice of deficiency except for those items that are the responsibility of the Owner's Representative and directives resulting from changes to the existing codes.

- .2 **Call Back Service:**

Include, as part of the maintenance program, 24-hour call back service at no extra cost to the Owner, including travel time.

Respond only to calls placed by the Owner's Representative except in the case of emergency calls.

At the time the call is placed the Owner's Representative may choose to indicate that the call can be handled during regular hours; otherwise, answer the call immediately whether it be in overtime or regular time.

Provide regular call back response within a maximum of one (1) hour from the time a call is placed until the arrival of a maintenance person at the site.

Provide emergency call back response within a maximum of one (1) hour from the time a call is placed until the arrival of a maintenance person at the site.

Provide a telephone answering service staffed 24 hours per day at no additional cost to Owner.

Ensure that calls received by the answering service are transmitted immediately to a responsible person for action.

1.17 WARRANTY

- .1 The Contractor shall guarantee the materials and workmanship of any installation required for the performance of the Services. Warranty period of all such work will be 12 months. This warranty excludes damages due to external causes such as fire, water and weather, improper use, misuse, neglect, or work by others, except where such damages are directly related to the Contractor's provision of the Services.

1.18 MAINTENANCE SERVICE INTERVALS

- .1 Minimum Monthly Visits and Labour

The Contractor will provide a minimum monthly visit with minimum monthly labour for maintenance of the equipment as follows:

- i. For the gearless elevators: 2 man-hours per elevator.
- ii. For the geared elevators: 2 man-hours per elevator.
- iii. For the hydraulic elevators: 1 man-hour per elevator.

.2 Minimum Quarterly Visits and Labour

The Contractor will provide a minimum quarterly visit with minimum labour for maintenance of the equipment as follows:

- i. For the vertical platform lifts: 1 man-hour per lift.

.3 If the AHJ allows a Maintenance Control Program (MCP) for the equipment, this MCP may be implemented but must meet the minimum interval and hours above.

.4 The above noted hours cannot include major work performed by a service team initiated as part of a preventative maintenance program.

.5 The above noted hours cannot include callbacks or minor repairs converted to maintenance hours (i.e. maintenance hours performed as part of a callback).

.6 Major hours spent on mandated maintenance such as annual inspections and testing shall contribute to the minimum monthly labour and can be considered as topped up hours.

.7 Travelling time shall not count as part of the hourly fulfilment.

.8 On an annual basis, two weeks following the anniversary date of the Agreement, the Contractor shall provide to the Owner a detailed inventory of hours printed directly from the database and not manipulated or adjusted by human intervention.

Part 2 Products and Services

1.19 INCLUSIONS

.1 Except for the exclusions described below, the Contractor shall, at least once per month, examine, clean, maintain, lubricate and, if necessitated by normal wear and tear, repair or replace all electrical and mechanical components required for the safe, quiet, and reliable operation of the Elevators, and within normal conditions keep the elevating devices operating in a safe manner in full Code and Standard conformity, including without limitation, the following:

.2 Elevators & Lifts:

Machines, worms, gears, shafts, thrusts, sheaves, motors, generators, armatures, rotors, commutators, windings, coils, carbon brushes, brush holders assemblies, AC or DC drive units, SCR solid state drives, tacks, brakes, brake shoes and linings, coils, linkages, governors, idlers, compensating sheaves or chain systems, controllers and dispatchers, relays, resistors, capacitors, EPROMS, ELITE PIs, microprocessors, printed circuit boards, sockets, transistors, integrated circuit modules, filters, contactors, fuses, overloads, power units, static units, phase protection mechanisms, selectors, steppers, contacts, brushes, all ropes and cables including hoist cables, governor cables, travelling cables, safety/tiller rope

and selector cables or tapes, tape-heads, hall and car door hardware and switches, rollers, gibs, bearings, shafts, pulleys, chains, linkage arms, eccentrics, retainers, door operators, infrared detectors, mechanical safety edges, telephones or other elevator communication systems (if supplied by an elevator contractor), battery powered emergency lighting, photo-eyes, clutches, hoistway, cab sills, limit and safety switches, car and hall push buttons and lights, indicators and lights, car top inspection stations, car slings, platforms, stabilizer systems, safety planks, LCD screens, computer systems, peripheral devices, load weighing systems, compensating chains and cables, buffers, counter-weights, top of car maintenance stations including lights, batteries, slippers or rollers, cylinders, pistons, heads, piping, couplers, hydraulic valve units, pumps, tanks, solenoids, Victaulic couplings, mufflers, gate valves, shackles, Crosbies, babbitts, babitted bearings or shackles, wedges, oil coolers, and all bearings.

1.20 EXCULSIONS

- .1 The Contractor shall not be responsible for the repair to any structural elements of the Buildings, hoistway, pit or machine room, architectural finishes, pit drainage, hall doors, hall sills and frames, car doors and car cabs, floors and floor tiles, cab lights, pit and machine room lights (except for changing light bulbs), machine room heating and ventilation systems, trusses, main disconnect switches and fuses or circuit breakers, emergency transfer switches, telephone line and signal, signal contacts for the fire department service and emergency power, hydraulic buried cylinders and buried piping.
- .2 This Agreement shall not include:

Performance by the Contractor of any additional tests not specified in this Section, it's references or in the Code or Standards as amended from time to time.

Replacement of misused, abused, or vandalized parts or components.

Installation of new additional parts or components; or

Compliance with directives or recommendations of insurance companies involving work which is not specified in the Agreement.
- .3 In addition, the Contractor shall not be required to install new attachments on the Elevators or parts different from those now constituting the equipment, except as direct replacements of existing components and as per the Agreement.
- .4 The Contractor shall be responsible for re-inspection costs levied by the governing authorities for deficiencies noted in their report. The re-inspection fees shall be deducted from the Fee.

1.21 GENERAL

- .1 In addition, the Contractor shall keep the controllers clean and the wiring neat when replacing relays, diodes, resistors, static units, or rectifiers.
- .2 All components shall be properly and securely mounted, and the designations permanently marked.

- .3 All replacement parts of a different manufacture and or machined parts shall be properly adapted and when components are modified or modernized all redundant material and wiring removed and schematics updated to reflect changes.
 - .4 All hall and car indicator lights, if not working, shall be checked, and replaced monthly as part of the regular maintenance schedule. The Contractor shall clean the machine rooms and pits whenever required and the hoistways at least once every year.
 - .5 The elevator machine room shall be maintained in a clean and tidy condition and the floor and walls shall be painted if soiled by the ropes as required with high quality floor paint.
 - .6 Areas leading to the machine room, pits and car tops shall be kept clean of dirt, grease, and oil.
 - .7 Any water problems or other building items in the hoistway, machine rooms or pits shall be reported to the Owner's representative in writing.
 - .8 Any test to ensure that the elevator equipment is safe or to determine if the components are safe, such as full load test, cylinder leakage test (with or without weights), brake test under load, or other tests deemed necessary by the Contractor.
 - .9 The following manufacturer's approved lubricants shall be provided by the Contractor in the performance of the Services: Gear oil (to be changed once a year), bearing oil or grease, hoist rope dressing (to be applied sparingly when needed), buffer oil (checked annually), dashpot oil, any door track and roller lubricants, rail oil, hydraulic oil (to be kept, cleaned, and filtered, as needed) and all general lubricants.
 - .10 Removal and disposal of oil (Overflow oil, grease, and dirt in the pits, etc.), solvents and grease or similar substances shall be in accordance with the Standards, all applicable safety regulations and environmental Standards and Workplace Hazardous Materials Information System (WHIMS).
- 1.1 **MANUFACTURER'S PARTS**
- .11 Use genuine OEM parts where possible.
 - .12 Where genuine OEM parts are not available, or a better substitute is available, submit the alternative part for the approval of the Owner's Representative.
- 1.22 **SUBSTITUTE PARTS**
- .1 Where items visible to the general public, in particular exposed finish and fixtures, are to be replaced, submit drawings, photographs or samples, as required, in ample time for consideration and review.
 - .2 Submit samples of metals, plastic laminates and finishes properly identified as to project, location, and material.
 - .3 Supply materials in accordance with the reviewed samples.

- .4 The review does not include the checking of measurements or the approval of variations from the Specifications or the Contract Documents.

1.23 MAINTENANCE PARTS

- .1 The Contractor shall be responsible to ensure availability and have in constant supply frequently used and equipment-specific spare parts, lubricants, and cleaning materials.

- .2 All other parts for the equipment shall be readily available from a central parts depot or available from manufacturers within thirty-six (36) hours, or otherwise shall be kept in constant supply of the Contractor.

- .3 Where the Contractor demonstrates an inability to provide replacement parts within 24 hours, the contractor shall purchase and maintain an inventory of spare printed circuits boards, encoders, brake pads, rollers, chains, sprockets, fuses, relays, transformers, valves, coils, contactors, locks, contacts, guide shoes, guide rollers, landing switches, limit switches, contact blocks, brake coil, packing, Victaulic seals, gaskets, sensors, and small motors on site.

Does not apply to parts related to escalator step chains, elevator or escalator motors, drives, handrails, cylinders, pistons, bull gear, drives or other major components that cannot be handled by a single mechanic capable of lifting thirty (30) pounds.

- .4 Light bulbs for indicators and push buttons shall be stored on site at the Building.

- .5 All replacement parts shall be original and genuine manufacturer's parts or, if not genuine manufacturer's parts, approved alternatives (as approved by Owner or Elevator Consultant) which shall be designed to work with the existing circuitry, control, and machinery, and not, in any event, be of a lesser quality.

- .6 Damaged or replaced parts, old oil, liquids, and grease are to be removed from the Building and properly disposed of off-site in accordance with all applicable safety regulations and environmental Standards.

- .7 All flammable liquids, rags and oils shall be stored in approved containers and all Safety Rules and WHIMS Regulations adhered to.

1.24 OBSOLESCENCE

- .1 The Contractor accepts the age of the Elevators and related equipment in the Building at the time of signing the Agreement and agrees to maintain these Elevators for the term, without the necessity to modernize due to obsolescence, except as per written exceptions to the Agreement.

- .2 Should any equipment or part thereof become obsolete, such equipment or part thereof shall be replaced if damaged, excessively worn or broken, due to normal use and while properly and preventively maintained, provided the Owner's express written authorization has first been received. The foregoing is applicable only if replacement parts are not available or cannot be manufactured or machined by any of the common supply and parts dealers or machine shops.

- .3 This section excludes printed circuit boards, motor drives, relays, LCD screens, contactors, and infrared detectors where replacement parts are readily available or interchangeable.
- .4 Following the replacement of such part, it shall become part of the existing equipment and shall be maintained as per the terms of the Agreement.

1.25 TOOLS

- .1 Maintain in good working order, including certifications and calibrations, and have available at all times, any tools required to perform the Service on all equipment covered by the Agreement.

Part 3 Execution

1.26 STANDARD OF CARE

- .1 The Contractor shall maintain the Elevators with a view to minimizing wear and tear on the equipment and minimizing the shut-down time and frequency of breakdowns.
- .2 In order to facilitate these requirements of the Agreement's objectives and Services, the Contractor shall use only competent, trained and qualified persons, supervised by the Contractor's own competent and qualified supervisors and management, fully familiar with the latest Code and Standards, applicable federal, provincial and local codes, Health and Safety Regulations and Workplace Hazardous Materials Information System ("WHMIS") requirements as well as the existing elevator equipment in the Buildings, as manufactured, modernized and designed, directly employed and under their supervision.

- .3 The Contractor hereby acknowledges having examined the Elevators and hereby represents and warrants:

that it is capable of maintaining, adjusting, repairing and servicing the Elevators; and

that it has access to all parts, schematics, manuals, and instructions necessary to maintain the Elevators to original performance and industry Standards for the duration of the Agreement.

The Contractor shall, at all times, maintain the Elevators in good, reliable, smooth, quiet, efficient and safe working order and shall use barricades and all possible means to protect passengers or personnel from accidental use or tripping or any other hazard to life or limb.

The Contractor's employees and agents shall make all reasonable efforts to keep the Elevators in good, smooth, quiet, and safe operating condition and shall report any defect which they cannot remedy within twenty-four (24) hours to the Supervisor, whereupon the Supervisor shall dispatch an adjustor/trouble shooter or a service crew on the next working day to correct such defect.

If an Elevator cannot be returned to service within twenty-four (24) hours, the Owner's representative shall be notified immediately as to when such Elevator will be returned to service and what steps have been taken to avoid a recurrence of the defect in question.

The Contractor shall maintain the original speed and performance times of the Elevators to reasonable expectations and, in any event, to within maximum five per cent (5%) variance of original design and installation parameters, including acceleration and deceleration and door opening and closing, having regard to the type of equipment and to its configuration, and shall perform all necessary adjustments as required to maintain such performances within the limits of the Standard.

The Contractor shall check and verify all changes to the control, wiring or equipment to assure safe operation at all times, and maintain the levelling within the original capability and Code and Standards requirements of the Elevators.

1.27 WORK TO BE PERFORMED

- .1 Periodically examine all safety devices and perform all safety tests as required by any national, regional or local codes, regulations or bylaws.
- .1 Regularly and systematically examine, clean, lubricate, maintain, repair or replace the elevators and lifts including (but not limited to) the following components and systems: hoist machines (and all components of the hoist machines), rotating electrical equipment, controller and dispatching parts, microprocessors, integrated circuits, printed circuit boards, brake coils, brake linings, door operating equipment, pumps, motors, pistons, gland packing, hydraulic fluid, door equipment, safety switches, selector components and all other mechanical and electrical parts required for the operation of the elevators or lifts, not including buried piping and buried cylinders.
- .2 Renew all suspension means as often as is necessary to maintain an adequate factor of safety, equalize the tension on all suspension means, and repair or replace cables/belts as required by prudent operating and maintenance practices or by elevator inspectors having jurisdiction.
- .3 Special attention must be given to proper protection and barricades while performing maintenance/service work at the owner's properties. This includes properly locking and securing elevator machine room doors, access doors to elevator shafts and pit areas.
- .4 Provide assistance and access to the owner, or owner's representative(s), to test, repair or replace any equipment located in the hoistway and not accessible to persons other than the elevator contractor (i.e. smoke detector or electrical outlets). This assistance is to be provided during regular working hours and is to be at no extra cost to the owner.

1.28 MAINTENANCE VISITS

- .1 Routine Maintenance: Perform the following duties:

Contractor shall perform the maintenance services as per the requirements of the latest edition of the:

- .1 CSA B44.2, Maintenance Requirements and Intervals for Elevators, Dumbwaiters, Escalators and Moving Walks,

- .2 CSA B355 Lifts for Persons with Physical Disabilities, including Annex B; Maintenance of Lifts for Persons with Physical Disabilities.
- .3 ASME A17.1 / CSA B44, Safety Code for Elevator and Escalators, including Section 8.6; Maintenance, Repair, Replacement and Testing.

In the course of the examination, should faulty parts be discovered replace them at once, and should any unusual operations or noises be found take corrective action immediately.

Schedule parts showing excessive wear for replacement on the next regular examination.

Prior to performing any examination of the equipment, Contractor personnel shall communicate with Owner's personnel on site.

1.29 ROPE REPLACEMENT PROCEDURES

- .1 Use rope terminations of the wedge clamp type.
- .2 Provide hoist ropes of sufficient number, size, and characteristics such that the addition of 50% of the rated load to the car cab will cause no more than a 0.04% elongation in the rope.
- .3 Where ropes are used in parallel to share a load, ensure that the ropes are from the manufacturing run.
- .4 If Langlay rope is used, provide means during and after installation to prevent the ropes turning (do not use swivel connections).
- .5 Provide sufficient removable counterweight buffer blocking to allow adjustment for rope stretch without requiring cable shortening.

1.30 TESTING

- .1 Perform periodic tests and maintenance inspections of all elevator equipment as required by current applicable safety codes as might be applicable for elevators, dumbwaiters, and lifts.
- .2 Perform annual test of hydraulic cylinder PVC protection system for infiltration of contaminants, record in logbook and report findings to Owner.
- .3 Submit written reports of tests to the Owner's Representative and governing bodies as required. In the case of running safety or load tests, prior notification shall be given so that a representative of the Owner may witness said test.
- .4 Provide necessary cooperation, assistance, and personnel to allow tests and inspections of the equipment by the Owner's Representative and or the regulatory inspection authorities.

- .5 Where re-inspection is required because of major or numerous deficiencies, provide the necessary manpower to assist in the re-inspection.
- .6 Where applicable, in coordination with the Owner's Representative, perform semi-annual tests of the elevator emergency power operation, fireman's service, as well as code blue control feature. These tests to be carried out in overtime hours at no extra cost to the Owner where they cannot be performed during business hours.

.1

.2

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Provide labour, materials, products, equipment, and services necessary for the installation of one (1) vertical platform wheelchair lift included in this specification.
 - .1 Vertical Platform Lift
 - .1 Capacity – 750 lbs (340 kg)
 - .2 Speed – 20 fpm (0.10 m/s) nominal
 - .3 Straight-through enter/exit
 - .2 If the Owner's Agent elects to accept the contractor's price, the successful elevator contractor agrees to be bound by the terms and conditions of a contract mutually agreed upon with Owner's Agent.

1.2 RELATED SECTIONS

- .1 Section 09 21 00 - Gypsum Board Assemblies: Gypsum machine room walls.
- .2 Section 14 24 33 – Elevator Maintenance.
- .3 Division 26 – Electrical Section: Electrical requirements.

1.3 REFERENCES

- .1 CSA B355 - Lifts for Persons with Physical Disabilities (Latest version adopted in jurisdiction).
- .2 CSA B44.1/ASME A17.5 - Elevator and Escalator Electrical Equipment.
- .3 CAN/CSA B651-18 - Accessible Design for the Built Environment.
- .4 CSA C22.1-2018 - Canadian Electrical Code, Part I, Safety Standard for Electrical Installations.
- .5 CSA W47.1-2019 - Certification of companies for fusion welding of steel, Includes Update No. 3 (2011), Update No. 5 (2012)
- .6 NFPA 70E - Standard for Electrical Safety in the Workplace.
- .7 Government of Prince Edward Island
 - .1 Prince Edward Island Elevators and Lifts Act, Chapter E-5 - R.S.P.E.I. 1974, Cap. E-4, s.3.
 - .1 Contractor's License or an Installer's Registration to the applicant, in accordance with the regulations. 2008,c.12,s.2.
 - .2 Elevators and Lifts General Regulations - R.S.P.E.I. 1974, Cap. E-4, s.2/
 - .3 Occupational Health and Safety Act, RSPEI 1988, c O-1.01.
 - .4 Prince Edward Island Building Code Act and Regulations.

- .8 Health Canada/Workplace Hazardous Materials Information System (WHMIS2015).
 - .1 Safety Data Sheets (SDS).
- .9 Seismic zone requirements
- .10 ASTM A36/A36M-19 - Standard Specification for Carbon Structural Steel.
- .11 ASTM A139/A139M-16 - Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over).
- .12 ASTM A167-99 (2009) - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- .13 ASTM A653/A653M-20 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- .14 ASTM A1008/A1008M-20 - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable.
- .15 ASTM B221-14 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes .
- .16 CAN/ULC-S104-15 - Standard Method for Fire Tests of Door Assemblies.
- .17 CAN/CGSB 1.40-97 - Anticorrosive Structural Steel Alkyd Primer.
- .18 CSA-C22.2 No. 100-14 (R2019) - Motors and Generators.
- .19 CSA-W55.3-08(R2018) - Certification of Companies for Resistance Welding of Steel and Aluminum.
- .20 NEMA LD3-2005 - High Pressure Decorative Laminates (HPDL).
- .21 SSPC (The Society for Protective Coatings) - Steel Structures Painting Manual.

1.4 DEFINITIONS

- .1 DEFINITIONS: as stated in other sections of this specification.
- .2 Additional definitions:
 - .1 The term “inspecting authorities”, as used herein, refers to the Authority Having Jurisdiction and authorized agents of governments and insurance groups which are charged with the responsibility of carrying out periodic inspections and tests on vertical transportation equipment.
 - .2 Substantial Performance: Substantial performance, as used herein, refers to the point in the progress of the work at which:
 - .1 The elevator is handed over for customer use.
 - .2 Subsequently, the equipment has been functioning in trouble-free fashion for a one-month period.
 - .3 The number of service disrupting call backs over the one-month period averages less than 1.0 per elevator;
 - .4 The components function as specified.

.5 The equipment provides service as intended.

1.5 SYSTEM DESCRIPTIONS

- .1 Elevator Type: Vertical platform lift
- .2 Characteristics of the Lift as follows:
 - .1 Machine Room-less
 - .2 Rated Capacity: 750lbs (340kg)
 - .3 Rated Speed: 20fpm (0.10 m/second).
 - .4 Nominal Car Dimensions: 36" x 54" (914 mm x 1371 mm)
 - .5 Number of Stops: 2 (Level 2 & Warm Room)
 - .6 Total Rise: 41-11/16" (1059mm)
 - .7 Car Access/Configuration: straight through enter/exit
 - .8 Side Guards: 42 1/8" (1070 mm)
 - .9 Fixed Access Ramp (no pit): 36" (915mm) x 3" (76mm)
 - .10 Drive System: 2:1 roller chain, hydraulic
 - .11 Emergency Operation:
 - .1 Remote Manual Lowering Device
 - .2 Battery-operated lowering with automatic recharging system.
 - .12 Main Power Supply: 110 Volt, 20 Amp, single phase, 60 Hz
 - .13 Operation: Continuous pressure button operation with automatic floor level stop
 - .14 Other Safety Features:
 - .1 Full height (80") door bottom landing
 - .2 Top landing: 42" gate
 - .3 Handrail
 - .4 Non-skid platform surface
 - .5 Emergency stop button
 - .6 Emergency phone
 - .7 Platform gate
 - .8 Safety underpan
 - .9 Door locks
 - .10 Safety brake
 - .15 Call stations at each landing: keyed or key FOB
 - .16 Public building/Commercial package
 - .17 Noise Level: maximum 75.0 dBA (up direction)
 - .18 Seismic Design: In accordance with applicable code.

1.6 PRODUCT REQUIREMENTS

- .1 Microprocessor cards and components for the equipment shall be readily available to purchase with no qualifications or delays.
- .2 Ensure that all parts supplied for this project are sourced from manufacturers that will guarantee availability of replacement parts and components for a minimum of ten (10) years.
- .3 Where purchased components are used, ensure that the original manufacturer's name and component designation are clearly marked on the part or in the parts catalogue.

1.7 ADMINISTRATIVE REQUIREMENTS

- .1 Project management and coordination procedures.
- .2 Coordination:
 - .1 Coordinate with other work having a direct bearing on work of this section.
 - .2 Coordinate installation of sleeves, block outs, pockets, lift equipment with integral anchors, and other items to be embedded in concrete or masonry.
 - .3 Provide templates, sleeves, pockets, lift equipment with integral anchors, and installation instructions in time for installation.
- .3 Pre-installation Meetings:
 - .1 Convene before starting work of this section.
 - .2 Require attendance of persons directly involved with the work of this section.

1.8 SUBMITTALS FOR REVIEW

- .1 Submission procedures.
- .2 Product Data: Provide data on the following items:
 - .1 Signal and operating fixtures, operating panels, indicators.
 - .2 Cab design, dimensions, layout, and components.
 - .3 Cab and hoistway door and frame details.
 - .4 Electrical characteristics and connection requirements.
- .3 Shop Drawings: Indicate the following information:
 - .1 Pump, motor, control valve, controller, selector, governor and other component locations.
 - .2 Car, machine beams, guide rails, buffers, and other components in hoistway.
 - .3 Individual weight of principal components; load reaction at points of support.
 - .4 Loads on hoist machine beams and location of load bearing pockets.
 - .5 Location of components in machine room.

- .6 Locations in hoistway and machine room of connections for car light.
- .7 Location and sizes of access doors, doors, and frames.
- .8 Expected heat dissipation of lift equipment in machine room and top of the hoistway.
- .9 Electrical characteristics and connection requirements.
- .4 Samples: Submit copies of samples, illustrating cab floor material, cab interior finishes, cab, gate and frame finishes, and handrail material and finish.

1.9 SUBMITTALS FOR INFORMATION

- .1 Submission procedures.
- .2 Installation Data: Manufacturer's special installation requirements.

1.10 CLOSEOUT SUBMITTALS

- .1 Submission procedures as per other sections of specification.
- .2 Maintenance Service:
 - .1 Provide service and full maintenance of lift system and components, as per 14 24 33, for one (1) year from Date of Substantial Completion during warranty period.
 - .2 This service is to be a full preventative maintenance program that includes maintenance and repair of all lift equipment subject to normal wear and tear, for the 12-month, period at no additional cost to the owner.
 - .3 Include 24-hour callback service (both regular and overtime hours), at no additional cost to the owner, as part of this maintenance. The cost for this maintenance service is to be included in the tender price.
 - .4 Contractor is not responsible for repairs or callbacks caused by misuse, abuse, vandalism, wilful damage or other reasons beyond their reasonable control.
 - .5 As part of this full maintenance service provide any form or Condition Report required by the Authority Having Jurisdiction for renewal of the lift licence.
 - .6 The cost of this maintenance service is to be included in the base bid.
- .3 Operation and Maintenance Data: Provide data and a minimum of one (1) hardcopy and one (1) electronic maintenance/data manuals as per the specification.

1.11 MAINTENANCE MATERIAL SUBMITTALS

- .1 Maintenance and extra material requirements as per other sections of specification.
- .2 Extra Stock Materials: Supply six (6) extra keys for all keyswitches in car operating panel.

1.12 QUALITY ASSURANCE

- .1 Perform Work to latest edition of CSA B355 - Lifts for Persons with Physical Disabilities, CSA-W55.3, CSA-C22.1, and as supplemented in this section.
- .2 Fabricate and install door and frame assemblies to NFPA 80.
- .3 Installer: Licensed to install the specified equipment with evidence of experience with the specified equipment. Employees and supervisor on payroll of lift equipment supplier/manufacturer.
- .4 Manufacturer Qualifications: Firm with minimum 10 years experience in manufacturing of vertical platform lifts, with evidence of experience with similar installations of type specified.
- .5 Maintenance: Contractor to have qualified people available to ensure fulfillment of maintenance and callback service without unreasonable loss of time in reaching project site.
- .6 Do not apply trademarks or logos visible to the general public on any piece of equipment.

1.13 REGULATORY REQUIREMENTS

- .1 Conform to applicable code and specified standards for manufacture and installation of lift system.
- .2 Provide platform lifts in compliance with:
 - .1 CAN/CSA B355:19 – Platform Lifts and Stair Lifts for Barrier Free Access.
- .3 Accessibility Requirements: CAN/CSA-B651-18.
- .4 Fire-Rated Hoistway Entrance Assemblies:
 - .1 Labelled and listed to CAN/ULC-S104.
 - .2 Installed door and frame assembly for fire rated class as indicated.
- .5 Products Requiring Electrical Connection: Listed and classified by CSA (ULC) testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

1.14 WARRANTY

- .1 Provide a one (1) year warranty to include coverage for failure to meet specified requirements, including coverage for elevator operating equipment and devices.

1.15 EXTENDED MAINTENANCE

- .1 Base Bid: Include in the Tender Price a maintenance and service agreement, as per 14 24 33, for the equipment which coincides and meets the requirements of the warranty, including but not limited to routine maintenance, parts, labour, and 24 hours call back services, for a period of one (1) year from the date of Substantial Performance of the work.

- .1 This maintenance shall include regular and overtime callbacks and this cost is to be included in the Tender Price.
- .2 Provide a Separate Price for a five-year, full-service maintenance agreement, as per 14 24 33, to include the following:
 - .1 The full-service maintenance agreement shall include all parts and service for the lift equipment that are affected by normal wear and tear. The agreement shall include regular and overtime call back service. The maintenance service provider shall not be responsible for any equipment repairs or service that are considered beyond their reasonable control (i.e. vandalism, misuse, abuse etc.)
 - .2 The decision to accept the Separate Price for the Extended Maintenance as part of this Contract is at the sole discretion of the Owner's representative and or Owner.
 - .3 Extended maintenance agreement to commence upon expiry of the base bid one-year maintenance agreement.
 - .4 The price for this work will be subject to yearly escalation maximum of 2% which must be justified.
 - .5 When requested, state the labour and material rates used, the indices upon which they are based, the percentages of the maintenance price escalated by these rates, and the date at which these rates apply.
 - .6 The maintenance agreement will not automatically renew on the anniversary date for a further term period.

Part 2 Products

2.1 ELEVATING SYSTEM & CONTROL

- .1 The controller shall have an automatic user interface and will be Microprocessor or Programable Logic Controller (PLC) based in all operations and provided from the manufacturer's premium line of products.
- .2 Elevating System:
 - .1 Acceptable Manufacturers: Savaria, Global Tardiff, Garaventa, Cambridge or approved non-proprietary, independent manufacturer of Vertical Platform Lifts.
 - .2 CSA certified Lift controller ensuring the control meets the requirements of CSA B355 Safety Code.
 - .3 Enclose controller and drive in NEMA 1 metal enclosure. The cabinets are to be mounted for easy maintenance and servicing. They are to be isolated so as not to transfer noise or vibration.
 - .4 Integrated self-diagnostics.

- .5 The controller is not to include equipment that will shut down or alter the normal operation of the lift after a predetermined number of starts or the number of door opening and closings.
- .6 Arrange all parameters to be adjustable from control space. The microprocessor inputs and outputs are to be protected from external devices by relays or other acceptable means. Controller and non-current carrying devices are to be grounded also protected and isolate equipment from spikes in the electrical supply.
- .7 If needed, provide fan cooling for controller and drive components with proper ventilation and space so all necessary components, terminals and wiring can be accommodated.
- .8 Provide Owner's Representative at completion of project with any quick tools, service tools, maintain up to date software, laptop computer required to maintain lift controller.
- .9 The use of relays will be limited to safety circuits, dispatcher, backup and power circuits.
- .10 All wires and cables to be neatly arranged terminated and protected including spare wires. Wiring to have Canadian UL certification and conform to the Canadian Electrical Code.
- .11 Use only a controller that is not affected by R.F. radiation.
- .12 Maintain the controller cabinet by using sealed knock outs and sealing any holes made during installation.
- .13 Provide means so that the lift system will automatically adjust to utility supplied power during a power interruption.
- .14 In the case where volatile memories are provided for position and other data necessary to the continuing operation of the lift, provide means of preserving this data on power failure or fading ("brownout") for a minimum of four hours and means of automatic recovery upon restoration of normal power.
- .15 Provide on-board diagnostic tool that does not require proprietary equipment to set-up, adjust and operate equipment.
- .16 If an on-board tool is not supplied provide external computing device or tool to make required adjustments.
- .17 Provide manuals and diagrams on how to operate this computing device.

2.2 MATERIALS

- .1 Rolled Steel Sections, Shapes, Rods: ASTM A36/A36M.
- .2 Sheet Steel: ASTM A1008/A1008M, with matte finish.
- .3 Plastic Laminate: NEMA LD-3; colour, pattern and surface finish as chosen from standard selection.

2.3 FINISH MATERIALS

- .1 Shop and Touch-Up Primer for Steel Components: CAN/CGSB-1.40.

- .2 Touch-Up Primer for Galvanized Steel Surfaces: CAN/CGSB-1.181 zinc rich.
- .3 Primer for Wood Surfaces: Alkyd primer sealer.
- .4 Structural Metal Surfaces: Clean surfaces of rust, oil or grease; wipe clean with solvent; prime two coats.
- .5 Machine Room Components: Clean and degrease; prime one (1) coat, finish with one (1) coat of enamel.
- .6 Galvanized Surfaces: Clean with neutralizing solvent; prime one (1) coat.
- .7 Baked Enamel on Steel: Clean and degrease metal surface; apply one (1) coat of primer sprayed and baked colour as selected.
- .8 Stainless Steel: No. 4 Satin Finish.

2.4 ELECTRICAL COMPONENTS

- .1 Motor: CSA-C22.2 No. 100.
- .2 Fittings: Steel compression type for electrical metallic tubing.
- .3 Spare Conductors: Include 10% extra conductors and six (6) pairs of spare shielded audio cables in traveling cables.
- .4 Include wiring and connections to lift devices remote from hoistway. Provide additional components and wiring to suit machine room layout.

2.5 EQUIPMENT

- .1 Hydraulic machine/motor/pump, Suspension means, Controller, Controls, Fixtures, Buttons, Wiring and Devices, Indicators: As required by the ASME A18.1/CSA B355 Safety Code.
- .2 Electronic reduced voltage starting (soft start) shall be used as part of the elevator motor start/drive system.
- .3 Guide Rails, Cables, Spring Buffers, Attachment Brackets and Anchors: Purpose designed, sized according to code with safety factors.
- .4 Provide continuous pressure button (floor selective) operation using a microprocessor-based controller or Programmable Logic Control (PLC) with automatic leveling feature that shall automatically level the car to floor landings within a tolerance of 0.25" or better under all loading conditions up to rated load.

2.6 DOOR CONSTRUCTION

- .1 Fire Rated Doors: 1-1/2 hour B label rating. Pre-hung, constructed of 16 gauge (1.5 mm) steel, with a vision panel, delayed action door closer, pull handle and integrated interlock. Doors mount flush to the inside wall of the shaftway.

2.7 LIFT CONTROLS

- .1 Stainless steel satin No. 4 finish.
- .2 24 VDC control circuit with the following features.

- .1 Direction Control: Illuminated constant pressure buttons.
- .2 Illuminated and audible emergency stop switch shuts off power to lift and activates audio alarm equipped with battery backup.
- .3 Keyed call stations
- .4 Provide emergency stop and alarm button.

Part 3 Execution

3.1 EXAMINATION

- .1 Verify existing conditions before starting work.
- .2 Verify that installation area, landings and pit are ready for work of this section.
- .3 Verify that electrical power is available and of the correct characteristics.

3.2 PREPARATION

- .1 Arrange for temporary electrical power for installation work and testing of elevator components.

3.3 DELIVERY, STORAGE, AND HANDLING

- .1 Store products in manufacturer's unopened packaging until ready for installation.
- .2 Store components off the ground in a dry covered area, protected from adverse weather conditions.

3.4 INSTALLATION

- .1 Install in accordance with the requirements of the latest adopted edition of the CSA B355.
- .2 Install system components. Connect equipment to building utilities.
- .3 Provide conduit, boxes, wiring, and accessories.
- .4 Mount machine and motor on structural supports and bearing plates. Securely fasten to building supports to prevent lateral displacement. Provide information with tender on the loads required to be supported at the top of the hoistway for the elevator hoist machine.
- .5 Arrange equipment in controller area and the hoistway so functioning equipment and other equipment can be removed for repairs or replacement without dismantling or removing other equipment components. Arrange for clear passage to access door. Accommodate equipment in space indicated.
- .6 Accurately machine and align guide rails. Form smooth joints with machined splice plates.
- .7 Provide inserts, in timely manner and with clear instructions, to be placed in hoistway wall(s), including pit wall(s), as hoistway is being constructed.

- .8 Bolt brackets to inserts placed in concrete form work that will perform to four times the rated pull-out load.
- .9 Coordinate installation of hoistway wall construction.
- .10 Install hoistway door sills, frames, and headers in hoistway walls. Grout sills in place. Set entrances in vertical alignment with car openings and aligned with plumb hoistway lines.
- .11 Adjust equipment for smooth and quiet operation.
- .12 The same lead mechanic must be assigned to the project from beginning to end. They must not be assigned to another project, even temporarily, while the elevator contractor has personnel working on-site. In addition, the lead on-site mechanic must hold a valid Contractor's License or an Installer's Registration shall install, construct, reconstruct, maintain or alter an elevating device as defined by the E-05 Elevator and Lifts Act.

3.5 FIELD QUALITY CONTROL

- .1 Perform tests required by CSA B355 and Authority Having Jurisdiction.
- .2 Tests by Regulatory Agencies:
 - .1 Obtain required permits to perform tests. Perform tests required by Authority Having Jurisdiction
 - .2 Schedule tests with agencies and Consultant.
 - .3 Furnish test and approval certificates issued by Authority Having Jurisdiction.

3.6 ADJUSTING

- .1 Adjust for smooth acceleration and deceleration of car so not to cause passenger discomfort.
- .2 Adjust automatic floor leveling feature at each floor to achieve 1/4 inch from flush.

3.7 SITE TESTS

- .1 Perform all tests required by AHJ and CSA B355 - Lifts for Persons with Physical Disabilities
 - .1 Provide one (1) week written notice of data and time of tests to Owner's Representative.
- .2 Provide all necessary testing instruments and equipment to facilitate testing, including but not limited to test weights, load weighing, meters.
- .3 The Owner's Representative will carry out one final inspection, one re-inspection for each device. The Contractor will pay for any additional inspections required due to incomplete work or deficiencies.
- .4 Furnish test and approval certificates issued by AHJs to Owner's Representative.

3.8 CLEANING

- .1 Cleaning installed work as per other sections of this specification.
- .2 Remove protective coverings from finished surfaces.
- .3 Clean surfaces and components ready for inspection.

3.9 PROTECTION OF FINISHED WORK

- .1 Protecting installed work.
- .2 Do not permit construction traffic after cleaning.

3.10 DEMONSTRATION & ELEVATOR KEYS

- .1 Provide a total of 2 hours in off hours for demonstration of newly installed systems to the Owner's Representative.
- .2 Provide six (6) sets of any keys supplied.
- .3 Provide a record in the maintenance operation manuals of the transmittal for keys complete with code numbers for reproduction.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 All Mechanical Sections.

1.2 SCOPE OF WORK

- .1 The work of the Mechanical Sections includes all labour, materials and equipment necessary for the installation complete of the mechanical systems shown on the drawings and described in these specifications.
- .2 It is the requirement of this work to provide all systems complete functioning in intended system operation, notwithstanding that every item necessarily required may not be specifically mentioned.

1.3 SUBMITTALS

- .1 Submittals: in accordance with Division 01 – General Requirements.
- .2 Shop drawings to be approved by Departmental Representative to show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
- .3 Shop drawings and product data accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Acoustical sound power data, where applicable.
 - .3 Points of operation on performance curves.
 - .4 Manufacturer to certify current model production.
 - .5 Certification of compliance to applicable codes.
- .4 In addition to transmittal letter referred to in Division 01 – General Requirements:
Identify section and paragraph number.
- .5 Closeout Submittals:
 - .1 Provide operation and maintenance data for incorporation into manual specified in Division 01 – General Requirements.
 - .2 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
 - .3 Operation data to include:
 - .1 Control schematics for systems including environmental controls.
 - .2 Description of systems and their controls.
 - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
 - .4 Operation instruction for systems and component.
 - .5 Description of actions to be taken in event of equipment failure.
 - .6 Valves schedule and flow diagram.
 - .7 Colour coding chart.

- .4 Maintenance data to include:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
 - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .5 Performance data to include:
 - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified.
- .6 Approvals:
 - .1 Submit required copies of draft Operation and Maintenance Manual to Departmental Representative and Engineer for approval. Submission of individual data will not be accepted.
 - .2 Make changes as required and re-submit as directed by Departmental Representative and Engineer.
- .7 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
- .8 Site records:
 - .1 Departmental Representative will provide one (1) set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur. Include changes to existing mechanical systems, control systems and low voltage control wiring.
 - .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection.
- .9 As-built drawings:
 - .1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
 - .3 Submit to Departmental Representative and Engineer for approval and make corrections as directed.
 - .4 Perform testing, adjusting and balancing for HVAC using as-built drawings.
 - .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.

.10 Submit copies of as-built drawings for inclusion in final TAB report in accordance with Division 01 – General Requirements.

.6 Sustainable Design:

.1 Submit VOC (g/L) data for all adhesives, coatings, paints and coatings used on site in association with products/materials for approval by Consultant.

1.4 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Division 01 – General Requirements.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Division 01 – General Requirements.

1.5 EQUIPMENT INSTALLATION

.1 In accordance with Manufacturer’s instructions unless otherwise indicated.

.2 Use valves and either unions or flanges for isolation and ease of maintenance and assembly.

1.6 CLEARANCES

.1 Provide space for disassembly, removal of equipment and components as recommended by Manufacturer or as indicated (whichever is greater) without interrupting operation of other system, equipment or components.

1.7 TRIAL USAGE

.1 General:

.1 Commissioning requirements in accordance with Division 01 – General Requirements.

.2 Departmental Representative and Commissioning Agent may use equipment and systems for test purposes prior to acceptance. Supply labour, material and instruments required for testing.

.2 Use of systems during construction:

.1 Use of mechanical systems during construction.

.2 Use of new and existing permanent heating and ventilating systems for supplying temporary heat or ventilation is permitted only under following conditions:

.1 Entire system is complete, commissioned, pressure tested, cleaned and flushed out.

.2 Specified water treatment system has been commissioned, water treatment is being continuously monitored.

.3 Building has been closed in, areas to be heated/ventilated are clean and will not thereafter be subjected to dust-producing processes.

.4 There is no possibility of damage.

.5 Supply ventilation systems are protected by 60% filters, inspected daily, changed every two (2) weeks or more frequently as required.

- .6 Return systems have approved filters over openings, inlets and outlets.
 - .7 Systems will be:
 - .1 Operated as per Manufacturer's recommendations and instructions.
 - .2 Operated by Contractor.
 - .3 Monitored continuously by Contractor.
 - .8 Warranties and Guarantees are not relaxed.
 - .9 Regular preventive and other Manufacturer's recommended maintenance routines are performed by Contractor at own expense and under supervision of Departmental Representative and Engineer.
 - .10 Refurbish entire system before static completion; clean internally and externally, restore to "as-new" condition and replace filters in air systems.
- .3 Filters specified in this Section are over and above those specified in other Sections of this project.

1.8 FIRESTOPPING

- .1 All Sub-Contractors shall coordinate all fire rated assembly penetrations with General Contractor. Fire stopping to be by the General Contractor.
- .2 Firestopping and smoke seal materials at openings around mechanical equipment as required to maintain firestop system.
- .3 Sub-Contractor shall provide required clearances between outside surface of pipe and inside surface of sleeve, core drilled hole or listed fire rated system.

1.9 TESTS

- .1 Give 48 hours' written notice of date for all tests.
- .2 Insulate or conceal work only after testing and approval by Departmental Representative and Commissioning Agent.
- .3 Conduct tests in presence of Departmental Representative and Commissioning Agent and local authority having jurisdiction where applicable.
- .4 Bear costs including retesting and making good.
- .5 Equipment: test as specified in relevant sections and Commissioning Sections.
- .6 Prior to tests, isolate all equipment or other parts, which are not designed to withstand test pressures or test medium.

1.10 INTERPRETATION OF PLANS AND SPECIFICATIONS

- .1 These specifications are to be considered as an integral part of the plans which accompany them and neither the plans nor the specifications shall be used alone. Any item which is omitted in one but which is reasonably implied in the other shall be considered properly and sufficiently specified and must, therefore, be provided by this Contractor.
- .2 Misinterpretation of the plans or specifications shall not relieve this Contractor of responsibility; final interpretation of details and clauses remains with the Departmental Representative.
- .3 Where uncertainty exists in the passing of pipes and location of equipment, the General Contractor and or project manager shall be consulted before work is started. Where such materials and equipment have been installed so as to cause interference with the inside treatment of the building, they shall be removed and relocated without additional cost to the Departmental Representative.
- .4 The plans do not necessarily show all valves, air vents, duct offsets, access panels, connections, balancing fittings, bases, isolators, flexible connections, drains, etc., and this Contractor shall not avail himself of these obvious omissions, but shall install the work complete in essential details so that it will function properly, can be easily balanced and so that repairs and removal of equipment can easily be made.
- .5 Building dimensions shall not be scaled from the Mechanical plans but shall be obtained from on-site dimensions of the building. Any discrepancy between the drawings and the building shall be questioned before proceeding with any installation.

1.11 CO-OPERATION OF CONTRACTORS

- .1 This Contractor shall become familiar with the work of other contractors and in laying out and installing the work shall co-operate with the other Contractors, so as to facilitate the progress of the work as a whole and avoid interference or delays. Where interference exists, this Contractor shall notify the General Contractor and/or project manager and the Departmental Representative before installing the work. Any changes in the work or alterations of the Mechanical Contractor's schedule of procedure required for such co-operation will not be considered as a claim for extra compensation.
- .2 Due to the complexities of many sub-trades, and the restrictive space available in this project, it is required that all trades co-operate closely so as to install all systems in their allotted locations as indicated on the drawings, or coordination on site.
- .3 The service and ceiling spaces are congested. All mechanical and electrical to coordinate installations with Departmental Representative prior to installation.

1.12 ERRORS AND OMISSIONS

- .1 The drawings are not intended to show every item of accessory equipment, but the Contractor shall tender on and install all essential details to provide for efficiency of operation and ease of maintenance.

- .2 Should this Contractor discover errors or discrepancies in the plans or specification, he shall refer the matter to the Departmental Representative for change or clarification and shall not proceed with that portion of the work until advised by the Departmental Representative to do so.

1.13 MAINTENANCE

- .1 Furnish spare parts in accordance with Division 01 – General Requirements and as follows:
 - .1 One set of packing for each pump.
 - .2 One casing joint gasket for each size pump.
 - .3 One glass for each gauge glass.
 - .4 One filter cartridge or set of filter media for each filter or filter bank in addition to final operating set.
- .2 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Division 01 – General Requirements.
- .3 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.14 DELIVERY, STORAGE, AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section Division 01 – General Requirements.
- .2 Store and handle materials in accordance with Construction Plan and Manufacturer’s written instructions.

1.15 COMMISSIONING REQUIREMENTS

- .1 Contractors are required to complete the commissioning, field quality assurance and testing and performance verification as outlined in this and subsequent sections.
- .2 The Commissioning Authority will conduct third party commissioning verification.

Part 2 Products

2.1 MATERIALS

- .1 Materials and products in accordance with Division 01 – General Requirements.
- .2 Do verification requirements in accordance with Division 01 – General Requirements.

2.2 VOC LIMITS

- .1 The purpose of this section is to reduce emissions of volatile organic compound (VOCs) and to eliminate emissions of chloroform, ethylene dichloride, methylene chloride, perchloroethylene, and trichloroethylene from the application of adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers, or any other primers. This section applies to all commercial and industrial sales and applications of adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers, or any other primers, unless otherwise specifically exempted by this rule.
- .2 Requirements:
 - .1 Unless otherwise specified in paragraph .2 a person shall not apply any adhesives, adhesive bonding primers, adhesive primers, or any other primer, which have a VOC content in excess of 250 g/L less water and less exempt compounds.
 - .2 A person shall not apply adhesives, adhesive bonding primers, adhesive primers, sealants, sealant primers, or any other primer, which have a VOC content in excess of the limits specified below:
 - .3 VOC Limit*, Less Water and Less Exempt Compounds in Grams per Liter

Fig. 1

Architectural Applications	Current VOC Limit
Cove Base Adhesives	50
Multipurpose Construction Adhesives	70
Structural Glazing Adhesives	100
Single Ply Roof Membrane Adhesives	250

Fig. 2

Specialty Applications	VOC Limits and Effective Dates**			
	Current VOC Limit	1-1-05	7-1-05	1-1-07
PVC Welding	510			
CPVC Welding	490			
ABS Welding	400		325	
Plastic Cement Welding	350	250		
Adhesive Primer for Plastic	650		550	
Computer Diskette Manufacturing	350			
Contact Adhesive	80			
Special Purpose Contact Adhesive	250			
Tire Retread	100			
Adhesive Primer for Traffic Marking Tape	150			
Structural Wood Member Adhesive	140			
Sheet Applied Rubber Lining Operations	850			
Top and Trim Adhesive	540			250

** The specified limits remain in effect unless revised limits are listed in subsequent columns.

- .1 For adhesives, adhesive bonding primers, or any other primer not regulated by the above two tables and applied to the following substrates, the following limits shall apply:

Fig. 3

Substrate Specific Applications	Current VOC Limit
Metal to Metal	30
Plastic Foams	50
Porous Material (except wood)	50
Wood	30
Fiberglass	80

- .2 If an adhesive is used to bond dissimilar substrates together the adhesive with the highest VOC content shall be allowed.

Fig. 4

Sealants	Current VOC Limit
Architectural	250
Marine Deck	760
Non-membrane Roof	300
Roadway	250
Single-Ply Roof Membrane	450
Other	420

Fig. 5

Sealant Primers	Current VOC Limit
Architectural	250
Non Porous	
Porous	775
Modified Bituminous	500
Marine Deck	760
Other	750

* For low-solid adhesives or sealants the VOC limit is expressed in grams per liter of material as determined in paragraph .3; for all other adhesives and sealants, VOC limits are expressed as grams of VOC per liter of adhesive or sealant less water and less exempt compounds as determined in paragraph .4.

- .3 GRAMS OF VOC PER LITER OF MATERIAL is the weight of VOC per volume of material, to be used for a low-solids adhesive or sealant, and can be calculated by the following equation:

$$\text{Grams of VOC per Liter of Material} = \frac{W_s - W_w - W_{es}}{V_m}$$

Where: W_s = weight of volatile compounds, in grams
 W_w = weight of water, in grams
 W_{es} = weight of exempt compounds, in grams
 V_m = volume of material, in liters

- .4 GRAMS OF VOC PER LITER OF ADHESIVE OR SEALANT, LESS WATER AND LESS EXEMPT COMPOUNDS is the weight of VOC per combined volume of VOC and adhesive or sealant solids, and can be calculated by the following equation:

Grams of VOC per Liter of Adhesive or Sealant, Less Water and Less

$$\text{Exempt Compounds} = \frac{W_s - W_w - W_{es}}{V_m - V_w - V_{es}}$$

Where: W_s = weight of volatile compounds, in grams
 W_w = weight of water, in grams
 W_{es} = weight of exempt compounds, in grams
 V_m = volume of material, in liters
 V_w = volume of water, in liters
 V_{es} = volume of exempt compounds, in liters

For adhesives or sealants that contain reactive diluents, the VOC content of the adhesive or sealant is determined after curing. The grams of VOC per liter of any adhesive or sealant, except a low solids adhesive or sealant shall be calculated by the following equation:

Grams of VOC per Liter of Adhesive or Sealant, Less Water and Less

$$\text{Exempt Compounds} = \frac{W_{rs} - W_{rw} - W_{res}}{V_{rm} - V_{rw} - V_{res}}$$

Where: W_{rs} = weight of volatile compounds not consumed during curing, in grams
 W_{rw} = weight of water not consumed during curing, in grams
 W_{res} = weight of exempt compounds not consumed during curing, in grams
 V_m = volume of material prior to reaction, in liters
 V_w = volume of water, in liters
 V_{es} = volume of exempt compounds, in liters

Part 3 Execution

3.1 CLEANING

- .1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

3.2 FIELD QUALITY CONTROL

- .1 Site Tests: conduct following tests in accordance with Division 01 – General Requirements and submit report as described in PART 1 - SUBMITTALS.
- .2 Manufacturer's Field Services:
.1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in Division 01 – SUBMITTALS AND AS SPECIFIED RESPECTIVE SECTIONS.

- .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.3 DEMONSTRATION

- .1 Departmental Representative and Engineer will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Trial usage to apply to following equipment and systems:
 - .1 As per Cx Plan.
- .3 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .4 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .5 Instruction duration time requirements as specified in appropriate sections.
- .6 Departmental Representative may record these demonstrations on video tape for future reference.

3.4 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Division 20 – Mechanical.
- .3 Division 21 – Fire Suppression.
- .4 Division 22 – Plumbing.
- .5 Division 23 – Heating, Ventilation and Air Conditioning (HVAC).
- .6 Division 25 – Integrated Automation.

1.2 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Division 01 – General Requirements.
- .2 Submit catalogue details for each type of door illustrating profiles, dimensions and methods of assembly.

1.3 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for cleaning and maintenance of stainless steel finishes for incorporation into manual in accordance with Division 01 – General Requirements.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Division 01 – General Requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Division 01 – General Requirements and Manufacturer’s written instructions.
- .2 Apply temporary protective coating to finished surfaces. Remove coating after erection. Do not use coatings that will become hard to remove or leave residue.
- .3 Leave protective covering in place until final cleaning of building.

Part 2 Products

2.1 ACCESS DOORS

- .1 Supply and install as necessary to gain access to all concealed mechanical equipment for operating, inspecting, adjusting, servicing.
- .2 Sizes: Except as indicated otherwise, to be minimum sizes as follows:
 - .1 600 x 600 mm.

- .3 Access doors shall be hinged with a positive locking mechanism.
- .4 Construction: Rounded safety corners, concealed hinges, screwdriver latch, anchor straps, able to open 180° and drywall tape edge.
- .5 Materials:
 - .1 Tiled or marble surfaces shower doors, high humidity and other special areas: Stainless steel with brushed satin or polished finish as directed by Department Representative.
 - .2 Other areas: Prime coated steel.

2.2 EXCLUSIONS

- .1 Lay-in tile ceilings. In this instance, use unobtrusive identification locators.
- .2 Fire Rated Applications: Use fire-rated access door.

Part 3 Execution

3.1 INSTALLATION

- .1 Installation:
 - .1 As per Manufacturer's instructions.

3.2 LOCATION

- .1 Location: Ensure that equipment is clearly within view and accessible for operating, inspecting, adjusting, servicing without the need for special tools.
- .2 Not all access door locations are shown on drawings. It is the responsibility of each individual contractor to assess access requirements and coordinate access door locations with General Contractor and other Sub-Contractors.

3.3 FIELD QUALITY CONTROL

- .1 Verification requirements in accordance with Division 01 – General Requirements.

3.4 CLEANING

- .1 Proceed in accordance with Division 01 – General Requirements.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 Section 20 00 10 – Common Work Results for Mechanical.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Division 01 – General Requirements.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for equipment being installed.
- .3 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Prince Edward Island, Canada.
 - .2 Indicate on drawings:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances.
 - .3 Shop drawings and product data accompanied by:
 - .1 Detailed drawings of bases, supports, and anchor bolts.
 - .2 Acoustical sound power data, where applicable.
 - .3 Points of operation on performance curves.
 - .4 Manufacturer to certify current model production.
 - .5 Certification of compliance to applicable codes.
 - .4 In addition to transmittal letter referred to in Division 01 – General Requirements: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Division 01 – General Requirements.
- .2 Operation and Maintenance Data: submit operation and maintenance data:
 - .1 Operation and maintenance manual approved by, and final copies deposited with, Departmental Representative before final inspection.
 - .2 Operation data to include:
 - .1 Control schematics for systems including environmental controls.
 - .2 Description of systems and their controls.
 - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
 - .4 Operation instruction for systems and component.
 - .5 Description of actions to be taken in event of equipment failure.
 - .6 Valves schedule and flow diagram.
 - .7 Colour coding chart.

- .3 Maintenance data to include:
 - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
 - .2 Data to include schedules of tasks, frequency, tools required and task time.
- .4 Performance data to include:
 - .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified.
- .5 Approvals:
 - .1 Submit two (2) copies of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.
 - .2 Make changes as required and re-submit as directed by Departmental Representative.
- .6 Additional data:
 - .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
- .7 Site records:
 - .1 Departmental Representative will provide one (1) set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur.
 - .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection.
- .8 As-Built drawings:
 - .1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
 - .3 Submit to Departmental Representative for approval and make corrections as directed.
 - .4 Perform testing, adjusting and balancing for HVAC using as-built drawings.
 - .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
- .9 Submit copies of as-built drawings for inclusion in final TAB report.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- .1 Submit in accordance with Division 01 – General Requirements.
- .2 Furnish spare parts as follows:
 - .1 One set of packing for each pump.
 - .2 One casing joint gasket for each size pump.
 - .3 One glass for each gauge glass.
- .3 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Division 01 – General Requirements.
- .4 Furnish one commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground, in dry location, indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Replace defective or damaged materials with new.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 DEMONSTRATION

- .1 Departmental Representative will use equipment and systems for test purposes prior to acceptance. Supply labour, material, and instruments required for testing.
- .2 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .3 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .4 Instruction duration time requirements as specified in appropriate sections.

- .5 Departmental Representative will record these demonstrations on video tape for future reference.

3.2 CLEANING

- .1 Progress Cleaning: clean in accordance with Division 01 – General Requirements.
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Division 01 – General Requirements.

3.3 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 All drawings and all division and sections of these specifications shall apply to and form an integral part of this division.

1.2 SCOPE

- .1 This specification outlines requirements for new:
 - .1 Sprinkler systems.

1.3 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Division 23 – Heating, Ventilation and Air Conditioning (HVAC).
- .3 Division 26 - Electrical.
- .4 This Trade Contractor is to review the drawings and specifications of other trades for work relating to this trade.

1.4 CONTRACT DRAWINGS

- .1 M0.00 Cover Sheet – Mechanical.
- .2 M0.01 Site Plan – Mechanical.
- .3 M1.00 Arena Zoning Floor Plans and Design Approach – Fire Protection.
- .4 M1.01 Level 1(A) Arena Floor Plan – Fire Protection.
- .5 M1.02 Level 1(B) & Basement Floor Plans – Fire Protection.
- .6 M1.03 Level 2 Arena Floor Plan – Fire Protection.
- .7 M1.04 Details – Fire Protection.
- .8 M2.01 Level 1(A) Arena Underground Floor Plan – Sanitary & Storm.
- .9 M2.02 Level 1(B) & Basement Underground Floor Plans – Sanitary & Storm.
- .10 M2.03 Level 1(A) Arena Floor Plan – Sanitary & Storm.
- .11 M2.04 Level 1(B) & Basement Floor Plans – Sanitary & Storm.
- .12 M2.05 Level 2 Arena Floor Plan – Sanitary & Storm.
- .13 M2.06 Roof Plan – Sanitary & Storm.
- .14 M2.07 Level 1(A) Arena Floor Plan – Domestic Water.

- .15 M2.08 Level 1(B) & Basement Floor Plans – Domestic Water.
- .16 M2.09 Level 2 Arena Floor Plan – Domestic Water.
- .17 M2.10 Details – Plumbing.

1.5 REGULATIONS

- .1 The installation of the fire protection systems shall be in accordance with the drawings issued under this contract, these specifications, and;
 - .1 The National Building Code of Canada 2015 (NBC).
 - .2 The National Fire Code of Canada 2015 (NFC).
 - .3 The National Plumbing Code of Canada (NPC) 2015.
 - .4 NFPA3 2012, “*Recommended Practice for Commissioning and Integrated Testing of Fire Protection and Life Safety System*”.
 - .5 NFPA 10-2013, “*Standard for Portable Fire Extinguishers*”.
 - .6 NFPA 13-2013, “*Standard for the Installation of Sprinkler Systems*”.
 - .7 NFPA 25-2014, “*Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems*”.
 - .8 R.J. Bartlett alternative solution (greenhouse) available upon request.

1.6 COMPONENTS

- .1 All system components required to be “listed” as per NFPA shall have their listing through Underwriter's Laboratories of Canada (ULC).

1.7 AUTHORITY HAVING JURISDICTION

- .1 The system is to be reviewed by the "Authority Having Jurisdiction (AHJ)".

1.8 REVIEW AUTHORITY

- .1 The working (shop) drawings are to be reviewed by the Consultant. Any comments shall be directed to the Consultant for review and action.
- .2 The Contractor will forward the drawings to AHJ.

1.9 SUBMISSIONS

- .1 Working (shop) drawings:
 - .1 Shall be submitted in strict accordance with NFPA 13.
 - .2 Floor plan drawings shall match the tender drawings scale and show required pipe routing, valves, sprinklers and all other system components.
 - .3 Plot plan showing underground services, siamese connection, and access routes.
 - .4 Cross sections of building showing floors, ceilings and sprinkler system components.
 - .5 Submit updated drawings at regularly scheduled job meetings or as requested by the Consultant during construction.

- .6 Working (shop) drawings shall be submitted to the Consultant for review and acceptance. Work shall commence only when all submissions have been reviewed by the Consultant. Allow ten (10) working days for the Consultant's review of each submission.
 - .7 Confirmation for full time foreman's name and provincial certification.
 - .8 All drawings shall be submitted as described above and in AutoCAD 2019 (or newer) format complete with electronic copy of each drawing.
 - .9 Submit hydraulic calculations for review.
 - .10 Submit detail for each type of seismic brace complete with corresponding load calculations.
 - .11 Complete catalogue information for devices/equipment specified.
 - .12 The working drawings shall be submitted as one package.
 - .13 Two (2) hard copies and one (1) PDF of each to be submitted.
- .2 Trade Contractor record drawings:
- .1 As-Built drawings shall represent the installed system components.
 - .2 The Trade Contractor shall use reviewed (stamped) white print shop drawings. During system installation the Trade Contractor shall note any substantial variances from the reviewed drawings and shall record these variances in red pencil on these drawings.
 - .3 Identify drawings as "As-Built Copy". Maintain in new condition and make available for inspection on site and at job meetings.
 - .4 The Trade Contractor shall submit up-to-date accurate record drawings for the complete systems to the Consultant.
 - .5 The Trade Contractor shall provide folded white prints for each maintenance manual and AutoCAD files on USB drive.
- .3 Operation and Maintenance Data:
- .1 The Trade Contractor shall provide three copies of operation and maintenance information in a 3-ring binder and drawings. Information in each binder is to include:
 - .1 Copy of reviewed (stamped) Product Data.
 - .2 Detailed periodic inspection and tests schedule per the requirements in the NFC and NFPA 25.
 - .3 Copy of record drawings (folded prints) and electronic file on USB drive.
 - .4 Copy of hydraulic calculations complete with node drawings.
 - .5 Copy of Material and Test Certificate for sprinkler systems.
 - .6 Copy of Material and Test Certificate for backflow preventer.
 - .7 Copy of Material and Test Certificate for underground.
 - .8 Pressure settings for all switches.
 - .9 Copy of hydraulic data nameplates.
 - .10 Letter from fire department accepting threads/connection on fire department connection and hose valve connections.

- .11 Letter identifying Trade Contractor's maintenance and warranty obligations.
- .12 As-built drawings in CAD format.
- .2 Binders are to include an index and dividing tabs for each section.
- .4 Submit maintenance manuals two weeks prior to substantial completion.

1.10 TRADE CONTRACTOR

- .1 Only Trade Contractors competent in the installation of sprinkler systems, standpipe systems, and fire pumps, and who have a thorough and demonstrated knowledge of requirements in NFPA 3, NFPA 10, NFPA 13 and NFPA 25 will be considered acceptable for this contract.
- .2 The Trade Contractor shall assign an on-the-job full-time foreman who has a sprinkler Journeypersons license. All employees working on site must hold a valid certification of qualification or a valid letter of authenticity in the occupation.
- .3 Trade Contractors are required to ensure that their workers are certified in accordance with the Apprenticeship and Occupational Certification Act, Section 17(2).

1.11 SPARE PARTS

- .1 The Trade Contractor shall provide spare sprinklers as outlined in NFPA 13, and a sprinkler wrench(s). A metal cabinet(s) sized to accommodate the spare sprinklers and wrench(s) shall be provided and mounted on the wall adjacent to the header.

1.12 MAINTENANCE

- .1 The Trade Contractor shall include in their price, one-year full maintenance as per the NFC and NFPA 25.
- .2 Trade Contractor to provide quarterly inspections throughout the first year. Proper forms, as per NFPA 25, shall be issued to Department Representative after each inspection.
- .3 Servicing, including replacement parts for the complete system, shall be readily available locally within twenty-four (24) hours of the placing of a trouble call.

1.13 WARRANTY

- .1 The equipment and installation shall be under full labour and material warranty for a period of one (1) year from certification.

1.14 CERTIFICATION

- .1 The Trade Contractor shall complete Material and Test Certificates for each sprinkler system (zone) in accordance with NFPA 13 (by underground installer).
- .2 This Trade Contractor shall complete Material and Test Certificate for water entrance in accordance with NFPA 13.

- .3 The Trade Contractor shall provide Material and Test Certificate for the backflow preventer.
- .4 Certification date shall be as posted on certificate unless otherwise directed by the Consultant.

1.15 DESIGN APPROACH

- .1 The Consultant has designed the sprinkler systems for the purpose of tendering.
- .2 The Trade Contractor shall prepare detailed design/working drawings following a detailed site and tender package review and coordination.
- .3 The Trade Contractor shall prepare hydraulic calculations matching the installation (shop) drawings.
- .4 The Trade Contractor shall install the system using the reviewed shop drawings and is responsible for confirming all pipe routing and sprinkler head locations. Any changes shall be the responsibility of the Trade Contractor and must be approved by the Consultant.
- .5 Any changes to piping or sprinkler head locations or type that, in the opinion of the Consultant, significantly alter the hydraulic design, will require confirming hydraulic calculations by this Trade Contractor.
- .6 Refer to drawings for design approach.

1.16 SYSTEM DESCRIPTIONS

- .1 This contract includes work identified on the contract drawings and specifications.
- .2 The following shall be included for each wet pipe sprinkler system zone:
 - .1 Control valve complete with tamper switch.
 - .2 Flow switch.
 - .3 Test and drain assembly.
 - .4 Listed pressure gauges.
 - .5 Check valves for penthouse sprinkler zone.
- .3 The following shall be included with the riser check valve:
 - .1 Riser check valve.
 - .2 Control valve complete with tamper switch.
 - .3 Listed pressure gauges.
 - .4 System header piping.
 - .5 Main drain valve and all drain piping.
 - .6 Installation and instruction manuals.
- .4 Identification tags shall be fastened to control valves and clearly indicate the appropriate system.

- .5 Hydraulic data nameplate for each system.
- .6 The systems shall be designed not to exceed 1,725 kPa (250 psi) working pressure.

1.17 DESIGN CRITERIA

- .1 Water supply for the sprinkler system shall be based on the municipal supply.
- .2 Municipal flow test results indicate:
 - .1 Static pressure of 303 kPa (44 psi).
 - .2 2006 LPM (530 USGPM) at a residual pressure of 289 kPa (42 psi).
 - .3 3,482 LPM (920 USGPM) at residual pressure of 283 kPa (41 psi.).
 - .4 This contractor will be responsible to conduct a new flow test if existing information is older than 12 months at time of working drawing production.

Part 2 Products

2.1 SPRINKLERS

- .1 All sprinklers shall be manufactured by one (1) manufacturer and be rated for 1,205 kPa (175 psi).
- .2 Sprinklers:
 - .1 Type A: Upright quick response,
Temperature 68°C (155°F), 15mm (1/2") Orifice, K80 (5.6),
Brass finish.
 - .2 Type B: Pendent quick response,
Temperature 68°C (155°F), 15mm (1/2") Orifice, K80 (5.6),
Chrome finish.
 - .3 Type C: Dry Pendant Sprinkler head quick response,
Temperature 68°C (155°F), 25mm (1") Orifice, K80 (5.6),
Chrome finish.
 - .4 Type D: Dry Horizontal Sidewall (Flex) quick response,
Temperature 68°C (155°F), 25mm (1") Orifice, K80 (5.6),
Chrome finish.
 - .5 Type E: Horizontal Sidewall quick response,
Temperature 68°C (155°F), 15mm (1/2") Orifice, K80 (5.6),
Brass finish.
- .3 Contractor to allow for twenty (20) additional pendants and twenty (20) additional uprights complete with installation.

2.2 PIPING AND FITTINGS

- .1 Piping shall satisfy the following criteria:
 - .1 Steel pipe shall be of the type tested for sprinkler use as per Section 6.3 of NFPA 13, be stamped accordingly, and rated for a minimum of 2,000 kPa (300 psi). Pipe to be manufactured in Canada or the United States. All pipe must be stored inside prior to installation and have zero corrosion.
 - .2 Concealed pipe shall have red and white decals indicating sprinkler system piping every 3 m (10 ft.) along mains and risers. Brady type or equivalent.
 - .3 Schedule 40 black steel for pipe 50 mm (2") or smaller.
 - .4 Schedule 10 black steel for pipe 65 mm (2½") and greater.
 - .5 Ductile iron piping from water entrance connection to backflow preventer.
 - .6 One manufacturer to be used for all pipe.
- .2 Fittings shall satisfy the following criteria:
 - .1 Piping 65 mm (2½") and greater to be grooved.
 - .2 Piping 50 mm (2") and smaller to be threaded or grooved.
 - .3 Pipefittings and couplings are to withstand 2,000 kPa (300 psi) working pressure.
 - .4 Fittings shall be of the type tested for sprinkler use as per Section 6.4 of NFPA 13. Each individual fitting is to be complete with a ULC marking, be stored inside prior to insulation, and have zero corrosion.
 - .5 One manufacturer to be used for each type (grooved and screwed) of fitting.
- .3 Flange bolts shall be square or hex head bolts with heavy hex nuts to ASTM A307-82a.
- .4 Flange gaskets shall be 1.6 mm (1/16") thick plain or cloth inserted red rubber to ASME/ANSI B16.20-1998 and ASME/ANSI B16.21-1992.
- .5 Tie rods shall be a minimum of 16 mm (⅝").
- .6 No site welding.
- .7 Exposed hangers shall have collars/plates at ceilings.

2.3 CONTROL VALVES

- .1 Only one manufacturer's valves shall be used.
- .2 Valves to be ULC listed.
- .3 Valves shall bear:
 - .1 Manufacturer's name.
 - .2 Trademark.
 - .3 Valves controlling water supply to any part of the fire suppression systems shall be:
 - .1 65 mm (2½") and greater: Butterfly complete with tamper switch.
 - .2 50 mm (2") and under: Ball valve complete with tamper switch.

.3 OS&Y gate valve main control valve.

2.4 SPRINKLER FLOW SWITCH

.1 Vane type water flow switch with retard and cover tamper switch kit.

2.5 SPRINKLER TAMPER SWITCH

.1 Switches for Butterfly and Butterball valve. Refer to Section 2.3.

2.6 CHECK VALVE

.1 Swing check valve complete with 12 mm (½") ball drip.

.2 Acceptable Alternates: Tyco, Victaulic.

2.7 PIPE HANGERS AND BRACES

.1 Piping shall be supported by hangers as per NFPA 13 and NBC 2015.

.2 Shall be ULC listed.

.3 Hangers shall be provided listed surge restraint.

.4 C-type clamps shall be provided with restraining straps.

.5 Clamps shall have shear type bolts.

2.8 INSPECTOR'S TEST CONNECTION/DRAINS

.1 TestanDrain (pre-manufactured) at zone control valves, complete with pressure relief.

.2 Control valves, sight glass, reducing orifice, and galvanized pipe to exterior for remote test connections.

2.9 PRESSURE GAUGES

.1 Provide and install a listed 100 mm (4") pressure gauge on all test connection assemblies for each zone and at the top of each standpipe riser.

2.10 SPRINKLER HEAD GUARDS/ESCUTCHEONS

.1 To be listed for use with installed sprinkler heads.

2.11 SPRINKLER HEAD CABINETS

.1 Accepts either 13mm or 19mm IPS sprinkler heads.

.2 Red enamel.

.3 Rear mounting holes.

2.12 IDENTIFICATION TAGS

- .1 Required for all control valves, drain valves, inspector's test connections, trim valves and auxiliary drain valves, exposed pipe.
- .2 Identification tags shall be red lamicaid with white letters.
- .3 Additional tagging is required on ceilings when a valve is located above.

2.13 HYDRAULIC DATA NAMEPLATES

- .1 Red background with white letters.
- .2 Complete with chains for hanging.

2.14 FIRE DEPARTMENT PUMPER CONNECTION

- .1 Flush mounted, 100 mm x 65 mm, 65 mm (4" x 2½" x 2½") double clapper inlet complete with Storz connections chrome caps and chain.
- .2 Exterior plate and cover shall have chrome finish and read "Sprinkler/Standpipe".

2.15 RISER CHECK VALVE

- .1 Designed for use in fire protection systems.
- .2 Valve body cast with arrow indicator to assist with proper valve operation.

2.16 ALARM SWITCH

- .1 Service use NFPA 13, ULC listed, FM approved.
- .2 Maximum system pressure 300 psi.
- .3 Pressure range 4-15 psi. (0,27 – 1,03 BAR).

2.17 SUPERVISORY PRESSURE SWITCH

- .1 Service use NFPA 13, ULC listed, FM approved.
- .2 Maximum system pressure 300 psi.
- .3 Pressure Range 10-60 psi. (0,7 – 4,1 BAR).

2.18 DOUBLE CHECK VALVE BACKFLOW PREVENTER

- .1 Double check assembly complete with test cocks, OS&Y gate valves, and tamper switch at water entrance.

Part 3 Execution

3.1 APPROVALS

- .1 Working plans and hydraulic calculations shall be reviewed by the Consultant and AHJ prior to any fabrication, ordering of material, or site work.
- .2 Product shop drawings shall be reviewed by the Consultant prior to start of installation.

3.2 OBSERVATION OF CONSTRUCTION

- .1 Do not recess, paint or conceal piping, accessories, or work prior to observation of construction by Department Representative and/or the Consultant.
- .2 Observation of construction reports as issued by the Consultant are to be signed off (by item) by the Site Foreman when the deficiency is rectified. Reports are to be issued to the Consultant upon completion.

3.3 INSTALLATION

- .1 All system components to be installed as per the shop drawings, these specifications, and the manufacturer's recommendations.
- .2 Install control valves, drain valves, and inspector's test sight glass in a manner that will allow for easy access and use.
- .3 Trade Contractor shall allow for pipe routing to suit obstructions.
- .4 Install drains with slopes to allow for proper draining. Where more than one sprinkler system drain is located in an area, they shall be interconnected so that only one pipe exits the building.
- .5 Provide/install chrome collars around pipe at all penetrations where exposed.
- .6 Quick Response sprinklers to be installed throughout.
- .7 Install guards on all sprinkler heads where possible damage could occur.
- .8 Locate spare sprinkler head cabinet at the sprinkler room and hydraulic data nameplates at the respective valve header.
- .9 Intermediate temperature classification sprinklers to be installed in service and elevator machine rooms.
- .10 All pipes draining to exterior shall be located a maximum of 610 mm (2' - 0") above grade.
- .11 Install sprinkler protection below fixed obstructions wider than 1220 mm (4' - 0") wide.
- .12 All sprinklers are to be centered on ceiling tiles unless shown otherwise on drawings.

3.4 FIRESTOPPING

- .1 Fire stopping will be by others. All penetrations through all separations (with and without fire resistance rating) shall be fire stopped as per the NBC.
- .2 This Trade Contractor is to assist Contractor in identifying areas for fire stopping associated with this Trade's penetrations.

3.5 TESTING AND TRAINING

- .1 This Trade Contractor shall subject all system components to operational and hydrostatic tests as per NFPA 13 and 25. Repair any leaks or defective piping that should occur during the tests.
- .2 This Trade Contractor shall provide hydraulic pump, temporary connections and labour required to perform tests.
- .3 The building maintenance staff shall be trained prior to functional testing.
- .4 This Trade Contractor shall conduct a full system functional test sprinkler systems in the presence of the Consultant/Department Representative. Provide foreman for a minimum of six (6) hours for the duration of this testing. The purpose of the test will be to verify the operation of the equipment and provide additional training to the building maintenance staff. Ten (10) days' notice shall be given before any functional testing. Coordinate testing with fire alarm Contractor.
- .5 This Trade Contractor shall issue completed Material and Test Certificates for each sprinkler system zone, backflow preventer and underground.

3.6 CUTTING, CORE DRILLING, PATCHING AND PAINTING

- .1 All cutting, core drilling, patching, and painting shall be the responsibility of the Trade Contractor. Coordinate with other Trades and Contractor.
- .2 All exposed sprinkler piping and fittings in finished areas shall be primed and painted (anti-corrosion paint) with four (4) coats in total on site. Colour to be red. Confirm colour with Department Representative. Painting by General Contractor.
- .3 Apply decals.

3.7 COORDINATION

- .1 Location of piping and equipment shall be closely coordinated with structural, architectural, plumbing, ventilation, heating, and electrical systems to avoid interference.
- .2 Sprinkler head locations are to be coordinated with all other services and ceilings. The architectural reflected ceiling plans are to be used for this purpose.
- .3 The complete tender package including architectural, kitchen, structural, mechanical (plumbing and ventilation), and electrical along with a detailed site review, shall be used in producing shop drawings.

3.8 CLEANING

- .1 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Materials and installation for plumbing specialties and accessories.
- .2 Related Sections:
 - .1 Division 01 – General Requirements.

1.2 REFERENCES

- .1 American Society for Testing and Materials International (ASTM):
 - .1 ASTM A126-95 (2001), Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
 - .2 ASTM B62-02, Specification for Composition Bronze or Ounce Metal Castings.
- .2 American Water Works Association (AWWA):
 - .1 AWWA C700-02, Cold Water Meters-Displacement Type, Bronze Main Case.
- .3 Canadian Standards Association (CSA International):
 - .1 CSA-B64 Series-01, Backflow Preventers and Vacuum Breakers.
 - .2 CSA-B356-00, Water Pressure Reducing Valves for Domestic Water Supply Systems.
 - .3 CAN/CSA-B45 Series-02, CSA Standards on Plumbing Fixtures.
 - .4 CAN/CSA-B125-01, Plumbing Fittings.
 - .5 CAN/CSA-B651-95 (R2001), Barrier-Free Design.
- .4 Health Canada/Workplace Hazardous Materials Information System (WHMIS):
 - .1 Material Safety Data Sheets (MSDS).
- .5 Plumbing and Drainage Institute (PDI):
 - .1 PDI-WH201-92, Water Hammer Arresters Standard.
- .6 Air-Conditioning and Refrigeration Institute (ARI):
 - .1 ARI 1010-02, Self-Contained, Mechanically Refrigerated Drinking Water Coolers.

1.3 SUBMITTALS

- .1 Submittals in accordance with Division 01 – General Requirements.
- .2 Co-ordinate submittal requirements and provide submittals required by Division 01 – General Requirements.
- .3 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet for fixtures and equipment.

- .2 Indicate dimensions, construction details and materials for specified items.
- .3 Submit WHMIS MSDS in accordance with Division 01 – General Requirements and Division 20 – Mechanical. Indicate VOC's for adhesive and solvents during application and curing.
- .4 Shop Drawings:
 - .1 Submit Manufacturer printed shop drawings to indicate materials, finishes, method of anchorage, number of anchors, dimensions, construction and assembly details and accessories.
- .5 Closeout submittals: submit maintenance and engineering data for incorporation into manual in accordance with Division 01 – General Requirements.
 - .1 Description of plumbing specialties and accessories, giving manufacturers name, type, model, year and capacity.
 - .2 Details of operation, servicing and maintenance.
 - .3 Recommended spare parts list.

1.4 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Division 01 – General Requirements.
- .2 Construction requirements: in accordance with Division 01 – General Requirements.
- .3 Verification: contractor's verification in accordance with Division 01 – General Requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Store and manage hazardous materials in accordance with Division 01 – General Requirements.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Division 01 – General Requirements.

Part 2 Products

2.1 MATERIALS

- .1 Materials and resources in accordance with Division 01 – General Requirements.

2.2 FLOOR DRAINS

- .1 Floor Drains: to CSA B79.
- .2 Refer to M304 for sizing.

2.3 WATER HAMMER ARRESTORS

- .1 Brass piston in a type K copper casing sized in accordance with manufacturer's recommendations to eliminate water hammer and shock from piping systems. Provide on hot, cold and non-potable water lines to all quick valves, solenoids and plumbing fixtures and locate in an upright position between the last two fixtures on a line or horizontally at the end of line closest to supply source.

2.4 BACK FLOW PREVENTERS

- .1 Preventers: to CSA-B64 Series, application as indicated reduced pressure principle type or double check valve assembly back flow preventer with intermediate atmospheric vent or vacuum breaker. Backflow as per National Plumbing Code 2015.

2.5 VACUUM BREAKERS

- .1 Breakers: to CSA-B64 Series, vacuum breaker atmospheric.

2.6 PRESSURE REGULATORS

- .1 Up to NPS 1-1/2 bronze bodies, screwed: to ASTM B62.
- .2 NPS 2 and over, semi-steel bodies, Class 125, flanged: to ASTM A126, Class B.
- .3 Semi-steel spring chambers with bronze trim.

2.7 TRAP SEAL PRIMERS

- .1 24V solenoid valve, complete with air gap fitting, EMCS for operation on timed sequence.
- .2 Provide distribution unit complete with air gap fitting.
- .3 Refer to drawings for drains per unit.

2.8 STRAINERS

- .1 860 kPa, Y type with 20 mesh, Monel, bronze or stainless steel removable screen.
- .2 NPS 2 and under, bronze body, screwed ends, with brass drain valve piped to drain.
- .3 NPS 2-1/2 and over, cast iron body, flanged ends, with ball drain valve piped to drain.

2.9 DOMESTIC HOT WATER BLEND VALVE

- .1 Thermostatic temperature controller complete with check stops, removable cartridge with strainer, stainless steel piston, thermal cartridge: standard finish complete with thermostat. Mount at an accessible height.

2.10 NON-FREEZE WALL HYDRANTS

- .1 Ecolotrol wall hydrant, non-freeze, encased, anti-syphon, automatic draining.
- .2 Backflow Prevention Device to be pressurized vacuum breaker.

2.11 ELEVATOR SUMP PUMP

- .1 System:
 - .1 The system shall be pre-assembled with pumps, discharge pipe nipples and floats pre-mounted to basin.
 - .2 System to be complete with guide rail assembly, including guide rails, 32mm stainless steel rails and stainless steel lifting chain.
 - .3 All miscellaneous hardware and plumbing to be included, including PVC ball valves, DVC check valves, float bracket, PVC discharge piping, etc.
- .2 Basin:
 - .1 The basin shall be a fiberglass basin with anti-floatation flange with side discharge.
 - .2 Basin to be complete with blank fiberglass cover, suitable for floor covering.
 - .3 Basin to be complete with two (2) 100mm unmounted hubs (one (1) for inlet, one (1) for vent).
 - .4 Size as per plans.
- .3 Control:
 - .1 System to be complete with Duplex pump controller complete with remote alarm contact and auxiliary contacts (two (2) such).
 - .2 System to control duplex pumps at 230 volt/1Ø.
 - .3 Control shall be NEMA 4X outdoor rated duplex control panel complete with junction box, watertight cable connectors and 50mm conduit coupling.
 - .4 Sump pumps to be complete with oil detection system.
- .4 Pumps:
 - .1 The pump motor shall be submersible type, oil filled and hermetically sealed. The rotor shall be 17-4 PH stainless steel and supported by upper and lower ball bearings.
 - .2 Provide 25' quick connect power cord per pump.
 - .3 Performance as per plans.

2.12 POWER TRANSFORMER FOR WASHROOM FIXTURES

- .1 120V/24V transformer to be provided by plumbing fixture supplier.
- .2 120V to transformer by electrical.
- .3 24V wiring to each fixture by plumbing contractor.
- .4 One (1) transformer to power ten (10) fixtures.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

3.2 INSTALLATION

- .1 Install in accordance with National Plumbing Code of Canada, Provincial Codes and local authority having jurisdiction.
- .2 Install in accordance with manufacturer's instructions and as specified.

3.3 CLEANOUTS

- .1 Install cleanouts at base of soil and waste stacks, and rainwater leaders, at locations required, by code, and as indicated.
- .2 Bring cleanouts to wall or finished floor unless serviceable from below floor.
- .3 Building drain cleanout and stack base cleanouts: line size to maximum NPS 4.

3.4 WATER HAMMER ARRESTORS

- .1 Install on branch supplies to fixtures or group of fixtures where indicated.

3.5 BACK FLOW PREVENTORS

- .1 Install in accordance with CSA B64 Series, where indicated and elsewhere as required by code.
- .2 Exact location of BFP to be determined on site with Departmental Representative.
- .3 Pipe discharge to terminate over nearest drain or service sink (above P-trap) as indicated on drawing.
- .4 All backflow preventers to be accessible.

3.6 TRAP SEAL PRIMERS

- .1 Install for floor drains and elsewhere, as indicated.
- .2 Install on cold water.
- .3 Install soft copper tubing to floor drain.

3.7 STRAINERS

- .1 Install with sufficient room to remove basket.

3.8 START-UP

- .1 General:
 - .1 In accordance with Division 01 – Commissioning Sections.
- .2 Timing: start up only after:
 - .1 Pressure tests have been completed.
 - .2 Disinfection procedures have been completed.
 - .3 Certificate of static completion has been issued.
 - .4 Water treatment systems operational.
- .3 Provide continuous supervision during start-up.

3.9 TESTING AND ADJUSTING

- .1 General:
 - .1 In accordance with Division 01 – Commissioning Sections.
- .2 Timing:
 - .1 After start-up deficiencies rectified.
 - .2 After certificate of completion has been issued by authority having jurisdiction.
- .3 Application tolerances:
 - .1 Pressure at fixtures: +/- 70 kPa.
 - .2 Flow rate at fixtures: +/- 20%.
- .4 Adjustments:
 - .1 Verify that flow rate and pressure meet design criteria.
 - .2 Make adjustments while flow rate or withdrawal is (1) maximum and (2) 25% of maximum and while pressure is (1) maximum and (2) minimum.
- .5 Floor drains:
 - .1 Verify operation of trap seal primer.
 - .2 Prime, using trap primer. Adjust flow rate to suit site conditions.
 - .3 Check operations of flushing features.
 - .4 Check security, accessibility, removability of strainer.
 - .5 Clean out baskets.
- .6 Vacuum breakers, backflow preventers, backwater valves:
 - .1 Test tightness, accessibility for O&M of cover and of valve.
 - .2 Simulate reverse flow and back pressure conditions to test operation of vacuum breakers, backflow preventers.
 - .3 Verify visibility of discharge from open ports.

- .7 Roof drains:
 - .1 Check location at low points in roof.
 - .2 Check security, removability of dome.
 - .3 Adjust weirs to suit actual roof slopes, meet requirements of design.
 - .4 Clean out sumps.
 - .5 Verify provisions for movement of roof systems.
- .8 Access doors:
 - .1 Verify size and location relative to items to be accessed.
- .9 Cleanouts:
 - .1 Verify covers are gas tight, secure, yet readily removable.
- .10 Water hammer arrestors:
 - .1 Verify proper installation of correct type of water hammer arrester.
- .11 Pressure regulators, PRV assemblies:
 - .1 Adjust settings to suit locations, flow rates, pressure conditions.
- .12 Strainers:
 - .1 Clean out repeatedly until clear.
 - .2 Verify accessibility of cleanout plug and basket.
 - .3 Verify that cleanout plug does not leak.
- .13 Commissioning Reports:
 - .1 In accordance with Section supplemented as specified.
- .14 Training:
 - .1 In accordance with Section supplemented as specified.
 - .2 Demonstrate full compliance with Design Criteria.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Materials and installation for plumbing pumps.
- .2 Division 01 – General Requirements.
- .3 Division 20 – Mechanical.

1.2 REFERENCES

- .1 Health Canada/Workplace Hazardous Materials Information System (WHMIS):
 - .1 Material Safety Data Sheets (MSDS).

1.3 SUBMITTALS

- .1 Submittals in accordance with Division 01 – General Requirements.
- .2 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and data sheet for fixtures and equipment.
 - .2 Submit WHMIS MSDS in accordance with Division 01 – General Requirements and Division 20 – Mechanical.
- .3 Shop Drawings:
 - .1 Submit shop drawings to indicate:
 - .1 Equipment, including connections, fittings, control assemblies and ancillaries. Identify whether factory or field assembled.
 - .2 Wiring and schematic diagrams.
 - .3 Dimensions and recommended installation.
 - .4 Pump performance and efficiency curves.
- .4 Closeout submittals: submit maintenance and engineering data for incorporation into manual in accordance with Division 01 – General Requirements include:
 - .1 Manufacturers name, type, model year, capacity and serial number.
 - .2 Details of operation, servicing and maintenance.
 - .3 Recommended spare parts list with names and addresses.

1.4 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Division 01 – General Requirements.
- .2 Construction requirements: in accordance with Division 01 – General Requirements.
- .3 Verification: contractor's verification in accordance with Division 01 – General Requirements.

1.5 DELIVERY, STORAGE AND HANDLING

- .1 Store and manage hazardous materials in accordance with Division 20 – Mechanical and Manufacturer’s written instructions.
- .2 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Division 01 – General Requirements.

Part 2 Products

2.1 MATERIALS

- .1 Materials and resources in accordance with Division 01 – General Requirements.

2.2 DOMESTIC HOT WATER CIRCULATING PUMP (RP-1/RP-2)

- .1 Capacity: Refer to pump schedule on “M & E” series drawings.
- .2 Construction: closed-coupled, in-line centrifugal, all bronze construction, stainless steel shaft, stainless steel or bronze shaft sleeve, two oil lubricated bronze sleeves or ball bearings.
- .3 Motor: Drip-proof, with thermal overload protection.
- .4 Supports: provide as recommended by manufacturer.
- .5 NSF61 rated.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheet.

3.2 INSTALLATION

- .1 Make piping and electrical connections to pump and motor assembly and controls as indicated.
- .2 Ensure pump and motor assembly do not support piping.

3.3 FIELD QUALITY CONTROL

- .1 Site Tests/Inspection:
 - .1 Check power supply.
 - .2 Check starter protective devices.
- .2 Start-up, check for proper and safe operation.

- .3 Check settings and operation of hand-off-auto selector switch, operating, safety and limit controls, audible and visual alarms, over-temperature and other protective devices.
- .4 Adjust flow from water-cooled bearings.
- .5 Adjust impeller shaft stuffing boxes, packing glands.
- .6 Verification requirements in accordance with Division 01 – General Requirements.

3.4 **START-UP**

- .1 General:
 - .1 In accordance with Division 01 – Commissioning Sections: General Requirements, supplemented as specified herein.
 - .2 Procedures:
 - .1 Check power supply.
 - .2 Check starter O/L heater sizes.
 - .3 Start pumps, check impeller rotation.
 - .4 Check for safe and proper operation.
 - .5 Check settings, operation of operating, limit, safety controls, over-temperature, audible/visual alarms, other protective devices.
 - .6 Test operation of hands-on-auto switch.
 - .7 Test operation of alternator.
 - .8 Adjust leakage through water-cooled bearings.
 - .9 Adjust shaft stuffing boxes.
 - .10 Adjust leakage flow rate from pump shaft stuffing boxes to manufacturer's recommendations.
 - .11 Check base for free-floating, no obstructions under base.
 - .12 Run-in pumps for twelve (12) continuous hours.
 - .13 Check installation, operation of mechanical seals, packing gland type seals. Adjust as necessary.
 - .14 Adjust alignment of piping and conduit to ensure full flexibility.
 - .15 Eliminate causes of cavitation, flashing, air entrainment.
 - .16 Measure pressure drop across strainer when clean and with flow rates as finally set.
 - .17 Replace seals if pump used to degrease system or if pump used for temporary heat.
 - .18 Verify lubricating oil levels.

3.5 **REPORTS**

- .1 In accordance with Division 01 – Commissioning Sections: reports, supplemented as specified.

- .2 Include:
 - .1 PV results on approved PV Report Forms.
 - .2 Product Information report forms.
 - .3 Pump performance curves (family of curves) with final point of actual performance.

3.6 TRAINING

- .1 In accordance with Division 01 – Commissioning Sections.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and installation for copper domestic water service used in the following:
 - .1 Hard drawn copper domestic hot and cold water services inside building.

1.2 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Division 20 00 10 – Common Work Results for Mechanical.
- .3 Section 23 05 15 – Common Installation Requirements for HVAC Pipework.
- .4 Section 23 05 23.01 – Valves – Bronze.
- .5 Section 23 05 23.01 – Valves – Cast Iron.
- .6 Section 23 05 93 – Testing, Adjusting and Balancing for HVAC.

1.3 REFERENCES

- .1 American National Standards Institute (ANSI)/American Society of Mechanical Engineers International (ASME):
 - .1 ANSI/ASME B16.15-02, Cast Bronze Threaded Fittings, Classes 125 and 250.
 - .2 ANSI/ASME B16.18-01, Cast Copper Alloy Solder Joint Pressure Fittings.
 - .3 ANSI/ASME B16.22-01, Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
- .2 American Society for Testing and Materials International, (ASTM):
 - .1 ASTM B88M-03, Standard Specification for Seamless Copper Water Tube (Metric).
- .3 Canadian Standards Association (CSA International):
 - .1 CSA B242-M1980 (R1998), Groove and Shoulder Type Mechanical Pipe Couplings.
- .4 Department of Justice Canada (Jus):
 - .1 Canadian Environmental Protection Act, 1999, c. 33 (CEPA).
- .5 Health Canada/Workplace Hazardous Materials Information System (WHMIS):
 - .1 Material Safety Data Sheets (MSDS).
- .6 Manufacturer's Standardization Society of the Valve and Fittings Industry (MSS):
 - .1 MSS-SP-70-98, Cast Iron Gate Valves, Flanged and Threaded Ends.
 - .2 MSS-SP-71-97, Cast Iron Swing Check Valves, Flanged and Threaded Ends.
 - .3 MSS-SP-80-03, Bronze Gate, Globe, Angle and Check Valves.

- .7 National Research Council (NRC)/Institute for Research in Construction:
 - .1 NRCC 38728, National Plumbing Code of Canada (NPC) - 1995.
- .8 Transport Canada (TC):
 - .1 Transportation of Dangerous Goods Act, 1992, c. 34 (TDGA).

1.4 SUBMITTALS

- .1 Submittals in accordance with Division 01 – General Requirements.
- .2 Submit product data for valves in accordance with Section 23 05 23.01 – Valves – Bronze and 23 05 23.2 – Valves – Cast Iron.
- .3 Submit WHMIS MSDS - Material Safety Data Sheets in accordance with Division 01 – General Requirements and Division 20 – Mechanical. Indicate VOC's for all adhesives and solvents during application and curing.
- .4 Coordinate submittal requirements and provide submittals in accordance with Division 01 – General Requirements.
- .5 Provide maintenance data for incorporation into manual in accordance with Division 01 – General Requirements.

1.5 HEALTH AND SAFETY

- .1 Do construction occupational health and safety in accordance with Division 01 – General Requirements.

1.6 STORAGE AND HANDLING

- .1 Store and manage hazardous materials in accordance with Division 01 – General Requirements and Manufacturer's written instructions.

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate waste materials for reuse and recycling in accordance with Division 01 – General Requirements.

Part 2 Products

2.1 SUSTAINABLE REQUIREMENTS

- .1 Materials and resources in accordance with Division 01 – General Requirements.

2.2 PIPING

- .1 Domestic hot, cold and recirculation systems, within building:
 - .1 Above ground: copper tube, hard drawn, type K: to ASTM B88M.
 - .2 Buried or embedded:
 - .1 Copper tube, soft annealed, Type K: to ASTM B88M, in long lengths with no buried joints.
 - .2 PEX to CSA B137.5.

2.3 FITTINGS

- .1 Bronze pipe flanges and flanged fittings, Class 150 and 300: to ANSI/ASME B16.24.
- .2 Wrought copper and copper alloy, solder type: to ANSI/ASME B16.22.

2.4 JOINTS

- .1 Rubber gaskets, latex-free 1.6 mm thick: to AWWA C111.
- .2 Bolts, nuts, hex head and washers: to ASTM A307, heavy series.
- .3 Solder: 95/5 tin copper alloy, lead free.
- .4 Dielectric connections between dissimilar metals: dielectric fitting to ASTM F492, complete with thermoplastic liner.

2.5 GATE VALVES

- .1 NPS 2-1/2 and over, in mechanical rooms, flanged:
 - .1 Rising stem: to MSS-SP-70, Class 125, 860 kPa, flat flange faces, cast-iron body, OS&Y bronze trim specified Section 23 05 23.01 – Valves – Bronze and 23 05 23.2 – Valves – Cast Iron.

2.6 GLOBE VALVES

- .1 NPS2 and under, soldered:
 - .1 To MSS-SP-80, Class 125, 860 kPa, bronze body, renewable composition disc, screwed over bonnet as specified Section 23 05 23.01 – Valves – Bronze and 23 05 23.2 – Valves – Cast Iron.

2.7 SWING CHECK VALVES

- .1 NPS 2 and under, soldered:
 - .1 To MSS-SP-80, Class 125, 860 kPa, bronze body, bronze swing disc, screw in cap, re-grindable seat as specified Section 23 05 23.01 – Valves – Bronze and 23 05 23.2 – Valves – Cast Iron.

2.8 BALL VALVES

- .1 NPS 2 and under, soldered:
 - .1 To ANSI/ASME B16.18, Class 150 – full port style.
 - .2 Bronze body, chrome plated brass ball, PTFE adjustable packing, brass gland and PTFE seat, steel lever handle, with NPT to copper adaptors as specified Section 23 05 23.01 – Valves – Bronze and 23 05 23.2 – Valves – Cast Iron.

Part 3 Execution

3.1 INSTALLATION

- .1 Install in accordance with NPC and local authority having jurisdiction.

- .2 Install pipe work in accordance with Section 23 05 15 – Common Installation Requirements for HVAC Pipework, supplemented as specified herein.
- .3 Assemble piping using fittings manufactured to ANSI standards.
- .4 Install CWS piping below and away from HWS and HWC and other hot piping so as to maintain temperature of cold water as low as possible.
- .5 Connect to fixtures and equipment in accordance with manufacturer's written instructions unless otherwise indicated.
- .6 Insulate as per Section 23 07 19 – HVAC Piping Insulation.

3.2 VALVES

- .1 Isolate equipment, fixtures and branches with gate for piping larger than NPS2 and full port ball valves for piping NPS2 and smaller.

3.3 PRESSURE TESTS

- .1 Conform to requirements of Section 20 00 10 – Common Work Results for Mechanical.
- .2 Test pressure: greater of 1-1/2 times maximum system operating pressure or 860 kPa.

3.4 PRE-START-UP INSPECTIONS

- .1 Systems to be complete, prior to flushing, testing and start-up.
- .2 Verify that system can be completely drained.
- .3 Ensure that air chambers, expansion compensators are installed properly.

3.5 FLUSHING AND CLEANING

- .1 Flush entire system for 8 h. Ensure outlets flushed for 2 hours. Let stand for 24 hours, then draw one sample off longest run. Submit to testing laboratory to verify that system is clean to Federal potable water guidelines. Let system flush for additional 2 hours, then draw off another sample for testing.

3.6 DISINFECTION

- .1 Flush out, disinfect and rinse system to approval of Departmental Representative.
- .2 Upon completion, provide laboratory test reports on water quality for Departmental Representative approval.

3.7 START-UP

- .1 Timing: start up after:
 - .1 Pressure tests have been completed.
 - .2 Disinfection procedures have been completed.
 - .3 Certificate of static completion has been issued.

- .4 Water treatment systems operational.
- .2 Provide continuous supervision during start-up.
- .3 Start-up procedures:
 - .1 Establish circulation and ensure that air is eliminated.
 - .2 Check pressurization to ensure proper operation and to prevent water hammer, flashing and/or cavitation.
 - .3 Bring HWS storage tank up to design temperature slowly.
 - .4 Monitor piping HWS and HWC piping systems for freedom of movement, pipe expansion as designed.
 - .5 Check control, limit, safety devices for normal and safe operation.
- .4 Rectify start-up deficiencies.

3.8 PERFORMANCE VERIFICATION

- .1 Scheduling:
 - .1 Verify system performance after pressure and leakage tests and disinfection are completed, and Certificate of Completion has been issued by authority having jurisdiction.
- .2 Procedures:
 - .1 Verify that flow rate and pressure meet Design Criteria.
 - .2 TAB HWC in accordance with Section 23 05 93 – Testing, Adjusting and Balancing for HVAC.
 - .3 Adjust pressure-regulating valves while withdrawal is maximum and inlet pressure is minimum.
 - .4 Sterilize HWS and HWC systems for Legionella control.
 - .5 Verify performance of temperature controls.
 - .6 Verify compliance with safety and health requirements.
 - .7 Check for proper operation of water hammer arrestors. Run one outlet for 10 seconds, then shut of water immediately. If water hammer occurs, replace water hammer arrestor or re-charge air chambers. Repeat for outlets and flush valves.
 - .8 Confirm water quality consistent with supply standards, and ensure no residuals remain as result of flushing or cleaning.
- .3 Reports:
 - .1 In accordance with General Commissioning (Cx) Requirements.
 - .2 Include certificate of water flow and pressure tests conducted on incoming water service, demonstrating adequacy of flow and pressure.

3.9 OPERATION REQUIREMENTS

- .1 Co-ordinate operation and maintenance requirements including, cleaning and maintenance of specified materials and products with Section 23 05 15 - Common Installation Requirements for HVAC Pipework.

3.10 CLEANING

- .1 Clean in accordance with Division 01 – General Requirements.

END OF SECTION

Part 1 General

1.1 RELATED DOCUMENTS

- .1 Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.

1.2 SUMMARY

- .1 This section includes storage water heaters for potable water utilizing hot water as the energy source.

1.3 REFERENCES

- .1 ASME Boiler and Pressure vessel code, section IV, Part HLW; UL 1453 “Electric Booster and Commercial Storage Tank Water Heaters”.
- .2 ASHRAE/IES 90.1-2010.
- .3 ISO 9001 Quality Management System.
- .4 NFPA 70- National Electric Code.
- .5 NSF/ANSI Standard 61- Drinking Water System Components.
- .6 ASTM G123 - 00(2005) “Standard Test Method for Evaluating Stress-Corrosion Cracking of Stainless Alloys with Different Nickel Content in Boiling Acidified Sodium Chloride Solution.”

1.4 SUBMITTALS

- .1 Product Data: Include rated capacities; shipping, installed, and operating weights; furnished specialties and accessories for each model indicated.
- .2 Shop Drawings: Detail equipment assemblies and indicate dimensions, required clearances, components, and size of each field connection.
- .3 Wiring Diagrams: Detail for wiring power signal, differentiate between manufacture-installed and field-installed wiring.
- .4 Field Test Reports: Indicate and interpret test reports for compliance with performance requirements. A copy will be furnished to the Department Representative.
- .5 Maintenance Data: Include in the maintenance manuals specified in Division 1. Include maintenance guide and wiring diagrams.

1.5 REGULATORY REQUIREMENTS

- .1 Conform to applicable code for internal wiring of factory wired equipment
- .2 Units: ETL, UL, or CSA Certified as a Complete Water Heater Assemblies.
- .3 Conform to ASME Section IV. Part HLW for Water Heater construction.

1.6 QUALITY ASSURANCE

- .1 Listing: The entire water heater will be listed ETL listed to a recognized commercial test standard for water heaters and to UL 1453 “Electric Booster and Commercial Storage Tank Water Heaters”
- .2 ASME Compliance: Water heater shall bear the ASME HLW stamp and be National Board listed
- .3 Water heater manufacturer shall be certified with ISO 9001 Quality Management System.

1.7 COORDINATION

- .1 Coordinate size and location of concrete bases.

1.8 WARRANTY

- .1 Storage Tank: 25-year coverage for manufacturing or material defects, leaks and /or the production of rusty water. Tank coverage shall include failure due to scale buildup with no provision or condition for maintenance or inspections and no limitations on water chemistry. Tank warranty does not require inspection and maintenance of anode rods.
- .2 All other heater parts: 1 year.
- .3 Stress Corrosion Cracking Warranty – 10-year, non-prorated coverage for failure of tank or heat exchanger due to chloride-induced stress corrosion cracking with no limit to the level of dissolved chlorides in the potable water supply and no exclusion for scale build up.
- .4 The heater shall have a first year service policy, which shall cover labor and freight costs under certain conditions for warranty covered services.

Part 2 Products

2.1 MANUFACTURERS

- .1 Available Manufacturers: Manufacturer shall be a company specializing in manufacturing the products specified in this section with minimum twenty years’ experience. The water heaters shall be manufactured by a company that has achieved certification to the ISO 9001 Quality Management System.
- .2 The water heaters shall be ETL listed as a complete unit. The heater shall satisfy current Federal Energy Policy Act standards for stand-by heat losses as established for indirect fired water heaters incorporating storage tanks.
- .3 Service Access: The water heater shall be provided with access covers for easily accessing all serviceable components.

2.2 CONSTRUCTION

- .1 Water heater will be a, storage-type design indirectly heated by boiler water through a copper u-tube bundle and an electric energy source.

- .2 The storage section of the water heater shall be ASME HLW stamped and National Board Registered for a maximum allowable working pressure of 150 psi and pressure tested at 1-1/2 times working pressure.
- .3 All tank connections/ fittings shall be nonferrous. Tank shall be equipped with a ball-type drain valve. Tank design will include a man way sized access to the tank interior.
- .4 The storage tank shall be an unlined pressure vessel constructed from phase-balanced austenitic and ferritic duplex steel with a chemical structure containing a minimum of 21% chromium to prevent corrosion and mill certified per ASTM A 923 Methods A to ensure that the product is free of detrimental chemical precipitation that affects corrosion resistance. The material selected shall be tested and certified to pass stress chloride cracking test protocols as defined in ISO 3651-2 and ASTM G123 - 00(2005) "Standard Test Method for Evaluating Stress-Corrosion Cracking of Stainless Alloys with Different Nickel Content in Boiling Acidified Sodium Chloride Solution."
- .5 Waterside surfaces shall be welded internally utilizing joint designs to minimize volume of weld deposit and heat input. All heat affected zones (HAZ) shall be processed after welding to ensure the HAZ corrosion resistance is consistent with the mill condition base metal chemical composition. Weld procedures (amperage, volts, welding speed, filler metals, and shielding gases) utilized shall result in a narrow range of austenite-ferrite microstructure content consistent with phase balanced objectives for welds, HAZ and the base metal.
- .6 All internal and external tank surfaces shall undergo full immersion passivation and pickling processing to meet critical temperature, duration, and chemical concentration controls required to complete corrosion resistance restoration of pressure vessel surfaces. Other passivation and pickling methods are not accepted. Immersion passivation and pickling certification documents are required and shall be provided with each product.
- .7 Materials shall meet ASME Section II material requirements and be accepted by NSF 61 for municipal potable water systems. Storage tank materials shall contain more than 80% post-consumer recycled materials and be 100% recyclable.
- .8 Water contacting tank surfaces will be non-porous and exhibit 0% water absorption.
- .9 The water heater will not require anode rods and none will be used. Tanks that employ anodes will not be acceptable.
- .10 Heating elements will be rated at 9 kW and 40 watts per square inch heat density.
- .11 Heating elements will be sheathed in Incoloy. Each element will individually mount to the tank by means of a four-bolt bronze flange over stainless steel studs with an O-ring seal. A fused magnetic contactor will be supplied for each power circuit. Maximum current per circuit will be 50 amps on three-phase units.

2.3 PERFORMANCE

- .1 Water heater will meet the tank insulation requirements of ASHRAE 90.1-2010.
- .2 Refer to equipment schedules for performances:

- .1 Tank properties of (Refer to M&E Drawings):
- .2 Accessories to include:
 - .1 ASME rated T and P relief valve.
 - .2 Control enclosure complete with electrical entry.
 - .3 Lifting lugs.
 - .4 Safety relief valve.
 - .5 Electrical element enclosure.
 - .6 Electrical entry.
 - .7 Tank water pressure gauge.
 - .8 Electronic operating control complete with digital read out.

2.4 WATER HEATER TRIM

- .1 As a minimum, the heater will be equipped with the following:
 - .1 an immersion operating thermostat.
 - .2 an immersion temperature limiting device.
 - .3 an ASME- or AGA-rated temperature and pressure relief valve.
 - .4 an electronic low water cut-off.
- .2 Operating and safety controls shall meet the requirements of ETL.

Part 3 Execution

3.1 INSTALLATION

- .1 Install water heaters level and plumb in accordance with manufacturers written instructions and referenced standards.

3.2 FINISHING

- .1 The storage and heating sections shall be completely factory packaged on a single skid, requiring only job site hookup to utilities, venting, and plumbing. The heater shall be insulated to ASHRAE 90.1-2010 requirements, jacketed with enameled steel panels, and mounted on heavy-duty channel skids. The heater shall fit properly in the space provided and installation shall conform to all local, state, and national codes.

3.3 START-UP

- .1 Start up on the unit will be performed by factory trained and authorized personnel. A copy of the start-up report will be provided to the Department Representative.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 The Contractor shall be responsible to carry out all the Work set out or referred to in this Section 22 42 13.

1.2 SUMMARY

- .1 Section Includes:
 - .1 The supply and installation of Plumbing Fixtures and Trim.
- .2 Sustainable requirements for construction and verification:
- .3 Products Installed but not Supplied Under this Section:
 - .1 Install rough-in for equipment supplied by others, complete with valves on hot and cold water supplies, waste and vent.
 - .2 Equipment installed by others:
 - .1 Connect with unions.
 - .3 Equipment not installed:
 - .1 Capped for future connection by others.
- .4 Related Sections:
 - .1 Division 01 – General Requirements.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International):
 - .1 CAN/CSA-B45 Series-02, Plumbing Fixtures.
 - .2 CAN/CSA-B125-01, Plumbing Fittings.
 - .3 CAN/CSA-B651-95 (R2001), Barrier-Free Design.
 - .4 CSA 317.1-09: Special requirements for plumbing installations in Health Care Facilities.

1.4 SUBMITTALS

- .1 Submittals in accordance with Division 01 – General Requirements.
- .2 Closeout Submittals:
 - .1 Submit maintenance data in accordance with Division 01 – General Requirements.
 - .2 Include:
 - .1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.
 - .2 Details of operation, servicing, maintenance.
 - .3 List of recommended spare parts.

1.5 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Division 01 – General Requirements.

1.6 DELIVERY STORAGE AND DISPOSAL

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Division 01 – General Requirements.
 - .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
 - .3 Fold up metal and plastic banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 GENERAL

- .1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.
- .2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.
- .3 Exposed plumbing brass and escutcheons to be chrome plated.
- .4 Number, locations: architectural drawings to govern.
- .5 Fixtures in any one location to be product of one manufacturer and of same type.
- .6 Trim in any one location to be product of one manufacturer and of same type.
- .7 Bring hot and cold piping to each fixtures as required min. NPS 13 mm (½") copper unless noted.
- .8 Each fixture shall have heavy chrome plated copper flexible supply risers complete with screwdriver stop, reducer and escutcheon.

2.2 FIXTURES

- .1 ***WC-1 Cadet Right Height™ Elongated Pressure-Assisted Toilet 1.6 GPF / 6.0 LPF***
 - .1 American Standard 2467600.020 Toilet - floor mounted, two piece, vitreous china, white finish, toilet, elongated bowl, sanitary dam on bowl, pressure-assisted siphon jet flush action, manual, fully-glazed 2-1/8" trapway, metal chrome trip lever, 10 x 12" water surface area, 768 x 521 x 781 mm (30-1/4" x 20-1/2" x 30-3/4"), bowl rim at 16-1/2" for accessible applications, **meets the Americans with Disabilities Act Guidelines and ANSI A117.1 Requirements for Accessible and Usable Building Facilities - Check Local Codes.**

Two bolt caps, low-consumption (1.6 GPF/6.0 LPF), EverClean® surface inhibits the growth of stain-and odor-causing bacteria, mold, and mildew on the surface, close-coupled flush-o-meter tank, 12" rough-in. **This toilet is designed to rough-in at a minimum dimension of 305 mm (12") from finished wall to C/L of outlet.** Recommended working pressure range 25 PSI - 80 PSI, CSA B45.1-08, ASME A112.19.2.

- .2 Centoco 1500STSCSSFE-001 Seat - FAST-N-LOCK, for elongated bowl, open front, heavy duty, for commercial applications, polypropylene, toilet seat, less seat cover, self-sustaining plastic commercial check hinges, and stainless steel hinge pin, specified in white finish, FAST-N-LOCK mounting system takes the guess work out when tightening the hardware. The specially designed fasteners in click" when the appropriate torque is reached. The bolt and nut material shall be stainless steel, dimensions: 32 mm (1-1/4") high, 473 mm (18-5/8") long, 368 mm (14-1/2") wide.
- .3 McGuire LFH166LK Supply - Lead free, premiere heavy loose supply, chrome-plated finish, 10 mm (3/8") I.P.S. x 10 mm (3/8") outer Ø heavy stop valve, 304 mm (12") steel braided risers, convertible loose key handle, toilet, shallow steel flange.

.2 ***WC-2 Cadet Right Height™ Elongated Pressure-Assisted Toilet 1.6 GPF / 6.0 LPF***

- .1 American Standard 2467600.020 Toilet - floor mounted, two Piece, vitreous china, white finish, toilet, elongated bowl, sanitary dam on bowl, pressure-assisted siphon jet flush action, manual, fully-glazed 2-1/8" trapway, metal chrome trip lever, 10 x 12" water surface area, 768 x 521 x 781 mm (30-1/4" x 20-1/2" x 30-3/4") , bowl rim at 16-1/2" for accessible applications, **Meets The Americans With Disabilities Act Guidelines and ANSI A117.1 Requirements for Accessible and Usable Building Facilities - Check Local Codes.** Two bolt caps, low-consumption (1.6 GPF/6.0 LPF), EverClean® surface inhibits the growth of stain-and-odor-causing bacteria, mold and mildew on the surface, close-coupled flush-o-meter tank, 12" rough-in, **This toilet is designed to rough-in at a minimum dimension of 305 mm (12") from finished wall to C/L of outlet.**, Recommended working pressure range 25 PSI - 80 PSI, CSA B45.1-08, ASME A112.19.2
- .2 Centoco 820STSS-001 Seat - For elongated bowl, open front, heavy duty, for commercial applications, polypropylene, toilet seat, with seat cover, stainless steel self-sustaining hinge, specified in white finish, includes stainless steel hardware, dimensions:25 mm (1") high, 470 mm (18-1/2") long, 362 mm (14-1/4") wide
- .3 McGuire LFH166LK Supply - lead free, premiere heavy loose supply, chrome-plated finish, 10 mm (3/8") I.P.S. x 10 mm (3/8") outer Ø heavy stop valve, 304 mm (12") steel braided risers, convertible loose key handle, toilet, shallow steel flange.

Part 3 Execution

3.1 INSTALLATION

- .1 Mounting heights:
 - .1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified.
 - .2 Wall-hung fixtures: To NBC heights, or as indicated on Architectural details.
 - .3 Physically handicapped: to comply with most stringent of either NBCC or CAN/CSA B651.

3.2 ADJUSTING

- .1 Conform to water conservation requirements specified this section.
- .2 Adjustments:
 - .1 Adjust water flow rate to design flow rates.
 - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
- .3 Checks:
 - .1 Aerators: operation, cleanliness.
 - .2 Vacuum breakers, backflow preventers: operation under all conditions.
 - .3 Wash fountains: operation of flow-actuating devices.
- .4 Thermostatic controls:
 - .1 Verify temperature settings, operation of control, limit and safety controls.

3.3 VERIFICATION

- .1 Verification requirements:
 - .1 Materials and resources.
 - .2 Storage and collection of recyclables.
 - .3 Construction waste management.
 - .4 Resource reuse.
 - .5 Local/regional materials.
 - .6 Low-emitting materials.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 The Contractor shall be responsible to carry out all the Work set out or referred to in this Section 22 42 16.

1.2 SUMMARY

- .1 Section Includes:
 - .1 The supply and installation of Plumbing Fixtures and Trim.
- .2 Sustainable requirements for construction and verification:
- .3 Products Installed but not Supplied Under this Section:
 - .1 Install rough-in for equipment supplied by others, complete with valves on hot and cold water supplies, waste and vent.
 - .2 Equipment installed by others:
 - .1 Connect with unions.
 - .3 Equipment not installed:
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- .1 Canadian Standards Association (CSA International):
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 - .2 CAN/CSA-B125-01, Plumbing Fittings.
 - .3 CAN/CSA-B651-95 (R2001), Barrier-Free Design.
 - .4 CSA 317.1-09: Special requirements for plumbing installations in Health Care Facilities.

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- .1 Submittals in accordance with Division 01 – General Requirements.
- .2 Closeout Submittals:
 - .1 Submit maintenance data in accordance with Division 01 – General Requirements.
 - .2 Include:
 - .1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.
 - .2 Details of operation, servicing, maintenance.
 - .3 List of recommended spare parts.

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- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Division 01 – General Requirements.

1.6 DELIVERY STORAGE AND DISPOSAL

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Division 01 – General Requirements.
 - .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
 - .3 Fold up metal and plastic banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 GENERAL

- .1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.
- .2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.
- .3 Exposed plumbing brass and escutcheons to be chrome plated.
- .4 Number, locations: architectural drawings to govern.
- .5 Fixtures in any one location to be product of one manufacturer and of same type.
- .6 Trim in any one location to be product of one manufacturer and of same type.
- .7 Bring hot and cold piping to each fixtures as required min. NPS 13 mm (½") copper unless noted.
- .8 Each fixture shall have heavy chrome plated copper flexible supply risers complete with screwdriver stop, reducer and escutcheon.

2.2 FIXTURES

- .1 *LV-1 Lavatory:*
 - .1 **American Standard 0955123EC.020 0059020EC.020 Basin** - MURRO, wall-hung lavatory, vitreous china, EverClean® antimicrobial surface, white finish, single hole with extra hole on right hand, rear overflow, faucet ledge with recessed self-draining deck, for concealed arm or wall support, vitreous china shroud/knee contact guard with EverClean (0059020EC), soap dispenser, when installed with a below deck electronics faucet which has the control box, the accessories will not fit under the shroud and will need to be installed outside the shroud, overall dimensions: 545 mm (21-7/16") long, 540 mm (21-1/4") wide, 152 mm (6") high,

- Bowl dimensions: 394 mm (15-1/2") long, 540 mm (21-1/4") wide, 127 mm (5") deep.
- .2 **Sloan EFX-200.100.0040 Faucet** - BASYS®, counter mounted, automatic no-touch, hardwired, lavatory faucet, polished chrome finish, single hole center-set, metal spout, flexible high pressure supply hoses with 10 mm (3/8") compression connections, 1.9 LPM (0.5 GPM) maximum flowrate, multi-laminar spray outlet, fixed spout, 147 mm (5-7/8") spout reach, 164 mm (6-7/16") high, infrared sensor, above deck control access, below deck mechanical mixing valve, less drain, Sloan transformer recommended, vandal-resistant spray insert, key housed inside faucet body.
 - .3 **Sloan MIX-60-A Mixing Valve** - Below deck mechanical water mixing valve, **Mechanical Mixing Valve**, Chrome plated finish, brass construction, lever dial adjustment with lock screw: **Cold-Hot**, equipped with integral check valves at inlets, designed to install under the lavatory. Installs in place of the Tee fitting supplied with the faucet prior to the solenoid valve.
 - .4 **Sloan EAF-70A Transformer** - 6 VDC box mount adapter.
 - .5 **Chicago Faucets 712-ABCP Faucet** – Counter mounted, manual, single handle, pot and glass filler, polished chrome finish, single hole center set, lead free ANSI/NSF 61 compliant, ECAST® brass construction, less supply, 5.9 LPM (1.55 GPM) maximum flowrate, dual screen outlet, integrated pedestal spout, 102 mm (4") projection, 234 mm (9-1/4") high, coated metal handle with locking clip, vandal proof screw, less drain, adjustable volume control, less side spray, 13 mm (1/2") NPT male inlet with deck flange.
 - .6 **McGuire 155A Fixture Drain** - Straight drain, cast brass, chrome plated finish, open grid PO plug, 7/32" (5.5 mm) Ø holes size, 17 gauge 32 mm (1-1/4") Ø tailpiece diameter, 17 gauge 17152 mm (6") long, brass locknut, heavy rubber basin washer fiber friction washer, ASME A112.18.2 CSA B125.2, CSA compliant.
 - .7 **McGuire LFH170N3 Supply** - Lead free, chrome-plated finish, lavatory supply, N3 - 76 mm (3") long rigid horizontal nipples.
 - .8 **McGuire 8872C P-Trap** - Heavy cast brass, adjustable p-trap, 292 mm (11-1/2") distance, with cleanout plug, steel shallow flange, neoprene gasket, slipnuts, 17 gauge seamless tubular wall bend, ASME A112.18.2 CSA B125.2, CSA compliant.
 - .9 **Watts CA-411 Carrier** - Floor mounted concealed arm lavatory carrier, leveling screws and basin locking device, upper tie rod, and plated hardware, required minimum space is 89 mm (3-1/2").
 - .10 **Bobrick B-8221 Soap Dispensers** - Dispense commercially marketed all-purpose hand soaps. Press piston down to dispense commercially marketed all-purpose hand soaps. Vandal-resistant spout can rotate 360° without damage to unit. Escutcheon locks to body with concealed locking mechanism that is opened with special key provided. To fill from top, unlock cover and remove piston, spout, and supply-tube assembly. Unit may also be filled by removing container from below lavatory. Soap dispenser, lavatory mounted, 4" (100 mm) center to outlet spout projection, translucent, shatter-resistant polyethylene container. Capacity of 20-fl. oz. (0.6-L).

Chrome-plated, high-impact-resistant ABS escutcheon with bright polished finish. Concealed locking mechanism, 3-1/4" (85 mm) dia. X 6-1/8" (155 mm) high bottle, ABS cylinder. Stainless steel spring. U-packing seal and duckbills, type-304 stainless steel with bright polished finish piston, spout, and top cover, high-impact-resistant plastic body and shank, rigid, impact-resistant polyester cover spacer.

.2 ***LV-2 Lavatory:***

- .1 **American Standard 0315000.020 Basin** - BOXE, Under-mount Lavatory, vitreous china, white finish, front overflow, unglazed rim, mounting clips available separately (P031006000), overall Dimensions: 508 mm (20") long, 406 mm (16") wide, 178 mm (7") high, bowl dimensions: 438 mm (17-1/4") long, 337 mm (13-1/4") wide, 127 mm (5") deep.
- .2 **Sloan EFX-200.100.0040 Faucet** - BASYS®, Counter mounted, automatic no-touch, hardwired, lavatory faucet, polished chrome finish, single hole center-set, metal spout, flexible high pressure supply hoses with 10 mm (3/8") compression connections, 1.9 LPM (0.5 GPM) maximum flowrate, multi-laminar spray outlet, fixed spout, 147 mm (5-7/8") spout reach, 164 mm (6-7/16") high, infrared sensor, above deck control access, below deck mechanical mixing valve, less drain, Sloan transformer recommended, vandal-resistant spray insert, key housed inside faucet body.
- .3 **Sloan MIX-60-A Mixing Valve** - Below deck mechanical water mixing valve, **Mechanical Mixing Valve**, chrome plated finish, brass construction, lever dial adjustment with lock screw: **Cold-Hot**, equipped with integral check valves at inlets, designed to install under the lavatory. Installs in place of the Tee fitting supplied with the faucet prior to the solenoid valve.
- .4 **Sloan EAF-70A Transformer** - 6 VDC box mount adapter.
- .5 **McGuire 155A Fixture Drain** - Straight drain, cast brass, chrome plated finish, open grid PO plug, 7/32" (5.5 mm) Ø holes size, 17 gauge 32 mm (1-1/4") Ø tailpiece diameter, 17 gauge 17152 mm (6") long, brass locknut, heavy rubber basin washer fiber friction washer, ASME A112.18.2 CSA B125.2, CSA compliant.
- .6 **McGuire LFH165N3 Supply** - Lead free, chrome-plated finish, lavatory supply, N3 - 76 mm (3") long rigid horizontal nipples.
- .7 **McGuire 8872C P-Trap** - Heavy cast brass, adjustable P-trap, 292 mm (11-1/2") distance, with cleanout plug, steel shallow flange, neoprene gasket, slipnuts, 17 gauge seamless tubular wall bend, ASME A112.18.2 CSA B125.2, CSA compliant.

.3 **LV-3 Lavatory:**

- .1 **American Standard 0955001EC.020 0059020EC.020 Basin - Murro**, wall-hung lavatory, vitreous china, EverClean® antimicrobial surface, white finish, single hole center-set, rear overflow, faucet ledge with recessed self-draining deck, for concealed arm or wall support, vitreous china shroud/knee contact guard with EverClean (0059020EC), soap dispenser, when installed with a below deck electronics faucet which has the control box, the accessories will not fit under the shroud and will need to be installed outside the shroud, overall dimensions: 545 mm (21-7/16") long, 540 mm (21-1/4") wide, 152 mm (6") high, bowl dimensions: 394 mm (15-1/2") long, 540 mm (21-1/4") wide, 127 mm (5") deep.
- .2 **Sloan EFX-200.100.0040 Faucet - BASYS®**, counter mounted, automatic no-touch, hardwired, lavatory faucet, polished chrome finish, single hole center-set, metal spout, flexible high pressure supply hoses with 10 mm (3/8") compression connections, 1.9 LPM (0.5 GPM) maximum flowrate, multi-laminar spray outlet, fixed spout, 147 mm (5-7/8") spout reach, 164 mm (6-7/16") high, infrared sensor, above deck control access, below deck mechanical mixing valve, less drain, Sloan transformer recommended, vandal-resistant spray insert, key housed inside faucet body.
- .3 **Sloan MIX-60-A Mixing Valve - Below deck mechanical water mixing valve, Mechanical Mixing Valve**, chrome plated finish, brass construction, lever dial adjustment with lock screw: **Cold-Hot**, equipped with integral check valves at inlets, designed to install under the lavatory. Installs in place of the Tee fitting supplied with the faucet prior to the solenoid valve.
- .4 **Sloan EAF-70A Transformer - 6 VDC box mount adapter.**
- .5 **McGuire 155A Fixture Drain - Straight drain, cast brass, chrome plated finish, open grid PO plug, 7/32" (5.5 mm) Ø holes size, 17 gauge 32 mm (1-1/4") Ø tailpiece diameter, 17 gauge 17152 mm (6") long, brass locknut, heavy rubber basin washer fiber friction washer, ASME A112.18.2 CSA B125.2, CSA compliant.**
- .6 **McGuire LFH170N3 Supply - Lead free, chrome-plated finish, lavatory supply, N3 - 76 mm (3") long rigid horizontal nipples.**
- .7 **McGuire 8872C P-Trap - Heavy cast brass, adjustable P-trap, 292 mm (11-1/2") distance, with cleanout plug, steel shallow flange, neoprene gasket, slipnuts, 17 gauge seamless tubular wall bend, ASME A112.18.2 CSA B125.2, CSA compliant.**
- .8 **Watts CA-411 Carrier - Floor mounted concealed arm lavatory carrier, leveling screws and basin locking device, upper tie rod, and plated hardware, required minimum space is 89 mm (3-1/2").**
- .9 **Bobrick B-8221 Soap Dispensers - Dispense commercially marketed all-purpose hand soaps. Press piston down to dispense commercially marketed all-purpose hand soaps. Vandal-resistant spout can rotate 360° without damage to unit. Escutcheon locks to body with concealed locking mechanism that is opened with special key provided. To fill from top, unlock cover and remove piston, spout, and supply-tube assembly. Unit may also be filled by removing container from below lavatory. Soap dispenser, lavatory mounted, 4" (100 mm) center to outlet spout projection, translucent, shatter-resistant polyethylene container.**

Capacity of 20-fl. Oz. (0.6-L). Chrome-plated, high-impact-resistant ABS escutcheon with bright polished finish. Concealed locking mechanism, 3-1/4" (85 mm) dia. X 6-1/8" (155 mm) high bottle, ABS cylinder. Stainless steel spring. U-packing seal and duckbills. Type-304 stainless steel with bright polished finish piston, spout, and top Cover. High-impact-resistant plastic body and shank. Rigid, impact-resistant polyester cover spacer.

.4 ***ADA, Single-Panel Stainless Steel Security Shower for Rear Mount (Chase)***
Application:

.1 **Acorn 1741ADA-EVS1 Complete Shower Trim** - 14 gauge type 304 stainless steel, exposed surfaces shall have a satin finish, wall shower, pneumatically operated, air-controlled metering valve having pushbutton with less than 5 lbs. force, EVS1 Master-Trol® (Electronic) : Single Temp, ANSI, UFAS codes compliant.

.5 ***Front Access, Single-Panel Stainless Steel Security Shower:***

.1 **Acorn 1741FA-9 Complete Shower Trim** - 14 gauge type 304 stainless steel, exposed surfaces shall have a satin finish, wall shower, 1.6 GPM (6 LPM) flow restrictor, pneumatically operated, air-controlled metering valve having pushbutton with less than 5 lbs. force, -9 Valve By Others: Punched for valve by others.

.6 ***MS-1 Floor Mounted, Mop Service Sinks:***

.1 **Fiat TSB3000501 Sink** - Single compartment sink, square, mop service sinks, with overall dimension 610 mm (24") long, 610 mm (24") wide, 305 mm (12") high, constructed from precast Terrazzo, bowl dimensions are white marble chips in grey Portland cement, drop front featured, center waste location, flat type constructed of 18 gauge Type 304 stainless steel (1453BB), stainless steel Terrazzo mop service basin strainer plate (default), stainless steel tiling flange at up-charge (optional), 152 mm (6"), on all the curbs, Terrazzo mop basins must be installed on a 13 mm (1/2") layer of mortar in order that the mop basin be level and to prevent cracking. Failure to install Terrazzo without a mortar bed will void the warranty, installations require a 7 mm (1/4") clearance between mop basin and wall, chrome-plated service faucet with vacuum breaker, integral stops, adjustable wall brace, pail hook and 19 mm (3/4") hose thread on spout (830AA), 610 mm (24") aluminum bumper guard, 457 mm (18") bumper guard constructed of aluminum with vinyl insert (1239BB24), hose and hose bracket (832AA), service faucet adapter set of two (2), extends hook-up of service faucet from 191 to 216 mm (7-1/2" to 8-1/2") (834AA), mop hanger (889CC), 610 mm x 610 mm (24" x 24") wall guards, two (2) 610 mm x 305 mm (24" x 12") stainless steel panels plus corner bracket (MSG2424), 76 mm (3") quick drain connector with 51 mm (2") hole (QDC32).

- .2 **Chicago Faucets 897-CCP Faucet** - Wall-hung, manual, two handles, mop sink faucet, polished chrome finish, 194 - 213 mm (7-5/8" to 8-3/8") adjustable center-set, brass construction, integral check valve, less supply, adjustable supply arms, Quatum™ compression cartridge (90° turn), no flow restrictor, threaded hose end, vacuum breaker spout with pail hook, 146 mm (5-3/4") spout reach, 273 mm (10-3/4") high, top brace, 60 mm (2-3/8") lever handle with indexed buttons, less drain.

- .7 ***Eye/Face Wash, Pedestal Mounted, Stainless Steel Bowl:***
 - .1 **Guardian G1760P Emergency Equipment** - Eye/Face Wash, floor mounted, 11-3/4" diameter orange ABS plastic, 39 1/2" (1003 mm), Ø11 1/8" (283 mm), two spray heads with a flip-top dust cover, internal flow control and filter on each spray head, 1/2" NPT female inlet, 1/2" IPS chrome plated brass stay-open ball valve, chrome plated brass ball and PTFE seals, Schedule 40 galvanized steel, completely assembled units and water tested.

- .8 ***Eye/Face Wash, Wall Mounted, Plastic Bowl:***
 - .1 **Guardian G1750P Emergency Equipment** - Eye/face wash with plastic bowl, wall-hung, corrosion resistant powder coated finish, 283 mm (11-1/8") Ø bowl size, two FS-Plus spray heads with flip top dust cover each, 13 mm (1/2") Ø I.P.S. chrome-plated brass stay open ball valve, 13 mm (1/2") Ø NPT female inlet, 32 mm (1-1/4") Ø NPT female outlet, heavy duty cast aluminum wall bracket, ANSI compliant.

- .9 ***KS-1 Counter Mounted, Drop-in, Commercial Sinks:***
 - .1 **Franke Commercial D8610-1 Sink** - Double compartment sink, commercial sinks, with overall dimension 895 mm (35-1/4") long, 511 mm (20-1/8") wide, 254 mm (10") high, constructed from Grade 18-18 20 gauge Type 302 stainless steel, left bowl is 406 mm (16") long and right bowl is 406 mm (16") long, left bowl is 457 mm (18") wide and right bowl is 457 mm (18") wide, left bowl is 254 mm (10") deep and right bowl is 254 mm (10") deep, polished to #4 satin finish, less overflow, factory installed EZ TORQUE™ fasteners, factory applied rim seal, center waste location, 38 mm (1-1/2") (DN38) brass tailpiece, standpipe with guard, 89 mm (3-1/2") crumb cup strainer, waste fitting included, undercoated to reduce condensation and resonance, Codes and Compliances: ASME A112.19.3 compliant, CSA B45.4 compliant.
 - .2 **GROHE 32665003 Faucet - Concetto**, counter mounted, manual, single handle, sink faucet, StarLight chrome finish, single hole center-set, die-cast zinc body, stainless steel flexible lines, GROHE SilkMove® ceramic cartridge (90° turn), 6.6 LPM (1.75 GPM) maximum flowrate, spray outlet, dual spray pull-out, high gooseneck spout, pull down, 218 mm (8-9/16") spout reach, 219 mm (8-5/8") high, protected against backflow, lever handle, integrated non-return valve, less drain.

- .3 **Sloan Mix-135-A Mixing Valve** - Below deck mechanical water mixing valve, tempered water mixer, rugged construction features solid brass valve body and corrosion resistant internal components, minimum flow — standard: 1 LPM (0.2 GPM) to ASSE 1016, UPC Low Lead Compliant, ASSE 1070, equipped with integral check valves at inlets, capacity — standard: 15.0 LPM (4.0 GPM) At 45 PSI differential (310 kPa), with hot water supply between 60°-82° C (140°-180° F), maximum operating pressure:125 psig (862kPa) , maximum hot water supply temperature: 180° F (82° C) , minimum hot water supply temperature: 5° F (2.8° C) above set point, designed for under-the-lavatory applications where the outlet temperature of hot water must be controlled for safe, economic use.
 - .4 **McGuire LFCK165LK Supply** - Lead free, pipe to compression, integral check supply kit, chrome plated finish, 3/8" I.P.S x 3/8" O.D, 305 mm (12") chrome plated risers, loose key, faucet, shallow wall flange.
 - .5 **McGuire 8912C P-Trap** - Heavy cast brass, adjustable P-trap, 292 mm (11-1/2") length, with cleanout plug, shallow steel flange, neoprene gasket, seamless tubular brass bend, slipnuts.
- .10 ***KS-2 Counter Mounted, Drop-in, Commercial Sinks:***
- .1 **Franke Commercial S7310P-1 Sink** - Single compartment sink, commercial sinks, with overall dimension 641 mm (25-1/4") long, 489 mm (19-1/4") wide, 254 mm (10") high, constructed from 18 gauge Type 304 stainless steel, bowl dimensions are 584 mm (23") long, 432 mm (17") wide, 254 mm (10") deep, Polished to #4 satin finish, factory installed EZ TORQUE™ fasteners, factory applied rim seal, center back waste location, 38 mm (1-1/2") (DN38) brass tailpiece, 89 mm (3-1/2") crumb cup strainer, waste fitting included, Codes and Compliances: ASME A112.19.3 compliant, CSA B45.4 compliant.
 - .2 **GROHE 32665003 Faucet - Concetto**, counter mounted, manual, single handle, Sink faucet, StarLight chrome finish, Single hole center-set, die-cast zinc body, stainless steel flexible lines, GROHE SilkMove® ceramic cartridge (90° turn), 6.6 LPM (1.75 GPM) maximum flowrate, spray outlet, dual spray pull-out, high gooseneck spout, pull down, 218 mm (8-9/16") spout reach, 219 mm (8-5/8") high, protected against backflow, lever handle, integrated non-return valve, less drain.
 - .3 **Sloan Mix-135-A Mixing Valve** - Below deck mechanical water mixing valve, tempered water mixer, rugged construction features solid brass valve body and corrosion resistant internal components, minimum flow — standard: 1 LPM (0.2 GPM) to ASSE 1016, UPC Low Lead Compliant, ASSE 1070, equipped with integral check valves at inlets, capacity — standard: 15.0 LPM (4.0 GPM) At 45 PSI differential (310 kPa), with hot water supply between 60°-82°C (140°-180°F), maximum operating pressure:125 psig (862kPa) , maximum hot water supply temperature: 180° F (82°C) , minimum hot water supply temperature: 5°F (2.8°C) above set point, designed for under-the-lavatory applications where the outlet temperature of hot water must be controlled for safe, economic use.
 - .4 **McGuire LFCK165LK Supply** - Lead free, pipe to compression, integral check supply kit, chrome plated finish, 3/8" I.P.S x 3/8" O.D, 305 mm (12") chrome plated risers, loose key, faucet, shallow wall flange.

- .5 **McGuire 8912C P-Trap** - Heavy cast brass, adjustable P-trap, 292 mm (11-1/2") length, with cleanout plug, shallow steel flange, neoprene gasket, seamless tubular brass bend, slipnuts.
- .11 ***Bottle Filler Deck-Mounted Manual Glass Filler, Single-Hole, Single-Supply:***
 - .1 **Chicago Faucets 712-ABCP Faucet** - Glass filler, single-hole deck mount, chrome plated. integral, one-piece spout. 1/2" NPT male inlet with deck flange. dual-screen outlet. Adjustable volume control, maximum flow rate 1.55 GPM (5.9 L/min). All-brass piston valve. Coated metal handle with locking clip. ECAST® construction with less than 0.25% lead content by weighted average. This product is tested and certified to industry standards: ASME A112.18.1/CSA B125.1, Certified to NSF/ANSI 61, Section 9, California Health and Safety Code 116875 (AB1953-2006), Vermont Bill S.152, and NSF/ANSI 372 Low Lead Content.

Part 3 Execution

3.1 INSTALLATION

- .1 Mounting heights:
 - .1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified.
 - .2 Wall-hung fixtures: To NBC heights, or as indicated on Architectural details.
 - .3 Physically handicapped: to comply with most stringent of either NBCC or CAN/CSA B651.

3.2 ADJUSTING

- .1 Conform to water conservation requirements specified this section.
- .2 Adjustments:
 - .1 Adjust water flow rate to design flow rates.
 - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
- .3 Checks:
 - .1 Aerators: operation, cleanliness.
 - .2 Vacuum breakers, backflow preventers: operation under all conditions.
 - .3 Wash fountains: operation of flow-actuating devices.
- .4 Thermostatic controls:
 - .1 Verify temperature settings, operation of control, limit and safety controls.

3.3 VERIFICATION

- .1 Verification requirements:
 - .1 Materials and resources.
 - .2 Storage and collection of recyclables.
 - .3 Construction waste management.

- .4 Resource reuse.
- .5 Local/regional materials.
- .6 Low-emitting materials.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 The Contractor shall be responsible to carry out all the Work set out or referred to in this Section 22 42 19.

1.2 SUMMARY

- .1 Section Includes:
 - .1 The supply and installation of Plumbing Fixtures and Trim.
 - .2 Sustainable requirements for construction and verification.
 - .3 Products Installed but not Supplied Under this Section:
 - .1 Install rough-in for equipment supplied by others, complete with valves on hot and cold water supplies, waste and vent.
 - .2 Equipment installed by others:
 - .1 Connect with unions.
 - .3 Equipment not installed:
 - .1 Capped for future connection by others.
 - .4 Related Sections:
 - .1 Division 01 – General Requirements.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International):
 - .1 CAN/CSA-B45 Series-02, Plumbing Fixtures.
 - .2 CAN/CSA-B125-01, Plumbing Fittings.
 - .3 CAN/CSA-B651-95 (R2001), Barrier-Free Design.
 - .4 CSA 317.1-09: Special requirements for plumbing installations in Health Care Facilities.

1.4 SUBMITTALS

- .1 Submittals in accordance with Division 01 – General Requirements.
- .2 Closeout Submittals:
 - .1 Submit maintenance data in accordance with Division 01 – General Requirements.
 - .2 Include:
 - .1 Description of fixtures and trim, giving manufacturer's name, type, model, year, capacity.
 - .2 Details of operation, servicing, maintenance.
 - .3 List of recommended spare parts.

1.5 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Division 01 – General Requirements.

1.6 DELIVERY STORAGE AND DISPOSAL

- .1 Waste Management and Disposal:
 - .1 Separate waste materials for reuse and recycling in accordance with Division 01 – General Requirements.
 - .2 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
 - .3 Fold up metal and plastic banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 GENERAL

- .1 Fixtures: manufacture in accordance with CAN/CSA-B45 series.
- .2 Trim, fittings: manufacture in accordance with CAN/CSA-B125.
- .3 Exposed plumbing brass and escutcheons to be chrome plated.
- .4 Number, locations: architectural drawings to govern.
- .5 Fixtures in any one location to be product of one manufacturer and of same type.
- .6 Trim in any one location to be product of one manufacturer and of same type.
- .7 Bring hot and cold piping to each fixtures as required min. NPS 13mm (½”) copper unless noted.
- .8 Each fixture shall have heavy chrome plated copper flexible supply risers complete with screwdriver stop, reducer and escutcheon.

2.2 FIXTURES

- .1 *SH-1 Shower:*
 - .1 ADA, single-panel stainless steel security shower for rear mount (chase) application:
 - .1 Acorn 1741ADA-EVS1 Complete Shower Trim - 14 gauge type 304 stainless steel, Exposed surfaces shall have a satin finish, Wall Shower, Pneumatically operated, air-controlled metering valve having push-button with less than 5 lbs force, -EVS1 Master-Trol® (electronic): single temp, ANSI, UFAS codes compliant.

- .2 **SH-2 Shower:**
 - .1 Front Access, Single-Panel Stainless Steel Security Shower:
 - .1 Base: by Architect.
 - .2 Trim: Acorn 1741FA-9 Complete Shower Trim - 14 gauge type 304 stainless steel, Exposed surfaces shall have a satin finish, Wall Shower, 1.6 GPM (6 LPM) flow restrictor, Pneumatically operated, air-controlled metering valve having push-button with less than 5 lbs force, -9 Valve By Others: Punched for Valve by Others.

Part 3 Execution

3.1 INSTALLATION

- .1 Mounting heights:
 - .1 Standard: to comply with manufacturer's recommendations unless otherwise indicated or specified.
 - .2 Wall-hung fixtures: To NBC heights, or as indicated on Architectural details.
 - .3 Physically handicapped: to comply with most stringent of either NBCC or CAN/CSA B651.

3.2 ADJUSTING

- .1 Conform to water conservation requirements specified this section.
- .2 Adjustments:
 - .1 Adjust water flow rate to design flow rates.
 - .2 Adjust pressure to fixtures to ensure no splashing at maximum pressures.
- .3 Checks:
 - .1 Aerators: operation, cleanliness.
 - .2 Vacuum breakers, backflow preventers: operation under all conditions.
 - .3 Wash fountains: operation of flow-actuating devices.
- .4 Thermostatic controls:
 - .1 Verify temperature settings, operation of control, limit and safety controls.

3.3 VERIFICATION

- .1 Verification requirements:
 - .1 Materials and resources.
 - .2 Storage and collection of recyclables.
 - .3 Construction waste management.
 - .4 Resource reuse.
 - .5 Local/regional materials.
 - .6 Low-emitting materials.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Section 23 05 23.01 – Valves – Bronze.
- .2 Related Sections:
 - .1 Division 01 – General Requirements.
 - .2 Section 23 05 15 – Common Installation Requirements for HVAC Pipework.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)/ American Society of Mechanical Engineers (ASME):
 - .1 ANSI/ASME B1.20.1-1983 (R2001), Pipe Threads, General Purpose (Inch).
 - .2 ANSI/ASME B16.18-2001, Cast Copper Alloy Solder Joint Pressure Fittings.
 - .3 ANSI/ASME B16.1-1998, Cast Iron Pipe Flanges and Flanged Fittings.
- .2 American Society for Testing and Materials International, (ASTM):
 - .1 ASTM B62-02, Specification for Composition Bronze or Ounce Metal Castings.
 - .2 ASTM B283-99a, Specification for Copper and Copper Alloy Die Forgings (Hot-Pressed).
 - .3 ASTM B505/B505M-02, Specification for Copper-Base Alloy Continuous Castings.
 - .4 ASTM A49-01, Specification for Heat-Treated Carbon Steel Joint Bars.
 - .5 ASTM A126-95 (2001), Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
 - .6 ASTM B62-93, Specification for Composition Bronze or Ounce Metal Castings.
 - .7 ASTM B85-03, Specification for Aluminum-Alloy Die Castings.
 - .8 ASTM B209-04, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .3 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):
 - .1 MSS-SP-25-1998, Standard Marking System for Valves, Fittings, Flanges and Unions.
 - .2 MSS-SP-80-2003, Bronze Gate Globe, Angle and Check Valves.
 - .3 MSS-SP-110-1996, Ball Valves, Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.
 - .4 MSS SP-70-1998, Cast Iron Gate Valves, Flanged and Threaded Ends.
 - .5 MSS SP-71-1997, Grey Iron Swing Check Valves, Flanged and Threaded Ends.
 - .6 MSS SP-82-1992, Valve Pressure Testing Methods.
 - .7 MSS SP-85-2002, Cast Iron Globe and Angle Valves, Flanged and Threaded Ends.

1.3 SUBMITTALS

- .1 Submittals in accordance with Division 01 – General Requirements.
- .2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets in accordance with Division 01 – General Requirements and Division 20 – Common Work Results for Mechanical.
 - .1 Submit shop drawings and product data in accordance with Division 01 – General Requirements.
 - .2 Submit data for valves specified in this section.
- .3 Closeout Submittals:
 - .1 Submit maintenance data for incorporation into manual in accordance with Division 01 – General Requirements.

1.4 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Division 01 – General Requirements.

1.5 DELIVERY STORAGE AND DISPOSAL

- .1 Waste Management and Disposal:
 - .1 Separate and recycle waste materials in accordance with Division 01 – General Requirements.

1.6 MAINTENANCE

- .1 Extra Materials:
 - .1 Furnish following spare parts:
 - .1 Valve seats: one for every ten (10) valves each size, minimum one (1).
 - .2 Discs: one (1) for every ten (10) valves, each size. Minimum one (1).
 - .3 Stem packing: one (1) for every ten (10) valves, each size. Minimum one (1).
 - .4 Valve Handles: Two (2) of each size.
 - .5 Gaskets for flanges: one (1) for every ten (10) flanged joints.

Part 2 Products

2.1 MATERIALS - GENERAL

- .1 Sustainable Requirements:
 - .1 Materials and resources in accordance with Division 01 – General Requirements.
- .2 Valves:
 - .1 Except for specialty valves, to be single manufacturer.
 - .2 All products to have CRN registration numbers.

2.2 VALVES - BRONZE

- .1 End Connections:
 - .1 Connection into adjacent piping/tubing:
 - .1 Steel pipe systems: Screwed ends to ANSI/ASME B1.20.1.
 - .2 Copper tube systems: Solder ends to ANSI/ASME B16.18.
- .2 Gate Valves:
 - .1 Requirements common to gate valves, unless specified otherwise:
 - .1 Standard Specification: MSS SP-80.
 - .2 Bonnet: union with hexagonal shoulders.
 - .3 Connections: screwed with hexagonal shoulders.
 - .4 Inspection and pressure testing: to MSS SP-80. Tests to be hydrostatic.
 - .5 Packing: non-asbestos.
 - .6 Handwheel: non-ferrous.
 - .7 Handwheel Nut: bronze to ASTM B62.
 - .2 NPS 2 and under, rising stem, solid wedge disc, Class 125:
 - .1 Body: with long disc guides, screwed bonnet.
 - .2 Operator: Handwheel.
 - .3 NPS 2 and under, rising stem, solid wedge disc, Class 150:
 - .1 Body: with long disc guides, screwed or union bonnet.
 - .2 Operator: Handwheel.
- .3 Globe Valves:
 - .1 Requirements common to globe valves, unless specified otherwise:
 - .1 Standard specification: MSS SP-80.
 - .2 Bonnet: union with hexagonal shoulders.
 - .3 Connections: screwed with hexagonal shoulders.
 - .4 Pressure testing: to MSS SP-80. Tests to be hydrostatic.
 - .5 Stuffing box: threaded to bonnet with gland follower, packing nut, high-grade non-asbestos packing.
 - .6 Handwheel: non-ferrous.
 - .7 Handwheel Nut: bronze to ASTM B62.
 - .2 NPS 2 and under, composition disc, Class 125:
 - .1 Body and bonnet: screwed bonnet.
 - .2 Disc and seat: renewable rotating PTFE disc composition to suit service conditions, re-grindable bronze seat, loosely secured to bronze stem to ASTM B505.
 - .3 Operator: Handwheel.
 - .3 Angle valve, NPS 2 and under, composition disc, Class 150:
 - .1 Body and bonnet: union bonnet.

- .2 Disc and seat: renewable rotating PTFE disc in slip-on easily removable disc holder having integral guides, re-grindable bronze seat, loosely secured to stem.
- .3 Operator: Handwheel.
- .4 Check Valves:
 - .1 Requirements common to check valves, unless specified otherwise:
 - .1 Standard specification: MSS SP-80.
 - .2 Connections: screwed with hexagonal shoulders.
 - .2 NPS 2 and under, swing type, bronze disc, Class 125:
 - .1 Body: Y-pattern with integral seat at 45 degrees, screw-in cap with hex head.
 - .2 Disc and seat: renewable rotating disc, two-piece hinge disc construction; seat: re-grindable.
 - .3 NPS 2 and under, vertical lift type, bronze disc, Class 125:
 - .1 Disc: rotating disc, having guides top and bottom, disc guides, retaining rings.
- .5 Ball Valves:
 - .1 NPS 2 and under:
 - .1 Body and cap: cast high tensile bronze to ASTM B62.
 - .2 Pressure rating: Class125, 860 kPa steam.
 - .3 Connections: solder ends.
 - .4 Stem: tamperproof ball drive.
 - .5 Stem packing nut: external to body.
 - .6 Ball and seat: replaceable hard chrome solid ball and Teflon seats.
 - .7 Stem seal: TFE with external packing nut.
 - .8 Operator: removable lever handle.

Part 3 Execution

3.1 INSTALLATION

- .1 Install rising stem valves in upright position with stem above horizontal.
- .2 Remove internal parts before soldering.
- .3 Install valves with unions at each piece of equipment arranged to allow servicing, maintenance, and equipment removal.

3.2 VERIFICATION

- .1 Verification requirements in accordance with Division 01 – General Requirements.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Section 23 05 23.02 – Valves – Cast Iron.
- .2 Related Sections:
 - .1 Division 01 – General Requirements.
 - .2 Section 23 05 15 – Common Installation Requirements for HVAC Pipework.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI)/ American Society of Mechanical Engineers (ASME):
 - .1 ANSI/ASME B1.20.1-1983 (R2001), Pipe Threads, General Purpose (Inch).
 - .2 ANSI/ASME B16.18-2001, Cast Copper Alloy Solder Joint Pressure Fittings.
 - .3 ANSI/ASME B16.1-1998, Cast Iron Pipe Flanges and Flanged Fittings.
- .2 American Society for Testing and Materials International, (ASTM):
 - .1 ASTM B62-02, Specification for Composition Bronze or Ounce Metal Castings.
 - .2 ASTM B283-99a, Specification for Copper and Copper Alloy Die Forgings (Hot-Pressed).
 - .3 ASTM B505/B505M-02, Specification for Copper-Base Alloy Continuous Castings.
 - .4 ASTM A49-01, Specification for Heat-Treated Carbon Steel Joint Bars.
 - .5 ASTM A126-95 (2001), Specification for Gray Iron Castings for Valves, Flanges and Pipe Fittings.
 - .6 ASTM B62-93, Specification for Composition Bronze or Ounce Metal Castings.
 - .7 ASTM B85-03, Specification for Aluminum-Alloy Die Castings.
 - .8 ASTM B209-04, Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
- .3 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):
 - .1 MSS-SP-25-1998, Standard Marking System for Valves, Fittings, Flanges and Unions.
 - .2 MSS-SP-80-2003, Bronze Gate Globe, Angle and Check Valves.
 - .3 MSS-SP-110-1996, Ball Valves, Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.
 - .4 MSS SP-70-1998, Cast Iron Gate Valves, Flanged and Threaded Ends.
 - .5 MSS SP-71-1997, Grey Iron Swing Check Valves, Flanged and Threaded Ends.
 - .6 MSS SP-82-1992, Valve Pressure Testing Methods.
 - .7 MSS SP-85-2002, Cast Iron Globe and Angle Valves, Flanged and Threaded Ends.

1.3 SUBMITTALS

- .1 Submittals in accordance with Division 01 – General Requirements.
- .2 Product Data: submit WHMIS MSDS - Material Safety Data Sheets in accordance with Division 01 – General Requirements and Division 20 – Mechanical.
 - .1 Submit shop drawings and product data in accordance with Division 01 – General Requirements.
 - .2 Submit data for valves specified in this section.
- .3 Closeout Submittals:
 - .1 Submit maintenance data for incorporation into manual in accordance with Division 01 – General Requirements.

1.4 QUALITY ASSURANCE

- .1 Health and Safety:
 - .1 Do construction occupational health and safety in accordance with Division 01 – General Requirements.

1.5 DELIVERY STORAGE AND DISPOSAL

- .1 Waste Management and Disposal:
 - .1 Separate and recycle waste materials in accordance with Division 01 – General Requirements.

1.6 MAINTENANCE

- .1 Extra Materials:
 - .1 Furnish following spare parts:
 - .1 Valve seats: one (1) for every ten (10) valves each size, minimum one (1).
 - .2 Discs: one (1) for every ten (10) valves, each size. Minimum one (1).
 - .3 Stem packing: one (1) for every ten (10) valves, each size. Minimum one (1).
 - .4 Valve Handles: Two (2) of each size.
 - .5 Gaskets for flanges: One (1) for every ten (10) flanged joints.

Part 2 Products

2.1 MATERIALS - GENERAL

- .1 Sustainable Requirements:
 - .1 Materials and resources in accordance with Division 01 – General Requirements.
- .2 Valves:
 - .1 Except for specialty valves, to be single manufacturer.
 - .2 All products to have CRN registration numbers.

2.2 VALVES – CAST IRON

- .1 Standard specifications:
 - .1 Gate valves: MSS SP-70.
 - .2 Globe valves: MSS SP-85.
 - .3 Check valves: MSS SP-71.
- .2 Requirements common to valves, unless specified otherwise:
 - .1 Body, bonnet: cast iron to ASTM B209 Class B.
 - .2 Connections: flanged ends plain face to ANSI B16.1.
 - .3 Inspection and pressure testing: to MSS SP-82.
 - .4 Bonnet gasket: non-asbestos.
 - .5 Stem: to have precision-machined Acme or 60 degrees V threads, top screwed for handwheel nut.
 - .6 Stuffing box: non-galling two-piece ball-jointed packing gland, gland bolts and nuts.
 - .7 Gland packing: non-asbestos.
 - .8 Handwheel: Die-cast aluminum alloy to ASTM B85 or malleable iron to ASTM A49. Nut of bronze to ASTM B62.
 - .9 Identification tag: with catalogue number, size and other pertinent data.
- .3 Gate Valves:
 - .1 NPS 2 ½ -8, outside screw and yoke (OS&Y), bronze trim, solid wedge disc:
 - .1 Body and multiple-bolted bonnet: with full-length disc guides designed to ensure correct re-assembly, yoke, yoke hub, yoke sleeve and nut. Class 125.
 - .2 Disc: solid offset taper wedge, bronze to ASTM B62 up to NPS 3, cast iron with bronze disc rings on other sizes, secured to stem through integral forged T-head disc-stem connection.
 - .3 Seat rings: renewable bronze screwed into body.
 - .4 Stem: manganese-bronze.
 - .5 Disc: solid offset taper all-cast iron, secured to stem through integral forged T-head disc-stem connection.
 - .6 Seat rings: integral with body.
 - .7 Stem: nickel-plated steel.
 - .8 Pressure-lubricated operating mechanism.
 - .9 Operator: Handwheel.
- .4 Globe Valves:
 - .1 NPS 2 ½ - 10, OSY:
 - .1 Body: with multiple-bolted bonnet.
 - .2 WP: 860 kPa steam, 1.4 MPa CWP.
 - .3 Bonnet-yoke gasket: non-asbestos.

- .4 Disc: bronze to ASTM B62, fully guided from bottom, securely yet freely connected to stem for swivel action and accurate engagement with disc.
 - .5 Seat ring: renewable, re-grindable and screwed into body.
 - .6 Stem: bronze to ASTM B62.
 - .7 Operator: Handwheel.
- .5 Check Valves:
- .1 Swing check valves, Class 125:
 - .1 Body and bolted cover: with tapped and plugged opening on each side for hinge pin. Flanged ends: plain faced with smooth finish.
 - .1 Up to NPS 16: cast iron to ASTM A126 Class B.
 - .2 Disc: rotating for extended life.
 - .1 Up to NPS 6: bronze to ASTM B62.
 - .3 Seat rings: renewable bronze to ASTM B62 screwed into body.
 - .4 Hinge pin, bushings: renewable bronze to ASTM B62.
 - .5 Disc: A126 Class B, secured to stem, rotating for extended life.
 - .6 Seat: cast iron, integral with body.
 - .7 Hinge pin: exelloy; bushings; malleable iron.
 - .8 Identification tag: fastened to cover.
 - .9 Hinge: galvanized malleable iron.
 - .2 Swing check valves, NPS 2 ½ - 8 Class 250:
 - .1 Body and bolted cover: cast iron to ASTM A126 Class B with tapped and plugged opening on each side for hinge pin.
 - .2 Flanged ends: 2 mm raised face with serrated finish.
 - .3 Disc: rotating for extended life.
 - .1 Up to NPS 3: bronze to ASTM B61.
 - .4 Seat rings: renewable bronze to ASTM B61, screwed into body.
 - .5 Hinge pin, bushings: renewable, bronze to ASTM B61.
 - .6 Hinge: galvanized malleable iron.
 - .7 Identification tag: fastened to cover.

Part 3 Execution

3.1 INSTALLATION

- .1 Install rising stem valves in upright position with stem above horizontal.
- .2 Remove internal parts before soldering.
- .3 Install valves with unions at each piece of equipment arranged to allow servicing, maintenance, and equipment removal.

3.2 VERIFICATION

- .1 Verification requirements in accordance with Division 01 – General Requirements.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 TAB is used throughout this Section to describe the process, methods and requirements of testing, adjusting and balancing for HVAC.
- .2 TAB means to test, adjust and balance to perform in accordance with requirements of Contract Documents and to do other work as specified in this section.

1.2 RELATED SECTIONS

- .1 Division 01 – General Requirements.

1.3 QUALIFICATIONS OF TAB PERSONNEL

- .1 Submit names of personnel to perform TAB to Commissioning Agent and Department Representative within 90 days of award of contract.
- .2 Provide documentation confirming qualifications, successful experience.
- .3 TAB: performed in accordance with the requirements of standard under which TAB Firm's qualifications are approved:
 - .1 Associated Air Balance Council, (AABC) National Standards for Total System Balance, MN-1-2002.
 - .2 National Environmental Balancing Bureau (NEBB) TABES, Procedural Standards for Testing, Adjusting, Balancing of Environmental Systems - 1998.
 - .3 Sheet Metal and Air Conditioning Contractors' National Association (SMACNA), HVAC TAB HVAC Systems - Testing, Adjusting and Balancing - 2002
- .4 Recommendations and suggested practices contained in the TAB Standard: mandatory.
- .5 Use TAB Standard provisions, including checklists, and report forms to satisfy Contract requirements.
- .6 Use TAB Standard for TAB, including qualifications for TAB Firm and Specialist and calibration of TAB instruments.
- .7 Where instrument manufacturer calibration recommendations are more stringent than those listed in TAB Standard, use manufacturer's recommendations.
- .8 TAB Standard quality assurance provisions such as performance guarantees form part of this contract:
 - .1 For systems or system components not covered in TAB Standard, use TAB procedures developed by TAB Specialist.
 - .2 Where new procedures, and requirements, are applicable to Contract requirements have been published or adopted by body responsible for TAB Standard used (AABC, NEBB, or TABB), requirements and recommendations contained in these procedures and requirements are mandatory.

1.4 PURPOSE OF TAB

- .1 Test to verify proper and safe operation, determine actual point of performance, evaluate qualitative and quantitative performance of equipment, systems and controls at design, average and low loads using actual or simulated loads
- .2 Adjust and regulate equipment and systems to meet specified performance requirements and to achieve specified interaction with other related systems under normal and emergency loads and operating conditions.
- .3 Balance systems and equipment to regulate flow rates to match load requirements over full operating ranges.

1.5 EXCEPTIONS

- .1 TAB of systems and equipment regulated by codes, standards to satisfaction of authority having jurisdiction and Commissioning Agent.

1.6 CO-ORDINATION

- .1 Schedule time required for TAB (including repairs, re-testing) into project construction and completion schedule to ensure completion before acceptance of project.
- .2 Do TAB of each system independently and subsequently, where interlocked with other systems, in unison with those systems.

1.7 PRE-TAB REVIEW

- .1 Review contract documents before project construction is started and confirm in writing to Department Representative adequacy of provisions for TAB and other aspects of design and installation pertinent to success of TAB.
- .2 Review specified standards and report to Department Representative in writing proposed procedures which vary from standard.
- .3 During construction, co-ordinate location and installation of TAB devices, equipment, accessories, measurement ports and fittings.

1.8 START-UP

- .1 Follow start-up procedures as recommended by equipment manufacturer unless specified otherwise.
- .2 Follow special start-up procedures specified elsewhere in Division 23.

1.9 OPERATION OF SYSTEMS DURING TAB

- .1 Operate systems for length of time required for TAB and as required by Department Representative for verification of TAB reports.

1.10 START OF TAB

- .1 Notify Commissioning Agent and Department Representative seven (7) days prior to start of TAB.
- .2 Start TAB when building is essentially completed.
- .3 Installation of ceilings, doors, windows, other construction affecting TAB.
- .4 Application of weather stripping, sealing, and caulking. Exterior envelope upgrade work must be complete.
- .5 Pressure, leakage, other tests specified elsewhere Division 23.
- .6 Provisions for TAB installed and operational.
- .7 Start-up, verification for proper, normal and safe operation of mechanical and associated electrical and control systems affecting TAB including but not limited to:
 - .1 Proper thermal overload protection in place for electrical equipment.
 - .2 Air systems:
 - .1 Filters in place, clean.
 - .2 Duct systems clean.
 - .3 Ducts, airshafts, ceiling plenums are airtight to within specified tolerances.
 - .4 Correct fan rotation.
 - .5 Fire, smoke, volume control dampers installed and open.
 - .6 Coil fins combed, clean.
 - .7 Access doors, installed, closed.
 - .8 Outlets installed, volume control dampers open.
 - .3 Liquid systems:
 - .1 Flushed, filled, vented.
 - .2 Correct pump rotation.
 - .3 Strainers in place, baskets clean.
 - .4 Isolating and balancing valves installed, open.
 - .5 Calibrated balancing valves installed, at factory settings.
 - .6 Chemical treatment systems complete, operational.

1.11 APPLICATION TOLERANCES

- .1 Do TAB to following tolerances of design values:
 - .1 HVAC systems: plus 5%, minus 5%.
 - .2 Hydronic systems: plus or minus 10%.

1.12 ACCURACY TOLERANCES

- .1 Measured values accurate to within plus or minus 2% of actual values.

1.13 INSTRUMENTS

- .1 Calibrate in accordance with requirements of most stringent of referenced standard for either applicable system or HVAC system.
- .2 Calibrate within three (3) months of TAB. Provide certificate of calibration to Commissioning Agent and Department Representative.

1.14 SUBMITTALS

- .1 Submit, prior to commencement of TAB:
- .2 Proposed methodology and procedures for performing TAB if different from referenced standard.

1.15 PRELIMINARY TAB REPORT

- .1 Submit for checking and approval of Department Representative, prior to submission of formal TAB report, sample of rough TAB sheets. Include:
 - .1 Details of instruments used.
 - .2 Details of TAB procedures employed.
 - .3 Calculations procedures.
 - .4 Summaries.

1.16 TAB REPORT

- .1 Format in accordance with referenced standard.
- .2 TAB report to show results in SI units and to include:
 - .1 Project record drawings.
 - .2 System schematics.
- .3 Submit required copies of TAB Report to Department Representative for verification and approval, in English in D-ring binders, complete with index tabs.
- .4 TAB Report must be accompanied by AutoCAD drawings complete with all actual measured readings entered on drawings for all associated equipment.

1.17 VERIFICATION

- .1 Reported results subject to verification by Commissioning Agent and Department Representative.
- .2 Provide personnel and instrumentation to verify up to 30% of reported results.
- .3 Number and location of verified results as directed by Commissioning Agent and Department Representative.
- .4 Pay costs to repeat TAB as required to satisfaction of Department Representative.

1.18 SETTINGS

- .1 After TAB is completed to satisfaction of Departmental Representative, replace drive guards, close access doors, lock devices in set positions, ensure sensors are at required settings.
- .2 Permanently mark settings to allow restoration at any time during life of facility. Do not eradicate or cover markings.

1.19 COMPLETION OF TAB

- .1 TAB considered complete when final TAB Report received and approved by Departmental Representative.

1.20 LIQUID SYSTEMS

- .1 Do TAB of the following systems, equipment and controls:
 - .1 Domestic and specialty systems.
 - .2 All pumps listed on drawings.

1.21 OTHER TAB REQUIREMENTS

- .1 General requirements applicable to work specified this paragraph:
 - .1 Qualifications of TAB personnel: as for air systems specified this section.
 - .2 Quality assurance: as for air systems specified this section.

1.22 POST-OCCUPANCY TAB

- .1 As per Commissioning Plan; refer to Division 01 – General Requirements.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 NOT USED

- .1 Not used.

END OF SECTION

Part 1 General

1.1 REFERENCES

- .1 ANSI/ASME B16.5-1996, Pipe Flanges and Flanged Fittings.
- .2 ANSI B16.18-84 (R1994), Cast Copper Alloy Solder Joint Pressure Fittings.
- .3 ASTM A 53/A53M-01, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
- .4 CAN/CGA B149.1-00, Natural Gas and Propane Installation Code.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with Division 01 – General Requirements.

1.3 CLOSEOUT SUBMITTALS

- .1 Provide Maintenance data for incorporation into manual as specified in Division 01 – General Requirements.

Part 2 Products

2.1 PIPE

- .1 Steel pipe: to ASTM A 53, Schedule 40, seamless as follows:
 - .1 NPS 1/2 to 2, screwed.
 - .2 NPS 2-1/2 and over, plain end, welded.

2.2 JOINTING MATERIALS

- .1 Screwed fittings: pulverized lead paste.
- .2 Welded fittings: to CSA W47.1.

2.3 FITTINGS

- .1 Steel pipe fittings, screwed, flanged or welded:
 - .1 Malleable iron: screwed, banded, Class 150.
 - .2 Steel pipe flanges and flanged fittings: to ANSI/ASME B16.5.
 - .3 Welding: butt-welding fittings.
 - .4 Unions: malleable iron, brass to iron, ground seat, to ASTM A47/A47M.
 - .5 Bolts and nuts: to ASME B18.2.1.
 - .6 Nipples: schedule 40, to ASTM A53/A53M.

2.4 VALVES

- .1 Provincial Code approved, lubricated ball type.

2.5 ELECTRIC SOLENOID VALVES

- .1 Provincial Code and CSA/ULC approved, solenoid operated shut-off valves.

- .2 Normally closed, power to open feature with minimum 11 kg closing force.
- .3 Size and location as shown on drawings. Electrics 120V AC.
- .4 Coordinate with Section 15889 for supply and installation of electric valves.
- .5 Standard of Acceptance: ASCO 8042.

2.6 CONNECTORS

- .1 Quick connect and flexible connectors for each appliance being served by the gas system.
- .2 Plastic coated stainless steel safety cables to secure each appliance mounted on castors, or on counters.
- .3 Standard of Acceptance:
 - .1 Fairview QD-GMC.
 - .2 Fairview ACM-50.
 - .3 Fairview ACM-GAS-RCP.

Part 3 Execution

3.1 PIPING

- .1 Install in accordance with applicable Provincial Codes.
- .2 Install in accordance with CAN/CSA B149.1-00.
- .3 Assemble piping using fittings manufactured to ANSI standards.
- .4 Connect to equipment in accordance with manufacturer's instruction unless otherwise indicated.
- .5 Slope piping down in direction of flow to low points.
- .6 Install drip points:
 - .1 At low points in piping system.
 - .2 At each connection to equipment.
- .7 Use eccentric reducers at pipe size change installed to provide positive drainage.
- .8 Provide clearance for access and for maintenance.
- .9 Ream pipes, clean scale and dirt, inside and out.
- .10 Install piping to minimize pipe dismantling for equipment removal.

3.2 VALVES

- .1 Install valves with stems upright or horizontal unless otherwise approved by Engineer, or authority having jurisdiction.

- .2 Install valves at branch take-offs to isolate each piece of equipment, and as indicated.

3.3 FIELD QUALITY CONTROL

- .1 Test system in accordance with CAN/CGA B149.1 and requirements of authorities having jurisdiction.

3.4 PURGING

- .1 Purge after pressure test in accordance with CAN/CGA B149.1-00.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 General requirements that are common to Sections of Division 26 – Electrical, Division 27 – Communications, Division 28 – Electronic Safety and Security and Division 33 – Sections 33 65 73 and 33 65 76.

1.2 RELATED SECTIONS

- .1 Division 01 – General Requirements.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International) Latest Edition of the following:
 - .1 CSA C22.1-21, Canadian Electrical Code, Part 1 (25th Edition), Safety Standard for Electrical Installations.
 - .2 CSA C22.2 No. 0-M91 (R2006), General Requirements.
 - .3 CAN3-C235-19 Preferred Voltage Levels for AC Systems, 0 to 50,000V.

1.4 SCOPE OF WORK

- .1 The work shall include all labour, materials and equipment necessary for the complete installation of the electrical, communications and electronic safety and security systems shown on the drawings and described in these specifications.
- .2 It is the requirement of this work to provide all systems completely functioning in intended system operation, notwithstanding that every item necessarily required may not be specifically mentioned.

1.5 DESIGN REQUIREMENTS

- .1 Operating voltages: to CAN3-C235.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.
 - .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .3 Overhead and Underground Electrical Services: CSA C22.3 No. 1 and CAN/CSA-C22.3 No. 3.
- .4 Barrier-Free access: design equipment and components in accordance with CAN/CSA-B651.

1.6 SUBMITTALS

- .1 Submittals: in accordance with Division 01 – General Requirements.
- .2 Submit requested documentation to Engineer.

- .3 Product Data: submit WHMIS MSDS in accordance with Division 01 – General Requirements.
- .4 All inquiries, shop drawings, requests for substitutions and similar items shall be submitted to the Engineer.
- .5 Shop drawings:
 - .1 Submit drawings in accordance with Division 01 – General Requirements.
 - .2 Submit installation details of proposed location, layout and arrangement of conduit and boxes, and other items that must be shown to ensure co-ordinated installation.
 - .3 Faxes are not acceptable for shop drawings. If sent by fax, they will not be reviewed.
 - .4 Do not begin fabrication until shop drawings have been reviewed by Consultant. Allow ten (10) working days for Consultant review.
 - .5 Consultant review of shop drawings does not relieve the contractor of the responsibility for co-ordination of field measurements required to complete the work.
 - .6 Contractor shall approve all shop drawings by signing and dating them prior to submitting to Consultant.
 - .7 If changes are required, notify Engineer of these changes before they are made.
- .6 Quality Control: in accordance with Division 01 – General Requirements.
 - .1 Provide CSA certified material.
 - .2 Where CSA certified material is not available, submit such equipment and material to authority having jurisdiction for approval before delivery to site.
 - .3 Pill testing of empty conduit system.
 - .4 Permits and fees: in accordance with General Conditions of contract.
 - .5 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Engineer.
- .7 Manufacturer's Field Reports: submit to Engineer written report, within 3 days of review, verifying compliance of Work, as described in PART 3 - FIELD QUALITY CONTROL.
- .8 As-Built Drawings:
 - .1 On a set of drawings, record all changes as work progresses. Incorporate all information issued in Addenda, Site Instructions and Change Orders and all changes in actual installation as a result of site conditions and coordination.
 - .2 Identify each drawing in lower right hand corner in letters at least 0.511” (13 mm) high as follows: AS-BUILT DRAWING This drawing has been revised to show electrical systems as installed, Name of Contractor, Signature of Contractor and Date.
 - .3 Submit to the General Contractor for approval and make all corrections as directed.

1.7 SUBSTITUTIONS

- .1 It is the intent of these specifications to establish the required quality of materials. Where manufacturer's name, catalogue reference, data are used, it is done in order to establish the required quality, style, size or function. The decision as to suitability shall rest with the Engineer.
- .2 Refer to architectural Division 01 – General Requirements.
- .3 All materials not meeting the standards as set down by these specifications shall not be allowed on the job site.
- .4 Substitutions affecting the design will not be permitted. Additional costs to any other trade as a result of a change or substitution by this Contractor shall be borne by this Contractor.
- .5 The listing of a manufacturer as acceptable does not imply acceptance of all products of that manufacturer and only products of that manufacturer and only products meeting the standards as set out in the specifications will be accepted.
- .6 All requests for alternates must be submitted no later than five (5) working days prior to tender close.
- .7 Faxes are not acceptable for request for alternates. If sent by fax, they will not be reviewed.

1.8 SAMPLES

- .1 Submit samples in accordance with Division 01 – General Requirements.
- .2 After review and acceptance, samples will be returned for incorporation into work.

1.9 TEST REPORTS

- .1 Submit certified test reports and certificates to Engineer from approved independent testing laboratories.
 - .1 Indicate compliance with specifications for specified performance characteristics and physical properties.
 - .2 Manufacturer's Field Services: submit copies of manufacturer's field inspection reports.

1.10 OPERATION AND MAINTENANCE DATA

- .1 Provide operation and maintenance data for incorporation into operation and maintenance manual as per Division 01 – General Requirements.
- .2 Include in Operation and Maintenance Data:
 - .1 Table of Contents.
 - .2 Names, addresses and telephone numbers of local suppliers for items included in Operation and Maintenance Manuals.
 - .3 Copy of reviewed Shop Drawings.
 - .4 Name and address of Electrical Contractor.

- .5 Copy of all test certificates.
- .6 Copy of all final panelboard schedules.
- .7 Copy of signed transmittal verifying all maintenance materials turned over to the owner/user.
- .8 Two (2) paper copies of drawings and specifications.
- .9 Include details of design elements, component function and maintenance requirements to effectively operate, maintain or repair.
- .10 Include technical data, product data, component illustrations, technical descriptions and parts list, wiring and schematic diagrams not considered proprietary, test and verification reports. Advertising or sales literature is not acceptable.

1.11 MAINTENANCE MATERIALS

- .1 Provide maintenance materials in accordance with Division 01 – General Requirements and as indicated in respective specification sections.

1.12 FIRESTOPPING

- .1 All fire stopping work is to be performed by the General Contractor.
- .2 Electrical contractor shall coordinate all fire rated assembly penetrations with General Contractor.
- .3 Electrical Contractor shall provide required clearances between outside surface of conduits and inside surface of sleeves, core drilled holes or listed fire rated systems.

1.13 ACCESS HATCHES

- .1 All access doors shall be provided by individual trades, where required, and turned over to General Contractor. See Division 08 – Openings.

1.14 INTERPRETATION OF PLANS AND SPECIFICATIONS

- .1 These specifications are to be considered as an integral part of the plans which accompany them and neither the plans nor the specifications shall be used alone. Any item which is omitted in one but which is reasonably implied in the other shall be considered properly and sufficiently specified and must, therefore, be provided by this Contractor.
- .2 Drawings are diagrammatic. Building dimensions shall not be scaled from the Electrical plans.
- .3 Any discrepancy between the drawings and the building shall be questioned before proceeding with any installation.

1.15 CO-OPERATION OF CONTRACTORS

- .1 This Contractor shall become familiar with the work of other contractors and in laying out and installing the work shall co-operate with the other Contractors, so as to facilitate the progress of the work as a whole and avoid interference or delays. Where interference exists, this Contractor shall notify the General Contractor and/or project manager and the engineer before installing the work.

Any changes in the work or alterations of the Electrical Contractor's schedule required for such co-operation will not be considered as a claim for extra compensation.

- .2 Due to the complexities of many sub-trades, and the restrictive space available in this project, it is required that all trades co-operate closely so as to install all systems in their allotted locations as indicated on the drawings, or as coordinated on site.

1.16 ERRORS AND OMISSIONS

- .1 The drawings are not intended to show every item of accessory equipment, but the Contractor shall tender on and install all essential details to provide for efficiency of operation and ease of maintenance.
- .2 Should this Contractor discover errors or discrepancies in the plans or specification, he shall refer the matter to the Engineer for change or clarification and shall not proceed with that portion of the work until advised by the Engineer to do so.

1.17 DELIVERY, STORAGE, AND HANDLING

- .1 Waste Management and Disposal:
 - .1 Construction/Demolition Waste Management and Disposal: in accordance with Division 01 – General Requirements.
- .2 Store and handle materials in accordance with Division 01 – General Requirements and manufacturer's written instructions.

1.18 SYSTEM START-UP

- .1 Instruct operating personnel in operation, care and maintenance of systems, system equipment and components.
- .2 The Contractor shall provide training with all systems. Sessions shall be broken into segments which will facilitate the training of individuals in the operation of this system. Operators Manuals and Users Guides shall be provided prior to the time of training. Segments shall as a minimum, consist of the following periods:
 - .1 Upon completion of the installation;
 - .2 After six (6) weeks use of the system and;
 - .3 During the last month of the warranty period.

1.19 PERMITS, FEES AND INSPECTION

- .1 Submit to Electrical Inspection Department necessary number of drawings and specifications for examination and approval prior to commencement of work.
- .2 Obtain an electrical work permit and pay associated fees.
- .3 Notify Engineer of changes required by the Electrical Inspection Department.
- .4 Contractor shall coordinate inspection date with Engineer and shall provide labour for access to all equipment for inspection. Such access shall imply removal of panel covers, opening of disconnect switches, junction/pull boxes, starters and luminaires, to confirm work method.

1.20 WARRANTY

- .1 Warranty duration: Twelve (12) calendar months following Substantial Completion.
- .2 Coverage: warrant against failure to perform to characteristics as specified.
- .3 Manufacturer's warranty: submit manufacturer's warranty, for Engineer's acceptance.

Part 2 Products

2.1 MATERIALS AND EQUIPMENT

- .1 Provide material and equipment in accordance with Division 01– General Requirements.
- .2 Material and equipment to be certified by an accredited certification organization and bear that organizations certification mark as evidence of having conformed to the appropriate Canadian Standards Association (CSA) Standards established under the provisions of the Canadian Electrical Code. Where CSA or ULC certified material and equipment are not available, obtain special approval from authority having jurisdiction, before delivery to site.
- .3 Ensure labels are visible and readable after equipment is installed.
- .4 Factory assemble electrical panels and component assemblies.

2.2 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

- .1 Verify installation and co-ordination responsibilities related to motors, equipment and controls, as indicated.
- .2 Division 26 responsibility is as follows:
 - .1 Supply and installation of breakers and/or switches.
 - .2 Supply and installation of power feeder (conduit and wire) from panel to starter, from starter to disconnect switch and from disconnect switch to motor.
 - .3 Supply and installation of starters complete with motor protection unless noted otherwise.
 - .4 Supply and installation of disconnect switches at motors unless noted otherwise.
 - .5 Supply and installation of branch wiring to mechanical equipment as indicated on drawings.
- .3 Control wiring and conduit is by Division 25 unless noted otherwise on electrical drawings.

2.3 WARNING SIGNS

- .1 Warning Signs: in accordance with requirements of authority having jurisdiction, inspection authorities and Engineer.
- .2 Signs, minimum size 7" x 10" (178 x 254 mm).

2.4 WIRING TERMINATIONS

- .1 Ensure lugs, terminals and screws used for termination of wiring are suitable for copper and aluminum conductors.

2.5 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two (2) coats of finish enamel.
 - .1 Paint outdoor electrical equipment "equipment" green finish to EEMAC Y1-1.
 - .2 Paint indoor switchgear and distribution enclosures light grey to EEMAC 2Y-1.
- .2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .3 Clean and prime exposed non-galvanized hangers, racks and fastenings to prevent rusting.

2.6 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates and labels as follows:
 - .1 Nameplates: 0.118" (3 mm) thick plastic engraving sheet, matt white finish face, black core, lettering accurately aligned and engraved into core, self-adhesive type.
 - .2 Sizes as follows:

<u>NAMEPLATE SIZES</u>			
Size 1	0.39 x 1.96" (10 x 50 mm)	1 line	0.118" high letters (3 mm)
Size 2	0.47 x 2.76" (12 x 70 mm)	1 line	0.196" high letters (5 mm)
Size 3	0.47 x 2.76" 12 x 70 mm	2 lines	0.118" high letters (3 mm)
Size 4	0.78 x 3.54 (20 x 90 mm)	1 line	0.314" high letters (8 mm)
Size 5	0.78 x 3.54" (20 x 90 mm)	2 lines	0.196" high letters (5 mm)
Size 6	0.98 x 3.94" (25 x 100 mm)	1 line	0.47" high letters (12 mm)
Size 7	0.98 x 3.94" (25 x 100 mm)	2 lines	0.236" high letters (6 mm)
 - .3 Labels:
 - .1 Embossed plastic labels with 6 mm high letters unless specified otherwise.
 - .4 Wording on nameplates to be approved by Engineer prior to manufacture.
 - .5 Allow for minimum of twenty-five (25) letters per nameplate.
 - .6 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics. Label both box and cover.
 - .7 Disconnects, starters and contactors: indicate equipment being controlled and voltage. Terminal cabinets and pull boxes: indicate system and voltage.
 - .8 Panelboards and switchboards: name and electrical characteristics (voltage, phase, wire, bus capacity, interrupting capacity, circuit number and designation).

Example:

Panel A – 225 A 120/208 V – 3 PH – 4 W Fed from panel DA Circuit #2, 4, 6	Minimum interrupting capacity of breakers installed in this panel is to be not less than 10 KAIC
--	--

- .9 Switch board and panels: indicate panel designation, amperage, voltage and interrupting rating.
- .10 Transformers: indicate transformer designation, capacity, primary and secondary voltages.
- .11 All power, switches, data and telephone outlets shall have a transparent identification permanently installed on coverplate.

2.7 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA C22.1–12.
- .4 Use colour coded wires in communication cables, matched throughout system.

2.8 CONDUIT AND CABLE IDENTIFICATION

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at 49.2' (15 m) intervals.
- .3 Colours: 0.984 (25 mm) wide primary colour and 0.787" (20 mm) wide auxiliary colour.
- .4 All electrical and communications conduits shall be color coded as follows:

	<u>Prime</u>	<u>Auxiliary</u>
600 V Normal	Yellow	
208/120 V Normal	Black	
Fire Alarm	Red	
Telephone	Blue	
Data	White	Yellow
CCTV	White	Blue
Security for Door Access	White	Red
Low Voltage	White	

- .5 Provide identification of equipment, components, and assemblies specified, using materials suitable to withstand anticipated operating environment.

2.9 HOUSEKEEPING PADS

- .1 Co-ordinate with the General Contractor for the provision of Housekeeping Pads under floor mounted equipment.
- .2 Provide concrete housekeeping pads for all switchboards, transformers and all other free-standing electrical equipment. Pads to be a minimum of 6.023” (153 mm) larger than the outside dimensions of the equipment they support, and not less than 4.016” (102 mm) thick.

Part 3 Execution

3.1 INTEGRATED SYSTEMS TESTING

- .1 Integrated systems testing of fire protection and life safety systems will be conducted in accordance with CAN/ULC-S1001-11 Integrated Systems Testing of Fire Protection and Life Safety Systems.
- .2 All contractors are to cooperate fully during the testing process to verify and document that all interconnections between systems provided for fire protection and life safety functions are installed and operating in conformance with the design criteria.
- .3 Integrated systems testing will be conducted in the presence of, and under the direction of, the third-party Integrated Systems Testing Coordinator for the project.
- .4 Integrated systems testing will only be conducted once all systems and integration are complete and free of deficiencies and contractors have complete their required testing.
- .5 Provide all test reports and confirmation that systems are ready for testing, as requested by the Integrated Systems Testing Coordinator.
- .6 Integrated systems testing will be conducted on, but not limited to, the following equipment and systems, as applicable. Refer to testing plan to be developed by the Integrated Systems Testing Coordinator for final list.
 - .1 Fire alarm systems.
 - .2 Mass notification systems.
 - .3 Elevators.
 - .4 Emergency generators.
 - .5 Audio visual systems.
 - .6 Lighting control systems.
 - .7 Notification systems.
 - .8 Sprinkler systems.
 - .9 Standpipe systems.
 - .10 Fire pumps.
 - .11 Water supplies and control valves.
 - .12 Freeze protection systems.
 - .13 Fixed fire suppression systems.
 - .14 Hold-open devices.
 - .15 Electromagnetic locks.

- .16 Smoke control systems.
- .17 Hazardous protection monitoring systems.
- .18 Smoke alarms.
- .19 HVAC systems.
- .20 Building automation systems.

3.2 FIELD QUALITY CONTROL

- .1 Confirm other related work is complete to receive work of this and related electrical sections.
- .2 Commission electrical systems.
- .3 Qualifications:
 - .1 Electricians: qualified, licensed electricians or apprentices in accordance with Provincial Act respecting manpower vocational training and qualifications.
 - .2 Apprentices: employees registered in provincial apprentices program permitted, under direct supervision of qualified licensed electrician, to perform specific tasks. Permitted activities determined based on level of training attained and demonstration of ability to perform specific duties.
- .4 Contractor holding valid Master Electrical contractor licensed as issued by Province must oversee that work is being constructed.
- .5 Contractor must be familiar with and adhere to the requirements of CAN Z462-12 at all times.

3.3 INSTALLATION

- .1 Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, MSDS, and product datasheets.
- .2 Protect electrical equipment from dust and dirt. Plug or cap openings in conduit, fixtures and equipment during construction with Consultant approved materials.
- .3 Conceal conduit in finished areas, unless otherwise authorized. Run exposed conduit parallel to building lines, and maintain maximum headroom.
- .4 Install outlets, plates and other visible items parallel to building lines. Line up exposed raceways, parallel and at right angles to building walls, partitions, and ceilings.
- .5 Set equipment and components plumb and level, accurate to position intended, and position hanger rods plumb.

3.4 LOCATION OF OUTLET BOXES

- .1 Do not install outlet boxes back to back in same wall or partition:
 - .1 Provide minimum 5.90" (150 mm) horizontal separation between boxes.
 - .2 Prior to completion of rough-in, relocate outlets up to 9.84' (3 m) at no change in Contract cost.

- .3 Locate disconnect devices on latch side of door.
- .2 Equipment mounting height, from finished floor to centerline of equipment item unless indicated otherwise:
 - .1 Local switches: 47.24" (1200 mm).
 - .2 Receptacles:
 - .1 General: 15.75" (400 mm).
 - .2 Above top of continuous baseboard heater: 7.87" (200 mm).
 - .3 Above top of counters or counter splash backs: 5.91" (150 mm).
 - .4 In Mechanical Room: 47.24" (1200 mm).
 - .3 Telephone outlets: 15.75" (400 mm).
 - .4 Data outlets: 15.75" (400 mm).
 - .5 Fire alarm:
 - .1 Pull stations: 47.24" (1200 mm).
 - .2 Fire alarm horn/strobes: 47.24" (2300 mm).
 - .6 Panel boards: as required by Code.
 - .7 Proximity card reader: 47.24" (1200 mm).
 - .8 Hand dryer: 43.30" (1100 mm).
 - .9 Exit Light: 11.81" (300 mm) above doorframe.
 - .10 Emergency Light: 11.81" (300 mm) above doorframe or 11.81' (3.6 m) A.F.F. in gym.
- .3 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .4 Attach electrical equipment, components and devices directly to structure and structural supporting elements.
- .5 Coordinate device heights with Architectural room and casework elevations. Install telephone and electrical panel backboards with plywood sheeting material where equipment is to be wall mounted. Size the backboard by 11.81" (300 mm) (min.) beyond size of electrical panel. See Division 06 for further requirements.

3.5 NAMEPLATES AND LABELS

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.6 CONDUIT AND CABLE INSTALLATION

- .1 Install conduit and sleeves prior to pouring of concrete:
 - .1 Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit, and protruding 2.01" (51 mm).
- .2 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .3 Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.

- .4 Locate outlets in accordance with Section 26 05 32 – Outlet Boxes, Conduit Boxes and Fittings.

3.7 TESTING

- .1 Provide advance notice Consultant of proposed testing schedule.
- .2 Perform tests at time of acceptance of work.
- .3 Conduct and pay for field tests:
 - .1 Power distribution, including phase voltage, grounding and load balancing.
 - .2 Circuits originating from branch distribution panels.
 - .3 Motors, including sequenced operation.
 - .4 Lighting and lighting control.
- .4 Perform tests in presence of Consultant.
 - .1 Provide instruments, meters, equipment and personnel required to conduct required tests.
 - .2 Test systems to verify operation as specified.
- .5 Conduct di-electric tests, hi-pot tests, insulation resistance tests and ground continuity tests as required by nature of various systems and equipment.
- .6 Perform following tests on completed power systems:
 - .1 Control and switching: test circuits for correct operation of devices, switches and controls.
 - .2 Polarity tests: test circuits for correct operation of devices, switches and controls.
 - .3 Voltage tests: test voltage at last outlet of each circuit; maximum potential drop 2% on 120V, and 208V branch circuits, 3% on feeder circuits. Correct deficiencies.
 - .4 Phase balance: measure load on each phase at switchboards, splitter, distribution panel board and lighting and power panel board.
 - .1 Submit results to Consultant in writing.
 - .2 Re-arrange phase connections as necessary to balance load on each phase as instructed by Consultant.
 - .3 After marking such changes, submit revised drawings showing modified connections to Consultant.
 - .5 Supply voltage: measure line voltage of each phase at load terminals of main breakers and report results in writing to Engineer Consultant. Perform test with majority of electrical equipment in use.
 - .6 Motor loading: measure line current of each phase of motors with motor operating under load, and report results in writing to Consultant.
 - .1 Upon indications of imbalances or overloads, thoroughly examine electrical connections and rectify defective parts or wiring.
 - .2 If electrical connections are correct, report overloads due to defects in driven machines in writing to Consultant.

- .7 Insulation resistance tests:
 - .1 Megger circuits, feeders and equipment up to 350V with a 500V instrument. Minimum insulation resistance shall be 0.5MΩ.
 - .2 Megger 350-600V circuits, feeders and equipment with a 1000V instrument. Minimum insulation resistance shall be 1.0MΩ.
 - .3 Check resistance to ground before energizing.
- .8 Co-ordinate and carry out motor testing at same time as driven equipment is being tested. In addition to motor loading tests, provide labour and instruments to read and record motor load readings required to supplement tests on driven equipment through various load sequences, as required by driven equipment tests.
- .7 General operations: energize and operate electrical circuit and item. Repair, alter, replace, test and adjust as necessary for a complete and operating electrical system.
- .8 Provide labour, instruments, apparatus and pay expenses required for testing. Consultant reserves right to demand proof of accuracy of instruments used.
- .9 Immediately prior to occupancy, test entire electrical system by performing loss and return of utility power test. Demonstrate operation of:
 - .1 High and low voltage service equipment and metering.
 - .2 Emergency lighting.
 - .3 Fire alarm, Public Address, Security Alarm/Door Access Control System, Video Surveillance System operation during power outage, including remote monitoring system.
 - .4 EMCS system shut down and auto restart, including re-stabilization of systems after power return. Attach report printouts as evidence of expected operation on systems.
 - .5 User equipment shut-down and auto-restart.
- .10 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .11 Manufacturer's Field Services:
 - .1 Obtain written certificates from manufacturers verifying compliance of Work, in handling, installing, applying, protecting and cleaning of products for inclusion in operation and maintenance manuals.
 - .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions as indicated in respective specification sections.

3.8 TEST RESULTS

- .1 Submit test results to Consultant for review.
- .2 Testing methods and test results: to CSA, CEC and authorities having jurisdiction.
- .3 Remove and replace conductors found damaged, with new materials.

- .4 Provide required labour and tools, if during testing Consultant requests equipment be opened and removed from their housings to examine equipment, terminations and connections.

3.9 TRAINING

- .1 Train operating personnel in operation, care and maintenance of electrical equipment and systems as indicated in paragraph 1.18.2 System Start-Up.
- .2 Arrange and pay for manufacturer's factory service engineer to provide training. Ensure operating personnel are conversant with its care and operation.
- .3 Obtain and submit written confirmation from operating personnel that satisfactory training has been received.

3.10 CLEANING

- .1 Perform final cleaning of electrical equipment, systems and components.

3.11 DEMONSTRATION

- .1 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.
- .2 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.
- .3 Owner's Representative may record these demonstrations on video tape for future reference.

3.12 PROTECTION

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

3.13 CONTROL OF HAZARDOUS ENERGY

- .1 Lock out and tag out all electrical and other equipment before performing work as per CAN/CSA-Z460-05.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and installation for wire and box connectors.

1.2 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.
- .3 Section 26 05 21 – Wires and Cables 0-1000V.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International) Latest Edition of the following:
 - .1 CAN/CSA-C22.2, No.18 (R2009), Outlet Boxes, Conduit Boxes, Fittings and Associated Hardware.
 - .2 CSA C22.2 No.65 (R2008) Wire Connectors.
- .2 Electrical and Electronic Manufacturers' Association of Canada (EEMAC) Latest Edition of the following:
 - .1 EEMAC 1Y-2, 1961 Bushing Stud Connectors and Aluminum Adapters (1200 Ampere Maximum Rating).

Part 2 Products

2.1 MATERIALS

- .1 Pressure type wire connectors to: CSA C22.2 No. 65-03, with current carrying parts of copper sized to fit copper conductors as required.
- .2 Fixture type splicing connectors to: CSA C22.2 No. 65-03, with current carrying parts of copper sized to fit copper conductors 10 AWG or less.
- .3 Bushing stud connectors to: EEMAC 1Y-2 to consist of:
 - .1 Connector body and stud clamp for stranded, copper conductors.
 - .2 Clamp for stranded copper conductors.
 - .3 Stud clamp bolts.
 - .4 Bolts for copper conductors.
 - .5 Bolts for aluminum conductors.
 - .6 Sized for conductors as indicated.
- .4 Clamps or connectors for armoured cable, flexible conduit, as required to: CAN/CSA-22.2 No. 18.1.
- .5 Joints required in connecting all wiring up to and including # 8 are to be made using twist-on connectors.

- .6 Joints for all other wiring shall be made using colour-keyed compression type connectors followed by a layer of CSA approved vinyl plastic tape.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

- .1 Remove insulation carefully from ends of conductors and:
 - .1 Install mechanical pressure type connectors and tighten screws with appropriate compression tool recommended by manufacturer. Installation shall meet secureness tests in accordance with CSA C22.2 No.65.
 - .2 Install fixture type connectors and tighten. Replace insulating cap.
 - .3 Install bushing stud connectors in accordance with EEMAC 1Y-2.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.
- .3 Section 26 05 20 - Wire and Box Connectors - 0 - 1000V.
- .4 Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.
- .5 Section 26 05 43 – Installation of Cables in Trenches and in Ducts.

1.2 REFERENCES

- .1 CSA C22.2 No .0.3-09 (R2005), Test Methods for Electrical Wires and Cables Latest Edition.
- .2 CAN/CSA-C22.2 No. 131-M89 (R2004), Type TECK 90 Cable Latest Edition.

Part 2 Products

2.1 BUILDING WIRES

- .1 Conductors: solid for #10 AWG and smaller; stranded for #8 AWG and larger. **Minimum size: #12 AWG.** For longer runs use minimum: #10 (20-40 m); #8 (40-55 m) or #6 (>55 m) at 120 volt. On 600V circuits size to assure maximum 1.5% voltage drop.
- .2 Conductors: size as indicated, with 600V insulation of chemically cross-linked thermosetting polyethylene material rated RW90 (RWU90 where specifically indicated).
- .3 Conductors: ACM (Nual) conductors may be used for feeders greater than 100A copper and longer than 5 m.
- .4 Neutral conductor insulated for 600V shall be continuous with no fuses, switches, or breaks of any kind.
- .5 Wiring requirements for specialized systems such as fire alarm, public address, etc. are indicated in the respective specification sections or on drawings.
- .6 The voltage drop shall in no case exceed 3% of the line volts for branch circuits.
- .7 Voltage drop shall be calculated based on 80% of the circuit breaker current rating for all branch circuits unless noted otherwise.
- .8 Voltage drop for motor branch circuits shall be calculated based on current equal to 80% of the ampacity of the branch circuit conductors.

- .9 Branch circuit conductor sizes specified on drawings are the minimum required. Upsize branch circuit conductor sizes as required so that the voltage drop is less than the maximum value permitted.

2.2 **TECK CABLE**

- .1 Cable: to CAN/CSA-C22.2 No. 131.
- .2 Conductors:
 - .1 Grounding conductor: copper.
 - .2 Circuit conductors: copper, size as indicated.
- .3 Insulation:
 - .1 Type: ethylene propylene rubber.
 - .2 Chemically cross-linked thermosetting polyethylene rated type RW90, 600V.
- .4 Inner jacket: polyvinyl chloride material.
- .5 Armour: interlocking.
- .6 Overall covering: thermoplastic polyvinyl chloride material.
- .7 Fastenings:
 - .1 Channel type supports for two or more cables at 1.5 m centers.
 - .2 Threaded rods: 0.511” (13 mm) dia. to support suspended channels.
- .8 Connectors:
 - .1 Watertight, approved for TECK cable.

2.3 **ARMOURED CABLES**

- .1 Conductors: insulated, copper, size as indicated.
- .2 Type: AC90.
- .3 Armour: interlocking type fabricated from galvanized steel strip.
- .4 Connectors: Steel set screw.
- .5 Complete with anti-short bushings.
- .6 AC-90 cables may only be used:
 - .1 As individual cable drops from junction boxes to devices and fixtures provided the horizontal components are not longer than 1.5 m, do not run from room to room, are adequately supported and are run concealed.
 - .2 For wiring of outlets or devices in cabinetry where it is impractical to install conduit.
- .7 AC-90 shall not be permitted in masonry walls.

2.4 CONTROL CABLES

- .1 Low energy 300V control cable: stranded annealed copper conductors sized as indicated, with PVC insulation type, TW wire braid over each group and overall covering of PVC jackets.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION OF BUILDING WIRES

- .1 Fire rated cables shall be used for all 600V, and 208V essential power feeder as well as fire alarm system wiring as required by NBCC (latest edition).
- .2 Install wiring as follows:
 - .1 In conduit systems in accordance with Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.
 - .2 In underground ducts and trenches in accordance with Section 26 05 43 – Installation of Cables in Trenches and in Ducts.
 - .3 Use vibration proof expanding spring wire connectors for No. 10 and smaller.

3.3 INSTALLATION OF TECK CABLE 0-1000V

- .1 Group cables wherever possible on channels.
- .2 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - 0 - 1000V.
- .3 Use only for portions of feeders located outdoors, unless indicated otherwise.

3.4 INSTALLATION OF ARMoured CABLES

- .1 Group cables wherever possible.
- .2 Terminate cables in accordance with Section 26 05 20 - Wire and Box Connectors - 0 - 1000V.
- .3 Fixture drops are to run from the junction box in the respective room and not to fixtures in other rooms. Fixture drops shall be from the side of the outlet boxes and not through the cover plate. Maximum of four fixture drops from any single junction box. AC 90 cables shall be secured within 11.81” (300 mm) of the junction boxes. Loop between fixtures is not acceptable.
- .4 Support and securing of AC 90 cables shall not be derived from suspended ceiling support wires or by lying on top of the ceiling.

3.5 INSTALLATION OF CONTROL CABLES

- .1 Install control cables in conduit or underground ducts as directed.
- .2 Ground control cable shield.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 32 – Outlet Boxes, Conduit Boxes and Fittings.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International):
 - .1 CSA C22.2 No.41-07, Grounding and Bonding Equipment.

Part 2 Products

2.1 CONNECTORS AND TERMINATIONS

- .1 Copper compression connectors to CSA C22.2 as required sized for conductors.

Part 3 Execution

3.1 INSTALLATION

- .1 Install, terminations, and splices in accordance with manufacturer's instructions.
- .2 Bond and ground as required to CSA C22.2 No.41.
- .3 Do not install more than three (3) connections per junction box unless specifically permitted by Engineer (in writing).

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.

1.2 REFERENCES

- .1 Canadian Standards Association, CSA C22.1–21, Canadian Electrical Code, Part 1.

Part 2 Products

2.1 EQUIPMENT

- .1 Clamps for grounding of conductor: size as required to electrically conductive underground water pipe.
- .2 Copper conductor: minimum 20' (6 m) long for each concrete encased electrode, bare, stranded, tinned, soft annealed, size as indicated.
- .3 Rod electrodes: copper clad steel 3/4" (19 mm) dia. by 10' (3 m) long.
- .4 Ground bus: copper, size as indicated, complete with insulated supports, fastenings, connectors.
- .5 Non-corroding accessories necessary for grounding system, type, size, material as indicated, including but not necessarily limited to:
 - .1 Grounding and bonding bushings.
 - .2 Protective type clamps.
 - .3 Bolted type conductor connectors.
 - .4 Thermit welded type conductor connectors.
 - .5 Bonding jumpers, straps.
 - .6 Pressure wire connectors.

2.2 MANUFACTURERS

- .1 Acceptable manufacturers: Burndy Corp., Erico Inc., Cadweld Div., Thomas & Betts (or approved equivalent).

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION GENERAL

- .1 Install complete permanent, continuous grounding system including electrodes, conductors, connectors, accessories. Where EMT is used, run ground wire in conduit.
- .2 Install connectors in accordance with manufacturer's instructions.
- .3 Protect exposed grounding conductors from mechanical injury.
- .4 Make buried connections, and connections to conductive water main and grounding electrodes using copper welding by Thermit process.
- .5 Use mechanical connectors for grounding connections to equipment provided with lugs.
- .6 Soldered joints not permitted.
- .7 Install bonding wire for flexible conduit, connected at both ends to grounding bushing, solderless lug, clamp or cup washer and screw. Neatly cleat bonding wire to exterior of flexible conduit.
- .8 Install separate ground conductor to outdoor lighting standards.
- .9 Connect building structural steel and metal siding to ground by welding copper to steel.
- .10 Make grounding connections in radial configuration only, with connections terminating at single grounding point. Avoid loop connections.
- .11 Bond single conductor metallic armoured cables to cabinet at supply end, and provide non-metallic entry plate at load end.
- .12 Install grounding conductors in conduit except where run in cable tray. Bond to EMT conduit.
- .13 Ground secondary enclosures.

3.3 ELECTRODES

- .1 Make ground connections to continuously conductive underground water pipe on street side of water meter.
- .2 Install water meter shunt.
- .3 Install rod electrodes and make grounding connections.
- .4 Bond separate, multiple electrodes together.
- .5 Use minimum size #6 AWG copper conductors for connections to electrodes.
- .6 Make special provision for installing electrodes that will give acceptable resistance to ground value where rock or sand terrain prevails. Ground as indicated.

3.4 EQUIPMENT GROUNDING

- .1 Install grounding connections to typical equipment included in, but not necessarily limited to following list: Service equipment, transformers, duct systems, frames of motors, starters, control panels, building steel work, elevators, distribution panels, outdoor lighting.
- .2 Run continuous bond wire the entire length of cable tray. Bond to cable tray at each section.

3.5 GROUNDING BUS

- .1 Install copper grounding bus mounted on insulated supports, on walls of electrical rooms as indicated on drawings.
- .2 Use Thermit weld connections for all connections to perimeter ground bus.

3.6 FIELD QUALITY CONTROL

- .1 Verifications requirements in accordance with Division 01 – General Requirements.
- .2 Perform tests in accordance with Section 26 05 00 – Common Work Results for Electrical.

3.7 COMMUNICATION SYSTEMS

- .1 Install grounding connections for telephone, sound, fire alarm, intercommunication systems as follows:
 - .1 Telephones: make telephone grounding system in accordance with telephone company's requirements.
 - .2 Sound, fire alarm, intercommunication systems as indicated.

3.8 FIELD QUALITY CONTROL

- .1 Perform ground continuity and resistance tests using method appropriate to site conditions and to approval of Engineer and local authority having jurisdiction over installation.
- .2 Perform tests before energizing electrical system.
- .3 Disconnect ground fault indicator during tests.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

Part 2 Products

2.1 SUPPORT CHANNELS

- .1 U shape, size 1.61 x 1.61 x 0.098” (41 x 41 x 2.5 mm) thick, surface mounted or suspended.

2.2 CABLE SUPPORTS

- .1 J-Hook secured to wall or structural member for support of communications cabling. See plans for more information.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

- .1 Secure equipment to hollow or solid masonry, tile and plaster surfaces with nylon shields.
- .2 Secure equipment to poured concrete with expandable inserts.
- .3 Secure equipment to hollow masonry walls or suspended ceilings with toggle bolts.
- .4 Secure surface mounted equipment with twist clip fasteners to inverted T bar ceilings. Ensure that T-bars are adequately supported to carry weight of equipment specified before installation.
- .5 Support equipment, conduit or cables using clips, spring-loaded bolts, cable clamps designed as accessories to basic channel members.
- .6 Fasten exposed conduit or cables to building construction or support system using straps:
 - .1 One-hole steel straps to secure surface conduits and cables 2” (51 mm) and smaller.
 - .2 Two-hole steel straps for conduits and cables larger than 2” (51mm).
 - .3 Beam clamps to secure conduit to exposed steel work.

- .7 Suspended support systems:
 - .1 Support individual cable or conduit runs with 0.393” (10 mm) dia. threaded rods and spring clips.
 - .2 Support two (2) or more cables or conduits on channels supported by 0.393” (10 mm) dia threaded rod hangers where direct fastening to building construction is impractical.
- .8 For surface mounting of two (2) or more conduits use channels at 4.92’ (1.5 m) on centre spacing.
- .9 Provide metal brackets, frames, hangers, clamps and related types of support structures where indicated or as required to support conduit and cable runs.
- .10 Ensure adequate support for raceways and cables dropped vertically to equipment where there is no wall support.
- .11 Do not use wire lashing or perforated strap to support or secure raceways or cables.
- .12 Do not use supports or equipment installed for other trades for conduit or cable support except with permission of other trade and approval of Engineer.
- .13 Install fastenings and supports as required for each type of equipment, cable and conduit, and in accordance with manufacturer's installation recommendations.
- .14 Do not support conduit from other conduit.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

Part 2 Products

2.1 JUNCTION AND PULL BOXES

- .1 Welded steel construction with screw-on flat covers for surface mounting.
- .2 Covers with 1” (25 mm) minimum extension all around, for flush-mounted pull and junction boxes.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 JUNCTION AND PULL BOXES INSTALLATION

- .1 Install pull boxes in inconspicuous but accessible locations.
- .2 Install pull boxes so as not to exceed 98.42' (30 m) of conduit run or 2-90° bends between pull boxes.
- .3 Mount cabinets with top not higher than 70.86” (1800 mm) above finished floor.
- .4 Maximum three (3) connections per junction box unless explicitly permitted by Engineer.

3.3 IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Install Size 2 identification labels indicating system name, voltage and phase.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

- .1 CSA C22.1-21, Canadian Electrical Code, Part 1.
- .2 CAN/CSA-C22.2 No. 18-98 (R2003) Outlet Boxes, Fittings and Associated Hardware.

Part 2 Products

2.1 OUTLET AND CONDUIT BOXES GENERAL

- .1 Size boxes in accordance with CSA C22.1.
- .2 4” (102 mm) square or larger outlet boxes as required for special devices.
- .3 Gang boxes where wiring devices are grouped.
- .4 Blank cover plates for boxes without wiring devices.
- .5 Combination boxes with barriers where outlets for more than one system are grouped.

2.2 SHEET STEEL OUTLET BOXES

- .1 Electro-galvanized steel single and multi gang flush device boxes for flush installation, minimum size 3” x 2” x 1.49” (76 x 51 x 38 mm) or as indicated. 4” (102 mm) square outlet boxes when more than one conduit enters one side with extension and plaster rings as required.
- .2 Electro-galvanized steel utility boxes for outlets connected to surface-mounted EMT conduit, minimum size 4 x 2.12 x 1.88” (102 x 54 x 48 mm).
- .3 4” (102 mm) square or octagonal outlet boxes for lighting fixture outlets.
- .4 4” (102 mm) square outlet boxes with extension and plaster rings for voice and data outlets.

2.3 MASONRY BOXES

- .1 Electro-galvanized steel masonry single and multi gang boxes for devices flush mounted in exposed block walls.

2.4 CONCRETE BOXES

- .1 Electro-galvanized sheet steel concrete type boxes for flush mounted devices in concrete with matching extension and plaster rings as required.

2.5 CONDUIT BOXES

- .1 Cast FS boxes with factory-threaded hubs and mounting feet for surface wiring of switches and receptacles.

2.6 FITTINGS - GENERAL

- .1 Bushing and connectors with nylon insulated throats.
- .2 Knock-out fillers to prevent entry of debris.
- .3 Conduit outlet bodies for conduit up to 1.25" (32 mm) and pull boxes for larger conduits.
- .4 Double locknuts and insulated bushings on sheet metal boxes.
- .5 EMT fittings to be steel set screw type.

2.7 IDENTIFICATION

- .1 All boxes installed above finished ceilings and in interstitial levels shall have their covers color-coded, as described in these specifications, and shall be labelled as to room number they serve.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

- .1 Support boxes independently of connecting conduits.
- .2 Fill boxes with paper, sponges or foam or similar approved material to prevent entry of debris during construction. Remove upon completion of work.
- .3 For flush installations mount outlets flush with finished wall using plaster rings to permit wall finish to come within 0.23" (6 mm) of opening.
- .4 Provide correct size of openings in boxes for conduit, and armored cable connections. Reducing washers are not allowed.
- .5 All boxes shall be installed recessed/flush unless indicated otherwise.
- .6 Install all outlet boxes in exterior walls with flexible vapour barrier and seal with caulking.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA) Latest Edition of the following:
 - .1 CAN/CSA C22.2 No. 18.1-04 (R2009), Metallic Outlet Boxes.
 - .2 CAN/CSA C22.2 No. 18.3-04 (R2009), Hardware for the Support of Conduit, Tubing and Cable Fittings.
 - .3 CAN/CSA C22.2 No. 18.5-02 (R2007), Positioning Devices.
 - .4 CSA C22.2 No. 45.1-07, Electrical Rigid Metal Conduit – Steel.
 - .5 CSA C22.2 No. 45.2-07, Electrical Rigid Metal Conduit – Aluminum, Red Brass and Stainless Steel.
 - .6 CSA C22.2 No. 56-04, Flexible Metal Conduit and Liquid-Tight Flexible Metal Conduit.
 - .7 CSA C22.2 No. 83.1-07, Electrical Metallic Tubing – Steel.
 - .8 CSA C22.2 No. 211.2-06, Rigid PVC (Un-plasticized) Conduit.
 - .9 CAN/CSA C22.2 No.227.3-05, Non-Metallic Mechanical Protection Tubing (NMPT), National Standard of Canada (February 2006).

Part 2 Products

2.1 CONDUITS

- .1 Rigid metal conduit: to CSA C22.2 No.5, Hot Dipped Galvanized Steel Threaded.
- .2 Electrical metallic tubing (EMT): to CSA C22.2 No. 83 – M 1985 (R003), with couplings.
- .3 Rigid PVC conduit: to CSA C22.2 No.211.2.
- .4 Flexible metal conduit and liquid-tight flexible conduit, complete with anti-short bushings: to CSA C22.2 No. 56-04, steel and liquid-tight flexible metal.
- .5 Flexible PVC conduit: to CAN/CSA-C22.2 No.227.3.

2.2 CONDUIT FASTENINGS

- .1 One-hole steel straps to secure surface conduits 53 mm (2”) and smaller. Two hole steel straps for conduits larger than 53 mm (2”).
- .2 Beam clamps to secure conduits to exposed steel work.
- .3 Channel type supports for two or more conduits at 1.5 m (5’) o.c.

- .4 Threaded rods, 6 mm (1/4") diameter, to support suspended channels.

2.3 CONDUIT FITTINGS

- .1 Rain tight EMT connectors shall be used on "vertical" sections of conduit runs where terminating into tops of electrical equipment incorporating drip shields or hoods.
- .2 Fittings: Use set screw connectors and fittings for EMT. Coating: same as conduit.
- .3 Factory "ells" where 90 degree bends are required for 1" (27 mm) and larger conduits.
- .4 Connectors for flexible conduit shall be set screw galvanized steel.
- .5 Connectors for liquid tight flexible conduit shall be watertight, compression type galvanized steel.
- .6 Threaded plastic or metal bushings to be installed on all EMT connectors sizes 35 mm (1-1/4") and larger.
- .7 Fittings: manufactured for use with conduit specified. Coating: same as conduit

2.4 EXPANSION FITTINGS FOR RIGID CONDUIT

- .1 Weatherproof expansion fittings with internal bonding assembly suitable for 1" (27 mm) linear expansion.
- .2 Watertight expansion fittings with integral bonding jumper suitable for linear expansion and 21 mm (3/4") deflection.
- .3 Weatherproof expansion fittings for linear expansion at entry to panel.

2.5 FISH CORD

- .1 Polypropylene.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

- .1 Install conduits to conserve headroom in exposed locations and cause minimum interference in spaces through which they pass.
- .2 Conceal conduits except in mechanical and electrical service rooms and in unfinished areas.
- .3 EMT shall be installed as a complete system.

- .4 Support of electrical systems raceway shall be independent of any type of suspended ceiling support rods, wires, etc. and mechanical piping or duct systems.
- .5 Use electrical metallic tubing (EMT) for all work, unless otherwise indicated, for panelboard feeders, branch circuit wiring, fire alarm and communications, etc., where not installed underground unless specifically indicated otherwise. Provide a separate green ground for all conduit systems, including E.M.T.
- .6 Use rigid PVC conduit underground (direct buried) or embedded in concrete walls or ceiling slabs for panels and equipment.
- .7 Flexible Metal Conduit:
 - .1 Use flexible metal conduit for connection to surface or recessed LED fixtures.
 - .2 Flexible metal conduit permitted above T-bar ceilings, for drops to various fire alarm devices mounted on flush outlet boxes in finished ceiling. Minimum size of flexible conduit: 21 mm (3/4"), Maximum length of drop: 1.5 m (5').
- .8 Use flexible PVC conduit embedded in concrete walls or ceiling for light/power branch circuit wiring and switch legs. Refer to structural notes on the drawings.
- .9 Use liquid tight flexible metal conduit for connection to motors or vibrating equipment, furniture and transformers. Include a separate ground wire.
- .10 Install conduit-sealing fittings in hazardous areas. Fill with compound.
- .11 Minimum conduit size for lighting and power circuits: 21 mm (3/4").
- .12 Bend conduit cold. Replace conduit if kinked or flattened more than 1/10th of its original diameter.
- .13 Mechanically bend steel conduit over 21 mm dia. (3/4").
- .14 Install rigid galvanized steel threaded conduit for service cables for electrical vault to service entrance boards.
- .15 Field threads on rigid conduit must be of sufficient length to draw conduits up tight.
- .16 Install fish cord in empty conduits.
- .17 Run 2 – 1" (25 mm) spare conduits up to accessible ceiling (or interstitial space where existing) space for each flush panel. Terminate these conduits in 153 x 153 x 103 mm (6" x 6" x 4") junction boxes in ceiling space/interstitial space.
- .18 Remove and replace blocked conduit sections. Do not use liquids to clean out conduits.
- .19 Dry conduits out before installing wire.
- .20 Securely fasten in place within 83 mm of each outlet box, junction box, cabinet, coupling or fitting, maximum spacing between supports as follows:

- .1 1.5 m (5') for 21 mm (3/4") trade size conduit and smaller.
- .2 2 m (6') for 27 mm (1") to 41 mm (1-1/2") trade size conduit.
- .3 3 m (10') for 53 mm (2") trade size and larger.

.21 Ground Wires:

- .1 Provide a separate green ground wire in all conduit, including EMT.

3.3 SURFACE CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Run conduits in flanged portion of structural steel.
- .3 Group conduits wherever possible on suspended or surface channels.
- .4 Do not pass conduits through structural members except as indicated.
- .5 Do not locate conduits less than 78 mm (3") parallel to steam or hot water lines with minimum of 1" (27 mm) at crossovers.
- .6 Unless approved in writing by Engineer, surface conduits are acceptable only in electrical, communications and mechanical rooms.

3.4 CONCEALED CONDUITS

- .1 Run parallel or perpendicular to building lines.
- .2 Do not install horizontal runs in masonry walls.
- .3 Do not run conduits horizontally in walls and do not run conduit on inside of metal studs.
- .4 Do not install conduits in terrazzo or concrete toppings.

3.5 CONDUITS IN CAST-IN-PLACE CONCRETE

- .1 Locate to suit reinforcing steel:
 - .1 Install in centre one third of slab.
- .2 Protect conduits from damage where they stub out of concrete.
- .3 Install sleeves where conduits pass through slab or wall.
- .4 Provide oversized sleeve for conduits passing through waterproof membrane, before membrane is installed:
 - .1 Use cold mastic between sleeve and conduit.
- .5 Conduits in slabs: minimum slab thickness four (4) times conduit diameter.
- .6 Encase conduits completely in concrete with minimum 78 mm (3") concrete cover.

- .7 Organize conduits in slab to minimize cross-overs.

3.6 CONDUITS IN CAST-IN-PLACE SLABS ON GRADE

- .1 Run conduits 27 mm (1") (minimum) and larger below slab and encase in 78 mm (3") concrete envelope:
 - .1 Provide 53mm (2") of sand over concrete envelope below floor slab.

3.7 CONDUITS UNDERGROUND

- .1 Slope conduits to provide drainage.
- .2 Waterproof joints (PVC accepted) with heavy coat of bituminous paint.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

Part 2 Products

2.1 NOT USED

- .1 Not used.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 CABLE INSTALLATION IN DUCTS

- .1 Install cables as indicated in ducts.
- .2 Install multiple cables in duct simultaneously.
- .3 Use CSA approved lubricants of type compatible with cable jacket to reduce pulling tension.
- .4 Before pulling cable into ducts and until cables are properly terminated, seal ends of lead covered cables with wiping solder; seal ends of non-leaded cables with moisture seal tape.
- .5 After installation of cables, seal duct ends with duct sealing compound.

3.3 FIELD QUALITY CONTROL

- .1 Verification requirements in accordance with Division 01 – General Requirements.
- .2 Perform tests in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .3 Check phase rotation and identify each phase conductor of each feeder.
- .4 Check each feeder for continuity, short circuits and grounds. Ensure resistance to ground of circuits is not less than 50 megohms.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

- .1 Canadian Standards Association, (CSA International):
 - .1 CAN3-C17-M84 (R2008), Alternating – Current Electricity Metering.

1.3 PRODUCT DATA

- .1 Submit product data.
- .2 Indicate meter, outline dimensions, panel drilling dimensions and include cutout template.

Part 2 Products

2.1 METER

- .1 Polyphase, kilowatt-hour energy meter: to CAN3-C17.
- .2 Combination energy and demand meter: to CAN3-C17.
- .3 Accuracy: 0.25% + 0.05%.
- .4 Ratings: as indicated.
- .5 120VAC power.
- .6 Ethernet connection.
- .7 Web server.

2.2 METERING TRANSDUCERS, CONVERTERS

- .1 Supply and install current transformers and potential transformers to match equipment capacity and meter manufacturer's requirements. Meters shall be installed where indicated on drawings.

2.3 INDICATING INSTRUMENTS

- .1 Digital indicating display:
 - .1 True RMS Ammeter.
 - .2 True RMS Voltmeter.
 - .3 Wattmeter.
 - .4 Varmeter.
 - .5 Frequency meter.
 - .6 Power factor meter.

2.4 SHOP INSTALLATION

- .1 Supply meters and transformers to switchgear manufacturer for installation in gear.
- .2 Install meters as shown on drawings.
- .3 Follow manufacturers' instructions for installation.
- .4 Ensure adequate spacing between current transformers installed on each phase.
- .5 Verify correctness of connections, polarities of meters, instruments, potential and current transformers, transducers, signal sources, electrical supplies.

2.5 ACCEPTABLE PRODUCT

- .1 Schneider Electric ION 8420 Meter shall be furnished with necessary hardware for remote (internet based) access to meter data. Provide local network connection option.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.
- .3 Section 26 27 26 – Wiring Devices.
- .4 Section 26 50 00 – Lighting.

1.2 WORK INCLUDED

- .1 Contractor’s work shall include all labour, materials, tools, appliances, control hardware, sensors, wire, junction boxes and equipment necessary for and incidental to the delivery, installation and furnishing of a completely operational occupancy and daylight sensor lighting control system, as described herein.

1.3 SYSTEM DESCRIPTION

- .1 The objective of this section is to ensure the proper installation of the occupancy sensor based lighting control system so that lighting is turned off automatically after reasonable time delay when a room or area is vacated by the last person to occupy said room or area.
- .2 The occupancy sensor based lighting controls shall accommodate all conditions of space utilization and all irregular work hours and habits (not applicable).
- .3 Contractor shall warrant all equipment furnished in accordance to this specification to be undamaged, free of defects in materials and workmanship, and in conformance with the specifications. The supplier’s obligation shall include repair or replacement, and testing without charge to the owner, all or any parts of equipment which are found to be damaged, defective or non-conforming and returned to the supplier.

1.4 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Provide certificate of proof of performance.

1.5 OCCUPANCY SENSOR OPERATION REQUIREMENTS

- .1 Sensors shall offer a minimum on timer of at least fifteen (15) minutes, in order to prevent all cycling of lamps before they have burned for the lamp manufacturers minimum recommended time period. This timer shall be in addition to the regular occupancy time delay that keeps lights on after last detected occupancy. User shall be able to disable/enable and change the value of this timer.
- .2 Sensors shall utilize an occupancy time delay that keeps lights on after last detected occupancy. Factory default setting of the occupancy time delay shall be fifteen (15) minutes.

- .3 Automatic adjustments to the occupancy time delay shall only be permitted if the controlling algorithm maximizes both lamp life and energy savings. For example a shorter more energy saving time delay setting shall only be allowed if the resulting lamp life is also improved.
- .4 Contractor, in accordance with manufacturer's recommendations, shall determine final sensor location.
- .5 The contractor shall be responsible for a complete and functional system in accordance with all applicable local and national codes.
- .6 It shall be the contractor's responsibility to make all required adjustments to assure the Owner's satisfaction with the occupancy sensor system.
- .7 Owner will direct contractor on settings of occupancy sensors (timing, sensitivity, etc.).

1.6 WARRANTY

- .1 Provide warranty as specified in luminaire schedule on drawings.

Part 2 Products

2.1 WALL SWITCH OCCUPANCY SENSORS

- .1 Sensor shall provide wall-to-wall dual technology detection such that small hand motions are detected out to 20 ft (6.10 m).
- .2 Sensors shall be rated for 120 VAC or 12 VAC.
- .3 Sensor shall recess into single gang outlet box and shall fit a standard GFI receptacle opening.
- .4 Sensor shall meet CEC grounding requirements by providing a dedicated ground connection and intrinsically grounding through its mounting strap.
- .5 Line and load wire connections shall be interchangeable, such that installer cannot make an improper connection to a line/load in a manner that will cause malfunction or damage to the sensor.
- .6 Sensor shall not require a neutral connection regardless of number of poles and/or detection technology.
- .7 Sensor shall not allow any leakage of current to pass to the load when sensor is in the unoccupied (off) condition. Sensor shall not require a minimum load to be connected in order to function.
- .8 Wall Switch sensors shall have field programmable adjustments for selecting operational modes, occupancy time delays, minimum on time, and photocell set-point as applicable.
- .9 All models shall be capable of both Auto-On and Manual On operation.

- .10 Acceptable Products: Sensor Switch #WSX-PDT-SA-WH.

2.2 LOW VOLTAGE OCCUPANCY SENSORS

- .1 The contractor shall install one or more sensors with dual technology coverage areas that cover the entire space and all entrance points. Exact placement and quantity required shall be per manufacturer's best practice recommendations.
- .2 Sensors shall utilize dual technology detection, micro phonics and a digital PIR detector (dual element pyro-electric detector) component, so as to provide a high degree of RF immunity.
- .3 Sensors shall interconnect with other sensors and power/relay packs with Class 2, three-conductor wire or Cat 5e wiring for Type "A" sensor.
- .4 Sensors shall operate on 12 to 24 VAC or VDC.
- .5 Upon initial power up, sensors must immediately turn on. Power packs may be wired on the line or load side of local switching and must not exhibit any delays when switch is energized.
- .6 Sensors shall have test mode that temporarily shortens/disable all time delays (e.g., minimum on, occupancy, photocell transition, and dimming rates) such that an installer can quickly test operation of sensor. Test mode shall time out and return sensor to normal operation should the installer forget to disable test mode after installation.
- .7 Acceptable Products:
- .1 Type 'A': Sensor switch CM-PDT-9-R (PIR/Microphonics, ceiling mount, extended range, or equal.
 - .2 Type 'B': Sensor switch CM-PDT9-R-LT (PIR/Microphonics, ceiling mount, extended range, or equal.

2.3 POWER PACK

- .1 Power packs shall accept and switch 120 or 347 VAC, be plenum rated, and provide Class 2 power for sensors.
- .2 Power pack shall securely mount to junction box location through a threaded 0.630" (16 mm) chase nipple. Plastic clips into junction box shall not be accepted. All Class 1 wiring shall pass through chase nipple into adjacent junction box without any exposure of wire leads.
- .3 Power pack shall incorporate a Class 1 relay and an AC electronic switching device. The AC electronic switching device shall make and break the load, while the relay shall carry the current in the on condition. This system shall provide full 20 Amp switching of all load types, and be rated for 400,000 cycles.
- .4 Power packs shall be single circuit, or two circuits. Slave packs may be used to control additional circuits. When two (2) circuit power packs, or slave packs are used, the power packs must be wired directly to circuit breaker. Otherwise, power packs may be wired on the line or load side of the local switch.

- .5 Acceptable Products:
 - .1 Sensor Switch #PP20 (Single Pole), or equal.
 - .2 Sensor Switch #PP20 2P (Two Pole), or equal.
 - .3 Sensor Switch #SP20 (Slave Pack), or equal.
 - .4 Sensor Switch #NPP16, or equal.
 - .5 Sensor Switch #nSP16, or equal.

2.4 ACCEPTABLE MANUFACTURERS

- .1 GE, Hubbell, Leviton, Sensor Switch, Watt Stopper, Eaton Greengate.
- .2 The listing of any manufacturer as "acceptable" does not imply automatic approval. It is the sole responsibility of the contractor to ensure that any price quotations received and submittals made are for sensors which meet or exceed the specifications included herein.

2.5 PHOTOELECTRIC LIGHTING CONTROL

- .1 Photoelectric Lighting Controls: to CSA C22.1:
 - .1 Luminaire Wall Cabinet mounting.
 - .2 Capable of switching 1800W of lighting at 120V complete with indoor relay enclosure to control multiple lighting circuits.
 - .3 Voltage variation: plus or minus 10%.
 - .4 Temperature range: minus 40°C to plus 40°C.
 - .5 Switching on lights from dusk to dawn.
 - .6 Switching off lights from dawn to dusk.
 - .7 Rated for 5000 operations.
 - .8 Options:
 - .1 Lightning arrester.
 - .2 Fail-safe circuit completed when relay de-energized.
 - .3 Twist-lock type receptacle.
 - .4 Terminal strip.
 - .5 Sensitivity adjustment.
 - .9 Switching time delay of 30 s.
 - .10 Wall mounting bracket.
 - .11 Color-coded leads: size 10 AWG, 460 mm (18") long.

2.6 ACCEPTABLE MANUFACTURERS

- .1 Watt Stopper, Sensor Switch, Leviton, Hubbell.
- .2 The listing of any manufacturer as "acceptable" does not imply automatic approval. It is the sole responsibility of the contractor to ensure that any price quotations received and submittals made are for sensors which meet or exceed the specifications included herein.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.2 INSTALLATION

- .1 It shall be the contractor's responsibility to locate and aim sensors in order to achieve complete and proper volumetric coverage within each room indicated. Rooms shall have ninety five (95) 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).
- .2 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.
- .3 Proper judgement 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.
- .4 Contractor shall include in their tender price all costs associated with the project (including review of job prior to rough-in, review of rough in, device locations, final installation and settings to accommodate specific user requirements) by factory-trained personnel.
- .5 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 MANUFACTURER'S FIELD SERVICES

- .1 Manufacturer shall provide the following three (3) Site Visits:
 - .1 Pre-installation.
 - .2 System Start-up.
 - .3 User training.

3.4 FIELD QUALITY CONTROL

- .1 The complete system shall be tested and verified to confirm that it is operating in conformance with the manufacturer's requirements and the intentions of this specification.
- .2 Provide a certificate from the manufacturer verifying that each component is functioning properly and that the system is functioning as intended.
- .3 Notify Owner's staff two weeks prior to testing so that they may be present during testing and verification.

3.5 TRAINING

- .1 Provide sufficient training to ensure that operating personnel are capable of proper operation of the system in accordance with Section 26 05 00 Paragraph 1.18.2.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and components for dry type transformers up to 600V primary, equipment identification and transformer installation.

1.2 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International):
 - .1 CSA C9-M1981 (R2001), Dry-Type Transformers.
 - .2 CAN/CSA - C802.6, Minimum Efficiency Values for Dry Type Transformers.

1.4 PRODUCT DATA

- .1 Submit product data in accordance with Section 26 05 00 – Common Work Results for Electrical.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Division 01 – General Requirements.
- .2 Remove from site and dispose of all packaging materials at appropriate recycling facilities.
- .3 Collect and separate for disposal paper, plastic, polystyrene, corrugated cardboard, packaging material in appropriate on-site bins for recycling in accordance with Waste Management Plan.
- .4 Divert unused wiring materials from landfill to metal recycling facility.
- .5 Fold up metal banding, flatten and place in designated area for recycling.

Part 2 Products

2.1 TRANSFORMERS

- .1 Use transformers of one manufacturer throughout project and in accordance with CAN/CSA-C22.2No.47 CSA-C9.
- .2 Design 1:
 - .1 Type: ANN.
 - .2 Three (3) phase, size as indicated on plans, 600V input, 120/208V output, 60 Hz.
 - .3 Voltage Taps: standard.
 - .4 Insulation: Class 220, 150°C temperature rise.

- .5 Basic Impulse Level (BIL): standard.
- .6 Hipot: standard.
- .7 Average sound level: standard.
- .8 Impedance at 17°C: standard.
- .9 Enclosure: NEMA, CSA, removable metal front panel.
- .10 Mounting: as indicated on plans.
- .11 Finish: in accordance with Section 26 05 00 – Common Work Results for Electrical.

2.2 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Label size: 7.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and data sheets.

3.2 INSTALLATION

- .1 Mount dry type transformers up to 75 kVA as indicated, or ceiling mounted as required.
- .2 Mount dry type transformers above 75 kVA on floor.
- .3 Ensure adequate clearance around transformer for ventilation.
- .4 Install transformers in level upright position.
- .5 Remove shipping supports only after transformer is installed and just before putting into service.
- .6 Loosen isolation pad bolts until no compression is visible.
- .7 Make primary and secondary connections in accordance with wiring diagram.
- .8 Energize transformers after installation is complete.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and installation for service entrance board.

1.2 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

1.3 REFERENCES

- .1 CAN/CSA-C22.2 No.31-M89 (R2000), Switchgear Assemblies.

1.4 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Indicate the following on shop drawings.
 - .1 Floor anchoring method and foundation template.
 - .2 Dimensioned cable entry and exit locations.
 - .3 Dimensioned position and size of bus.
 - .4 Overall length, height and depth.
 - .5 Dimensioned layout of internal and front panel mounted components.
 - .6 Time-current characteristic curves for circuit breakers and fuses.

1.5 OPERATION AND MAINTENANCE DATA

- .1 Provide maintenance data for service entrance board for incorporation into Operation and Maintenance Manual specified in Division 01 – General Requirements.

Part 2 Products

2.1 SERVICE ENTRANCE BOARDS

- .1 Service Entrance Boards: to CAN/CSA-C22.2 No.31.
- .2 Rating: 600V, 3-phase, 4-wire, amperage as indicated, short circuit current as indicated (rms symmetrical).
- .3 Cubicles: free-standing, dead front, floor mounted.
- .4 Barrier metering section from adjoining sections.
- .5 Utility metering compartment.

- .6 Customer metering (electronic display, V, A, power factor, frequency, kW, kVA, THD, demand kW, demand kVA, demand THD, etc.) with pulsed output for interfacing with the Energy Management Control System (EMCS).
- .7 Distribution section complete with TVSS protection.
- .8 Hinged access panels with captive knurled thumbscrews.
- .9 Aluminum Bus bars for phases and neutral.
- .10 Bus from load terminals of main breaker to metering section and bus from metering section to lugs of distribution section.
- .11 Identify phases with colour coding.
- .12 Copper ground bus bar.
- .13 Cable Feed: bottom of main breaker section.
- .14 Approved for service entrance.
- .15 Enclosure: NEMA Type 2 (Sprinkler proof).
- .16 Provide a provision for CT's where required, as indicated on the Drawing.

2.2 MOULDED CASE CIRCUIT BREAKERS

- .1 Provide circuit breakers as indicated on single line diagram and as per Specification Section 26 28 21 – Moulded Case Circuit Breakers.

2.3 GROUNDING

- .1 Copper ground bus extending full width of cubicles and located at bottom.
- .2 Lugs at each end.

2.4 SURGE PROTECTION DEVICES (SERVICE ENTRANCE BOARD)

- .1 Surge protection device for operation on a 600/347 volt 3-phase, 4-wire system to provide surge protection in accordance with C62.41 Standards and Nema LS-1 Specification.
- .2 A nameplate shown the electrical ratings, including UL1449 Surge Suppression ratings and the UL and CSA monograms shall be permanently affixed to the unit.
- .3 The unit shall be external to the service entrance board.
- .4 All TVSS devices shall be listed under UL1449 and certified by CSA.
- .5 TVSS device shall meet NFMA 3R requirements.

- .6 The Maximum Continuous Operating Voltage (MCOV) shall be rated at a minimum of 115% of the nominal system voltage.
- .7 If stand-alone unit is carried:
 - .1 Contractor to allow for a 30 amp, three-pole breaker in Service entrance board for stand-alone unit.
 - .2 Wire to unit to be 3c # 6 in 1.377" (35 mm) EMT.
 - .3 Conductors to be no greater than 11.81" (300 mm) in length.
- .8 Service entrance panel protection complete with:
 - .1 320,000 Peak Amp Capacity.
 - .2 Fault current fusing.
 - .3 Visual and audible indication of panel status.
 - .4 Audible alarm able to be silenced.
 - .5 Mode protection must include (3x L-G, 3x N-L, 1x N-G).
 - .6 Incorporation of surge counter.
- .9 Manufacturer:
 - .1 Standard of Acceptance: Hubbell.
- .10 Other Approved Manufacturers: Eaton; Siemens.

2.5 METERING

- .1 As per Section 26 09 23 – Metering and Switchboard Instruments.

2.6 POWER SUPPLY AUTHORITY METERING

- .1 Separate compartment and metal raceway for exclusive use of power supply authority metering.
- .2 Mounting accessories and wiring for metering supplied by power supply authority:
 - .1 Potential transformers.
 - .2 Current transformers.

2.7 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Nameplates: Size 7.

2.8 ACCEPTABLE MANUFACTURERS

- .1 Acceptable Manufacturers:
 - .1 Square D.
 - .2 Eaton.
 - .3 Siemens.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Locate service entrance boards as indicated on drawings.
- .2 Service entrance boards shall be mounted on concrete housekeeping pads as per Section 26 05 00 – Common Work Results for Electrical.
- .3 Connect main secondary service to line terminals of main breaker.
- .4 Connect load terminals of distribution breakers to feeders.
- .5 Check factory made connections for mechanical security and electrical continuity.
- .6 Run one grounding conductor, sized as indicated, from ground bus to main building ground bar.
- .7 Check trip unit settings against co-ordination study to ensure proper working and protection of components.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and installation for breaker type panelboards.

1.2 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.
- .3 Section 26 28 21 – Moulded Case Circuit Breakers.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International) Latest Edition of the following:
 - .1 CSA C22.2 No.29–M 1989 (R2004), Panelboards and Enclosed Panelboards.

1.4 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Drawings include electrical detail of panelboard, branch breaker type, quantity, ampacity and enclosure dimension, shown in the same layout as on panelboard schedules.

Part 2 Products

2.1 PANELBOARDS

- .1 Panelboards: to CSA C22.2 No.29–M 1989 (R2004) and product of one manufacturer:
 - .1 Install circuit breakers in panelboards before shipment.
 - .2 In addition to CSA requirements, manufacturer's nameplate must show fault current that panel including breakers has been built to withstand.
 - .3 All provisional space shall be fully bussed and breaker ready.
- .2 250V panelboards: bus and breakers rated for 10 kA rms (symmetrical) interrupting capacity minimum or as indicated. 600V panelboard bus and breakers rated for 22000A (symmetrical) interrupting capacity or as indicated.
- .3 Sequence phase bussing with odd numbered breakers on left and even on right, with each breaker identified by permanent number identification as to circuit number and phase.
- .4 Panelboards: mains, number of circuits, and number and size of branch circuit breakers as indicated.
- .5 Two keys for each panelboard and key panelboards alike. Turn over keys to building Owner.
- .6 Aluminum bus with neutral of same ampere rating as mains, unless noted otherwise.

- .7 Mains: suitable for bolt-on breakers.
- .8 Trim with concealed front bolts and hinges.
- .9 Trim and door finish: baked grey enamel.
- .10 Copper ground bus.
- .11 Surface mounted panelboard shall be sprinkler proof.

2.2 BREAKERS

- .1 Breakers: to Section 26 28 21 – Moulded Case Circuit Breakers.
- .2 Breakers with thermal and magnetic tripping in panelboards except as indicated otherwise.
- .3 Main breaker: separately mounted on top or bottom of panel to suit cable entry.
- .4 Lock on devices for 10% of 15 to 30A breakers installed as indicated. Turn over unused lock on devices to Owner.
- .5 Lock on devices for fire alarm, door supervisory, intercom, stairway, exit and night light circuits. Provide copy of receptacles of used breakers locked in operation and maintenance manuals.
- .6 Breakers shall be installed in panelboards as per schedule on drawings and load balancing. Shop drawings shall indicate above positioning.

2.3 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Nameplate for each panelboard Size 4 engraved as indicated.
- .3 Nameplate for each circuit in distribution panelboards Size 2 engraved as indicated.
- .4 Provide typewritten circuit directory, indicating location and load for each circuit.

2.4 ACCEPTABLE MANUFACTURERS

- .1 Acceptable Manufacturers:
 - .1 Square D.
 - .2 Eaton.
 - .3 Siemens.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Locate panelboards as indicated and mount securely, plumb, true and square to adjoining surfaces.
- .2 Install surface mounted panelboards on plywood backboards or either fire retardant type or painted on all sides with fire retardant paint.
- .3 Mount panelboards to height specified in Section 26 05 00 – Common Work Results for Electrical or as indicated.
- .4 Connect loads to circuits.
- .5 Connect neutral conductors to common neutral bus with respective neutral identified.
- .6 Each flush mounted panel shall have two 27mm (1”) empty conduits studded to accessible ceiling space for future connections.

3.3 TESTS

- .1 Test each branch breaker to verify that it controls the load indicated on the drawing and panel directory.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and installation for solar photovoltaic panels.

1.2 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International) Latest Edition.

1.4 SUBMITTALS

- .1 Submit Shop Drawings in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Supplier shall perform solar study for expected daily and annual output. Summarize in report for review.

Part 2 Products

2.1 PHOTOVOLTAIC MODULES

- .1 Shall include minimum 25 year power output warranty and have a maximum rated output of 450 watts. Panel string voltage shall not exceed 1000V in peak winter conditions.
- .2 Modules shall have a positive only power tolerance. High efficiency mono crystalline PV panel with minimum efficiency of 18%.
- .3 Shall demonstrate tolerance for winter operation, including snow loading, corrosion, and low temperature operation. Panel must be rated for a minimum snow loading of 5400Pa and minimum wind load of 3600Pa.
- .4 Panel dimensions shall be maximum 1100mm wide x 2200mm long x 35mm deep.
- .5 Maximum weight per panel shall be 25 kg.
- .6 Acceptable Product: Canadian Solar Hiku CS3W-450.

2.2 MOUNTING SYSTEM

- .1 The mounting system shall firmly secure the panels accounting for wind loading, snow drifting, etc. The Solar panels shall be anchored to the frame using machine screws and bolts, self-tapping screws are not permitted.
- .2 The mounting system shall be designed for installation on a flat roof and provide a maximum 15 degree tilt to the photovoltaic panels.

- .3 Mounting system shall be non-penetrating pre-manufactured concrete ballast designed for racking system. The ballasted solar panel system shall not exceed a dead load of 0.35 kPa. Provide pre-attached and unattached roof protection mats to separate racking system from roofing membranes. Mats shall be suitable for installation on two ply modified bitumen cap sheet. Provide submittals including ballast calculations, system weight, and roof uplift loading (wind uplift) stamped by a Professional Engineer licensed in Prince Edward Island for review.
- .4 Solar photovoltaic contractor shall submit shop drawings detailing structural loading details associated with mounting system specific to the indicated layout and site conditions. Shop drawing submission shall indicate mounting system components including design details. Shop drawings to be sealed by a professional engineer licensed for Nova Scotia and submitted for review by the Departmental Representative.
- .5 The mounting system shall allow for individual modules to be tipped forward or up for ease of access to the roof for any repairs which may be required over the lifetime of the system.
- .6 The mounting system shall include a grounding lug to facilitate ground requirements.
- .7 The mounting system shall include a wire management system to facilitate installation and protection of cabling.
- .8 The mounting system shall be made of aluminum EN AW 6060 T64, module-clamps shall be made of aluminum EN AW 6063 T66, screws shall be stainless steel, and wind-deflector shall be made of galvanized steel.

2.3 INVERTER

- .1 Inverter is permitted to be 480V complete with 480V-600V transformer. This contractor shall carry all mounting requirements and accessories to facilitate transformer mounting.
- .2 Inverter shall be provided with rapid shutdown as either an integrated feature or an external device and shall be rated to be installed on the roof.
- .3 Inverter shall be provided with a smart data logger to provide live monitoring and data logging of historical performance.
- .4 Inverter shall be connected using BACnet/Modbus to BAS. Coordinate with controls and include all costs and programming.
- .5 Acceptable Product: SMA Sunny Tri-power Core 1 50 kW.

2.4 ELECTRICAL INTERCONNECTION

- .1 The system shall include all required materials and equipment and all work necessary to facilitate the interconnection of the PV system to the local distribution system. Refer to single line diagram for tie-in details.

2.5 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results for Electrical and as indicated on Electrical drawings.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.
- .2 Energy Efficiency: Verify equipment is properly installed, connected, and adjusted. Verify that equipment is operating as specified.
- .3 Comply with ASTM E1799 – Standard Practice for Visual Inspections of Photovoltaic Modules.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

1.2 SECTION INCLUDES

- .1 Switches, receptacles, wiring devices, cover plates and their installation.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International) Latest Edition of the following:
 - .1 CSA-C22.2 No.42-99 (R2004), General Use Receptacles, Attachment Plugs and Similar Devices.
 - .2 CSA-C22.2 No.42.1-00 (R2004), Cover Plates for Flush-Mounted Wiring Devices (Bi-national standard, with UL 514D).
 - .3 CSA-C22.2 No.55-M 1986 (R2003), Special Use Switches.
 - .4 CSA-C22.2 No.111-00, General-Use Snap Switches (Bi-national standard, with UL 20, twelfth edition).

1.4 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 26 05 00 – Common Work Results for Electrical.

Part 2 Products

2.1 SWITCHES

- .1 15A, 120V and 347V single pole, 3-way and 4-way switches, and commercial specification grade to: CSA-C22.2 No.55 and CSA-C22.2 No.111.
- .2 Manually-operated commercial specification grade ac switches with following features:
 - .1 Terminal holes approved for No. 10 AWG wire.
 - .2 Silver Alloy contacts.
 - .3 High strength thermoplastic polycarbonate toggle.
 - .4 Urea or melamine moulding for parts subject to carbon tracking.
 - .5 Suitable for back and side wiring.
 - .6 Toggle colour: white.
- .3 Toggle operated locking fully rated for tungsten filament and fluorescent lamps, and up to 80% of rated capacity of motor loads.
- .4 Acceptable products:
 - .1 Momentary contact (indicated with ‘LV’ on drawings):
 - .1 Cat5 Low voltage digital wall switch, two (2) zones (2 button) as indicated on drawings.

- .1 Standard of Acceptance: Sensor Switch #NPODM-25-WH.
- .2 Cat 5 low voltage digital room controller, 2 zones as indicated on drawings.
 - .1 Standard of acceptance: Sensor Switch #NPP16.
- .3 Other approved manufacturers; Cooper Green Gate, WattStopper.
- .2 Toggle switch:
 - .1 15A, 120V, single pole, and 3-way, specification grade, white color, toggle switch.
 - .1 Standard of Acceptance: CSB115-W and #CSB3115-W.
 - .2 15A, 347V, Single and 3-way, specification grade, white color toggle switch.
 - .1 Standard of Acceptance: Hubbell #18201-W and #18203-W.
 - .3 15A, 120V, specification grade, white color key switch.
 - .1 Standard of Acceptance: Hubbell #1201LW.
 - .4 15A, 347V, specification grade, Brown color key switch.
 - .1 Standard of Acceptance: Hubbell #18201LCN.
 - .5 Switches of one manufacturer throughout project.
 - .6 Other approved manufactures; Leviton, Pass & Seymour.
- .5 Each light switch shown on plans shall have the circuit number and supplying panelboard identified. This identification shall be a label and shall be visible when the coverplate is in place, and shall be in a position not likely to be painted over.

2.2 DIMMERS

- .1 LED:
 - .1 0-10V control.
 - .2 Continuous dimming from 100% to 10%.
 - .3 Color: White.
 - .4 Acceptable product: Lutron Nova-T Series or approved equivalent.
 - .5 Cover plate shall be from same manufacturer as dimmer.
- .2 Each dimmer switch shown on plans shall have the circuit number and supplying panelboard permanently identified. This identification shall be a mechanically attached label and shall be visible when the coverplate is in place, and shall be in a position not likely to be painted over, and shall not be on the coverplate itself.

2.3 RECEPTACLES

- .1 Duplex commercial specification grade receptacles, CSA types 5-15R and 5-20R 125V, U ground, specification grade, to: CSA-C22.2 No.42 with following features:
 - .1 Impact resistant nylon face.
 - .2 Thermoplastic back body.
 - .3 White urea moulded housing.
 - .4 Suitable for No. 10 AWG for back and side wiring.
 - .5 Break-off links for use as split receptacles.

- .6 Triple wipe contacts and riveted grounding contacts.
- .7 Plated steel mounting strap with integral ground contacts.
- .8 Color: as indicated.
- .2 Acceptable Materials:
 - .1 Duplex receptacles (NEMA 5-15R) shall be rated for 15 amp, 125 volt, Receptacles shall be specification grade.
 - .1 Standard of Acceptance Hubbell BR15-W white.
 - .2 Duplex receptacles (NEMA 5-20R) shall be rated for 20 amp, 125 volt, with a T-slot. Receptacles shall be specification grade.
 - .1 Standard of Acceptance Hubbell BR20-W white.
 - .3 Other approved manufacturer; Cooper, Leviton, Pass & Seymour.
- .3 White housing for receptacles connected to non-essential power.
- .4 Devices shall be tamper proof where indicated on plans.
- .5 Receptacles of one manufacturer throughout project.

2.4 COVER PLATES

- .1 Cover plates for wiring devices to: CSA-C22.2 No.42.1.
- .2 Cover plates from one manufacturer throughout project.
- .3 Cover plates for all flush-mounted switches and receptacles shall be as indicated on drawings.
- .4 FS-type cover plates for wiring devices installed in surface-mounted FS-type outlet boxes.
- .5 Recess weather protective covers as indicated on drawings.
- .6 Sheet steel utility box cover for wiring devices installed in surface mounted utility boxes.
- .7 Nylon coverplates, thickness 0.098" (2.5 mm) for wiring devices mounted in flush mounted outlet box. White coverplates for receptacles and switches connected to non-essential power.
- .8 Sheet metal cover plates for wiring devices mounted in surface mounted FS or FD type conduit boxes.
- .9 Exterior weatherproof, heavy duty cast aluminum, flush mounted, lockable enclosure, complete with decora mounting plate, neoprene basket, and two (2) keys for cam lock:
 - .1 Acceptable Product: Pass & Seymour #4600 Series.

2.5 SPECIAL WIRING DEVICES

- .1 Other receptacles with ampacity and voltage as indicated on drawings.

2.6 DIMMING CONTROL STATION

- .1 Cat5 low voltage digital dimming system, 0-10V dimming control, minimum 15A, 120V or 347V rated relay. Control station, two (2) zone (6 button) shall have on/off, up, down controls clearly labelled:
 - .1 Cat5 dimming control station, on/off, up, down dimming control:
 - .1 Standard of Acceptance; SensorSwitch nLight #nPODM-2P-DX-WH.
 - .2 Cat5 dimming modules, 0-10V dimming output:
 - .1 Standard of Acceptance; SensorSwitch nLight #nPP16-D (Cafeteria).
 - .2 Standard of Acceptance; SensorSwitch nLight #nPP16-D-347 (Gym).
 - .3 Other approved manufacturers; Cooper Green Gate, WattStopper.

2.7 ACCEPTABLE MANUFACTURERS

- .1 Pass & Seymour, Hubbell, Leviton, Cooper.

2.8 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Label size: 1.
- .3 Provide one label for each wiring device indicating circuit number that the wiring device is connected to. Example: “A-23”.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Switches and dimmers:
 - .1 Install single throw switches with handle in "UP" position when switch closed.
 - .2 Install switches in gang type outlet box when more than one switch is required in one location.
 - .3 Mount toggle switches at height specified in Section 26 05 00 – Common Work Results for Electrical or as indicated.
 - .4 Install 3-way switches such that load is “OFF” when both toggles are down.
- .2 Receptacles:
 - .1 Install receptacles in gang type outlet box when more than one receptacle is required in one location.
 - .2 Where two (2) receptacles are fed from different panelboards and installed in a common 2-gang outlet box, install voltage barrier between the receptacles.

- .3 Mount receptacles at height specified in Section 26 05 00 – Common Work Results for Electrical or as indicated.
- .4 All receptacles shall be installed with the “U” ground at the top.
- .5 All receptacles mounted horizontal shall be oriented with ground to the left.

- .3 Cover plates:
 - .1 Protect cover plate finish with paper or plastic film until painting and other work is finished.
 - .2 Install suitable common cover plates where wiring devices are grouped.
 - .3 Do not use cover plates meant for flush outlet boxes on surface-mounted boxes.

- .4 General:
 - .1 All surface mounted wiring devices shall be installed in FS-type outlet boxes, c/w FS-type coverplates.

3.3 PROGRAMMING AND TRAINING

- .1 Provide training to users for programming and operation of Dimming Control Stations.

3.4 TESTS

- .1 Test each receptacle for polarity and retention of blades.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International):
 - .1 CAN/CSA-C22.2 No.144.1-06, Ground Fault Circuit Interrupters.
- .2 National Electrical Manufacturers Association (NEMA):
 - .1 NEMA PG 2.2-1999, Application Guide for Ground Fault Protection Devices for Equipment.

1.3 SUBMITTALS AND SHOP DRAWINGS

- .1 Submittals in accordance with Division 01 – General Requirements.
- .2 Submit product data and shop drawings.

1.4 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Division 01 – General Requirements.

Part 2 Products

2.1 MATERIALS

- .1 Equipment and components for ground fault circuit interrupters (GFCI): to CAN/CSA-C22.2 No.144 NEMA PG 2.2.
- .2 Components comprising ground fault protective system to be of same manufacturer.

2.2 BREAKER TYPE GROUND FAULT INTERRUPTER

- .1 Single pole ground fault circuit interrupter (class “A”) for 15A, 120V, 1 phase circuit complete with test and reset facilities.

2.3 GROUND RECEPTACLE

- .1 Self-contained with 15A, 120V circuit interrupter and duplex single receptacle complete with:
 - .1 Solid state ground sensing device.
 - .2 Facility for testing and reset.
 - .3 Flush mounted with white nylon faceplate.
 - .4 Tamper proof where indicated.

- .2 Acceptable product:
 - .1 Hubbell #GF15WLA.
 - .2 Leviton #7599-W.
 - .3 Pass & Seymour #1595W.

Part 3 Execution

3.1 INSTALLATION

- .1 Connect supply and load wiring to equipment in accordance with manufacturer's recommendations.

3.2 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results for Electrical and co-ordinate with Division 01 – General Requirements.
- .2 Demonstrate simulated ground fault tests.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials for moulded-case circuit breakers.

1.2 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.
- .3 Section 26 24 17 – Panelboards Breaker Type.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International) Latest Edition of the following:
 - .1 CSA-C22.2 No. 5-2 (R2007), Moulded-Case Circuit Breakers, Moulded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, tenth edition, and the second edition of NMX-J-266-ANCE).
 - .2 CAN/CSA-C22.2 No. 144-M91 (R2001), Ground Fault Circuit Interrupters.

1.4 SUBMITTALS

- .1 Submit Shop Drawings in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Include time-current characteristic curves for breakers with ampacity of 100A and over.

Part 2 Products

2.1 BREAKERS GENERAL

- .1 Moulded-case circuit breakers: to CSA C22.2 No. 5
- .2 Bolt-on moulded case circuit breaker: quick-make, quick-break type, for manual and automatic operation with temperature compensation for 40°C ambient.
- .3 Common-trip breakers: with single handle for multi-pole applications.
- .4 Magnetic instantaneous trip elements in circuit breakers to operate only when value of current reaches setting:
 - .1 Trip settings on breakers with adjustable trips to range from 3-8 times current rating.
- .5 Circuit breakers to have minimum symmetrical rms interrupting capacity rating to match panel.

2.2 THERMAL MAGNETIC BREAKERS

- .1 Moulded case circuit breaker to operate automatically by means of thermal and magnetic tripping devices to provide inverse time current tripping and instantaneous tripping for short circuit protection.

2.3 GFCI BREAKERS

- .1 Ground fault circuit interrupter (GFCI) breakers to CAN/CSA-C22.2 No. 144, Class “A” type.
- .2 Single pole GFCI breakers, rated as noted complete with test and reset facilities.

2.4 ACCEPTABLE MATERIALS

- .1 Breakers shall be compatible with panelboards specified in Section 26 24 17 – Panelboards Breaker Type and shall meet the short circuit interrupting ratings as indicated.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install circuit breakers as indicated.

3.3 TESTS

- .1 Demonstrate simulated ground fault tests for all GFCI breakers.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and installation for fused and non-fused disconnect switches.

1.2 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International) Latest Edition of the following:
 - .1 CAN/CSA C22.2 No.4-04 (R2009), Enclosed Switches.
 - .2 CSA C22.2 No.39-M 1987 (R2003), Fuse holder Assemblies.

1.4 SUBMITTALS

- .1 Submit Shop Drawings in accordance with Section 26 05 00 – Common Work Results for Electrical.

Part 2 Products

2.1 DISCONNECT SWITCHES

- .1 Fusible and non-fusible, heavy-duty horsepower rated disconnect switches to CAN/CSA C22.2 No.4, sized to match circuit ampacity and voltage, or as indicated.
- .2 Provision for padlocking in off switch position by three (3) locks.
- .3 Mechanically interlocked door to prevent opening when handle is in ON position.
- .4 Quick-make, quick-break action.
- .5 ON-OFF switch position indication on switch enclosure cover.
- .6 Enclosure: NEMA Type 1 or as indicated.

2.2 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 - Common Work Results for Electrical.
- .2 Indicate name of load controlled on Size 4 nameplate.

2.3 ACCEPTABLE MANUFACTURERS

- .1 Square D.
- .2 Eaton.
- .3 Siemens.

2.4 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

2.5 INSTALLATION

- .1 Install disconnect switches complete with fuses, if applicable, where indicated on drawings.
- .2 Disconnect switches for mechanical equipment shall be mounted on uni-strut framework.

2.6 TESTS

- .1 Operate each disconnect switch to verify that the loads are disconnected.

END OF SECTION

Part 1 General

1.1 SECTION INCLUDES

- .1 Materials and installation for contactors for system voltages up to 600V.

1.2 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International):
 - .1 CSA C22.2 No.14-95 (R2005), Industrial Control Equipment.

1.4 SUBMITTALS

- .1 Submit Shop Drawings in accordance with Section 26 05 00 – Common Work Results for Electrical.

Part 2 Products

2.1 CONTACTORS

- .1 Contactors: to CSA C22.2 No.14.
- .2 Electrically held controlled by pilot devices as indicated and rated for type of load controlled. Half size contactors not accepted.
- .3 Number of poles as indicated.
- .4 Complete with normally open auxiliary contacts unless indicated otherwise. Quantity in accordance with plans.
- .5 Mount in CSA Type 1 Enclosure unless otherwise indicated.
- .6 Include following options in cover:
 - .1 Red indicating lamp.
 - .2 Hand-Off-Auto selector switch.
- .7 Control transformer: Confirm coil voltage prior to ordering.

2.2 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Size 4 nameplate indicating name of load controlled as indicated.

2.3 ACCEPTABLE MANUFACTURERS

- .1 Square D.
- .2 Eaton.
- .3 Siemens.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install contactors and connect auxiliary control devices.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

1.2 SUBMITTALS

- .1 Submit Shop Drawings in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Shop Drawings shall indicate:
 - .1 Mounting method and dimensions.
 - .2 Starter size and type.
 - .3 Layout of identified internal and front panel components.
 - .4 Enclosure types.
 - .5 Wiring diagram for each type of starter.
 - .6 Interconnection diagrams.

1.3 OPERATION AND MAINTENANCE DATA

- .1 Provide operation and maintenance data for motor starters for incorporation into Operation and Maintenance Manual specified in Division 01 – General Requirements.
- .2 Include operation and maintenance data for each type and size of starter.

1.4 MAINTENANCE MATERIALS

- .1 Provide maintenance materials in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Provide the following spare parts for each different size and type of starter:
 - .1 Three (3) contacts, stationary.
 - .2 Three (3) contacts, movable.
 - .3 One (1) contact, auxiliary.
 - .4 One (1) control transformer.
 - .5 One (1) operating coil.
 - .6 Two (2) fuses.
 - .7 10% indicating lamp bulbs used.
- .3 Provide a copy of receipts of maintenance and materials in the maintenance and operation manuals.

Part 2 Products

2.1 MATERIALS

- .1 Starters: NEMA Type.
- .2 Half size starters not acceptable.
- .3 I.E.C. rated starters not acceptable.

2.2 MANUAL MOTOR STARTERS

- .1 Single and Three phase manual motor starters of size, type, rating, and enclosure type as indicated, with components as follows:
 - .1 Switching mechanism, quick make and break.
 - .2 One (1) or three (3) overload heater(s), manual reset, trip indicating handle.
- .2 Accessories:
 - .1 Toggle switch: standard.
 - .2 Indicating light: standard, red in color.
 - .3 Locking tab to permit padlocking in "ON" or "OFF" position.

2.3 MAGNETIC MOTOR STARTERS

- .1 Magnetic and combination magnetic starters with components as follows:
 - .1 Contactor, solenoid operated, rapid action type.
 - .2 Motor overload protective device in each phase, manually reset from outside enclosure.
 - .3 Wiring and schematic diagram inside starter enclosure in visible location.
 - .4 Identify each wire and terminal for external connections, within starter, with permanent number marking identical to diagram.
 - .5 Hand-off-auto selector switch.
 - .6 Full voltage non-reversing NEMA contactors in EEMAC 1 enclosure.
 - .7 Size per motor rating.
 - .8 Power and control terminals.
- .2 Combination type starters to include non-fused disconnect switch with operating lever on outside of enclosure and provision for:
 - .1 Locking in "OFF" position with up to three (3) padlocks.
 - .2 Independent locking of enclosure door.
 - .3 Provision for preventing switching to "ON" position while enclosure door open.
- .3 Accessories:
 - .1 Selector switches: standard.
 - .2 Indicating lights: standard type and colour red.
 - .3 1-N/O and 1-N/C spare auxiliary contacts unless otherwise indicated.

- .4 Control transformer: 24V.
- .5 Locking in “ON” position.
- .6 All starters for motors 5HP and larger shall have phase loss, phase reversal and low line voltage protection.

2.4 CONTROL TRANSFORMERS

- .1 Single phase, dry type, control transformer with primary voltage as indicated and secondary voltage to match control signal voltage, complete with secondary fuse, installed in with starter as indicated.
- .2 Size control transformer for control circuit load plus 20% spare capacity.
- .3 Magnetic starter designation label, white face, black core (normal), red face, yellow core (essential), Size 2 engraved as indicated.

2.5 MANUAL MOTOR SWITCHES

- .1 Manual motor switches as indicated on drawings.

2.6 FINISHES

- .1 Apply finishes to enclosure in accordance with Section 26 05 00 – Common Work Results for Electrical.

2.7 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Manual starter designation label, white face, black core (normal), Size 1, engraved as indicated.
- .3 Magnetic starter designation label, white face, black core (normal), Size 2 engraved as indicated.
- .4 Combination magnetic starter, designation label, white face, black core (normal), Size 4, engraved as indicated.

2.8 ACCEPTABLE MANUFACTURERS

- .1 Square D.
- .2 Eaton.
- .3 Siemens.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install starters, connect power and control as indicated.
- .2 Ensure correct fuses and overload device elements installed.
- .3 Install manual starters recessed where possible.

3.3 TESTS

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results for Electrical and manufacturer's instructions.
- .2 Operate switches and contactors to verify correct functioning.
- .3 Perform starting and stopping sequences of contactors and relays.
- .4 Check that sequence controls, interlocking with other separate related starters, equipment, control devices, operate as indicated.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

- .1 National Electrical Manufacturers' Association (NEMA):
 - .1 NEMA MG1-2009, Motors and Generators.
- .2 Canadian Standards Association (CSA):
 - .1 Canadian Electrical Code CSA C22.1-18.
 - .2 C282-15 Emergency Power Supply for Building.
 - .3 Only CSA certification is approved.
- .3 Canadian General Standards Board (CGSB):
 - .1 CAN/CGSB-3.6-2000, Regular Sulphur Diesel Fuel.
- .4 International Organization for Standardization (ISO):
 - .1 ISO 3046-1-2002, Reciprocating Internal Combustion Engines - Performance - Part 1: Declarations of Power, Fuel And Lubricating Oil Consumptions, And Test Methods.
- .5 The generator covered by:
 - .1 These specifications shall be designed, tested, rated, assembled and installed in strict accordance with all applicable standards of ANSI, CSA , ISO, ULC, IEEE, NEMA and shall meet requirements. No site certification is permitted for any part of assembly.
- .6 The fuel system shall meet ULC S601 – Above ground storage tanks for flammable liquids, CSA-B139 installation code for oil-burning equipment.
- .7 The diesel generator set (consisting but not limited to the diesel motor, alternator, accessories, etc.) shall meet requirements of CSA-C282-15 - Emergency Power Supply for Building.

1.3 WORK INCLUDED

- .1 System Test:
 - .1 A complete system resistive load bank test performed at the site and factory (Consultant to witness testing (Site), pay for all associated factory witnessing costs and documentation to be provided with unit.
 - .2 Site Testing to be completed to C282-15. Contractor shall provide complete testing procedure two months before generators arrive on site.

- .2 Requirements, Codes and Regulations:
 - .1 The equipment supplied shall meet the requirements of the CSA C22.1-18 and all applicable local codes and regulations including C282-15. All equipment shall be of new and current production by a manufacturer who has at least twenty-five (25) years of experience building this type of equipment.

1.4 SYSTEM DESCRIPTION

- .1 Generating system consists of:
 - .1 Diesel engine.
 - .2 Alternator.
 - .3 Alternator control panel.
 - .4 Battery charger and battery.
 - .5 Motorized damper to maintain enclosure to NFPA 110.
 - .6 Fuel supply system and fuel polishing system.
 - .7 Exhaust system.
 - .8 Steel mounting base, complete with double-walled sub-base fuel tank.
 - .9 Control panel.
 - .10 Remote annunciator.
 - .11 Start-up and Commissioning.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Division 01 – General Requirements and 26 05 00 – Common Work Results for Electrical.
- .2 Include:
 - .1 Provide method of procedures on all scope de-energizing and re-energizing electrical devices.
 - .2 Engine: make and model, with performance curves.
 - .3 Alternator: make and model.
 - .4 Voltage regulator: make, model and type.
 - .5 Battery: make, type and capacity.
 - .6 Battery charger: make, type and model.
 - .7 Alternator control panel: make and type of meters and controls.
 - .8 Governor type and model.
 - .9 Generator space ventilation system.
 - .10 Horizontal critical silencer complete with exhaust piping and flapper cover.
 - .11 Sub-base fuel tank.
 - .12 Sound attenuated enclosure.
 - .13 Flow diagrams for:
 - .1 Diesel fuel.
 - .2 Cooling air.

- .14 Dimensioned drawing showing complete generating set mounted on steel base, including vibration isolators, exhaust system, drip trays, and total weight.
- .15 Continuous full load output of set at 0.8PF lagging.
- .16 Description of set operation including:
 - .1 Automatic starting and transfer to load and back to normal power, including time in seconds from start of cranking until unit reaches rated voltage and frequency.
 - .2 Manual starting.
 - .3 Automatic shut down and alarm on:
 - .1 Over cranking.
 - .2 Over speed.
 - .3 High engine temp.
 - .4 Low lube oil pressure.
 - .5 Short circuit.
 - .6 Alternator overvoltage.
 - .7 Lube oil high temperature.
 - .8 Over temperature on alternator.
 - .4 Manual remote emergency stop.
- .17 Submit proof of local maintenance office as per clause 2.14.2.1 and 2.14.2.2.
- .18 Submit testing reports as noted 2.14.

1.6 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance data for diesel generator for incorporation into manual specified in Division 01 – General Requirements.
- .2 Include in Operation and Maintenance Manual instructions for particular unit supplied and not general description of units manufactured by supplier and:
 - .1 Operation and maintenance instructions for engine, alternator, control panel, battery charger, battery, fuel system, exhaust system and accessories, to permit effective operation, maintenance and repair.
 - .2 Technical data:
 - .1 Illustrated parts lists with parts catalogue numbers.
 - .2 Schematic diagram of electrical controls.
 - .3 Flow diagrams for:
 - .1 Fuel system.
 - .2 Lubricating oil.
 - .3 Cooling system.
 - .4 Certified copy of factory test results.
 - .5 Maintenance and overhaul instructions and schedules.
 - .6 Precise details for adjustment and setting of time delay relays or sensing controls which require on site adjustment.

1.7 EXTRA MATERIALS

- .1 Provide maintenance materials in accordance with Division 01 – General Requirements.
- .2 Include:
 - .1 Two (2) fuel filter replacement elements.
 - .2 Two (2) lube oil filter replacement elements.
 - .3 Two (2) air cleaner filter elements.
 - .4 Two (2) sets of fuses for control panel.
 - .5 Special tools for unit servicing.
 - .6 CSA282-15 logbook to track initial commissioning, and periodic testing requirements.

1.8 FACTORY TESTING

- .1 The generator set manufacturer shall perform a complete operational test on the generator set prior to shipping from the factory. A certified test report shall be provided. Equipment supplied shall be fully tested at the factory for function and performance.
- .2 Generator set factory testing on the equipment shall be performed at rated load and rated power factor. Generator sets that have not been factory tested at rated power factor will not be acceptable. Tests shall include: run at full load, maximum power, voltage regulation, transient and steady-state governing, single-step load pickup, and function of safety shutdowns.

1.9 WARRANTY

- .1 Five (5) Year Warranty:
 - .1 The manufacturer's warranty shall be for a standard five (5) year from date of initial handover of the system to the end user or 1500 operating hours, whichever comes first. Shall include material, labor, and travel expenses necessary for repairs at the job site, and expendables (lubricating oil, filters, antifreeze, and other service items made unusable by the defect) used during the course of repair. Submittals received without written warranties as specified will be rejected in their entirety.

Part 2 Products

2.1 DIESEL ENGINE

- .1 Diesel engine: to ISO 3046-1:
 - .1 Engine: standard product of current manufacturer, from company regularly engaged in production of such equipment.
- .2 Diesel, 4 cycle, liquid cooled, 1800 rpm.
- .3 Capacity:
 - .1 Rated standby power in kW at rated speed, after adjustment for system losses in auxiliary equipment necessary for engine operation; to be calculated as follows:

- .1 Engine brake horse power = min. 617.
- .2 Under following site conditions:
 - .1 Altitude: 100 m.
 - .2 Exterior rated temperature.
- .4 Cooling System:
 - .1 Liquid cooled radiator complete with pusher fan.
 - .2 Water jacket block heater complete with controller suitable to maintain block temperature for starting and transfer of load as per C282-19. Coordinate exact power requirements and connections on-site.
- .5 Fuel:
 - .1 #2 Diesel Fuel.
- .6 Fuel system: solid injection, mechanical fuel transfer pump, fuel filters and air cleaner, fuel rack solenoid energized when engine running.
- .7 Governor:
 - .1 Electronic with:
 - .1 Steady state speed band of plus or minus 0.5%.
 - .2 Speed regulation no load to full load 5% maximum.
 - .3 Electronic type, electric actuator, speed droop externally adjustable from isochronous to 5%, temperature compensated with steady state speed maintenance capability of plus or minus 0.25%.
- .8 Closed crankcase breather system.
- .9 Lubrication system:
 - .1 Pressure lubricated by engine driven pump.
 - .2 Lube oil filter: replaceable, full flow type, removable without disconnecting piping.
 - .3 Lube oil cooler.
 - .4 Engine sump drain valve.
 - .5 Oil level dip-stick.
- .10 Starting system:
 - .1 Positive shift, gear engaging starter 24VDC.
 - .2 Cranking limiter to provide 3 cranking periods of 10 s duration, each separated by 10 s rest.
 - .3 Calcium/lead antimony 24V storage battery with sufficient capacity to crank engine for 1 min at 10°C without using more than 20% of Voltage capacity as per C282 Section 7.6.1.1. Batteries shall be maintenance free but not completely sealed to permit periodic testing.

- .4 Battery charger: constant voltage, solid state, two-stage from trickle charge at standby to boost charge after use. Regulation: plus or minus 1% output for plus or minus 10% input variation. Automatic boost for 6h every 30 days. Equipped with DC voltmeter, DC ammeter and on-off switch. Minimum charger capacity: 10A.
- .11 Vibration isolated engine instrument panel with:
 - .1 Lube oil pressure gauge.
 - .2 Lube oil temperature gauge.
 - .3 Lube oil level gauge.
 - .4 Coolant temperature gauge.
 - .5 Coolant level gauge.
 - .6 Running time meter: non-tamper type.
- .12 Guards to protect personnel from hot and moving parts. Locate guards so that normal daily maintenance inspections can be undertaken without their removal.
- .13 Drip tray.

2.2 ALTERNATOR

- .1 Alternator: to NEMA MG1.
- .2 Rating: 347/600V, 3 phase, 4-wire, 60Hz, 130°C Rise, at 0.8PF:
 - .1 Rated at 750 kW/937 kVA standby duty.
 - .2 Microprocessor based controls.
- .3 Output at 40°C ambient:
 - .1 100% full load continuously as per C282 Section 6.1.1.3.
- .4 Revolving field, brushless, single bearing.
- .5 Drip proof enclosure, complete with condenser heater.
- .6 Amortisseur windings.
- .7 Synchronous type, four (4) poles.
- .8 Dynamically balanced rotor permanently aligned to engine by flexible disc coupling.
- .9 Exciter: rotating brushless permanent magnet complete with relay capable of withstanding 300% nameplate current rating for up to 105.
- .10 NEMA class H insulation on windings.
- .11 Voltage regulator: thyristor controlled rectifiers with phase controlled sensing circuit:
 - .1 Stability: 2% maximum voltage variation at any constant load from no load to full load.

- .2 Regulation: 5% maximum voltage deviation between no-load steady state and full-load steady state.
- .3 Transient: 5% maximum voltage dip on one-step application of 0.8PF full load.
- .4 Transient: 5% maximum voltage rise on one-step removal of 0.8PF full load.
- .5 Transient: 10s maximum voltage recovery time with application or removal of 0.8PF full load.
- .12 Alternator: capable of sustaining 300% rated current for period not less than ten (10) seconds permitting selective tripping of down line protective devices when short circuit occurs. Output breaker shall have auxiliary contact for fire alarm monitoring.
- .13 Unbalanced load capability of 100% of rated standby current.
- .14 All breakers with provisions for logic setting shall be included in study as per Section 26 05 00, 2.10.

2.3 CONTROL PANEL

- .1 Control panel shall meet C282 Section 7.4.
- .2 Totally enclosed, mounted height not to exceed 1.7 m above finished grade.
- .3 Digital display with keypad for local data access.
- .4 Provisions for connection to remote annunciator, remote emergency stops and fire alarm panel.
- .5 Generator pre alarms and alarms appear on digital display.
- .6 Selector switch for Run-Off-Auto.
- .7 Emergency stop.
- .8 LED indicators for:
 - .1 System Ready.
 - .2 System Pre-alarm/warning/alarm.
 - .3 Not in Auto.
 - .4 System Shutdown.
- .9 Lamp Test Button.
- .10 Alarm knowledge/silence button.
- .11 Alarm Horn.
- .12 Connection to building controls system BMS/DDC.

2.4 REMOTE ANNUNCIATOR PANEL

- .1 Remote annunciator panel shall meet C282 Section 7.4, locate at main commissionaire desk.
- .2 Provide with all safety indicators as per table 1 of C282.

2.5 GENERATOR MOUNTED INDICATOR PANEL

- .1 Provide indicator panel for all safety indicators as per C282 Table 1.
- .2 Connect all required signals for indicators as required. Coordinate with other trades as required.
- .3 Lamp test button.
- .4 Alarm horn.
- .5 Alarm knowledge/silence button.

2.6 STEEL MOUNTING BASE

- .1 Complete generating set mounted on structural steel base of sufficient strength and rigidity to protect assembly from stress or strain during transportation, installation and under operating conditions on suitable level surface.
- .2 Provide documentation showing seismic ratings of spring isolators.
- .3 Removal and adjustable spring type Isolators with adjustable side snubbers for leveling. Isolators shall be seismic rated. Provide isolators on all control and indicators panels mounted on generator.
- .4 Sound insulation pads for installation between isolators and concrete base.

2.7 EXHAUST SYSTEM

- .1 Horizontal Critical Grade Silencer. With noise reduction level at 25-30dBA.
- .2 Provide with Generator, installed within enclosure.

2.8 SOUNDPROOF ENCLOSURE

- .1 Environmental Enclosure:
 - .1 The sound attenuated weatherproof vandal resistant enclosure shall be formed (steel) construction. The design and construction shall be modular in that the side panels, doors, and louvers shall not exceed 36 inches in width and shall be a minimum thickness of 14-gauge for all component parts. The enclosure roof shall be strengthened to support the exhaust silencer. The enclosure shall provide access and visibility of instruments, controls, engine gauges, etc. Each door shall be fitted with flush-mounted same key-lock latches. All louvers shall be designed to prevent the entrance of snow, but shall have sufficient free area to allow for 120% of the total engine-generator cooling air requirements in this application.

Provide mounting brackets for the exhaust silencer and a rain skirt/collar to prevent the entrance of rain. Provide intake hood to prevent snow/ice. A 90-degree elbow shall be attached to the exhaust silencer outlet and a suitable rain cap shall be furnished. A stainless steel, seamless, flexible exhaust connector with all necessary bolts, flanges, and gaskets to mate to the engine and the exhaust silencer shall be provided. Finish paint shall be custom color selected by Owner.

Provide internal 120V service receptacles and 120V lighting for service/inspection.

- .2 The sound attenuated weatherproof vandal resistant enclosure shall meet all requirements of CSA C282-15.
- .3 Unit to allow sound levels of no greater than 74 dBA at 7.6m.
- .4 Control panel viewing window is to be safety glass.
- .5 Exhaust silencing system to be housed within enclosure.
- .6 Exterior Finish: Consist of an epoxy type covering with similar properties as spray in liners. The finish shall be corrosion resistant, heavy duty durable and applied with eco-friendly process. Testing shall be in accordance with ASTM for salt spray of 244 hours @ 5% solution and 100% humidity for 24 hr. both at 90°F.
- .7 Enclosure shall provide a minimum of 1 m access to all main electrical components. Enclosure shall have heating to maintain ambient temperature of 15°C, lighting, emergency lighting two (2) hour, convenience receptacle and load center to power auxiliary systems.

2.9 FUEL SYSTEM

- .1 Fuel Tank:
 - .1 Fuel Tank Base:
 - .1 Provide a fuel tank base with a capacity to operate the generator for twenty-four (24) hours at full load. Tank construction shall be double wall and bear the ULC-S601 label.
 - .2 The tank shall include normal vent, emergency vent, level gauge, four point lifting provisions, and an adequate stub-up space shall be provided inside the tank structure to allow underneath connection of the generator feeders. Fuel fill piping shall extend beyond enclosure complete with two (2) gallon spill containment basket with provision for locking cover. Fill pipe location shall not impede access for service or operation. Clearly indicate on shop drawings.
 - .3 To the generator. Tank shall be provided with a low fuel switch and a leak detector switch, which closes when fuel enters the interstitial space of the two (2) tanks.
 - .4 The engine's supply and return lines shall be plumbed with flexible fuel line. Provide spring type vibration isolators between the engine rails and the fuel tank base.
 - .5 Finish shall meet or exceed enclosure finish to prevent any leaks.

- .2 Fuel Filtration System:
 - .1 Provide mechanical pumping system and particulate, water block filters to polish fuel as ISO 4406, Standard.

2.10 COOLING AIR SYSTEM

- .1 Motorized dampers as per NFPA 110, to maintain enclosure at 10°C minimum.

2.11 EQUIPMENT IDENTIFICATION

- .1 Provide equipment identification in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Control panel:
 - .1 Size 4 nameplates for controls including alternator breakers and program selector switch.
 - .2 Size 2 nameplates for meters, alarms, indicating lights and minor controls.

2.12 FABRICATION

- .1 Shop assemble generating unit including:
 - .1 Base.
 - .2 Engine and radiator.
 - .3 Alternator.
 - .4 Control panel.
 - .5 Remote annunciator panel
 - .6 Indicator panel
 - .7 Battery and charger.
 - .8 Galvanized steel steps with adequate landing, handrail and mounting base to be located at each entry to enclosure.

2.13 FINISHES

- .1 Apply finishes in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Alternator control cubicle: paint inside, exterior to match engine and alternator.
- .3 Supply 0.25L of touch-up enamel.

2.14 SOURCE QUALITY CONTROL

- .1 Factory test generator set including engine, alternator, control panels and accessories. The complete generator set shall be built, tested and shipped by one manufacturer to ensure one source of supply.
 - .1 The performance of generator shall be certified by an independent testing laboratory for full power rating, stability, voltage and frequency regulation. Submit testing reports with all shop drawing submissions. Submitting after shop drawings is not permitted.

- .2 Acceptable Manufacturers:
 - .1 The manufacturers of the generator system shall have qualified local service representatives factory trained within four (4) hours of the installation site and be available upon request twenty-four (24) hours per day, seven (7) days a week. In addition, manufacturer shall have an established network or factory direct service technicians capable of service.
 - .2 Generator shall be local distributor and permanent local representatives within province of New Brunswick.
 - .3 Contactor shall supply complete set of drawings showing layout of electrical, fuel and exhaust connection locations. Drawings shall also show any other site differences that need to be considered. AutoCAD files of room layouts will be provided.
 - .4 Approved Manufacturers are:
 - .1 Kohler.
 - .2 Caterpillar.
 - .3 Cummins.
 - .4 Any other suppliers must submit complete submittal with simulated step load model a minimum of fifteen (15) days prior to bid closing date to Owner/Engineer for review. Alternate manufacturers must be approved by Owner/Engineer.

Part 3 Execution

3.1 INTEGRATED SYSTEMS TESTING

- .1 Integrated systems testing of fire protection and life safety systems will be conducted in accordance with CAN/ULC-S1001-11 Integrated Systems Testing of Fire Protection and Life Safety Systems.
- .2 All contractors are to cooperate fully during the testing process to verify and document that all interconnections between systems provided for fire protection and life safety functions are installed and operating in conformance with the design criteria.
- .3 Integrated systems testing will be conducted in the presence of, and under the direction of, the third-party Integrated Systems Testing Coordinator for the project.
- .4 Integrated systems testing will only be conducted once all systems and integration are complete and free of deficiencies and contractors have complete their required testing.
- .5 Provide all test reports and confirmation that systems are ready for testing, as requested by the Integrated Systems Testing Coordinator.
- .6 Integrated systems testing will be conducted on, but not limited to, the following equipment and systems, as applicable. Refer to testing plan to be developed by the Integrated Systems Testing Coordinator for final list.
 - .1 Fire alarm systems.
 - .2 Mass notification systems.

- .3 Elevators.
- .4 Emergency generators.
- .5 Audio visual systems.
- .6 Lighting control systems.
- .7 Notification systems.
- .8 Sprinkler systems.
- .9 Standpipe systems.
- .10 Fire pumps.
- .11 Water supplies and control valves.
- .12 Freeze protection systems.
- .13 Fixed fire suppression systems.
- .14 Hold-open devices.
- .15 Electromagnetic locks.
- .16 Smoke control systems.
- .17 Hazardous protection monitoring systems.
- .18 Smoke alarms.
- .19 HVAC systems.
- .20 Building automation systems.

3.2 INSTALLATION

- .1 Locate generating unit and install as indicated.
- .2 Complete wiring and interconnections as indicated.
- .3 Start generating set and test to ensure correct performance of components. Provide all fuel required for commissioning and start-up.

3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Notify Engineer ten (10) working days in advance of test date.
- .3 Test Generators as per C282-15.
- .4 Initial installation performance tests:
 - .1 All onsite testing of the generator shall conform to C282 Section 10.
 - .2 C282 Section 10.2.1 states that a power failure shall be simulated by opening all switches or breaker that supply the normal power to the building;
 - .3 A complete test procedure shall be supplied by the contractor, indicated what tests are being completed, in what order and what values will be recorded. This documentation shall be provided two (2) months before generator arrive on site. Consulting Engineer will provide feedback on submitted test procedure and work with Contractor to ensure quality of final test procedure.

- .4 Test procedures:
 - .1 Prepare blank forms and check sheet with spaces to record data. At top of first sheet record:
 - .1 Date.
 - .2 Generator set serial no.
 - .3 Engine, make, model, serial no.
 - .4 Alternator, make, model, serial no.
 - .5 Voltage regulator, make and model.
 - .6 Rating of generator set, kW, kVA, V, A, r/min, Hz.
 - .2 With reference to Section C282 Section 10.3 Full load Test, shall be complete with the following additional information being provided, for a minimum duration of eight (8) hours.
 - .1 Running time.
 - .2 Ambient temperature in °C.
 - .3 Lube oil pressure in kPa.
 - .4 Lube oil temperature in °C.
 - .5 Engine coolant temperature in °C.
 - .6 Exhaust stack temperature in °C.
 - .7 Alternator voltage: Phase 1, 2 and 3.
 - .8 Alternator current: Phase 1, 2 and 3.
 - .9 Power in kW.
 - .10 Frequency in Hz.
 - .11 Power Factor.
 - .12 Battery charger current in A.
 - .13 Battery voltage.
 - .14 Alternator cooling air outlet temp.
 - .3 Complete thermographic scans in accordance with commissioning procedures.
- .5 C282 Section 10.3.5(c) test shall be modified to the below load increments:
 - .1 No load to full load to no load.
 - .2 No load to 70% load to no load.
 - .3 No load to 20% load to no load.
 - .4 20% load to 40% load to no load.
 - .5 40% load to 60% load to no load.
 - .6 60% load to 80% load to no load.
- .6 After completion of load tests, demonstrate all safety indicators and shutdowns indicated in table 1 of C282. Do not subject generator to any excesses stress not required by testing. Alarm settings can be adjusted to safe values to show operation.

- .5 Demonstrate:
 - .1 Unit start, transfer to load, retransfer to normal power, unit shut down, on "Automatic" control.
 - .2 Unit start and shut down on "Manual" control.
 - .3 Unit start and transfer on "Test" control.
 - .4 Unit start on "Engine start" control.
 - .5 Operation of manual bypass switch.
 - .6 Operation of automatic alarms and shut down devices.
- .6 Once all required C282 Testing is completed, run units on building load for period of two (2) hours to show load carrying ability, stability of voltage and frequency, and satisfactory performance of dampers in ventilating system to provide adequate engine cooling.
- .7 After completion of building load test, provide 3 - 10 minute tests in fully automatic mode while each phase conductor of utility is opened, one during each test, to ensure emergency power system is capable of detecting single phase conditions.
- .8 At end of test run, check battery voltage to demonstrate battery charger has returned battery to fully charged state.
- .9 At completion of testing, Contractor shall replenish fuel and leave tank full at turn over.
- .10 Supplier shall submit test reports and data to Contractor to be included in closeout submittals.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 CSA Group (CSA):
 - .1 CSA C22.2 No.5-09 , Moulded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures (Tri-national standard with UL 489, NMX-J-266-ANCE-2010).
 - .2 CSA C22.2 No.178.1-2007, Automatic Transfer Switches.
 - .3 CAN/CSA C60044-1-07, Instrument Transformers.
- .2 National Electrical Manufacturers Association (NEMA):
 - .1 NEMA ICS 2-1996(R2009), Controllers, Contactors, and Overload Relays, Rated Not More Than 2000 Volts AC or 750 Volts DC, Part 8: Disconnect Devices for Use in Industrial Control Equipment.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Submit in accordance with Division 01 – General Requirements.
- .2 Product Data:
 - .1 Submit manufacturer's instructions, printed product literature and data sheets for transfer switches and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Shop Drawings:

Submit drawings stamped and signed by professional engineer registered or licensed in Province.

 - .1 Indicate on drawings:
 - .1 Make, model and type.
 - .2 Load classification:
 - .1 Lighting load.
 - .2 Motor load.
 - .3 Restricted use: resistance and general loads, 0.8 pf or higher.
 - .3 Single line diagram showing controls and relays.
 - .4 Description of equipment operation including:
 - .1 Automatic starting and transfer to standby unit and back to normal power.
 - .2 Test control.
 - .3 Manual control.
 - .4 Automatic shutdown.
- .4 Sustainable Design Submittals:
 - .1 Construction Waste Management:

- .1 Submit project Waste Management Plan Waste Reduction Workplan highlighting recycling and salvage requirements.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Division 01 – General Requirements.
- .2 Operation and Maintenance Data: submit operation and maintenance data for transfer switches for incorporation into manual.
- .3 Detailed instructions to permit effective operation, maintenance and repair.
- .4 Technical data:
 - .1 Schematic diagram of components, controls and relays.
 - .2 Illustrated parts lists with parts catalogue numbers.
 - .3 Certified copy of factory test results.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with manufacturer's written instructions and Division 01 – General Requirements.
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled with manufacturer's name and address.
- .3 Storage and Handling Requirements:
 - .1 Store materials off ground in dry location indoors and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
 - .2 Store and protect transfer switches from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.
- .4 Develop Construction Waste Management Plan related to Work of this Section.
- .5 Packaging Waste Management: remove for reuse and return by manufacturer of packaging materials pallets, crates, padding, as specified in Construction Waste Management Plan.

Part 2 Products

2.1 SYSTEM DESCRIPTION

- .1 Automatic load transfer equipment to:
 - .1 Monitor voltage on phases of normal power supply.
 - .2 Initiate cranking of standby generator unit on normal power failure or abnormal voltage on any one phase below preset adjustable limits for adjustable period of time.
 - .3 Transfer load from normal supply to standby unit when standby unit reaches rated frequency and voltage pre-set adjustable limits.

- .4 Transfer load from standby unit to normal power supply when normal power restored, confirmed by sensing of voltage on phases above adjustable pre-set limit for adjustable time period .
- .5 Shut down standby unit after running unloaded to cool down using adjustable time delay relay.

2.2 MATERIALS

- .1 Instrument transformers: to CAN/CSA C60044-1.
- .2 Contactors: to NEMA ICS2.

2.3 CONTACTOR TYPE TRANSFER EQUIPMENT

- .1 Contact Type Transfer Equipment: to CSA C22.2 No.178.1.
- .2 Two – 3 and 4 single pole contactors mounted on common frame, in double throw arrangement, mechanically and electrically interlocked, open type with CSA enclosure solenoid motor operated.
- .3 Rated: as indicated.
- .4 Main contacts: silver surfaced, protected by arc disruption means.
- .5 Switch and relay contacts, coils, spring and control elements accessible for inspection and maintenance from front of panel without removal of switch panel or disconnection of drive linkages and power conductors.
- .6 Auxiliary contact: gold silver plated, to initiate emergency generator start-up on failure of normal power.
- .7 Fault withstand rating: to match the largest upstream Fault rating.
- .8 Lever to operate switch manually when switch is isolated.
- .9 Neutral bar, rated: to match current rating.
- .10 Overlapping neutral contacts on contactor type transfer equipment.

2.4 CONTROLS

- .1 Selector switch - 3 position "Auto" "Test", "Auto", "Engine start":
 - .1 Test position - normal power failure simulated. Engine starts and transfer takes place. Return switch to "Auto" to stop engine.
 - .2 Auto position - normal operation of transfer switch on failure of normal power; retransfers on return of normal voltage and shuts down engine.
 - .3 Engine start position - engine starts but unit will not transfer unless normal power supply fails. Switch must be returned to "Auto" to stop engine.
- .2 Control transformers: dry type with 120 V secondary to isolate control circuits from:
 - .1 Normal power supply.

- .2 Emergency power supply.
- .3 Relays: continuous duty, industrial control type, with wiping action contacts rated 10A minimum:
 - .1 Voltage sensing: 3-phase for normal power and on one phase only for emergency, solid state type, adjustable drop out and pick up, close differential, 2V minimum under voltage and over voltage protection.
 - .2 Time delay: normal power to standby, adjustable solid state, 5 to 180 s 0 to 60 s 20 s to ten (10) minutes.
 - .3 Time delay on engine starting to override momentary power outages or dips, adjustable solid state, 0 to 60 s 3 to 20 s delay.
 - .4 Time delay on retransfer from standby to normal power, adjustable 20 s to ten (10) minutes 5 to 180 s 0 to 60 s.
 - .5 Time delay for engine cool-off to permit standby set to run unloaded after retransfer to normal power, adjustable solid state , 0 to 60 s 20 s intervals to ten (10) minutes 5 s intervals to 180 s.
 - .6 Time delay during transfer to stop transfer action in neutral position to prevent fast transfer, adjustable, 5 s intervals to 180 s.
 - .7 Frequency sensing, to prevent transfer from normal power supply until frequency of standby unit reaches preset adjustable values.
 - .8 Neutral disconnected position delay: allow time for motors to delay between live sources, adjustable, 0 to 5 s.
- .4 Solid state electronic in-phase monitor.

2.5 ACCESSORIES

- .1 Ensure pilot lights indicate power availability normal and standby, switch position, green for normal, red for standby, mounted in panel remote.
- .2 Plant exerciser: 168 hours timer to start standby unit once each week for selected interval but does not transfer load from normal supply transfers load to emergency supply and retransfers to normal supply on standby unit shutdown. Timer adjustable 0 - 168 hours in fifteen (15) minute intervals.
- .3 Instruments:
 - .1 Digital Analogue true RMS, indicating type 2% accuracy, flush panel mounting:
 - .1 Voltmeter: ac, scale as recommended by manufacturer.
 - .2 Ammeter: ac, scale as recommended by manufacturer.
 - .3 Frequency meter: scale 55 to 65 Hz.
- .4 Voltmeter selector switch: rotary, maintained contacts, panel mounting type, round notched handle, four position, labelled "OFF-Phase A-Phase B-Phase C".
- .5 Potential transformers - dry type for indoor use:
 - .1 Ratio: 600 to 120.
 - .2 Rating: 600V, 60Hz, BIL

- .3 Accuracy rating: standard.
- .6 Ammeter selector switch: rotary, maintained contacts, panel-mounting type, designed to prevent opening of current circuits, round notched handle, four position labelled "OFF - Phase A - Phase B - Phase C".
- .7 Current transformers - dry type for indoor use:
 - .1 Ratio: as recommended by manufacturer.
 - .2 Rating: 600V, 60Hz, BIL
 - .3 Accuracy rating: as recommended by manufacturer.
 - .4 Positive action automatic short- circuiting device in secondary terminals.
- .8 Manual bypass and isolator: to normal supply to emergency supply to both supplies.

2.6 EQUIPMENT IDENTIFICATION

- .1 Identify equipment in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Control panel:
 - .1 For selector switch and manual switch: Size 5, four (4) nameplates.
 - .2 For meters, indicating lights, minor controls: use Size 2 three (3) nameplates.
 - .3 Nameplates to include: sources, loads, current/voltage rating, and essential or standby power.

2.7 SOURCE QUALITY CONTROL

- .1 Complete equipment, including transfer mechanism, controls, relays and accessories factory assembled and tested in presence of Consultant.
- .2 Notify Consultant five (5) days' minimum in advance of date of factory test.
- .3 Tests:
 - .1 Operate equipment both mechanically and electrically to ensure proper performance.
 - .2 Check selector switch, in modes of operation Test, Auto, Manual, Engine Start and record results.
 - .3 Check voltage sensing and time delay relay settings.
 - .4 Check:
 - .1 Automatic starting and transfer of load on failure of normal power.
 - .2 Retransfer of load when normal power supply resumed.
 - .3 Automatic shutdown.
 - .4 In-phase monitor operation.

Part 3 Execution

3.1 INTEGRATED SYSTEMS TESTING

- .1 Integrated systems testing of fire protection and life safety systems will be conducted in accordance with CAN/ULC-S1001-11 Integrated Systems Testing of Fire Protection and Life Safety Systems.
- .2 All contractors are to cooperate fully during the testing process to verify and document that all interconnections between systems provided for fire protection and life safety functions are installed and operating in conformance with the design criteria.
- .3 Integrated systems testing will be conducted in the presence of, and under the direction of, the third-party Integrated Systems Testing Coordinator for the project.
- .4 Integrated systems testing will only be conducted once all systems and integration are complete and free of deficiencies and contractors have complete their required testing.
- .5 Provide all test reports and confirmation that systems are ready for testing, as requested by the Integrated Systems Testing Coordinator.
- .6 Integrated systems testing will be conducted on, but not limited to, the following equipment and systems, as applicable. Refer to testing plan to be developed by the Integrated Systems Testing Coordinator for final list.
 - .1 Fire alarm systems.
 - .2 Mass notification systems.
 - .3 Elevators.
 - .4 Emergency generators.
 - .5 Audio visual systems.
 - .6 Lighting control systems.
 - .7 Notification systems.
 - .8 Sprinkler systems.
 - .9 Standpipe systems.
 - .10 Fire pumps.
 - .11 Water supplies and control valves.
 - .12 Freeze protection systems.
 - .13 Fixed fire suppression systems.
 - .14 Hold-open devices.
 - .15 Electromagnetic locks.
 - .16 Smoke control systems.
 - .17 Hazardous protection monitoring systems.
 - .18 Smoke alarms.
 - .19 HVAC systems.
 - .20 Building automation systems.

3.2 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for transfer switches installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant of unacceptable conditions immediately upon discovery.
 - .3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Consultant.

3.3 INSTALLATION

- .1 Locate, install and connect transfer equipment as indicated.
- .2 Check relays solid-state monitors and adjust as required to ensure correct operation.
- .3 Install and connect remote alarms battery.

3.4 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results for Electrical.
- .2 Energize transfer equipment from normal power supply.
- .3 Set selector switch in "Test" position to ensure proper standby start, running, transfer, retransfer. Return selector switch to "Auto" position to ensure standby shuts down.
- .4 Set selector switch in "Manual" position and check to ensure proper performance.
- .5 Set selector switch in "Engine start" position and check to ensure proper performance. Return switch to "Auto" to stop engine.
- .6 Set selector switch in "Auto" position and open normal power supply disconnect. Standby should start, come up to rated voltage and frequency, and then load should transfer to standby. Allow to operate for 10 minutes, then close main power supply disconnect. Load should transfer back to normal power supply and standby should shutdown.
- .7 Repeat, at one (1) hour intervals.

3.5 CLEANING

- .1 Progress Cleaning: clean in accordance with Division 01 – General Requirements:
 - .1 Leave Work area clean at end of each day.
- .2 Final Cleaning: upon completion, remove surplus materials, rubbish, tools and equipment in accordance with Division 01 – General Requirements.
- .3 Waste Management: separate waste materials for reuse recycling in accordance with Division 01 – General Requirements.

- .1 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

- .1 American National Standards Institute (ANSI):
 - .1 ANSI C82.1-2004, Electric Lamp Ballasts-Line Frequency Fluorescent Lamp Ballast.
 - .2 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE):
 - .1 ANSI/IEEE C62.41-1991, IEEE Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.
 - .3 United States of America, Federal Communications Commission (FCC):
 - .1 FCC (CFR47) EM and RF Interference Suppression.
 - .4 Illuminating Engineering Society of North America (IESNA):
 - .1 IESNA LM-79-08.

1.3 SUBMITTALS

- .1 Submit shop drawings for each of the following:
 - .1 Luminaires.
 - .2 Drivers.
 - .3 Poles.
- .2 Luminaire shop drawings shall indicate: housing construction, driver type, reflector type, lens type and photo metrics.
- .3 Driver shop drawings shall indicate: driver type, and input power.
- .4 Submit complete photometric data prepared by independent testing laboratory for luminaires where specified, for review by Consultant.

1.4 QUALITY ASSURANCE

- .1 LED Luminaires shall be provided with a five (5) year warranty covering LED's, drivers, parts and mechanical components.

1.5 EXTRA MATERIALS

- .1 Provide maintenance materials in accordance with Division 01 – General Requirements.
- .2 Provide copy of receipts of maintenance materials in operation and maintenance manuals.

Part 2 Products

2.1 TECHNICAL REQUIREMENTS FOR LED LUMINAIRES

- .1 Electrical:
 - .1 Power Factor: The Luminaire shall have a power factor of 0.90 or greater.
 - .2 THD: Total harmonic distortion (current and voltage) induced into an AC power line by a Luminaire shall not exceed 20 percent.
- .2 Photometric Requirements:
 - .1 All photometric data will be measured by the IESNA LM-79-08 standard.
 - .2 Illuminance: The illuminance shall not decrease by more than 30% over the **expected operating life**.
 - .3 Light Color/Quality: The luminaire shall have a correlated color temperature (CCT) as indicated in luminaire schedule. The color rendition index (CRI) shall be 80 or greater.
- .3 Thermal Management:
 - .1 The thermal management of the heat generated by the LEDs shall be of sufficient capacity to assure proper operation of the Luminaire over the **expected useful life**.

2.2 LUMINAIRES

- .1 Refer to Luminaire Schedule on drawings.

Part 3 Execution

3.1 INTEGRATED SYSTEMS TESTING

- .1 Integrated systems testing of fire protection and life safety systems will be conducted in accordance with CAN/ULC-S1001-11 Integrated Systems Testing of Fire Protection and Life Safety Systems.
- .2 All contractors are to cooperate fully during the testing process to verify and document that all interconnections between systems provided for fire protection and life safety functions are installed and operating in conformance with the design criteria.
- .3 Integrated systems testing will be conducted in the presence of, and under the direction of, the third-party Integrated Systems Testing Coordinator for the project.
- .4 Integrated systems testing will only be conducted once all systems and integration are complete and free of deficiencies and contractors have complete their required testing.
- .5 Provide all test reports and confirmation that systems are ready for testing, as requested by the Integrated Systems Testing Coordinator.
- .6 Integrated systems testing will be conducted on, but not limited to, the following equipment and systems, as applicable. Refer to testing plan to be developed by the Integrated Systems Testing Coordinator for final list.

- .1 Fire alarm systems.
- .2 Mass notification systems.
- .3 Elevators.
- .4 Audio visual systems.
- .5 Lighting control systems.
- .6 Notification systems.
- .7 Sprinkler systems.
- .8 Standpipe systems.
- .9 Fire pumps.
- .10 Water supplies and control valves.
- .11 Freeze protection systems.
- .12 Fixed fire suppression systems.
- .13 Hold-open devices.
- .14 Electromagnetic locks.
- .15 Smoke control systems.
- .16 Smoke alarms.
- .17 HVAC systems.
- .18 Building automation systems.

3.2 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.3 INSTALLATION

- .1 Locate and install luminaires as indicated.

3.4 WIRING

- .1 Connect luminaires to lighting circuits as indicated.

3.5 LUMINAIRE SUPPORTS

- .1 Provide all supports and brackets for mounting luminaries. Confirm mounting method for all luminaires with Engineer prior to rough-in.

3.6 LUMINAIRE ALIGNMENT

- .1 Align luminaries mounted in continuous rows to form straight uninterrupted line.
- .2 Align luminaries mounted individually parallel or perpendicular to building grid lines.
- .3 All flush trims on recessed pot lights to be flat/flush to finished ceiling.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

1.2 SUBMITTALS

- .1 Submit Shop Drawings in accordance with Section 26 05 00 – Common Work Results for Electrical.

1.3 REFERENCES

- .1 Canadian Standards Association (CSA International):
 - .1 CSA C22.2 No.141 (R2012), Unit Equipment for Emergency Lighting.

1.4 GUARANTEE

- .1 Provide a written guarantee stating that all batteries for emergency lighting are guaranteed against defects in material and workmanship for a period of five years, from the date of the Substantial Completion.

1.5 DELIVERY

- .1 Deliver batteries in dry state unless hermitically sealed.

Part 2 Products

2.1 BATTERY UNITS

- .1 Supply voltage: 120/347V.
- .2 Output voltage: 12 VDC.
- .3 Operating time: thirty (30) minutes minimum.
- .4 Battery: sealed, maintenance free, ten (10)-year life.
- .5 Charger: solid state, multi-rate, voltage/current regulated, inverse temperature compensated, short circuit protected with regulated output of plus or minus 0.01V for plus or minus input variations.
- .6 Solid state transfer circuit.
- .7 Low voltage disconnect: solid state, modular, operates at 80% battery output voltage.
- .8 Signal lights: solid state, life expectancy 100,000 hour minimum, for AC Power On and High Charge.
- .9 Lamp heads: as indicated.

- .10 Cabinet: complete with knockouts for conduit. Removable or hinged front panel for easy access to batteries.
- .11 Automatic self-diagnostic circuitry.
- .12 Auxiliary equipment:
 - .1 Lamp disconnect switch.
 - .2 Test switch.
 - .3 Battery disconnect device.
 - .4 AC input and DC output terminal blocks inside cabinet.
 - .5 Bracket.

2.2 REMOTE UNITS

- .1 Refer to luminaire schedule on drawings.

2.3 WIRING OF REMOTE HEADS

- .1 Conduit: to section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.
- .2 Conductors: type RW90 to section 26 05 21 – Wires and Cables 0-1000V, and in accordance with manufacturer's recommendations. Voltage drop shall not exceed 3%.

2.4 ACCEPTABLE MANUFACTURERS

- .1 Refer to luminaire schedule.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install battery units and remote units as indicated.
- .2 Aim heads to illuminate path of egress in corridors and as indicated in open areas.
- .3 Mount directly to wall or ceiling as indicated.
- .4 Connect to lighting circuit of area served in accordance with CEC 46-304 (4) and 46- 400 (20). Provide relays as required.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.

1.2 REFERENCES

- .1 Canadian Standards Association (CSA International):
 - .1 CSA C22.2 No.141-02, Unit Equipment for Emergency Lighting.
 - .2 CSA C860-01 (December 2002), Performance of Internally-Lighted Exit Signs.
- .2 National Building Code of Canada 2015 (NBC 2015).

1.3 SUBMITTALS

- .1 Submit Shop Drawings in accordance with Section 26 05 00 – Common Work Results for Electrical.

Part 2 Products

2.1 EXIT SIGNS

- .1 Exit signs: to CSA C22.2 No.141, CSA C860 and NBC 2015 compliant.
- .2 Housing: 1.0 mm thick, extruded aluminum face, white finish.
- .3 Face and back plates: cast aluminum alloy.
- .4 Lamps: white LED, 25-year life, 5 watt max total consumption, solid-state board.
- .5 Pictogram type, green on white (or lightly tinted background) running man with arrow graphic viewable (where required).
- .6 Two (2) exit signs required where bi-directional arrows are indicated.
- .7 Mounting as indicated.
- .8 Single and double face units, as indicated.
- .9 Supply voltage: 120/347V.
- .10 Face plate to remain captive for re-lamping.

2.2 ACCEPTABLE MANUFACTURERS

- .1 Refer to luminaire schedule on drawings.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions and datasheets.

3.2 INSTALLATION

- .1 Install exit lights as indicated in accordance with NBC 2015, local regulatory requirements, NFPA Standard and Listing Requirements.
- .2 Connect exit lights to circuits as indicated.
- .3 Ensure that exit light circuit breakers are locked in ON position. Provide lock-on devices.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.
- .3 Section 26 05 28 – Grounding – Secondary.

1.2 REFERENCES

- .1 American National Standards Institute:
 - .1 ANSI J-STD-607-A-2002, Joint Standard - Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.
- .2 Telecommunications Industries Association (TIA)/Electronic Industries Alliance (EIA):
 - .1 TIA/EIA-606-2002, Administration Standard for the Commercial Telecommunications Infrastructure.
- .3 U.S. Department of Labor/Occupational Safety and Health Administration (OSHA):
 - .1 Nationally Recognized Testing Laboratory (NRTL).

1.3 SYSTEM DESCRIPTION

- .1 Telecommunications grounding and bonding system consisting of grounding bus bars, bonding backbones, and other bonding conductors.
- .2 Provides ground reference for telecommunications systems within building and bonding to ground of equipment in telecommunications rooms.
- .3 Metallic pathways, cable shields, conductors, and hardware within telecommunications spaces are bonded to telecommunications grounding and bonding system.

Part 2 Products

2.1 TELECOMMUNICATIONS MAIN GROUNDING BUSBAR (TMGB)

- .1 Predrilled copper bus bar, listed by NRTL with holes 8 mm (1/3”) diameter for use with standard-sized lugs to: ANSI J-STD-607-A.
- .2 Dimensions 6 mm thick, 100 mm wide, 600 mm long (1/4” thick, 4” wide, 24” long) to: ANSI J-STD-607-A.

2.2 TELECOMMUNICATIONS GROUNDING BUSBARS (TGB)

- .1 Predrilled copper bus bar, listed by NRTL with holes 8 mm (1/3”) diameter for use with standard-sized lugs to: ANSI J-STD-607-A.
- .2 Dimensions 6 mm thick, 50 mm wide, 600 mm long (1/4” thick, 2” wide, 24” long) to: ANSI J-STD-607-A.

2.3 BONDING CONDUCTOR FOR TELECOMMUNICATIONS

- .1 Copper conductor, green insulated, size as indicated to: ANSI J-STD-607-A.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 TELECOMMUNICATIONS MAIN GROUNDING BUSBAR (TMGB)

- .1 Install TMGB on insulated supports 50 mm (2") high close to telephone backboard.

3.3 TELECOMMUNICATIONS GROUNDING BUSBARS (TGB)

- .1 Install one TGB in each communications room.
- .2 Install copper bonding conductor, size as indicated, from each TGB to TMGB.

3.4 BONDING CONDUCTORS GENERAL

- .1 When placed in ferrous metallic conduit or EMT, bond one end of conduit or EMT using grounding bushing.

3.5 BONDING CONDUCTOR FOR TELECOMMUNICATIONS

- .1 Install bonding conductor for telecommunications, size as indicated, from TMGB to service equipment (power) ground.
- .2 Use approved two (2)-hole compression lugs for connection to TMGB.

3.6 BONDING TO TMGB

- .1 Bond metallic communications raceways terminated at the telephone backboard to TMGB using #6 AWG green insulated copper conductor.
- .2 For communications cables near telephone backboard having shield or metallic member, bond shield or metallic member to TMGB.
- .3 Bond equipment racks and cabinets near telephone backboard to TMGB using #6 AWG green insulated copper conductor.

3.7 BONDING TO TGB

- .1 Bond metallic communications raceways in communications rooms to the corresponding TGB using #6 AWG green insulated copper conductor.
- .2 For communications cables within communications rooms having shield or metallic member, bond shield or metallic member to the corresponding TGB.

- .3 Bond equipment racks and cabinets located in communications rooms to the corresponding TGB using #6 AWG green insulated copper conductor.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.
- .3 Section 26 05 31 – Splitters, Junction and Pull Boxes.
- .4 Section 26 05 32 – Outlet Boxes, Conduit Boxes and Fittings.
- .5 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

1.2 SYSTEM DESCRIPTION

- .1 Raceway system for communications systems consisting of outlet boxes, cover plates, conduits, pull boxes, fish wires, cable tray and overhead J-hook distribution system.

Part 2 Products

2.1 MATERIAL

- .1 Conduits: In accordance with Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.
- .2 Junction and pull boxes: in accordance with Section 26 05 31 – Splitters, Junction and Pull Boxes.
- .3 Outlet boxes, conduit boxes and fittings: in accordance with Section 26 05 32 – Outlet Boxes, Conduit Boxes and Fittings.
- .4 Fish wire: polypropylene type.
- .5 J-hooks: Cooper B-line #BCH21X or approved equal.
- .6 Cable tray: (Wire Basket):
 - .1 Carbon steel wire, ASTM A 510, Grade 1008. Wire welded, bent, and surface treated after manufacture.
 - .2 Finish for Carbon Steel Wire after welding and bending of mesh to be Electrodeposited Zinc Plating: ASTM B 633, Type III, SC-1.
 - .3 Cable tray will consist of continuous, rigid, welded steel wire mesh cable management system, to allow continuous ventilation of cables and maximum dissipation of heat, with UL Classified splices where tray acts as Equipment Grounding Conductor (EGC).
 - .4 Provide splices, supports, and other fittings necessary for a complete, continuously grounded system.
 - .5 Mesh: 50 x 100 mm (2" x 4").
 - .6 Straight Section Lengths: 3,000 mm (118").

- .7 Fittings: Wire mesh cable tray fittings are field-fabricated from straight tray sections, in accordance with manufacturer's instructions and Item 2.3.
- .8 CF Series Cable Tray Size:
 - .1 Depth: Cable tray depth will be (unless otherwise shown on drawings) 100 mm (4").
 - .2 Width: Cable tray width will be (unless otherwise shown on drawings) 600 mm (24").
 - .3 Length: Cable tray length will be 3000 mm (118 inches) unless otherwise shown on drawings.
 - .4 Fill Ratio: Cable tray may be filled to (40%) of total fill capacity. Size cable tray to accommodate future cabling changes or additions.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install fish wire, outlet boxes, pull boxes, coverplates, conduit, cable tray, J-hooks, miscellaneous and positioning material to constitute a complete system, in preparation for cable installation under this contract.
- .2 Cable Tray (Wire Basket):
 - .1 Supply and install wire basket for conveyance of communications system cabling within communications rooms.
 - .2 Maximum length of unsupported communications wire basket shall be 1500 mm (60").
 - .3 Coordinate locations of wire basket supports with other trades to ensure that they are easily accessible.
 - .4 Ground cable trays at end of continuous run.
- .3 J-Hooks:
 - .1 Supply and install J-hooks for conveyance of communications system cabling from individual conduit stubs to communications rooms.
 - .2 Maximum length of unsupported communications cabling shall be 900 mm (36").
 - .3 J-hooks shall be spaced not more than 1500 mm (60") apart.
 - .4 Coordinate locations of J-hooks with other trades to ensure that they are easily accessible.
 - .5 J-hooks shall only be installed in accessible ceiling spaces and in service rooms.

- .4 Conduits:
 - .1 Provide conduits for conveyance of communications system cabling as follows:
 - .1 In ceiling spaces that are not accessible (i.e. above gypsum board ceilings).
 - .2 In public areas that have exposed (open) ceilings.
 - .3 For all fiber optic cables.
- .5 Voice/Data Outlets:
 - .1 Provide a 100mm x 100mm (4" x 4") flush-mounted outlet box complete with square single-gang tile ring.
 - .2 Provide minimum 21mm (3/4") EMT conduit from outlet box to accessible corridor ceiling space or to nearest cable tray complete with pull rope and grounding bushing.
 - .3 Bond conduit grounding bushing to nearest power conduit using #12AWG bare solid copper.
- .6 Data outlets for wireless access points:
 - .1 Provide a 100 mm x 100 mm (4" x 4") surface-mounted outlet box in accessible ceiling space complete with square single-gang tile ring.
 - .2 Provide conduit and bonding as indicated in Article 3.2.4.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Section 26 05 32 – Outlet Boxes, Conduit Boxes and Fittings.
- .2 Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.

1.2 SYSTEM DESCRIPTION

- .1 Audio/video wiring system and equipment consisting of pre-terminated audio/video cables, modules, device plates, adapters, speakers, amplifier and equipment rack.

1.3 SUBMITTALS

- .1 Provide shop drawings in accordance with Division 01 – General Requirements.

Part 2 Products

2.1 MATERIALS

- .1 Conduit: EMT to Section 26 05 34 – Conduits, Conduit Fastenings and Conduit Fittings.
- .2 Outlet boxes, conduit boxes and fittings: to Section 26 05 32 - Outlet Boxes, Conduit Boxes and Fittings.

2.2 HDMI VIDEO/AUDIO OUTLETS

- .1 HDMI adapters mounted in decorator style white device plates.
- .2 Supporting HDMI v1.4a and 1080p video.

2.3 HDMI VIDEO/AUDIO CABLES

- .1 Pre-terminated HDMI cables supporting 1080p video.
- .2 Length to suit.
- .3 Quantity as required to provide connections between all HDMI outlets (refer to drawings).

2.4 PATCH CORDS

- .1 Patch cords shall be supplied and installed by Contractor.

2.5 COVER PLATES

- .1 Cover plates to be stainless steel decora style.

2.6 RCA AUDIO OUTLET

- .1 RCA female to IDC Audio insert mounted in a three port (3) decora style white device plate.

2.7 AUDIO RACK

- .1 Provide 19” swing out audio rack complete with all required components for a complete and working A/V system including paging, audio and announcing.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 INSTALLATION

- .1 Install audio/video cables in continuously bonded conduit. Do not exceed maximum pulling tension as per manufacturer’s recommendations.
- .2 Provide all required components, accessories and mounting hardware for a complete and working system.
- .3 Install audio/video devices in outlet boxes as indicated on drawings.

3.3 TESTS

- .1 Perform tests in accordance with Section 26 05 00 - Common Work Results - Electrical and manufacturer's instructions.
- .2 Test all audio/video cables and provide test results.

3.4 COMMISSIONING

- .1 Contractors are required to complete the commissioning, field quality assurance and testing and performance verification as outlined in this and subsequent sections.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.

1.2 SYSTEM DESCRIPTION

- .1 The system shall be capable of controlling access at doors as shown on drawings. It shall be integrated with a security alarm system to allow for monitoring addressable motion sensors and panic stations button in Administration. If panic button in administration is activated, door holders on selected doors (as indicated on riser) shall release and doors shall lock. Also, egress door power supplies and barrier free door operators shall be disabled on all exterior doors located in defined areas as well as locking electrical strikes for exterior door in defined area. In addition, all blue lockdown strobes shall activate and continue to operate until lockdown is cleared at keypad with correct code. User shall be capable of activating normal operation of door access system schedule via occupied keyed switch, located in staff entrance. When occupied keyed switch is manually activated by user (e.g. after hours, holidays, weekends), exterior controlled doors will remain locked and will not release under any circumstance. When the keyed switch is inactivated by the user, the building's door access system will operate under normal programmed sequence. In addition a video intercom master station in the Reception Area shall be interfaced with the door access system to allow for release of inner and outer main vestibule doors by the video intercom master station.

1.3 SUBMITTALS

- .1 Submit shop drawings and product data in accordance with Division 01 – General Requirements.
- .2 Include schematic, wiring and interconnection diagrams.

1.4 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance data for all security components for incorporation into manual specified in Division 01 – General Requirements.

1.5 QUALITY ASSURANCE

- .1 The manufacturer shall be a firm regularly engaged in the manufacture door access control systems and ancillary equipment, of types and capacities required, whose products have been in satisfactory use in similar services for not less than three (3) years.
- .2 The system installer shall be a firm with at least five (5) years of successful installation experience with projects utilizing specified system and equipment required for this project. A list of three (3) projects of similar size shall be made available, if requested.
- .3 All items of equipment including wire and cable shall be designed by the manufacturer to function as a complete system and shall be accompanied by the manufacturer's complete service notes and drawings detailing all interconnections.

.4 The contractor shall be an established communications and electronics Contractor that has had and currently maintains a locally run and operated business for at least five years. The Contractor shall be a duly authorized distributor of the equipment supplied with full manufacturer's warranty privileges.

.5 The Contractor shall show satisfactory evidence, upon request, that they maintain a fully equipped service organization capable of furnishing adequate inspection and service to the system. The Contractor shall maintain at their facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.

Part 2 Products

2.1 GENERAL DESCRIPTION

.1 The system shall consist of network controllers, reader controllers, proximity readers, door contacts, motion sensors, security alarm panel, panic buttons, keypads and software.

2.2 READER CONTROLLER

.1 Reader controller features:

- .1 Supports two (2), four (4), six (6) or eight (8) doors, as indicated.
- .2 Two (2) supervised RS485 communication ports.
- .3 On board diagnostics.
- .4 Eight (8) supervised input circuits.
- .5 One (1) dedicated fire alarm input.
- .6 12V DC battery back-up, complete with charger.
- .7 Acceptable product: MIRCOM TX3 or equal.

.2 Input/Output controller features:

- .1 Supports thirty-two (32) inputs and thirty-two (32) outputs ports, fully selectable as inputs or outputs.
- .2 Supports up to twenty-four (24) input and sixty (60) output form C relays, SPDT 2A at 30VDC, dry contacts.
- .3 Thirty-two (32) supervised circuits.

2.3 PROXIMITY READER

.1 Card reader features:

- .1 Microprocessor based.
- .2 Reader head: proximity type.
- .3 Read range: 220 mm (9").
- .4 Power supply: 5-12V DC.
- .5 Operating temperature: -30°C to 65°C.
- .6 Confirmation: tri color visible LED, audible beeper.
- .7 Tamper switch.

- .8 Enclosure: weatherproof polycarbonate, black.
- .9 Provide owner with remote controls for parking garage – two (2)/suites.
- .10 Allow for extra credentials to cover hotel parking demands.
- .11 Acceptable product: SR-2400-GR-MP or equal.

2.4 POWER SUPPLY

- .1 ULC listed.
- .2 120V AC output.
- .3 Dual outputs: 12 or 24V.
- .4 Four (4) zones.
- .5 Battery with charger, 5 or 3 amp capacity.
- .6 LED power indicator.
- .7 Jumper selectable auto or manual reset (set auto at factory).
- .8 Acceptable manufacturer: Rutherford Controls #10-5-PPD-FT or equal.

2.5 EMERGENCY PHONE STATION

- .1 Programmable inputs and outputs.
- .2 Allows for integration with CCTV and other devices.
- .3 Call and Emergency Buttons complete with Braille label.
- .4 Surface mounting with weather hood.
- .5 Vandal resistant stainless steel construction.
- .6 Direct connections to security desk of guard phone.
- .7 VOIP capabilities.
- .8 Complete with Ethernet Port gateway up to forty-eight (48) ports.

2.6 WIRING

- .1 All wiring shall be as recommended by the manufacturer, and shall be run in conduit.

2.7 CARDS AND MANAGEMENT SOFTWARE

- .1 Supply and install management software to code management personnel on user supplied PC. Ensure software is compatible with existing user system.

- .2 Supply one hundred thirty (130) proximity cards to user. Provide two (2) cards and garage remote per suite for residential.
- .3 Provide capabilities to lock and unlock main door via a cell phone App.

Part 3 Execution

3.1 INTEGRATED SYSTEMS TESTING

- .1 Integrated systems testing of fire protection and life safety systems will be conducted in accordance with CAN/ULC-S1001-11 Integrated Systems Testing of Fire Protection and Life Safety Systems.
- .2 All contractors are to cooperate fully during the testing process to verify and document that all interconnections between systems provided for fire protection and life safety functions are installed and operating in conformance with the design criteria.
- .3 Integrated systems testing will be conducted in the presence of, and under the direction of, the third-party Integrated Systems Testing Coordinator for the project.
- .4 Integrated systems testing will only be conducted once all systems and integration are complete and free of deficiencies and contractors have complete their required testing.
- .5 Provide all test reports and confirmation that systems are ready for testing, as requested by the Integrated Systems Testing Coordinator.
- .6 Integrated systems testing will be conducted on, but not limited to, the following equipment and systems, as applicable. Refer to testing plan to be developed by the Integrated Systems Testing Coordinator for final list.
 - .1 Fire alarm systems.
 - .2 Elevators.
 - .3 Audio visual systems.
 - .4 Lighting control systems.
 - .5 Notification systems.
 - .6 Sprinkler systems.
 - .7 Standpipe systems.
 - .8 Fire pumps.
 - .9 Water supplies and control valves.
 - .10 Freeze protection systems.
 - .11 Fixed fire suppression systems.
 - .12 Hold-open devices.
 - .13 Electromagnetic locks.
 - .14 Hazardous protection monitoring systems.
 - .15 Smoke alarms.
 - .16 HVAC systems.

.17 Building automation systems.

3.2 INSTALLATION

- .1 Locate security devices as indicated and make interconnections in accordance with manufacturer's requirements.
- .2 All security devices shall be mounted in recessed boxes, and all wiring run concealed.
- .3 Program software to function in accordance with the Owner's requirements.
- .4 The final programming and/or identification shall use room numbers which will be assigned by the user. The room numbers used on the contract drawings shall not be used unless advised otherwise.

3.3 TESTING

- .1 The complete system shall be tested and verified to confirm that it is operating in conformance with the manufacturer's requirements and the intentions of this specification.
- .2 Provide a certificate from the manufacturer verifying that each component is functioning properly and that the system is functioning as intended.

3.4 TRAINING

- .1 The Contractor shall provide a minimum of five (5) hours of in-service training with this system. These sessions shall be broken into segments which will facilitate the training of individuals in the operation of this system. Operators Manuals and Users Guides shall be provided prior to the time of this training. Segments shall as a minimum consist of the following periods: Upon completion of the installation, after six (6) weeks use of the system and during the last month of the warranty period.

END OF SECTION

Part 1 General

1.1 SYSTEM DESCRIPTION

- .1 The closed circuit television system shall consist of wiring, cameras, power supplies, monitor, keyboard and UPS (per rack), as well as a network recorder and software.

1.2 CARE, OPERATION AND START-UP

- .1 Provide instructions in accordance with Division 01 – General Requirements.
- .2 Manufacturers representative shall verify, adjust and balance the system, and include four (4) eight (8) hours to instruct personnel in the operation and maintenance of the system.

1.3 REFERENCE STANDARDS

- .1 Canadian Standards Association (CSA International):
 - .1 CSA C22.1-2009, Canadian Electrical Code, Part 1 (21st edition) Safety Standard for Electrical Installations.
 - .2 CAN/CSA-C22.3 No.1-M87 (R1997), Overhead Systems.
- .2 Underwriters Laboratories of Canada (ULC):
 - .1 ULC-S317, Installation and Classification of Closed Circuit Video Equipment (CCVC) Systems for Institutional and Commercial Security Systems.

1.4 DEFINITIONS

- .1 CCTV: Closed Circuit Television.
- .2 CCVC: Closed Circuit Video.
- .3 CCD: Charge Coupled Device.
- .4 FOV: Field of View.

1.5 DESIGN PERFORMANCE REQUIREMENTS

- .1 Alarm point monitoring: System capable, upon alarm recognition, of switching CCTV cameras associated with alarm point.
- .2 Switching:
 - .1 Provision to switch any camera in system to any monitor in system manually or automatically.
 - .2 Provision to switch system video recorders to selective monitor outputs in system.
- .3 Enter and edit CCTV programs and save them for future use.
- .4 Set dwell time for viewing of any camera picture.
- .5 Define sequence for viewing cameras on each monitor.

- .6 Bypass cameras in system during sequencing to monitor.
- .7 Provide ability to display stored 'video image' of cardholder, and switch real-time camera to card reader location for specific card usage.
- .8 Overall control of CCTV provided through software control, from administration PC's which provides complete integration of security components as well as remote access from off-site location as dictated by user.
- .9 Environment: Design video components and systems to operate with all specified requirements under following ambient temperatures:
 - .1 Indoor installations:
 - .1 Temperature: 0°C to 30°C.
 - .2 Humidity: 10 to 90%.
 - .2 Outdoor installations:
 - .1 Temperature: -40°C to 60°C.
 - .2 Humidity: 10 to 100%.

1.6 SUBMITTALS AND SHOP DRAWINGS

- .1 Product Data: Submit manufacturer's printed product literature, specifications and datasheet in accordance with Division 01 – General Requirements.
- .2 Shop Drawings: Submit in accordance Division 01 – General Requirements:
 - .1 Submit shop drawings to indicate project layout, camera locations, point-to-point diagrams, cable schematics, risers, mounting details and identification labeling scheme including:
 - .1 Functional description of equipment.
 - .2 Technical data sheets of all devices.
 - .3 Device location plans and cable lists.
 - .4 Video camera surveillance chart.
 - .5 Video interconnection detail drawings.
- .3 Samples: Submit in accordance with Division 01 – General Requirements:
 - .1 Submit one sample of each camera selected complete with housing, brackets and mounting hardware.
 - .2 Camera will be returned for incorporation into work as appropriate.
- .4 Quality Assurance:
 - .1 The manufacturer shall be a firm regularly engaged in the manufacture of integrated closed circuit television systems and ancillary equipment, of types and capacities required, whose products have been in satisfactory use in similar services for not less than three (3) years.
 - .2 The system installer shall be a firm with at least five (5) years of successful installation experience with projects utilizing integrated closed circuit television systems and equipment similar to that required for this project.

- .3 A list of three (3) projects of similar size shall be made available, if requested.
 - .4 All items of equipment including wire and cable shall be designed by the manufacturer to function as a complete system and shall be accompanied by the manufacturer's complete service notes and drawings detailing all interconnections.
 - .5 The contractor shall be an established communications and electronics Contractor that has had and currently maintains a locally run and operated business for at least five (5) years. The Contractor shall be a duly authorized distributor of the equipment supplied with full manufacturer's warranty privileges.
 - .6 The Contractor shall show satisfactory evidence, upon request, that he maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system. The Contractor shall maintain at his facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.
 - .7 Installation of system and cabling shall be by the same company.
 - .8 One (1) year warranty to include hardware and software coverage including all software updates during the year.
- .5 Quality Assurance Submittals: Submit the following in accordance with Division 01 – General Requirements.
- .1 Test Reports: Submit certified test reports from approved independent testing laboratories indicating compliance with specifications for specified performance characteristics and physical properties.
 - .2 Certificates: Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .1 Submit UL Product safety Certificates.
 - .2 Submit verification Certificate that service company is "UL Listed alarm service company".
 - .3 Submit verification Certificate that video surveillance system is "Certified alarm system".
 - .1 Instructions: Submit manufacturer's installation instructions.
 - .2 Manufacturer's Field Services: Submit copies of manufacturer's field reports.
- .6 Maintenance Data: Submit maintenance data for incorporation into manual specified in Division 01 – General Requirements. Include following:
- .1 System configuration and equipment physical layout.
 - .2 Functional description of equipment.
 - .3 Instructions on operation, adjustment and cleaning.
 - .4 Illustrations and diagrams to supplement procedures.
 - .5 Manufacturer's operation instructions

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Division 01 – General Requirements.

Part 2 Products

2.1 MATERIALS

.1 Interior Cameras:

- .1 Interior cameras shall include but not be limited to the following features:

- .1 Internet protocol 10/100 base T.
- .2 1/4" progress scan RGB CMOS.
- .3 VDC: 12V, VAC: 24, POE: IEEE802.3af Class 2 compliant.
- .4 2.0 mega pixel, day/night 1280(H) x 720(V).
- .5 1/ 2.7' progressive scan CMOS.
- .6 Image compression method (MPEG-4 Part 10/AVC), motion JPEG.
- .7 Focal length: 3-9 mm.
- .8 Angle of View: 35-98 degree.
- .9 Auto iris (direct drive).
- .10 Acceptable product: Avigilon #2.0 MP-H3-D01, or approved equivalent by Axis Communications.

- .2 Interior Camera Dome features:

- .1 In ceiling mount T-Bar or drywall.
- .2 Totally enclosed.
- .3 Black opaque dome with clear window.
- .4 Vandal resistant and IP66 compliant.
- .5 Body: Aluminum.
- .6 Acceptable product: Avigilon #H3-D0P-Smoke, Samsung "SNV" Series or approved equivalent.

.2 Exterior Cameras:

- .1 Exterior cameras shall include but not be limited to the following features:

- .2 Type "A"

- .1 Internet protocol 10/100 base T.
- .2 ¼" progress scan RGB CMOS.
- .3 VDC: 12 V, VAC: 24, POE: IEEE802.3af Class 2 compliant.
- .4 5.0 mega pixel, day/night 2592 (H) x 1944 (V).
- .5 1/2.7' progressive scan CMOS.
- .6 Image compression method (MPEG-4 Part 10/AVC), motion JPEG.
- .7 Focal length: 3-9 mm.
- .8 Angle of View: 28-84 degree.
- .9 Auto iris (direct drive).

- .10 Acceptable product: Avigilon #5.0 MP-H3-DP1, Samsung “SNV” Series or approved equivalent by Axis Communications.
- .3 Exterior camera dome features:
 - .1 Pendant Mount.
 - .2 Totally enclosed.
 - .3 Black opaque dome with clear window.
 - .4 Vandal resistant and IP66 compliant.
 - .5 Body: Cast aluminum.
 - .6 Acceptable product: Avigilon #H3-DOP-Smoke & MNT-PEND-WALL or approved equivalent.
- .3 Network Video Recorder:
 - .1 Network video recorder features:
 - .1 Input voltage 120V AC.
 - .2 Operating system: Windows Embedded Standard.
 - .3 Video inputs: 32 cameras. Camera channels: up to 128.
 - .4 Recorder rate: 32 MB/S, up to 30 images per second per camera.
 - .5 Hard Disk Drive Configuration: Hot-swappable RAID 5.
 - .6 Processor: Intel Xeon Processor E5-2407.
 - .7 Memory: 12GB RAM.
 - .8 Network Interface: Two (2) Gigabit Ethernet RJ-45 ports (1000Base-T).
 - .9 Optical drive: DVD/RW.
 - .10 Display 1, 4, 9 or 16 cameras simultaneously.
 - .11 On screen pan/tilt/zoom control.
 - .12 Rack mounted.
 - .13 Storage Requirement: Thirty (30) days recording at 50% / twelve (12) hours daily motion at seven (7) images per second with expansion of 20% based on using two (2) megapixel camera. Must provide storage calculations for any alternates.
 - .14 Acceptable product: Avigilon #XXX TB-HD-NVR or equivalent by IRTVision.
 - .15 IONODES “Cirrus CR5-1U4” shall be considered an approved alternate, given the following requirements: Memory shall be upgraded to 12GB.

2.2 MONITOR

- .1 Monitor features:
 - .1 610 mm LED monitor.
 - .2 Resolution: 1920 x 1200.
 - .3 Contrast ratio: 1000:1.
 - .4 Input voltage: 120V AC.
 - .5 On-screen display for setup and adjustment.
 - .6 DVI-D and Display Port.
 - .7 Front mounted controls.
 - .8 Construction: black plastic.
 - .9 Acceptable product: DELL U2413, or approved equal.

- .10 Stand by, low-profile, plug-and-play configuration.
- .11 Two (2) year warranty.

2.3 UPS

- .1 120V UPS features:
 - .1 Standby, low profile, plug-and-play configuration.
 - .2 Power Rating: to provide one (1) hour of backup.
 - .3 Allow for supply and installation of one (1) UPS per rack.
 - .4 Rack mountable.
 - .5 Two (2) year warranty.
- .2 Acceptable product: Eaton “5P” Series.

2.4 JUNCTION BOX

- .1 Metal, sized to handle all system conduit interconnections with appropriate expansion.

2.5 WIRING

- .1 All wiring shall be Cat 6 (purple) in cable tray or on j hooks as recommended by manufacturer. Connect directly to camera at device end with eight (8) pin connector.

2.6 SOFTWARE

- .1 Install operational software on three (3) PC’s for Administrative Assistant, Principal, Vice-Principal and Remote Workstation. System shall also be capable of remote access via remote IP interface. Software shall be Avigilon Control Centre Enterprise Edition, Milestone Xprotect Professional or approved alternate.

2.7 REMOTE VIEWING WORKSTATIONS

- .1 Two monitor remote workstations:
 - .1 Desktop/Tower Form complete with mouse, keyboard and supports two high-resolution monitors.
 - .2 Comes with Avigilon VMS Software.
 - .3 Intel Xeon Processor E3-12200V2.
 - .4 Memory 4GB Ram.
 - .5 Viewing Streams: up to 72.
 - .6 Viewing Rate: up to 10 MB/s.
 - .7 Windows 7 OS (min.).
 - .8 KVM Switch.
 - .9 Keyboard.
 - .10 Mouse.
- .2 Acceptable Product: 2MN-HD-RMWS or equivalent.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and datasheet.

3.2 INSTALLATION

- .1 Install equipment in accordance with manufacturer's recommendations, and to instructions and wiring diagrams obtained from the manufacturer prior to roughing-in.
- .2 Run all cable concealed above ceiling.
- .3 Interconnect cameras to monitor, network recorder and POE switch.
- .4 Make all adjustments to installed equipment including orientation, and aiming.
- .5 Program cameras and sequence of operation to owners' requirements.
- .6 Make final camera lense adjustments to owners' requirements.
- .7 Make all network connections and configurations.
- .8 Final programming and/or identification shall use room name or numbers as assigned by the users. Do not use room numbers from contract drawings unless advised otherwise.

3.3 FIELD QUALITY CONTROL

- .1 Manufacturer's Services:
 - .1 Have manufacturer of products, supplied under this Section, review work involved in the handling, installation/application, protection and cleaning, of its products and submit written reports, in acceptable format, to verify compliance of work with contract.
 - .2 Manufacturer's Field Services: Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
 - .3 Schedule site visits, to review work, at stages listed:
 - .1 After delivery and storage of products, and when preparatory work, or other work, on which the work of this Section depends, is complete but before installation begins.
 - .2 Twice during progress of work at 25% and 60% complete.
 - .3 Upon completion of the work, after cleaning is carried out.
 - .4 Obtain reports, within three (3) days of review, and submit, immediately, to Consultant.

3.4 VERIFICATION

- .1 Perform verification inspections and tests.
 - .1 Perform tests in accordance with Section Division 01 – General Requirements.
 - .2 Test complete system including, control, signal strength, picture quality, and camera coverage.
- .2 Visual verification: Objective is to assess quality of installation and assembly and overall appearance to ensure compliance with Contract Documents. Visual inspection to include:
 - .1 Sturdiness of equipment fastening.
 - .2 Non-existence of installation related damages.
 - .3 Compliance of device locations with reviewed shop drawings.
 - .4 Compatibility of equipment installation with physical environment.
 - .5 Inclusion of all accessories.
 - .6 Device and cabling identification.
- .3 Technical verification: Purpose to ensure that all systems and devices are properly installed and free of defects and damage. Technical verification includes:
 - .1 Measurements of voltage and power.
 - .2 Connecting joints and equipment fastening.
 - .3 Measurements of signals (dB, lux, baud rate, etc).
 - .4 Compliance with manufacturer's specification, product literature and installation instructions.

3.5 CLEANING AND ADJUSTING

- .1 Remove protective coverings from cameras and components.
- .2 Adjust cameras for correct function.
- .3 Clean camera housing, system components and lens, free from marks, packing tape, and finger prints, in accordance with manufacturer's written cleaning recommendations.

3.6 TRAINING

- .1 The Contractor shall provide a minimum of four (4) eight (8) hours of in-service training with this system. These sessions shall be broken into segments which will facilitate the training of individuals in the operation of this system.
- .2 Operators Manuals and Users Guides shall be provided prior to the time of this training. Segments shall as a minimum consist of the following periods: Upon completion of the installation, after six (6) weeks use of the system and during the last month of the warranty period.

END OF SECTION

Part 1 General

1.1 RELATED SECTIONS

- .1 Division 01 – General Requirements.
- .2 Section 26 05 00 – Common Work Results for Electrical.
- .3 Section 26 05 21 – Wires and Cables – 0 – 1000V.

1.2 REFERENCES

- .1 Government of Canada:
 - .1 NBC-2015, National Building Code of Canada.
 - .2 CSA C22.1-21, Canadian Electrical Code, Part 1 (25th Edition).
- .2 Underwriters' Laboratories of Canada (ULC):
 - .1 CAN/ULC-S524-2014, Installation of Fire Alarm Systems.
 - .2 ULC-S525-2007, Audible Signal Devices for Fire Alarm.
 - .3 CAN/ULC-S526-2007, Visual Signal Appliances.
 - .4 CAN/ULC-S527-2011, Control Units.
 - .5 CAN/ULC-S528-2005, Manual Pull Stations.
 - .6 CAN/ULC-S529-2009, Smoke Detectors.
 - .7 CAN/ULC-S530-2007, Heat Actuated Fire Detectors.
 - .8 CAN/ULC-S531-2007, Smoke Alarms.
 - .9 CAN/ULC-S536-2013, Inspection and Testing of Fire Alarm Systems.
 - .10 CAN/ULC-S537-2013, Verification of Fire Alarm Systems.
 - .11 CAN/ULC-S548-2008, Devices and Accessories for Water Type Extinguishers Systems.
 - .12 CAN/ULC-S561, Signal-receiving devices.

1.3 SYSTEM DESCRIPTION

- .1 Fully supervised, microprocessor-based, fire alarm system utilizing digital techniques for data control and digital, and multiplexing techniques for data transmission.
- .2 System to carry out fire alarm and protection functions; including receiving alarm signals; initiating general alarm; supervising components and wiring; actuating annunciators and auxiliary functions; initiating trouble signals and signalling to monitoring agency.
- .3 Zoned, single stage.
- .4 Modular in design to allow for future expansion.
- .5 Operation of system shall not require personnel with special computer skills.

- .6 System to include:
 - .1 Central Control Unit in separate enclosure with power supply, stand-by batteries, central processor with microprocessor and logic interface, main system memory, input-output interfaces for alarm receiving, annunciation/display, and program control/signalling; master telephone, microphone with necessary switches and controls.
 - .2 Power supplies.
 - .3 Initiating/input circuits.
 - .4 Output circuits.
 - .5 Auxiliary circuits.
 - .6 Manual and automatic initiating devices.
 - .7 Audible and visual signalling devices with voice reproducing capability.
 - .8 End-of-line resistors and isolating modules as required.
 - .9 Local and Remote annunciators.
 - .10 Event log memory chip.
 - .11 Historic event recorder.

1.4 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 26 05 00 – Common Work Results for Electrical and Division 01 – General Requirements.
- .2 Include:
 - .1 Detail assembly and internal wiring diagrams for control units.
 - .2 Overall system riser wiring diagram identifying control equipment, initiating zones, signaling circuits; identifying terminations, terminal numbers, conductors and raceways.
 - .3 Details for devices.
 - .4 Details and performance specifications for control, annunciation and peripherals with item by item cross reference to specification for compliance.
 - .5 Step-by-step operating sequence, cross referenced to logic flow diagram.
 - .6 Detailed annunciator and control panel layout.

1.5 QUALITY ASSURANCE

- .1 Inspection tests to conform to: CAN/ULC-S536.
- .2 Submit inspection report, to Engineer.
- .3 The manufacturer shall be a firm regularly engaged in the manufacture of fire alarm systems and ancillary equipment, of types and capacities required, whose products have been in satisfactory use in similar services for not less than three (3) years.

- .4 The system installer shall be a firm with at least five years of successful installation experience with projects utilizing fire alarm systems and equipment identical to that required for this project. A listing of three (3) projects of similar size shall be provided (if requested), including location, contact person, and telephone number.
- .5 All items of equipment including wire and cable shall be designed by the manufacturer to function as a complete system and shall be accompanied by the manufacturer's complete service notes and drawings detailing all interconnections.
- .6 The contractor shall be an established fire alarm system Contractor that has had and currently maintains a locally run and operated business for at least five (5) years. The Contractor shall be a duly authorized distributor of the equipment supplied with full manufacturer's warranty privileges.
- .7 The Contractor shall show satisfactory evidence, upon request, that he maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system. The Contractor shall maintain at his facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.

1.6 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance data for fire alarm system for incorporation into manual specified in Division 01 – General Requirements.
- .2 Include:
 - .1 Instructions for complete fire alarm system to permit effective operation and maintenance.
 - .2 Technical data - illustrated parts lists with parts catalogue numbers.
 - .3 Copy of approved shop drawings with corrections completed and marks removed except review stamps.
 - .4 List of recommended spare parts for system.

1.7 REGULATORY REQUIREMENTS

- .1 System:
 - .1 Subject to FC approval.
 - .2 Subject to FC inspection for final acceptance.
- .2 System components: listed by ULC and comply with applicable provisions of National Building Code, Local/Provincial Building Code, and meet requirements of local authority having jurisdiction, and office of the Fire Marshall.

1.8 WARRANTY

- .1 Warranty all work for a period of one (1) year from data of substantial completion. Warranty shall cover parts and labour.

1.9 MAINTENANCE

- .1 Provide one (1) year's free maintenance with two inspections by manufacturer during warranty period. Inspection test to conform to CAN/ULC-S536. Submit inspection report to the owner.

1.10 TRAINING

- .1 Provide one (1) day(s) of on-site lectures and demonstration by fire alarm equipment manufacturer to train operational personnel in use of maintenance of fire alarm system. These sessions shall be broken into segments which will facilitate the training of individuals in the operation of this system. Operators Manuals and Users Guides shall be provided prior to the time of this training. Segments shall as a minimum consist of the following periods: Upon completion of the installation, after six weeks use of the system and during the last month of the warranty period. All training shall be Bilingual.
- .2 Provide training video.
- .3 Training session format, contents and schedule to be approved by Owner.

Part 2 Products

2.1 DESCRIPTION

- .1 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.
- .2 Power supply: to CAN/ULC-S524.
- .3 Audible signal devices: to ULC-S525.
- .4 Visual signal devices: to CAN/ULC-S526.
- .5 Control unit: to CAN/ULC-S527.
- .6 Manual pull stations: to CAN/ULC-S528.
- .7 Thermal detectors: to CAN/ULC-S530.
- .8 Smoke detectors: to CAN/ULC-S529.
- .9 Digital Communicator with GSM backup per CAN/ULC-S561

2.2 SYSTEM OPERATION: SINGLE STAGE – SIGNALS ONLY

- .1 Actuation of any alarm-initiating device to:
 - .1 Cause electronic latch to lock-in alarm state at central control unit and data gathering panel/transponder.
 - .2 Indicate zone of alarm at central control unit and remote annunciator display.
 - .3 Cause audible signaling devices to sound continuously throughout building and at central control unit.

- .4 Transmit signal to fire department via central station master fire alarm box.
- .5 Cause air conditioning and ventilation fans to shut down or to function to provide required control of smoke movement.
- .6 Cause fire doors and smoke control doors, if normally held open, to close automatically.
- .7 Cause elevators to return to floor of egress, or to alternate floor, as required.
- .2 Acknowledging alarm: indicated at central control unit.
- .3 Ensure that it is possible to silence signals by "alarm silence" switch at control unit, after sixty (60) seconds period of operation.
- .4 Subsequent alarm, received after previous alarm has been silenced, to re-activate signals.
- .5 Actuation of supervisory devices to:
 - .1 Cause electronic latch to lock-in supervisory state at central control unit and data gathering panel/transponder.
 - .2 Indicate respective supervisory zone at central control unit and at remote annunciator display.
 - .3 Cause audible signal at central control unit to sound.
 - .4 Activate common supervisory sequence.
- .6 Resetting alarm supervisory device not to return system indications/functions back to normal until control unit has been reset.
- .7 Trouble on system to:
 - .1 Indicate circuit in trouble at central control unit.
 - .2 Activate "system trouble" indication, buzzer and common trouble sequence. Acknowledging trouble condition to silence audible indication; whereas visual indication to remain until trouble is cleared and system is back to normal.
- .8 Trouble on system: suppressed during course of alarm.
- .9 Trouble condition on any circuit in system not to initiate alarm conditions.

2.3 CONTROL PANEL

- .1 Central control unit (CCU):
 - .1 Suitable for DCLA communication style: to CAN/ULC-S524.
 - .2 Features specified are minimum requirements for microprocessor-based system with digital data control and digital multiplexing techniques for data transmission.
 - .3 Minimum capacity of 318 addressable monitoring and control/signal points. Points may be divided between two (2) communication channels in distributed system, each channel operating independently of other. Faults on one (1) communication channel not to affect operation of other.

- .4 System to provide for priority reporting levels, with fire alarm points assigned highest priority, supervisory and monitoring lower priority, and third priority for troubles. Possible to assign control priorities to control points in system to guarantee operation or allow emergency override as required.
- .5 Integral power supply, battery charger and standby batteries, complete with TVSS protection.
- .6 All system operational software is to be stored in FLASH memory. Future systems software upgrades including system and device application code, operating system changes and audio WAV file digitized messages must be achieved by downloading software from a laptop on-site. Replacement of electronic components including burning new chips (IC) is not acceptable.
- .7 System programming shall use advanced Windows TM-based System Definition Utility with Program Version Reporting to document any and all changes made during system start-up or system commissioning. Time and date Stamps of all modifications made to the program must be included to allow full retention of all previous program version data. All field editing shall be password protected.
- .8 Circuitry to continuously monitor communications and data processing cycles of microprocessor. Upon failure, audible and visual trouble indication to activate.
- .9 Equipped with software routines to provide Event-Initiated-Programs (EIP); change in status of one or more monitor points, may be programmed to operate any or all of system's control points.
- .10 Software and hardware to maintain time of day, day of week, day of month, month and year.
- .11 Software to operate variable-sensitivity addressable smoke detectors and announce their status and sensitivity settings at control panel.
- .12 Panel mounted large two (2) line, eighty (80) character backlit LCD Display.
- .13 Fire department relay wired to dialer
- .14 Surface Mounted.

2.4 POWER SUPPLIES

- .1 120V, 60Hz as primary source of power for system.
- .2 Voltage regulated, current limited distributed system power.
- .3 Primary power failure or power loss (less than 102V) will activate common trouble sequence.
- .4 Interface with battery charger and battery to provide uninterruptible transfer of power to standby source during primary power failure or loss.
- .5 During normal operating conditions fault in battery charging circuit, short or open in battery leads to activate common trouble sequence and standby power trouble indicator.
- .6 Standby batteries: sealed, maintenance free.

- .7 Continuous supervision of wiring for external initiating and alarm circuits to be maintained during power failure.

2.5 INITIATING/ INPUT CIRCUITS

- .1 Receiving circuits for alarm initiating devices such as manual pull stations, smoke detectors, heat detectors and water flow switches, wired in DCLA configuration to central control unit.
- .2 Alarm receiving circuits (active and spare): compatible with smoke detectors and open contact devices.
- .3 Actuation of alarm initiating device: cause system to operate as specified in "System Operation".
- .4 Receiving circuits for supervisory, N/O devices. Devices: wired in DCLA configuration to central control unit.
- .5 Actuation of supervisory initiating device: cause system to operate as specified in "System Operation".

2.6 ALARM OUTPUT CIRCUITS

- .1 Alarm output circuit: connected to signals wired in Class B configuration to central control unit:
 - .1 Signal circuits' operation to follow system programming; capable of sounding horns. Each signal circuit: rated at 2A, 24 VDC, fuse-protected from overloading/overcurrent.
 - .2 Manual alarm silence, automatic alarm silence and alarm silence inhibit to be provided by system's common control.

2.7 AUXILIARY CIRCUITS

- .1 Auxiliary contacts for control functions.
- .2 Actual status indication (positive feedback) from controlled device.
- .3 Alarm, supervisory and trouble on system to cause operation of programmed auxiliary output circuits.
- .4 Two sets of separate contacts for elevator capture (to main floor of egress and to alternate floor of egress).
- .5 Upon resetting system, auxiliary contacts to return to normal or to operate as pre-programmed.
- .6 Fans: stagger-started upon system reset; timing circuit to separate starting of each fan or set of fans connected to auxiliary contact on system. Timing circuit: controlled by CCU.
- .7 Auxiliary circuits: rated at 2A, 24V DC or 120V AC, fuse-protected.

2.8 WIRING

- .1 Copper conductors.
- .2 To initiating circuits: 18AWG minimum, and in accordance with manufacturer's requirements.
- .3 To signal circuits: 16AWG minimum, and in accordance with manufacturer's requirements.
- .4 To control circuits: 14AWG minimum, and in accordance with manufacturer's requirements.

2.9 MANUAL ALARM STATIONS

- .1 Intelligent manual pull station.
 - .1 One stage.
 - .2 Break glass operation.
 - .3 Non-volatile memory.
 - .4 Automatic device mapping.
 - .5 Electronic addressing.
 - .6 Integral microprocessor.
 - .7 French and English markings.
 - .8 Standard of Acceptance:
 - .1 Notifier Model NBG-12LX.

2.10 AUTOMATIC ALARM INITIATING DEVICES

- .1 Intelligent photoelectric/thermal sensor:
 - .1 Integrates photoelectric smoke, and fixed temperature heat sensing technologies.
 - .2 Non-volatile memory.
 - .3 Automatic device mapping.
 - .4 Electronic addressing.
 - .5 Environmental compensation.
 - .6 Integral microprocessor.
 - .7 Self diagnostic.
 - .8 Twin status LED'S.
 - .9 Polyethylene vapour barrier extender over detector backbox where required.
 - .10 Standard of Acceptance:
 - .1 Notifier Model FAPT-851A.
- .2 Intelligent photoelectric smoke detector (duct smoke detectors only):
 - .1 Integral microprocessor.
 - .2 Non-volatile memory.
 - .3 Automatic device mapping.

- .4 Electronic addressing.
- .5 Environmental compensation.
- .6 Identification of dirty or defective detectors.
- .7 Twin status LED's.
- .8 Standard detector mounting base.
- .9 Standard of Acceptance:
 - .1 Notifier Model FSP-851A.
- .10 Intelligent duct smoke detector housing:
 - .1 High impact plastic housing with clear cover Notifier DNRA.
 - .2 Intelligent analog duct sensor.
 - .3 Sampling tubes.
- .3 Intelligent control relay module:
 - .1 One N/O, N/C contact.
 - .2 Rated two (2) amps at 24V (0.5V at 120V).
 - .3 Non-volatile memory.
 - .4 Automatic device mapping.
 - .5 Electronic addressing.
 - .6 Integral microprocessor.
 - .7 Twin status LED'S.
 - .8 Standard of Acceptance:
 - .1 Notifier Model FRM-1A.
- .4 Intelligent input module:
 - .1 Non-volatile memory.
 - .2 Automatic device mapping.
 - .3 Electronic addressing.
 - .4 Integral microprocessor.
 - .5 Twin status LED's.
 - .6 Single or dual module addresses.
 - .7 Standard of Acceptance:
 - .1 Notifier model FMM-1A or FDM-1A.

2.11 SIGNAL DEVICES

- .1 Horn/Strobe:
 - .1 Field configurable dB level.
 - .2 Field configurable candela output (15 to 110cd).
 - .3 Flush wall mounted.
 - .4 24V DC.
 - .5 Red housing with "FIRE" marking.

- .6 Standard of Acceptance:
 - .1 Notifier model P2RA-B.
- .2 Strobe:
 - .1 Field configurable candela output (15-110 cd).
 - .2 Flush wall mount.
 - .3 24V.
 - .4 Red front plate with “Fire” Marking.
 - .5 Standard of Acceptance:
 - .1 Notifier Model SRA-B.

2.12 REMOTE ANNUNCIATORS

- .1 LCD/LED type, with designation cards to indicate zones.
- .2 Display:
 - .1 Alarms and troubles for alarm initiating circuits.
 - .2 Supervisory alarms and troubles for supervisory initiating circuits.
 - .3 Common system trouble.
- .3 Trouble buzzer:
 - .1 Acknowledging trouble at main panel to silence trouble buzzers in system.
- .4 Supervised, with LED test button and alarm trouble acknowledge button.
- .5 Minimum wiring configuration with main panel and other remote annunciators.
- .6 Standard of Acceptance:
 - .1 Notifier Model LCD-80/ACM.

2.13 END-OF-LINE DEVICES

- .1 End-of-line devices to control supervisory current in alarm circuits and signalling circuits, sized to ensure correct supervisory current for each circuit. Open, short or ground fault in any circuit will alter supervisory current in that circuit, producing audible and visible alarm at main control panel and remotely as indicated.

2.14 AUTOMATIC DIGITAL DIALER

- .1 Automatic digital dialer:
 - .1 Dual line dialer.
 - .2 Primary and secondary telephone line connections.
 - .3 Automatic verification of communications between fire alarm panel and receiving equipment.
 - .4 Transmits zone alarm, supervisory and trouble conditions to digital alarm communicator receiver station.
 - .5 Dialer status LED.

- .6 Dialer enable/disable switch.
- .7 Two communication formats 20PPS 3/2 or 4/2 format.
- .8 Wireless backup communication capable.
- .9 Standard of acceptance:
 - .1 DSCKIT32-412HC complete with;
 - .2 DSC Model 3G2060R; Wireless alarm communicator.

2.15 PASSIVE GRAPHIC DISPLAYS

- .1 Provide passive graphic display(s) on white photo bond paper in metal frame(s) with polycarbonate or Plexiglas glazing. In compliance with NFPA-72 6-2.3, the graphic(s) shall be designed and fabricated and installed in a manner to render them damage and tamper resistant.
- .2 The display(s) shall be securely attached to the wall adjacent to the fire alarm annunciator panel(s) and near the main fire alarm panel. The labelling on the graphic must closely correspond to the displays on the fire alarm annunciator or the labels for each fire panel alarm indication.
- .3 Each graphic display must be oriented to match the direction of the location at which it is to be posted, i.e., oriented to the direction in which the person viewing the display is facing. All wording shall be in English and French. The floor plan drawing is to indicate:
 - .1 The building outline showing all exterior doors.
 - .2 The building's corridors, stairways and elevators.
 - .3 The location of and divisions between the fire alarm zones.
 - .4 The location of the main fire alarm panel (and annunciators where relevant).
 - .5 The location of the main sprinkler system valve and the supervised valve for each sprinkler zone. (Use of a legend and symbols is recommended).
 - .6 The duct smoke detector locations and zone numbers, where relevant. (Use of a legend and symbols is recommended).
 - .7 Symbol Legend.
 - .8 Kitchen fire suppression system, where relevant.
 - .9 The air sampling smoke detection system locations and zone numbers.
 - .10 An accurate "You are here" indicator.

2.16 ANCILLARY DEVICES

- .1 Remote relay unit to initiate fan shutdown.

2.17 MANUFACTURERS

- .1 Standard of Acceptance:
 - .1 Notifier.
- .2 Other acceptable Manufacturers:
 - .1 Siemens.

- .2 Simplex Grinnell.
- .3 Edwards.

Part 3 Execution

3.1 INTEGRATED SYSTEMS TESTING

- .1 Integrated systems testing of fire protection and life safety systems will be conducted in accordance with CAN/ULC-S1001-11 Integrated Systems Testing of Fire Protection and Life Safety Systems.
- .2 All contractors are to cooperate fully during the testing process to verify and document that all interconnections between systems provided for fire protection and life safety functions are installed and operating in conformance with the design criteria.
- .3 Integrated systems testing will be conducted in the presence of, and under the direction of, the third-party Integrated Systems Testing Coordinator for the project.
- .4 Integrated systems testing will only be conducted once all systems and integration are complete and free of deficiencies and contractors have complete their required testing.
- .5 Provide all test reports and confirmation that systems are ready for testing, as requested by the Integrated Systems Testing Coordinator.
- .6 Integrated systems testing will be conducted on, but not limited to, the following equipment and systems, as applicable. Refer to testing plan to be developed by the Integrated Systems Testing Coordinator for final list.
 - .1 Fire alarm systems.
 - .2 Elevators.
 - .3 Audio visual systems.
 - .4 Lighting control systems.
 - .5 Notification systems.
 - .6 Sprinkler systems.
 - .7 Standpipe systems.
 - .8 Fire pumps.
 - .9 Water supplies and control valves.
 - .10 Freeze protection systems.
 - .11 Fixed fire suppression systems.
 - .12 Hold-open devices.
 - .13 Electromagnetic locks.
 - .14 Hazardous protection monitoring systems.
 - .15 Smoke alarms.
 - .16 HVAC systems.
 - .17 Building automation systems.

3.2 INSTALLATION

- .1 Install systems to CAN/ULC-S524.
- .2 Install central control unit and connect to ac power supply, AC and DC standby power.
- .3 Install manual alarm stations and connect to alarm circuit wiring.
- .4 Locate and install detectors and connect to alarm circuit wiring. Do not mount detectors within 1 m of air outlets. Maintain at least 600 mm radius clear space on ceiling, below and around detectors. Locate duct type detectors in straight portions of ducts.
- .5 Connect alarm circuits to main control panel.
- .6 Install signaling devices to ULC-S525 and visual signal devices to CAN/ULC-S526 and connect to signalling circuits.
- .7 Connect signalling circuits to main control panel.
- .8 Install end-of-line devices at end of alarm and signalling circuits as required.
- .9 Install remote annunciator panels and connect to annunciator circuit wiring.
- .10 Install door releasing devices.
- .11 Install remote relay units to control fan shut down.
- .12 Sprinkler system: wire alarm and supervisory switches and connect to control panel.
- .13 Connect fire suppression systems to control panel.
- .14 Splices are not permitted.
- .15 Provide necessary raceways, cable and wiring to make interconnections to terminal boxes, annunciator equipment and CCU, as required by equipment manufacturer.
- .16 Ensure that wiring is free of opens, shorts or grounds, before system testing and handing over.
- .17 Identify circuits and other related wiring at central control unit, annunciators, and terminal boxes.
- .18 Electrical contractor and fire alarm system manufacturer shall cooperate with the owner in order to establish addressable device annunciation labels that are mutually acceptable.

3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 00 – Common Work Results for Electrical and CAN/ULC – S537.

- .2 On completion of all the work shown on drawings and described herein, the fire alarm system shall be in perfect working order.
- .3 To ensure that all components are working properly, the Electrical Contractor shall arrange an inspection of the installation by ULC approved, factory trained personnel. This inspection shall be so arranged so as to coincide with the Sprinkler System Inspection, to ensure that both systems are functioning properly, and shall also include other commissioning teams.
- .4 The approved ULC supplier shall make an inspection of the fire alarm system, including those components necessary to the direct operation of the system, such as manual stations, smoke detectors, sprinkler monitoring devices and signaling devices. The inspection shall comprise an examination of such equipment for the following:
 - .1 That the wiring connection to all equipment components is correct and meet CAN/ULC-S524 and CSA requirements.
 - .2 That equipment is installed in accordance with the approved ULC supplier's recommendations, and that all devices (where possible without destructive testing) have been operated and/or tested to verify their operation.
 - .3 That the supervisory wiring of those items of equipment connected to a supervised circuit, is operating properly and that the Governmental Regulations, if any, concerning such supervisory wiring, have been met to the satisfaction of the Inspecting Officials.
 - .4 All such tests and inspection shall be in conformance with CAN/ULC-S536 and CAN/ULC-S537.
 - .5 On completion of the inspection and tests, and when all of the above conditions have been complied with, including any necessary corrective measures, the approved ULC supplier shall issue an inspection report, and a certificate of verification.
 - .6 The inspection report shall include a detailed list showing the location of each device and certifying the test result of each device. The certificate of verification shall confirm that the inspection has been completed and is satisfactory.
 - .7 All costs involved in this inspection, both from the approved ULC supplier and the Contractor's work shall be included with the Contractor's total Tender price.
 - .8 The Contractor shall notify the Engineer and the Owner's Representative of the date of the inspection, so the Engineer may attend if he so desires.
 - .9 All cost associated with final commissioning of the system shall be included in the contractors tender price.

3.4 DEMONSTRATION AND TRAINING

- .1 Provide on-site lectures and demonstration by fire alarm equipment manufacturer to train operational personnel in use and maintenance of fire alarm system in accordance with Section 26 05 00 Paragraph 1.18.2.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes supply and placement of topsoil, including soil analysis and amendments.

1.2 RELATED SECTIONS

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 32 92 00 - Sodding

1.3 REFERENCES

- .1 The Canadian System of Soil Classification.

1.4 SOURCE QUALITY CONTROL

- .1 Advise Consultant of source of topsoil to be utilized 7 days in advance of starting work.
- .2 Contractor is responsible for analysis of soil nutrients and requirements for amendments to topsoil as specified. All soil shall be tested by the PEI Dept. of Agriculture and a copy of this analysis made available to the Consultant prior to delivery of soil to the site. The Contractor shall make whatever modifications to the topsoil which are stated in the analysis. All soil shall be re-tested for compliance prior to acceptance. Contractor shall pay for the costs of all testing, as specified in Section 01 33 00 – Submittal Procedures.

1.5 SUBMITTALS

- .1 Submit copies of the topsoil analysis described above.

Part 2 Products

2.1 TOPSOIL

- .1 Topsoil: imported material consisting of a mixture of mineral particulates, micro organisms and organic matter which provides suitable medium for supporting intended plant growth.
- .2 Soil texture: sandy loam, based on The Canadian System of Soil Classification, to consist of 20 to 70% sand and contain 2 to 10% organic matter by weight.
- .3 Fertility: major soil nutrients present in following ratios:
 - 1. Nitrogen (N): 20 to 40 micrograms of available N per gram of topsoil.
 - 2. Phosphorus (P): 10 to 20 micrograms of phosphate per gram of topsoil.
 - 3. Potassium (K): 80 to 120 micrograms of potash per gram of topsoil.
 - 4. Calcium, magnesium, sulfur and micro-nutrients present in balanced ratios to support germination and/or establishment of intended vegetation.

- .4 Ph value: 6.5 to 8.0.
- .5 Contain no toxic elements or growth inhibiting materials.
- .6 Free from:
 - 1. Debris and stones over 25 mm diameter.
 - 2. Course vegetative material, 12 mm diameter and 100 mm length, Occupying more than 2% of soil volume.
 - 3. Weeds and weed seed.
- .7 Consistency: friable when moist.

2.2 SOIL AMENDMENTS

- .1 Peatmoss:
 - .1 Derived from partially decomposed species of Sphagnum Mosses.
 - .2 Elastic and homogeneous, brown in colour.
 - .3 Free of wood and deleterious material which could prohibit growth.
 - .4 Shredded particle minimum size: 6 mm.
 - .5 Acidity range: 4.5 - 6 pH.
- .2 Limestone:
 - .1 Ground agricultural limestone containing minimum calcium carbonate equivalent of 85%.
 - .2 Gradation requirements: percentage passing by weight, 90% passing 1.0 mm sieve, 50% passing 0.125 mm sieve.
- .3 Fertilizer:
 - .1 Complete, commercial, with 35% soluble nitrogen.
 - .2 Well aged manure, free of seeds.
- .4 Compost:
 - .1 Mixture of soil and decomposing organic matter containing not less than 50% organic matter as determined by the LOI test of its equivalent under the Walkley-Black test.
 - .2 Product must be sufficiently decomposed (i.e. stable) so that any further decomposition does not adversely affect plant growth (C:N ratio below 25/50) and contain no toxic or growth inhibiting contaminants or heavy metals.
 - .3 Composed bio-solids must meet the requirements of the Guidelines For Compost Quality, Category A, produced by the Canadian Council of the Minister of the Environment, January 1996.
 - .4 The Contractor is responsible for providing certification of compost material.
- .5 Manure:
 - .1 Organic matter may be composed of well aged manure, free of lumps and impurities. Well decomposed, minimum 2 years old, with particle size meeting organic matter requirements.
- .6 Sewage sludge is not acceptable for organic content.

Part 3 Execution

3.1 PREPARATION OF SUBGRADE

- .1 Verify that grades are correct. If discrepancies occur, notify Consultant and do not commence work until instructed by Consultant.
- .2 Grade soil, eliminating uneven areas and low spots, ensuring positive drainage.
- .3 Remove debris, roots, branches, stones more than 25 mm diameter and other deleterious materials. Remove soil contaminated with calcium chloride, toxic materials and petroleum products. Remove debris which protrudes more than 50 mm above surface. Dispose of removed material off site.
- .4 Course cultivate entire area which is to receive topsoil to depth of 100 mm. Cross-cultivate those areas where equipment used for hauling and spreading has compacted soil.

3.2 PLACING AND SPREADING OF TOPSOIL

- .1 Place topsoil after Consultant has accepted subgrade.
- .2 Spread topsoil in uniform layer over unfrozen subgrade free of standing water.
- .3 Spread topsoil to minimum depth of 150 mm after settlement and compaction to 90% Standard Proctor density.
- .4 Manually spread topsoil around trees, shrubs and obstacles.

3.3 FINISH GRADING

1. Grade to eliminate rough spots and low areas and ensure positive drainage. Prepare loose friable bed by means of cultivation and subsequent raking.
2. Consolidate topsoil to required bulk density using equipment approved by Consultant. Leave surfaces smooth, uniform and firm against deep footprinting.

3.4 ACCEPTANCE

- .1 Consultant will inspect topsoil and planting soil in place and determine acceptance of material, depth of soil and finish grading. Contractor will test soil in place. Approval of soil material subject to soil testing and analysis.

3.5 RESTORATION OF STOCKPILE SITES

- .1 Restore stockpile sites acceptable to Consultant.

3.6 SURPLUS MATERIALS

- .1 Dispose of materials not required off site.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 This section specifies requirements for sodding. Work includes supply and placement of sod, complete with all related components and accessories and maintenance.

1.2 RELATED WORK

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 32 91 21 - Soil Preparation and Grading

1.3 REFERENCES

- .1 Canadian Nursery Trades Association; Canadian Standards for Nursery Stock, latest Edition.

1.4 SCHEDULING

- .1 Sod to be laid when soil is not frozen and when soil moisture conditions are suitable, after April 15 and before Nov. 15.
- .2 Do not schedule sodding for the period July 1 to Aug. 15 or for any other time when weather is extremely hot and dry.
- .3 Sod shall be laid immediately after preparation of soil surface.

1.5 DELIVERY AND STORAGE

- .1 Schedule delivery of sod to coincide with end of topsoil execution. Minimize period of storage on site.
- .2 Deliver, unload and store sod on pallets.
- .3 Protect sod against damage during delivery and transportation.
- .4 Protect sod when stored on site to prevent drying or damage by rainfall. If necessary, cover sod with protective cover and apply water to keep moist.

1.6 QUALITY CONTROL

- .1 Inform Consultant of source of sod to be supplied and provide sample. Do not commence work prior to approval of sod.
- .2 Confirm approval of sod by Consultant prior to laying.
- .3 Confirm approval of sod installation by Consultant prior to start of establishment period.
- .4 Confirm approval of watering schedule and operations by Consultant during the maintenance period.

- .5 Confirm approval of rolling equipment and procedure by Consultant prior to rolling.

1.7 WARRANTY

- .1 All turf areas shall remain free of defects for one full growing season following date of acceptance. Growing season shall be May 1 – Nov. 30.
- .2 End of warranty inspection to be conducted by Consultant.
- .3 Warranty to be extended if development and growth is not sufficient to ensure future survival as determined by Consultant.

1.8 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with provincial and municipal regulations.

Part 2 Products

2.1 MATERIALS

- .1 Turfgrass Nursery Sod:
- .1 sod that has been seeded and cultivated in a sod nursery field as turf grass sod
 - .2 mature and having grown a minimum of two years from date of seeding
 - .3 quality and source to comply with Canadian Nursery Trades Association; Canadian Standards for Nursery Stock, latest Edition
 - .4 to be grown in a sandy loam media
 - .5 sod grown in soils containing greater than 25% clay content will not be accepted
 - .6 Number One Kentucky Bluegrass: sod grown from a seed mixture containing equal proportions of 3 compatible Kentucky Bluegrass varieties
 - .7 sod to contain:
 - 90% Kentucky Bluegrass
 - 10% Improved Perennial Ryegrass
 - .8 sod shall be free of clover, with no more than 1 broadleaf weed per 40 square metres of sodded area
 - .9 mowing height of sod when lifted to be 40 to 70 mm
 - .10 there shall be no surface soil visible when sod is mowed to a height of 70mm
 - .11 sod shall be well rooted with no burnt or bare spots
 - .12 soil portion shall be uniform in thickness and not exceed 19mm in thickness, and to Section 17 of the Canadian Standards for Nursery Stock
 - .13 thickness of thatch on soil portion shall be less than 6 mm
- .2 Water:
- .1 to be supplied by Contractor
 - .2 potable, free of impurities.

- .3 Fertilizer:
 - .1 To Canada "Fertilizers Act" and "Fertilizers Regulations".
 - .2 Complete, synthetic, slow release with 65% of nitrogen content in water-insoluble form.

2.2 SOURCE QUALITY CONTROL

- .1 Obtain approval from Consultant of source of sod.
- .2 When proposed source of sod is approved, use no other source without written authorization.

Part 3 Execution

3.1 PREPARATION

- .1 Verify that grades are correct and prepared in accordance with Section 32 91 21 - Soil Preparation and Grading. If discrepancies occur, notify Consultant and do not commence work until instructed by Consultant.
- .2 Do not perform work under adverse field conditions such as frozen soil, excessively wet or dry soil or soil covered with snow, ice, or standing water.
- .3 Fine grade surface free of humps and hollows to smooth, even grade, to contours and elevations indicated, to tolerance of plus or minus 6 mm, surface to drain naturally.
- .4 Remove and dispose of weeds; debris; stones 25 mm in diameter and larger; soil contaminated by oil, gasoline and other deleterious materials off site.
- .5 Cultivate fine grade approved by Consultant to 25 mm depth immediately prior to sodding.

3.2 SOD PLACEMENT

- .1 Lay sod within 36 h of being lifted.
- .2 Lay sod sections in rows, longitudinally, along contours of slopes, joints staggered. Butt sections closely without overlapping or leaving gaps between sections. Cut out irregular or thin sections with sharp implements.
- .3 Provide close contact between sod and soil by light rolling. Use of heavy roller to correct irregularities in grade is not permitted.

3.3 MAINTENANCE

- .1 Site conditions:
 - .1 Do not perform maintenance operations after heavy rainfall or when soil is wet. Do not mow when turf is wet.

- .2 Equipment:
 - .1 All machinery shall be equipped with turf tires and designed to specifically perform the intended operation.
 - .2 Maintain mowing blades well sharpened and free of rust and abrasions.
- .3 Watering
 - .1 Water sodded areas throughout the maintenance periods in sufficient quantity and at frequency required to maintain optimal soil moisture conditions to a depth of 100 mm.
 - .2 Watering to be done between 7:00 am and 10:00 am and 4:00 pm and 10:00 pm, using best horticultural practice.
 - .3 The contractor shall provide a record indicating the dates and duration of watering operations.
- .4 Mowing:
 - .1 Mow sodded area throughout the growing season to maintain the turf between 70 mm and 90 mm. Do not cut any more than 1/3 of the leaf at one time.
 - .2 Mowing operations shall done in cross mode.
- .5 Fertilizing:
 - .1 Fertilize sodded areas two to three weeks after laying of sod with 1-2-2 ratio with a minimum of 50% slow release nitrogen applied at a rate of 0.25 kg N / 100 square metres per application.
 - .2 For sod laid after Sept. 21, postpone fertilization with high nitrogen content until the beginning of the next growing season and fertilize with a high potassium slow release fertilizer.
 - .3 Apply 1-2-2 ratio fertilizer at a rate of 0.50 kg per 100 square metres three time over the growing season during the following periods:
 - .1 mid spring (May 1 - June 1)
 - .2 early summer (June 21 - July 15)
 - .3 late summer (Sept. 1- 21).
- .6 Control of weeds, diseases and insects:
 - .1 Maintain sodded areas free of weeds, disease and insects through proper cultural, and maintenance practice including but not limited to aeration, watering, ph control, fertilization, proper mowing practice, over seeding and control of grass coverage thickness.
 - .2 Any application of pesticide will be performed in accordance with federal, provincial and municipal regulations as and when required to control insects, fungus and diseases.
 - .3 Submit pesticide data and schedule to consultant for approval prior to application.

3.4 MAINTENANCE DURING ESTABLISHMENT PERIOD

- .1 Perform following operations from time of installation until acceptance:
 - .1 Water turf areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 100 mm.

- .2 Cut grass to 70 mm when it reaches height of 90 mm. Remove clippings which will smother grassed areas.
- .3 Maintain turf areas weed free.
- .4 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles and water in well.
- .5 Replace any dead or poor quality sod immediately as directed by Consultant.
- .6 Inspect and ensure all sod on sloped areas is secure. Provide wooden pegs if required, as directed by Consultant.

3.5 ACCEPTANCE

- .1 Turf areas will be accepted by Consultant provided that:
 - .1 Turf areas are properly established and turf is growing vigorously with a healthy root system penetrating into the topsoil layer.
 - .2 Turf is free of bare / dead spots, free of weeds, disease and insects and without noxious or invasive species.
 - .3 No surface soil is visible from height of 1.5 m when grass has been cut to height of 70 mm.
 - .4 There are no visible gaps between pieces of sod.
 - .5 Surface is even and without depressions and gradients meet specifications.
 - .6 Turf areas have been cut within 24 h prior to acceptance.
 - .7 Fertilizing has been carried out at least once.
- .2 Areas sodded in the fall will be accepted in the following spring, one month after start of growing season provided acceptance conditions are fulfilled.

3.6 MAINTENANCE DURING WARRANTY PERIOD

- .1 Perform following operations during the warranty period:
 - .1 Water turf areas in sufficient quantities and at frequency required to maintain optimum soil moisture condition to depth of 100 mm.
 - .2 Cut grass to 70 mm when it reaches height of 90 mm. Remove clippings which will smother grassed areas.
 - .3 Maintain turf areas free of noxious and invasive species.
 - .4 Fertilize areas in accordance with fertilizing program. Spread half of required amount of fertilizer in one direction and remainder at right angles, water in.
 - .5 Replace any dead or poor quality turf. Lay new sod or reseed immediately as directed by Consultant.
 - .6 Inspect and ensure all sod on sloped areas is secure. Provide additional wooden pegs if required, as directed by Consultant.

END OF SECTION

APPENDIX A

GEOTECHNICAL REPORT

**GEOTECHNICAL INVESTIGATION
PROPOSED SIMMONS ARENA AND POOL REPLACEMENT
170 NORTH RIVER ROAD, CHARLOTTETOWN
QUEENS COUNTY, PEI**

JOOSE ENVIRONMENTAL PROJECT NO. JE0600





Joose Environmental Consulting Inc.
PO Box 19
North Wiltshire, PE C0A 1Y0

April 26, 2022

Project No. JE0600

Mr. Mike White, Arenas Superintendent
City of Charlottetown
Cody Banks Arena
PO Box 98, 58 Maple Avenue
Charlottetown, PE C1A 7K2

Dear Mr. White:

**Reference: Geotechnical Investigation - Proposed Simmons Arena and Pool Replacement
170 North River Road, Charlottetown, Queens County, PEI**

This report presents the results of the geotechnical investigation carried out for the above-noted project, in accordance with your request. The purpose of the investigation was to establish the subsurface conditions at the site and, based on the conditions encountered, to provide geotechnical engineering recommendations pertaining to site preparation, foundation design, and pavement structure design for the proposed arena and swimming pool.

PROCEDURE

The field work for the present investigation was carried out on April 11, 2022, and consisted of drilling a total of eleven (11) boreholes at the site with a track-mounted auger drill rig (CME 55). The boreholes were advanced to depths ranging from 4.6 to 6.1 m below existing grade at the locations shown on the appended Drawing No. 1.

Samples of the overburden soils encountered were taken at regular intervals by means of a conventional split spoon sampler during the performance of Standard Penetration Tests. Bedrock was inferred at all borehole locations based on split spoon refusal and resistance to auger advancement.

All soil samples recovered were placed in moisture-proof containers and were delivered to our office for classification and testing. All samples remaining after testing will be stored for a period of 60 days from the date of issue of this report after which they will be discarded unless directions to the contrary are received.



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The locations and ground surface elevations of the test pits were established in the field by our personnel. The test pit locations were established relative to the existing arena building. The elevations are referenced to a Geodetic Datum, based on the temporary benchmark shown on the drawing.

Detailed logs of the strata encountered at the site and of the sampling/testing carried out are shown on the appended Borehole Records.

SUBSURFACE CONDITIONS

The subsurface conditions encountered at the boreholes are shown in detail on the appended Borehole Records, are summarized on Table 1 (appended), and are described below. The results of all laboratory testing carried out for soil classification purposes are presented on Table 2 (appended).

Fill Materials

Fill materials were encountered at the surface of each borehole and found to extend to depths ranging from 0.6 to 1.4 m below present grade, with an overall average of 1.0 m. The fill is comprised of a brown to reddish brown silt and sand, with traces of gravel and roots. The upper 200 mm (+/-) of the fill generally consists of a rootmat/topsoil layer.

Standard Penetration Test N-values obtained within the fill were found to range from 2 to 17, with an average of 7, indicating a highly variable, but typically loose, relative density.

Grain size testing (curves appended) performed on representative samples of the fill recovered from the boreholes shows it to contain 2 to 7 percent gravel, 46 to 54 percent sand, and 39 to 52 percent fines (i.e., silt and clay sizes). The moisture content of selected fill samples was found to range from 15 to 25 percent.

Glacial Till

The principal overburden soil encountered at the site consists of a reddish brown silt and sand (glacial till) that contains trace to some gravel and occasional sandstone cobbles. The till stratum was encountered directly below the fill layer at each borehole location. The till surface elevation was found to range from a low of el. 13.82 m at BH-04 to a high of el. 15.13 m at BH-05. The thickness of the till stratum was found to range from 2.0 to 3.7 m with an average thickness of 2.9 m.

N-values obtained within the till stratum fill were generally found to range from 10 to 31, with an average of 19, indicating an overall compact relative density.

Grain size analyses (curves appended) performed on representative samples of the till show it to contain 8 to 18 percent gravel, 36 to 52 percent sand, and 40 to 47 percent fines. The natural moisture content of selected till samples was found to range from 12 to 16 percent with an average of 14. In addition to the

above testing, a composite sample of the till was prepared on split spoon samples recovered from BH-01, BH-02, BH03, BH-05, BH-08, and BH-10. The composite sample was found to contain 20 gravel, 35 percent sand, and 45 percent fines. A moisture-density determination (Proctor Test) carried out on the composite sample shows it to have a maximum dry density of 115.9 pcf (18.2 kN/m³) at an optimum moisture content for compaction of 13.9 percent.

The insitu permeability of the native till soil would be expected to be low, likely 1×10^{-4} cm/s or less, based on the relatively high percentage of silt and clay sizes present. The following parameters may be assigned to the native till soil for design purposes:

Parameter	Glacial Till (compact)
Total Unit Weight, kN/m ³	21
Effective Friction Angle (Φ), degrees	34

Bedrock

Sandstone bedrock was inferred, based on split spoon refusal and resistance to auger advancement, at each borehole location at depths ranging from 3.0 to 4.6 m below present grade. The bedrock surface elevation was found to range from a low of el. 10.61 m at BH-02 to a high of el. 12.69 m at BH-05.

Groundwater

No evidence of groundwater was observed during drilling activities. Perforated plastic standpipes were installed in six (6) boreholes following drilling to further assess for the presence of groundwater. Measurements taken one week following drilling showed all of the standpipes to be dry, indicating that the groundwater table at the site is currently located below the depth investigated. It should be noted however, that variations to the groundwater table can occur as result of seasonal changes and/or significant precipitation events.

DISCUSSION AND RECOMMENDATIONS

Overview

It is understood that the proposed arena and swimming pool will be located to the east of the existing arena building and that the existing parking area is to be extended to the east. It is assumed that the finished floor elevation of the new arena will be established above/near the average existing grade level at the site.

The subsurface conditions encountered at the site may be summarized as 0.6 to 1.4 m of loose existing fill materials, over 2.0 to 3.7 m of glacial till soil, over sandstone bedrock. The effect of the subsurface conditions encountered on the design and construction of the proposed arena and pool, from a geotechnical perspective, is considered in the following sections.

Site Preparation

Building and Pool Area - Site preparation for the proposed building and pool area should consist of the removal of all existing fill materials from within the proposed building/pool footprint. The existing fill, due to its loose and potentially compressible nature, is not considered to be suitable for the support of floor slab or foundation loads. The excavation for the removal of these materials should extend downward to the competent till stratum and outward from the proposed footing perimeter, a horizontal distance at least equal to the depth of structural fill to be placed below founding level (i.e., 1 horizontal to 1 vertical splay).

Upon removal of all unsuitable materials, the building/pool area should be brought up to the required subgrade level(s) using structural fill. Excavation activities should be coordinated with the timely placement of structural fill. Structural fill should consist of an approved soil (preferably granular) which is free of organics and deleterious material such as pit run sandstone or other approved inorganic soil. Fill material meeting the current Prince Edward Island Transportation and Infrastructure (PEITI) Select Borrow specification (i.e., maximum of 30 percent fines based on the minus 4.75 mm sieve fraction) is commonly used as a general structural fill and would be acceptable for this project.

Excavated site till could also be considered for reuse as structural fill but the testing undertaken indicates that the current moisture content of the till is near, or slightly above, the optimum value for compaction.

All structural fill used within the building area should be placed and compacted in lifts to 100 percent of Standard Proctor maximum dry density.

Parking Areas - Site preparation for the proposed parking areas should consist of the removal of all surficial vegetation, rootmat/topsoil, and cutting to the required subgrade level. The subgrade surface (i.e., existing fill or native till) should then be proof-rolled with a loaded tandem truck. Any soft or deformable soils revealed by the rolling, defined by deflecting more than 15 mm under the wheel loads, should be removed. The parking areas may then be brought up to the final subgrade level with an approved subgrade fill, such as Select Borrow, placed and compacted in lifts to 98 percent of Standard Proctor.

General - Lift thickness should be compatible with the fill material selected for use and the compaction equipment used. All earthworks at the site should be undertaken during dry periods whenever possible to minimize disturbance of the native till soil. Furthermore, exposed areas of fill/native till should be graded and compacted at the end of each day's activities to limit water infiltration and subsequent disturbance.

It is recommended that site preparation be monitored by qualified geotechnical personnel to ensure that all unsuitable materials are removed, that only suitable replacement fills are used, and that the required degree of compaction is attained.

Foundations

Spread footing foundations would be suitable for use at the site. Spread footings placed on undisturbed till or on structural fill, prepared as outlined above, may be designed using an allowable bearing pressure of 175 kPa (3,655 psf). Associated total and differential settlements would be within tolerable limits for a conventional structure. All footings which will be subjected to freezing conditions should have a soil cover of at least 1.5 m (or equivalent insulation) for frost protection.

Structural fill used as a bearing stratum must extend outward beyond the footing perimeter a horizontal distance at least equal to the depth of fill placed below the footing to include the full stress zone of influence.

Slab-on-Grade

A slab-on-grade may be placed over undisturbed till or structural fill. Design of ice surface slabs and associated granular base layer(s) typically depends on the expected length of time that the ice is to be maintained each year. For continuous ice-in operations (often defined as more than seven months per year), a sub-slab heating system, typically warm brine or electric cables, is generally required to prevent a build-up of frozen soil and associated frost heave. The use of non-frost susceptible fill in conjunction with rigid insulation are utilized in the design of both, continuous and seasonal operations floor slabs. A clean washed sand, gravel, or sand/gravel blend, containing less than 5 percent fines would all be considered non-frost susceptible fill materials.

A typical design detail for an ice rink slab used on a continuous basis would consist of:

- A concrete floor slab with freezing coils embedded within;
- A layer of rigid insulation;
- A layer of non-frost susceptible soil with heating cables/coils located near the bottom of the layer; and, if necessary,
- An under-slab drainage system.

Final design of the of rink slab and sub-layers will depend on the refrigeration (and heating) system(s) selected for use. Consideration could be given to the installation of permanent thermocouples near the underside of the non-frost susceptible soil layer to permit ongoing temperature monitoring of the subsoil and to optimize the performance of the refrigeration/heating systems.

Pavement Structure Design

The following pavement structure designs are recommended based on the conditions encountered and on the expected traffic loadings:

Light Duty (Vehicle Parking)

- 80 mm of Asphalt Seal (Type B); placed in two uniform lifts
- 200 mm of Granular Class A (base)
- 300 mm of Select Borrow (subbase)

Medium Duty (Driveways and Occasional Heavy Truck Areas)

- 40 mm of Asphalt Seal (Type B)
- 60 mm of Asphalt Base (Type A)
- 250 mm of Granular Class A (base)
- 300 mm of Select Borrow (subbase)

The above pavement designs assume a stable subgrade has been achieved prior to placement and compaction of the subbase. All of the above materials should comply with present PEITI specifications.

The subgrade/subbase and base layers should be compacted to 98 percent and 100 percent of Standard Proctor density, respectively.

OTHER CONSIDERATIONS

In the event that some excavation into bedrock at the site is necessary (e.g., for buried services), it should be noted that excavation depths into the typically weak layered local sandstone bedrock of up to 1 m (or more) are often possible with a large excavator. Some pre-fracturing may be necessary, however, if more extensive excavation into the sandstone is required or if stronger, more intact layers, are encountered. Pre-fracturing could be accomplished through the use of a hydraulic rock breaker or a ripper tooth mounted on an excavator or dozer.

A Class B Site Classification is recommended for Seismic Design based on the average expected conditions within upper 30 m (i.e., sandstone bedrock).

CLOSING COMMENTS

A geotechnical investigation is a limited sampling of a site. In the event that any conditions are encountered that differ from those encountered at the test locations, we request that we be notified immediately to permit a reassessment of our design assumptions.

We trust this report contains all of the information required at this time, and we are available at your convenience should you have any questions. We would be pleased to provide further geotechnical input for this project on an as required, as requested basis.

Sincerely,

JOOSE ENVIRONMENTAL CONSULTING INC.

George Zafiris

George W. Zafiris, P. Eng.
Geotechnical Engineer
georgez@jooseenv.com

GWZ/gz

APPENDIX

Table 1 - Borehole Summary - Simmons Arena

	Borehole Number										
	BH-01	BH-02	BH-03	BH-04	BH-05	BH-06	BH-07	BH-08	BH-09	BH-10	BH-11
Ground Surface el., m	14.89	15.18	15.57	15.19	15.74	15.72	15.21	15.43	15.46	15.35	15.26
Fill Thickness, m	0.91	0.91	0.76	1.37	0.61	1.37	1.37	0.91	0.76	0.76	1.37
Till Surface el., m	13.98	14.27	14.81	13.82	15.13	14.35	13.84	14.52	14.70	14.59	13.89
Till Thickness, m	2.59	3.66	2.59	1.98	2.44	3.20	3.20	3.66	2.75	2.75	3.20
Depth to GWT, m	> 5.39	> 4.46	> 4.40	-	-	-	-	> 4.30	-	> 4.45	> 5.80
GWT el., m	-	-	-	-	-	-	-	-	-	-	-
Depth to Bedrock, m	3.50	4.57	3.35	3.35	3.05	4.57	4.57	4.57	3.51	3.51	4.57
Bedrock Surface el., m	11.39	10.61	12.22	11.84	12.69	11.15	10.64	10.86	11.95	11.84	10.69
Depth of Borehole, m	6.10	4.62	4.57	4.65	4.65	4.65	4.65	4.57	4.62	4.60	6.10

NOTES:

- the boreholes were drilled at the site on April 11, 2022 using a track-mounted CME 55 auger drill rig
- elevations are referenced to Geodetic Datum and are based on the benchmark shown on the accompanying Borehole Location Plan
- GWT denotes groundwater table; perforated plastic standpipes were installed in BH-01, BH-02, BH-03, BH-08, BH-10, and BH-11
- bedrock was inferred based on split spoon refusal and/or resistance to auger advancement

Table 2 - Laboratory Testing Summary - Simmons Arena

Borehole No.	Sample No.	Depth, m	Grain Size Distribution, %			Moisture - Density (Proctor)	Moisture Content, %	Soil Description
			Gravel	Sand	Silt/ Clay			
BH-01	SS 3	1.5 - 2.1	-	-	-	-	15	TILL
BH-02	SS 3	1.5 - 2.1	17	38	45	-	14	Silt and sand, some gravel: TILL
BH-02	SS 4	3.0 - 3.6	-	-	-	-	13	TILL
BH-03	SS 3	1.5 - 2.1	17	36	47	-	15	Silt and sand, some gravel: TILL
BH-04	SS 2	0.6 - 1.2	2	46	52	-	25	Silt and sand, trace gravel: FILL
BH-04	SS 3	3.0 - 3.6	-	-	-	-	12	TILL
BH-05	SS 3	1.5 - 2.1	18	37	45	-	15	Silt and sand, some gravel: TILL
BH-06	SS 2	0.6 - 1.2	7	54	39	-	15	Silt and sand, trace gravel: FILL
BH-06	SS 3	1.5 - 1.9	-	-	-	-	13	TILL
BH-07	SS 2	0.6 - 1.2	-	-	-	-	23	FILL
BH-07	SS 3	1.5 - 2.1	-	-	-	-	15	TILL
BH-09	SS 2	0.6 - 1.2	-	-	-	-	15	TILL
BH-09	SS 3	1.5 - 2.1	-	-	-	-	15	TILL
BH-10	SS 3	1.5 - 1.9	8	52	40	-	13	Silt and sand, trace gravel: TILL
BH-11	SS 2	0.6 - 1.2	5	47	48	-	24	Silt and sand, trace gravel: FILL
BH-11	SS 3	1.5 - 2.1	-	-	-	-	14	TILL
BH-11	SS 4	3.0 - 3.6	-	-	-	-	16	TILL
Composite Sample (BH-01, BH-02, BH-03, BH-05, BH-08, and BH-10)			20	35	45	115.9 pcf @ 13.9 % moisture	14	Silt and sand, some gravel: TILL

Symbols and Terms used on Borehole and Test Pit Records

The following information is intended to assist in the interpretation of terms and symbols used on the borehole logs, test pit logs and reports.

Soils Description

Terminology describing common soil genesis:

<i>Topsoil</i>	- mixture of soil and humus capable of supporting vegetative growth
<i>Peat</i>	- mixture of visible and invisible fragments of decayed organic matter
<i>Till</i>	- unstratified glacial deposit which may range from clay to boulders
<i>Fill</i>	- material below the surface identified as placed by humans (excluding buried services)

Terminology describing soil structure:

<i>Desiccated</i>	- having visible signs of weathering by oxidization of clay minerals, shrinkage cracks, etc.
<i>Fissured</i>	- having cracks, and hence a blocky structure
<i>Varved</i>	- composed of regular alternating layers of silt and clay
<i>Stratified</i>	- composed of alternating successions of different soil types, e.g. silt and sand
<i>Layer</i>	- > 75 mm in thickness
<i>Seam</i>	- 2 mm to 75 mm in thickness
<i>Parting</i>	- < 2 mm in thickness

Terminology describing soil types:

The classification of soil types are made on the basis of grain size and plasticity in accordance with the Modified Unified Soil Classification System (MUSCS) and in accordance with the Canadian Foundation Engineering Manual Fourth Edition (Canadian Geotechnical Society, 2006). The classification excludes particles larger than 75 mm (3 inches). The MUSCS provides a group symbol (e.g. SM) and group name (e.g. silty sand) for identification.

Terminology describing cobbles, boulders, and non-matrix materials (organic matter or debris):

Terminology describing materials outside the USCS, (e.g. particles larger than 76 mm, visible organic matter and construction debris) is based upon the proportion of these materials present:

<i>Trace, or occasional</i>	Less than 10%
<i>Some</i>	10-20%
<i>Frequent</i>	> 20%

Symbols and Terms used on Borehole and Test Pit Records

Consistency of Cohesive Soils: May be estimated using simple field tests, or described in terms of a strength scale. In the field, the undrained shear strength (s_u) can be assessed using a simple field tool appropriate for cohesive soils, in conjunction with the relevant calibration. Refer to AS 1726-1993, Table A4.

Consistency - Essentially Cohesive Soils					
Term	Field Guide	Symbol	SPT "N" Value	Undrained Shear Strength s_u (kPa)	Unconfined Compressive Strength q_u (kPa)
Very soft	Oozes between fingers when	VS	0-2	<12	<25
Soft	Easily moulded with fingers.	S	2-4	12-25	25-50
Firm	Can be moulded by strong pressure of fingers.	F	4-8	25-50	50-100
Stiff	Not possible to mould with fingers.	St	8-15	50-100	100-200
Very stiff		VSt	15-30	100-200	200-400
Hard	Can be indented with difficulty by thumb nail.	H	>30	>200	>400

Note: SPT - N to q_u correlation from Terzaghi and Peck, 1967. (General guide only).

Soil Particle Sizes	
Term	Size Range
BOULDERS	>200 mm
COBBLES	63-200 mm
Coarse GRAVEL	20-63 mm
Medium GRAVEL	6-20 mm
Fine GRAVEL	2.36-6 mm
Coarse SAND	0.6-2.36 mm
Medium SAND	0.2-0.6 mm
Fine SAND	0.075-0.2 mm
SILT	0.002-0.075 mm
CLAY	<0.002 mm

Consistency of Non-Cohesive Soils: Is described in terms of the density index, as defined in AS 1289.0-2000. This can be assessed using a field tool appropriate for non-cohesive soils, in conjunction with the relevant calibration. Refer to AS 1726-1993, Table A5; BS5930-1999, p117.

Consistency - Essentially Non-Cohesive Soils				
Term	Symbol	SPT N Value	Field Guide	Density Index (%)
Very loose	VL	0-4	Foot imprints readily	0-15
Loose	L	4-10	Shovels Easily	15-35
Medium dense	MD	10-30	Shovelling difficult	35-65
Dense	D	30-50	Pick required	65-85
Very dense	VD	>50	Picking difficult	85-100

Standard Penetration Test (SPT): Refer to. AS 1289.6.3.1-2004. Example report formats for SPT results are shown below:

Test Report	Penetration Resistance (N)	Explanation / Comment
4, 7, 11	N=18	Full penetration; N is reported on engineering borehole log
18, 27, 32	N=59	Full penetration; N is reported on engineering borehole log
4, 18, 30/15 mm	N is not reported	30 blows causes less than 100 mm penetration (3 rd interval) - test discontinued
30/80 mm	N is not reported	30 blows causes less than 100 mm penetration (1 st interval) - test discontinued
rw	N<1	Rod weight only causes full penetration
hw	N<1	Hammer and rod weight only causes full penetration
hb	N is not reported	Hammer bouncing for 5 consecutive blows with no measurable penetration - test discontinued

Rock Description

Except where specified below, terminology for describing rock is as defined by the International Society for Rock Mechanics (ISRM) 2007 publication "The Complete ISRM Suggested Methods for Rock Characterization, Testing and Monitoring: 1974-2006"

Terminology Describing Rock Quality:

RQD	Rock Mass Quality
0 - 25	<i>Very Poor Quality</i>
25 - 50	<i>Poor Quality</i>
50 - 75	<i>Fair Quality</i>
75 - 90	<i>Good Quality</i>
90 - 100	<i>Excellent Quality</i>

Alternate (Colloquial) Rock Mass Quality	
<i>Very Severely Fractured</i>	<i>Crushed</i>
<i>Severely Fractured</i>	<i>Shattered or Very Blocky</i>
<i>Fractured</i>	<i>Blocky</i>
<i>Moderately Jointed</i>	<i>Sound</i>
<i>Intact</i>	<i>Very Sound</i>

RQD (Rock Quality Designation) denotes the percentage of intact and sound rock retrieved from a borehole of any orientation. All pieces of intact and sound rock core equal to or greater than 100 mm (4 inches) long are summed up and divided by the total length of the core run. RQD is determined in accordance with ASTM D6032.

SCR (Solid Core Recovery) denotes the percentage of solid core (cylindrical) retrieved from a borehole of any orientation. All pieces of the solid (cylindrical) core are summed and divided by the total length of the core run (It excludes all portions of core pieces that are not fully cylindrical as well as crushed or rubble zones).

Fracture Index (FI) is defined as the number of naturally occurring fractures within a given length of core. The Fracture Index is reported as a simple count of the natural occurring fractures.

Refer to AS 1726-1993 (Appendix A3.3) for the description and classification of rock material composition, including:

- (a) Rock type (Table A6, (a) and (b))
- (b) Grain size
- (c) Texture and fabric
- (d) Colour (describe as per soil).

The condition of a rock material refers to its weathering characteristics, strength characteristics and rock mass properties. Refer to AS 1726-1993 (Appendix A3 Tables A8, A9 and A10).

Weathering Condition (Degree of Weathering):

The degree of weathering is a continuum from fresh rock to soil. Boundaries between weathering grades may be abrupt or gradational.

Rock Material Weathering		
Weathering Grade	Symbol	Definition
Residual Soil	RS	Soil-like material developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the material has not been significantly transported.
Extremely Weathered Rock	XW	Rock is weathered to such an extent that it has 'soil' properties, i.e. it either disintegrates or can be remoulded in water, but substance fabric and rock structure still recognizable.
Highly Weathered Rock	HW	Strong discolouration is evident throughout the rock mass, often with significant change in the constituent minerals. The intact rock strength is generally much weaker than that of the fresh rock.
Moderately Weathered Rock	MW	Modest discolouration is evident throughout the rock fabric, often with some change in the constituent minerals. The intact rock strength is usually noticeably weaker than that of the fresh rock.
Slightly Weathered	SW	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh Rock	FR	Rock shows no sign of decomposition or staining.

Notes:

1. Minor variations within broader weathering grade zones will be noted on the engineering borehole logs.
2. Extremely weathered rock is described in terms of soil engineering properties.
3. Weathering may be pervasive throughout the rock mass, or may penetrate inwards from discontinuities to some extent.
4. The 'Distinctly Weathered (DW)' class as defined in AS 1726-1993 is divided to incorporate HW and MW in the above table. The symbol DW should not be used.

Strength Condition (Intact Rock Strength):

Terminology Describing Rock Strength

Strength Classification	Grade	Unconfined Compressive Strength (MPa)
Extremely Weak	R0	< 1
Very Weak	R1	1 - 5
Weak	R2	5 - 25
Medium Strong	R3	25 - 50
Strong Very	R4	50 - 100
Strong Extremely	R5	100 - 250
Strong	R6	> 250

Discontinuity Spacing: On the geotechnical borehole log, a graphical representation of defect spacing vs depth is shown. This representation takes into account all the natural rock defects occurring within a given depth interval, excluding breaks induced by the drilling / handling of core. Refer to AS 1726-1993, BS5930-1999.

Defect Spacing			Bedding Thickness (Sedimentary Rock Stratification)	
Spacing/Width (mm)	Descriptor	Symbol	Descriptor	Spacing /Width (mm)
			Thinly Laminated	<6
<20	Extremely Close	EC	Thickly Laminated	6 - 20
20 - 60	Very Close	VC	Very Thinly Bedded	20 - 60
60 - 200	Close	C	Thinly Bedded	60 -200
200 - 600	Medium	M	Medium Bedded	200 - 600
600 - 2000	Wide	W	Thickly Bedded	600 - 2000
2000 - 6000	Very Wide	VW	Very Thickly Bedded	>2000
>6000	Extremely Wide	EW		

Defect Spacing in 3D	
Term	Description
Blocky	Equidimensional
Tabular	Thickness much less than length or width
Columnar	Height much greater than cross section

Direct Persistence (areal extent)
Trace length of defect given in metres

Symbols and Terms used on Borehole and Test Pit Records

The list on the following table provides an explanation of terms and symbols used on the geotechnical borehole, test pit and penetrometer logs.

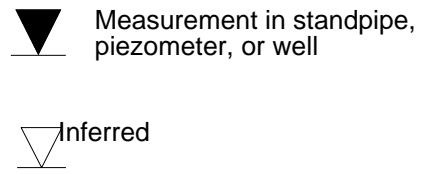
Test Results				Test Symbols	
PI	Plasticity Index	c'	Effective Cohesion	DCP	Dynamic Cone Penetrometer
LL	Liquid Limit	c_u	Undrained Cohesion	SPT	Standard Penetration Test
LI	Liquidity Index	c'_R	Residual Cohesion	CPTu	Cone Penetrometer (Piezocone) Test
DD	Dry Density	ϕ'	Effective Angle of Internal Friction	PANDA	Variable Energy DCP
WD	Wet Density	ϕ_u	Undrained Angle of Internal Friction	PP	Pocket Penetrometer Test
LS	Linear Shrinkage	ϕ'_R	Residual Angle of Internal Friction	U50	Undisturbed Sample 50 mm (nominal diameter)
MC	Moisture Content	c_v	Coefficient of Consolidation	U100	Undisturbed Sample 100mm (nominal diameter)
OC	Organic Content	m_v	Coefficient of Volume Compressibility	UCS	Uniaxial Compressive Strength
WPI	Weighted Plasticity Index	$c_{\alpha\epsilon}$	Coefficient of Secondary Compression	Pm	Pressuremeter

Test Results				Test Symbols	
WLS	Weighted Linear Shrinkage	e	Voids Ratio	FSV	Field Shear Vane
DoS	Degree of Saturation	ϕ'_{cv}	Constant Volume Friction Angle	DST	Direct Shear Test
APD	Apparent Particle Density	q_t / q_c	Piezocone Tip Resistance (corrected / uncorrected)	PR	Penetration Rate
s_u	Undrained Shear Strength	q_d	PANDA Cone Resistance	A	Point Load Test (axial)
q_u	Unconfined Compressive Strength	$I_{s(50)}$	Point Load Strength Index	D	Point Load Test (diametral)
R	Total Core Recovery	RQD	Rock Quality Designation	L	Point Load Test (irregular lump)

Sample Type

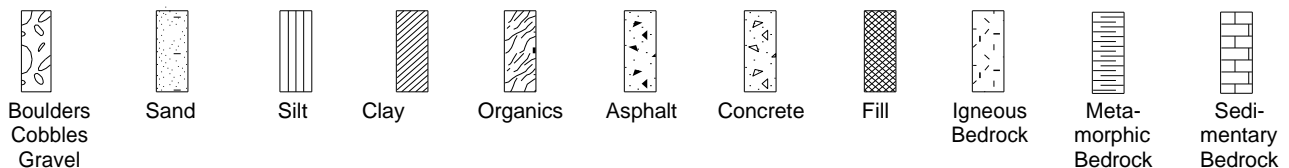
SS	Split spoon sample (obtained by performing the Standard Penetration Test)
ST	Shelby tube or thin wall tube
DP	Direct-Push sample (small diameters tube sampler hydraulically advanced)
PS	Piston sample
BS	Bulk sample
WS	Wash sample
HQ,NQ, BQ, etc	Rock core samples obtained with the use of standard size diamond coring bits.

Water Level Measurement



Strata Plot

Strata plots symbolize the soil or bedrock description. They are combinations of the following basic symbols. The dimensions within the strata symbols are not indicative of the particle size, layer thickness, etc.



Particle Size Distribution Report



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	3.8	13.0	1.2	5.4	31.2	45.4	

LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
		7.3989	0.1742	0.1007					

Material Description	USCS	AASHTO
<input type="radio"/> BH-2 SS-3 April 18, 2022		

Project No. 15716 **Client:** Joose Environmental
Project: Simmons Arena
 Location: Charlottetown

Remarks:



Figure

Tested By: R.Wakelin **Checked By:** D.Taweel

Particle Size Distribution Report



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.6	8.4	1.6	7.2	27.5	46.7	

LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
		7.2837	0.1688	0.0926					

Material Description	USCS	AASHTO
BH-3 SS-3 5-7ft April 18, 2022		

Project No. 15716 **Client:** Joose Environmental
Project: Simmons Arena
Location: Charlottetown

Remarks:



Figure

Tested By: R.Wakelin **Checked By:** D.Taweel

Particle Size Distribution Report



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

% +3"	% Gravel		% Sand			% Fines			
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
0.0	0.0	1.6	1.8	6.9	37.4	52.3			
LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
		0.2805	0.1106						

Material Description	USCS	AASHTO
<input type="radio"/> BH-4 SS-2 2-4ft April 18, 2022		

Project No. 15716 **Client:** Joose Environmental
Project: Simmons Arena
 Location: Charlottetown

Remarks:

Figure



Tested By: R.Wakelin **Checked By:** D.Taweel

Particle Size Distribution Report



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

% +3"	% Gravel		% Sand			% Fines			
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
0.0	6.0	12.3	2.4	5.7	28.9	44.7			
LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
		7.3197	0.1792	0.1038					

Material Description	USCS	AASHTO
BH-5 SS-3 5-7ft April 18, 2022		

Project No. 15716 **Client:** Joose Environmental
Project: Simmons Arena
Location: Charlottetown

Remarks:



Figure

Tested By: R.Wakelin **Checked By:** D.Taweel

Particle Size Distribution Report



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

% +3"	% Gravel		% Sand			% Fines			
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
0.0	2.3	4.8	1.3	8.9	44.0	38.7			
LL	PL	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
		0.4947	0.1932	0.1494					

Material Description	USCS	AASHTO
BH-6 SS-2 2-4ft April 18, 2022		

Project No. 15716 **Client:** Joose Environmental
Project: Simmons Arena
Location: Charlottetown

Remarks:



Figure

Tested By: R.Wakelin **Checked By:** D.Taweel

Particle Size Distribution Report



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	4.3	3.8	1.4	7.2	43.7	39.6	

LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
		0.5104	0.1792	0.1280					

Material Description	USCS	AASHTO
BH-10 SS-3 5-6ft6" April 18, 2022		

Project No. 15716 **Client:** Joose Environmental
Project: Simmons Arena
Location: Charlottetown

Remarks:



Figure

Tested By: R.Wakelin **Checked By:** D.Taweel

Particle Size Distribution Report



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

% +3"	% Gravel		% Sand			% Fines			
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
0.0	0.0	4.6	2.8	7.4	36.6	48.6			
LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
		0.4128	0.1404	0.0812					

Material Description	USCS	AASHTO
BH-11 SS-2 2-4ft April 18, 2022		

Project No. 15716 **Client:** Joose Environmental
Project: Simmons Arena
Location: Charlottetown

Remarks:



Figure

Tested By: R.Wakelin **Checked By:** D.Taweel

Particle Size Distribution Report



These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicative of apparently identical samples.

% +3"	% Gravel		% Sand			% Fines			
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay		
0.0	11.8	8.0	0.7	4.7	29.2	45.6			
LL	PL	D85	D60	D50	D30	D15	D10	Cc	Cu
		10.7146	0.1726	0.0985					

Material Description	USCS	AASHTO
Composite Sample April 18, 2022		

Project No. 15716 **Client:** Joose Environmental
Project: Simmons Arena
Location: Charlottetown

Remarks:



Figure

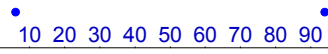
Tested By: R.Wakelin **Checked By:** D.Taweel

BOREHOLE No. BH-01

Date Drilled: 11 April 2022
Water Level: 18 April 2022 (dry)
Contractor/Equipment: Logan/CME 55

Project No.: JE0600
Elevation: 14.89
Datum: Geodetic

Location: North River Road, Charlottetown, PEI
Project: Simmons Arena Replacement
Client: City of Charlottetown

Depth	Elevation, m	SOIL DESCRIPTION	Strata Plot	Water Level	Sample Type	Sample Number	Recovery, mm	SPT N-Value	RQD	Moisture Content, %	Other Tests	SPT N-Value	
													
0	14.89 0.00	Ground Surface											
1		Very loose to loose brown to reddish brown silt and sand, trace gravel, roots: Fill ; upper 200 mm (+) rootmat/topsoil			SS	1	450	5				●	
2													●
3	13.98 0.91	Compact reddish brown silt and sand, trace to some gravel, occasional sandstone cobbles: Till			SS	2	300	9				●	
4													●
5													●
6							SS	3	600	21		15	
7												●	
8												●	
9												●	
10												●	
11	11.39 3.50	Sandstone Bedrock (Inferred)			SS	4	450	20				●	
12													●
13												●	
14												●	
15												●	
16					SS	5	75	50				●	
17												●	
18												●	
19												●	
20	8.79 6.10	End of Borehole										●	
21												●	

BOREHOLE No. BH-02

Date Drilled: 11 April 2022
Water Level: 18 April 2022 (dry)
Contractor/Equipment: Logan/CME 55

Project No.: JE0600
Elevation: 15.18
Datum: Geodetic

Location: North River Road, Charlottetown, PEI
Project: Simmons Arena Replacement
Client: City of Charlottetown


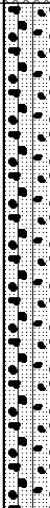
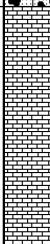
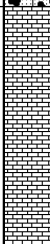
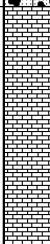
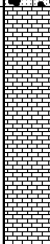
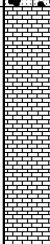
Depth	Elevation, m	SOIL DESCRIPTION	Strata Plot	Water Level	Sample Type	Sample Number	Recovery, mm	SPT N-Value	RQD	Moisture Content, %	Other Tests	SPT N-Value
0	15.18	Ground Surface										
0	0.00											
1		Very loose to loose brown to reddish brown silt and sand, trace gravel, roots: Fill ; upper 200 mm (+) rootmat/topsoil			SS	1	400	7				
2												
3	14.27	Compact reddish brown silt and sand, trace to some gravel, occasional sandstone cobbles: Till			SS	2	550	9				
4	0.91											
5												
6					SS	3	550	21		14	Sieve	
7												
8												
9												
10												
11					SS	4	600	24		13		
12												
13												
14												
15	10.61	Sandstone Bedrock (Inferred)			SS	5	50	50+				
16	4.57	End of Borehole										
17												
18												
19												
20												
21												

BOREHOLE No. BH-03

Date Drilled: 11 April 2022
Water Level: 18 April 2022 (dry)
Contractor/Equipment: Logan/CME 55

Project No.: JE0600
Elevation: 15.57
Datum: Geodetic

Location: North River Road, Charlottetown, PEI
Project: Simmons Arena Replacement
Client: City of Charlottetown

Depth	Elevation, m	SOIL DESCRIPTION	Strata Plot	Water Level	Sample Type	Sample Number	Recovery, mm	SPT N-Value	RQD	Moisture Content, %	Other Tests	SPT N-Value		
												10	20 30 40 50 60 70 80 90	
0	15.57 0.00	Ground Surface												
1		Very loose to loose brown to reddish brown silt and sand, trace gravel, roots: Fill ; upper 200 mm (+) rootmat/topsoil			SS	1	500	3						
2														
3	14.81 0.76	Compact reddish brown silt and sand, trace to some gravel, occasional sandstone cobbles: Till			SS	2	450	23						
4														
5														
6		Sandstone Bedrock (Inferred)			SS	3	600	16		15	Sieve			
7														
8		Sandstone Bedrock (Inferred)												
9														
10		Sandstone Bedrock (Inferred)			SS	4	300	14						
11	12.22 3.35													
12		Sandstone Bedrock (Inferred)												
13														
14		Sandstone Bedrock (Inferred)												
15	11.00 4.57													
16		End of Borehole			SS	5	50	50+						
17														
18														
19														
20														
21														

BOREHOLE No. BH-04

Date Drilled: 11 April 2022
Water Level: -
Contractor/Equipment: Logan/CME 55

Project No.: JE0600
Elevation: 15.19
Datum: Geodetic

Location: North River Road, Charlottetown, PEI
Project: Simmons Arena Replacement
Client: City of Charlottetown

Depth	Elevation, m	SOIL DESCRIPTION	Strata Plot	Water Level	Sample Type	Sample Number	Recovery, mm	SPT N-Value	RQD	Moisture Content, %	Other Tests	SPT N-Value	
												10	20 30 40 50 60 70 80 90
0	15.19	Ground Surface											
0	0.00												
1		Very loose to loose brown to reddish brown silt and sand, trace gravel, roots: Fill ; upper 200 mm (+/-) rootmat/topsoil			SS	1	300	4					
2					SS	2	400	8		25	Sieve		
3													
4	13.82												
5	1.37	Compact reddish brown silt and sand, trace to some gravel, occasional sandstone cobbles: Till			SS	3	500	25		12			
6													
7													
8													
9													
10													
11	11.84				SS	4	300	46					
12	3.35												
13		Sandstone Bedrock (Inferred)											
14													
15	10.54				SS	5	75	50+					
16	4.65	End of Borehole											
17													
18													
19													
20													
21													

BOREHOLE No. BH-05

Date Drilled: 11 April 2022
Water Level: -
Contractor/Equipment: Logan/CME 55

Project No.: JE0600
Elevation: 15.74
Datum: Geodetic

Location: North River Road, Charlottetown, PEI
Project: Simmons Arena Replacement
Client: City of Charlottetown




Depth	Elevation, m	SOIL DESCRIPTION	Strata Plot	Water Level	Sample Type	Sample Number	Recovery, mm	SPT N-Value	RQD	Moisture Content, %	Other Tests	SPT N-Value	
0	15.74 0.00	Ground Surface										10	90
1	15.13 0.61	Very loose to loose brown to reddish brown silt and sand, trace gravel, roots: Fill ; upper 200 mm (+) rootmat/topsoil			SS	1	600	7				10	90
2		Compact reddish brown silt and sand, trace to some gravel, occasional sandstone cobbles: Till			SS	2	500	18				10	90
3												10	90
4													10
5					SS	3	600	20		15	Sieve	10	90
6												10	90
7												10	90
8												10	90
9												10	90
10	12.69 3.05				SS	4	50	50+				10	90
11		Sandstone Bedrock (Inferred)										10	90
12												10	90
13													10
14												10	90
15	11.09 4.65	End of Borehole			SS	5	75	50+				10	90
16												10	90
17												10	90
18												10	90
19												10	90
20												10	90
21												10	90

BOREHOLE No. BH-06

Date Drilled: 11 April 2022
Water Level: -
Contractor/Equipment: Logan/CME 55

Project No.: JE0600
Elevation: 15.72
Datum: Geodetic

Location: North River Road, Charlottetown, PEI
Project: Simmons Arena Replacement
Client: City of Charlottetown




Depth	Elevation, m	SOIL DESCRIPTION	Strata Plot	Water Level	Sample Type	Sample Number	Recovery, mm	SPT N-Value	RQD	Moisture Content, %	Other Tests	SPT N-Value		
												10	20 30 40 50 60 70 80 90	
0	15.72	Ground Surface												
0	0.00													
1		Very loose to compact brown to reddish brown silt and sand, trace gravel, roots: Fill ; upper 200 mm (+/-) rootmat/topsoil			SS	1	400	4					10	
2					SS	2	500	17		15	Sieve		20	
3														30
4	14.35	Compact reddish brown silt and sand, trace to some gravel, occasional sandstone cobbles: Till			SS	3	450	31		13			40	
5	1.37												50	
6														60
7														70
8													80	
9													90	
10					SS	4	600	25						
11														
12														
13														
14														
15	11.15	Sandstone Bedrock (Inferred)			SS	5	75	50+						
16	4.57	End of Borehole												
17														
18														
19														
20														
21														

BOREHOLE No. BH-07

Date Drilled: 11 April 2022
Water Level: -
Contractor/Equipment: Logan/CME 55

Project No.: JE0600
Elevation: 15.21
Datum: Geodetic

Location: North River Road, Charlottetown, PEI
Project: Simmons Arena Replacement
Client: City of Charlottetown


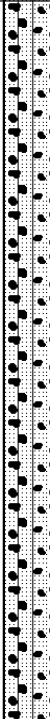

Depth	Elevation, m	SOIL DESCRIPTION	Strata Plot	Water Level	Sample Type	Sample Number	Recovery, mm	SPT N-Value	RQD	Moisture Content, %	Other Tests	SPT N-Value	
												10	20 30 40 50 60 70 80 90
0	15.21	Ground Surface											
0	0.00												
1		Very loose to loose brown to reddish brown silt and sand, trace gravel, roots: Fill ; upper 200 mm (+/-) rootmat/topsoil											
2				SS	1	450	4						
3													
4	13.84	Compact reddish brown silt and sand, trace to some gravel, occasional sandstone cobbles: Till											
5	1.37			SS	2	600	7		23				
6				SS	3	550	20		15				
7													
8													
9													
10													
11													
12													
13													
14													
15	10.64	Sandstone Bedrock (Inferred)											
16	4.57			SS	4	500	13						
17		End of Borehole											
18													
19													
20													
21													

BOREHOLE No. BH-08

Date Drilled: 11 April 2022
Water Level: 18 April 2022 (dry)
Contractor/Equipment: Logan/CME 55

Project No.: JE0600
Elevation: 15.43
Datum: Geodetic

Location: North River Road, Charlottetown, PEI
Project: Simmons Arena Replacement
Client: City of Charlottetown


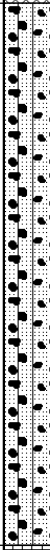
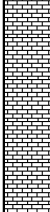
Depth	Elevation, m	SOIL DESCRIPTION	Strata Plot	Water Level	Sample Type	Sample Number	Recovery, mm	SPT N-Value	RQD	Moisture Content, %	Other Tests	SPT N-Value		
												10	20 30 40 50 60 70 80 90	
0	15.43	Ground Surface												
0	0.00													
1		Very loose to loose brown to reddish brown silt and sand, trace gravel, roots: Fill ; upper 200 mm (+) rootmat/topsoil												
2				SS	1	450	9							
3	14.52				SS	2	600	14						
4	0.91	Compact reddish brown silt and sand, trace to some gravel, occasional sandstone cobbles: Till												
5				SS	3	150	16							
6														
7														
8														
9														
10														
11														
12														
13														
14														
15	10.86	Sandstone Bedrock (Inferred)												
16	4.57			SS	5	50	50+							
17		End of Borehole												
18														
19														
20														
21														

BOREHOLE No. BH-09

Date Drilled: 11 April 2022
Water Level: -
Contractor/Equipment: Logan/CME 55

Project No.: JE0600
Elevation: 15.46
Datum: Geodetic

Location: North River Road, Charlottetown, PEI
Project: Simmons Arena Replacement
Client: City of Charlottetown


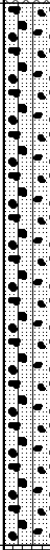
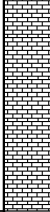
Depth	Elevation, m	SOIL DESCRIPTION	Strata Plot	Water Level	Sample Type	Sample Number	Recovery, mm	SPT N-Value	RQD	Moisture Content, %	Other Tests	SPT N-Value	
												10	20 30 40 50 60 70 80 90
0	15.46 0.00	Ground Surface											
1		Very loose to loose brown to reddish brown silt and sand, trace gravel, roots: Fill ; upper 200 mm (+) rootmat/topsoil											
2				SS	1	450	2						
3	14.70 0.76	Compact reddish brown silt and sand, trace to some gravel, occasional sandstone cobbles: Till											
4				SS	2	400	20		15				
6				SS	3	450	16		15				
11				SS	4	350	10						
12	11.95 3.51	Sandstone Bedrock (Inferred)											
15				SS	5	75	50+						
15	10.84 4.62	End of Borehole											

BOREHOLE No. BH-10

Date Drilled: 11 April 2022
Water Level: 18 April 2022 (dry)
Contractor/Equipment: Logan/CME 55

Project No.: JE0600
Elevation: 15.35
Datum: Geodetic

Location: North River Road, Charlottetown, PEI
Project: Simmons Arena Replacement
Client: City of Charlottetown

Depth	Elevation, m	SOIL DESCRIPTION	Strata Plot	Water Level	Sample Type	Sample Number	Recovery, mm	SPT N-Value	RQD	Moisture Content, %	Other Tests	SPT N-Value		
												10	20 30 40 50 60 70 80 90	
0	15.35	Ground Surface												
0	0.00	Very loose to loose brown to reddish brown silt and sand, trace gravel, roots: Fill ; upper 200 mm (+) rootmat/topsoil												
1				SS	1	400	7							
2	14.59	Compact reddish brown silt and sand, trace to some gravel, occasional sandstone cobbles: Till												
3	0.76			SS	2	450	15							
4														
6				SS	3	450	10		13	Sieve				
11	11.84	Sandstone Bedrock (Inferred)												
12	3.51			SS	4	300	11							
15	10.75	End of Borehole												
15	4.60				SS	5	25	50+						

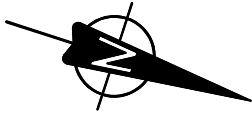
BOREHOLE No. BH-11

Date Drilled: 11 April 2022
Water Level: 18 April 2022 (dry)
Contractor/Equipment: Logan/CME 55

Project No.: JE0600
Elevation: 15.26
Datum: Geodetic

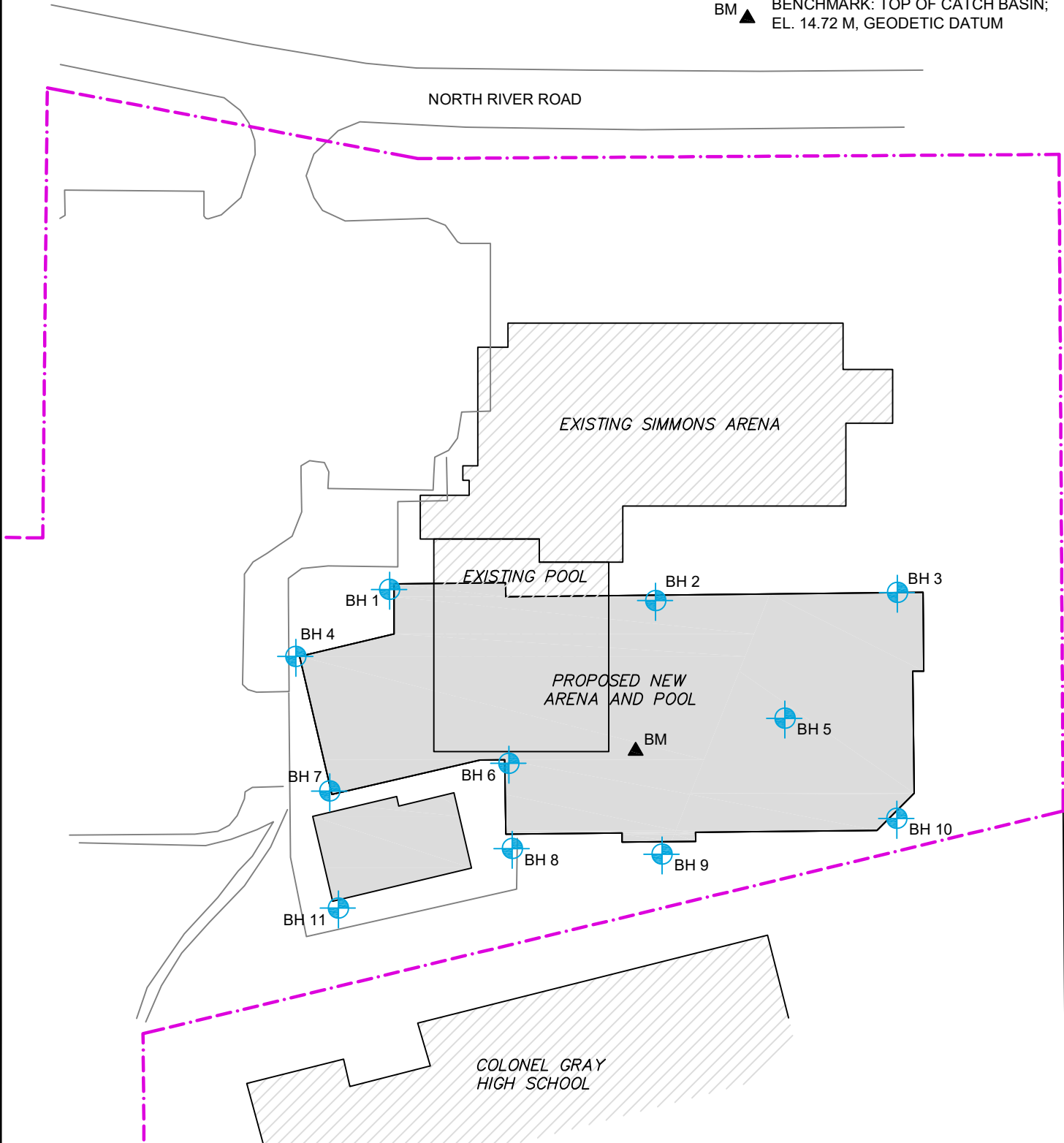
Location: North River Road, Charlottetown, PEI
Project: Simmons Arena Replacement
Client: City of Charlottetown


Depth	Elevation, m	SOIL DESCRIPTION	Strata Plot	Water Level	Sample Type	Sample Number	Recovery, mm	SPT N-Value	RQD	Moisture Content, %	Other Tests	SPT N-Value	
												10	20 30 40 50 60 70 80 90
0	15.26	Ground Surface											
0	0.00												
1		Very loose to loose brown to reddish brown silt and sand, trace gravel, roots: Fill ; upper 200 mm (+/-) rootmat/topsoil			SS	1	500	6					
2					SS	2	500	6		24	Sieve		
3	1												
4	13.89	Compact reddish brown silt and sand, trace to some gravel, occasional sandstone cobbles: Till											
5	1.37				SS	3	450	26		14			
6													
7					SS	4	600	18		16			
8													
9													
10	3												
11													
12													
13	4												
14													
15	10.69	Sandstone Bedrock (Inferred)											
16	4.57				SS	5	25	50+					
17													
18													
19													
20	6												
21	9.16	End of Borehole											
	6.10												



LEGEND

- · - · - SUBJECT PROPERTY
- EXISTING BUILDING
- PROPOSED NEW ARENA AND POOL
- ⊕ BOREHOLE LOCATION (BH)
- BM ▲ BENCHMARK: TOP OF CATCH BASIN;
EL. 14.72 M, GEODETIC DATUM



 GEOTECHNICAL DIVISION OF JOOSE ENVIRONMENTAL	BOREHOLE LOCATION PLAN SIMMONS ARENA REPLACEMENT CHARLOTTETOWN, QUEENS COUNTY, PEI	SCALE: 1 : 1000	JOB NO.: JE0600	DWG NO.: 1
	CLIENT: CITY OF CHARLOTTETOWN	DATE 2022/04/18	DWN BY: MLJ	APPD BY: GWZ

APPENDIX B

CCDC 2 DOCUMENT

DEFINITIONS

The following Definitions shall apply to all *Contract Documents*.

1. **Change Directive**
A *Change Directive* is a written instruction prepared by the *Consultant* and signed by the *Owner* directing the *Contractor* to proceed with a change in the *Work* within the general scope of the *Contract Documents* prior to the *Owner* and the *Contractor* agreeing upon adjustments in the *Contract Price* and the *Contract Time*.
2. **Change Order**
A *Change Order* is a written amendment to the *Contract* prepared by the *Consultant* and signed by the *Owner* and the *Contractor* stating their agreement upon:
 - a change in the *Work*;
 - the method of adjustment or the amount of the adjustment in the *Contract Price*, if any; and
 - the extent of the adjustment in the *Contract Time*, if any.
3. **Construction Equipment**
Construction Equipment means all machinery and equipment, either operated or not operated, that is required for preparing, fabricating, conveying, erecting, or otherwise performing the *Work* but is not incorporated into the *Work*.
4. **Consultant**
The *Consultant* is the person or entity engaged by the *Owner* and identified as such in the Agreement. The *Consultant* is the Architect, the Engineer or entity licensed to practise in the province or territory of the *Place of the Work*. The term *Consultant* means the *Consultant* or the *Consultant's* authorized representative.
5. **Contract**
The *Contract* is the undertaking by the parties to perform their respective duties, responsibilities and obligations as prescribed in the *Contract Documents* and represents the entire agreement between the parties.
6. **Contract Documents**
The *Contract Documents* consist of those documents listed in Article A-3 of the Agreement - CONTRACT DOCUMENTS and amendments agreed upon between the parties.
7. **Contract Price**
The *Contract Price* is the amount stipulated in Article A-4 of the Agreement - CONTRACT PRICE.
8. **Contract Time**
The *Contract Time* is the time stipulated in paragraph 1.3 of Article A-1 of the Agreement - THE WORK from commencement of the *Work* to *Substantial Performance of the Work*.
9. **Contractor**
The *Contractor* is the person or entity identified as such in the Agreement. The term *Contractor* means the *Contractor* or the *Contractor's* authorized representative as designated to the *Owner* in writing.
10. **Drawings**
The *Drawings* are the graphic and pictorial portions of the *Contract Documents*, wherever located and whenever issued, showing the design, location and dimensions of the *Work*, generally including plans, elevations, sections, details, and diagrams.
11. **Notice in Writing**
A *Notice in Writing*, where identified in the *Contract Documents*, is a written communication between the parties or between them and the *Consultant* that is transmitted in accordance with the provisions of Article A-6 of the Agreement – RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING.
12. **Owner**
The *Owner* is the person or entity identified as such in the Agreement. The term *Owner* means the *Owner* or the *Owner's* authorized agent or representative as designated to the *Contractor* in writing, but does not include the *Consultant*.
13. **Place of the Work**
The *Place of the Work* is the designated site or location of the *Work* identified in the *Contract Documents*.
14. **Product**
Product or *Products* means material, machinery, equipment, and fixtures forming the *Work*, but does not include *Construction Equipment*.

15. **Project**
The *Project* means the total construction contemplated of which the *Work* may be the whole or a part.
16. **Provide**
Provide means to supply and install.
17. **Shop Drawings**
Shop Drawings are drawings, diagrams, illustrations, schedules, performance charts, brochures, *Product* data, and other data which the *Contractor* provides to illustrate details of portions of the *Work*.
18. **Specifications**
The *Specifications* are that portion of the *Contract Documents*, wherever located and whenever issued, consisting of the written requirements and standards for *Products*, systems, workmanship, quality, and the services necessary for the performance of the *Work*.
19. **Subcontractor**
A *Subcontractor* is a person or entity having a direct contract with the *Contractor* to perform a part or parts of the *Work* at the *Place of the Work*.
20. **Substantial Performance of the Work**
Substantial Performance of the Work is as defined in the lien legislation applicable to the *Place of the Work*. If such legislation is not in force or does not contain such definition, or if the *Work* is governed by the Civil Code of Quebec, *Substantial Performance of the Work* shall have been reached when the *Work* is ready for use or is being used for the purpose intended and is so certified by the *Consultant*.
21. **Supplemental Instruction**
A *Supplemental Instruction* is an instruction, not involving adjustment in the *Contract Price* or *Contract Time*, in the form of *Specifications*, *Drawings*, schedules, samples, models or written instructions, consistent with the intent of the *Contract Documents*. It is to be issued by the *Consultant* to supplement the *Contract Documents* as required for the performance of the *Work*.
22. **Supplier**
A *Supplier* is a person or entity having a direct contract with the *Contractor* to supply *Products*.
23. **Temporary Work**
Temporary Work means temporary supports, structures, facilities, services, and other temporary items, excluding *Construction Equipment*, required for the execution of the *Work* but not incorporated into the *Work*.
24. **Value Added Taxes**
Value Added Taxes means such sum as shall be levied upon the *Contract Price* by the Federal or any Provincial or Territorial Government and is computed as a percentage of the *Contract Price* and includes the Goods and Services Tax, the Quebec Sales Tax, the Harmonized Sales Tax, and any similar tax, the collection and payment of which have been imposed on the *Contractor* by the tax legislation.
25. **Work**
The *Work* means the total construction and related services required by the *Contract Documents*.
26. **Working Day**
Working Day means a day other than a Saturday, Sunday, statutory holiday, or statutory vacation day that is observed by the construction industry in the area of the *Place of the Work*.

GENERAL CONDITIONS OF THE STIPULATED PRICE CONTRACT**PART 1 GENERAL PROVISIONS****GC 1.1 CONTRACT DOCUMENTS**

- 1.1.1 The intent of the *Contract Documents* is to include the labour, *Products* and services necessary for the performance of the *Work* by the *Contractor* in accordance with these documents. It is not intended, however, that the *Contractor* shall supply products or perform work not consistent with, not covered by, or not properly inferable from the *Contract Documents*.
- 1.1.2 Nothing contained in the *Contract Documents* shall create any contractual relationship between:
- .1 the *Owner* and a *Subcontractor*, a *Supplier*, or their agent, employee, or other person performing any portion of the *Work*.
 - .2 the *Consultant* and the *Contractor*, a *Subcontractor*, a *Supplier*, or their agent, employee, or other person performing any portion of the *Work*.
- 1.1.3 The *Contract Documents* are complementary, and what is required by any one shall be as binding as if required by all.
- 1.1.4 Words and abbreviations which have well known technical or trade meanings are used in the *Contract Documents* in accordance with such recognized meanings.
- 1.1.5 References in the *Contract Documents* to the singular shall be considered to include the plural as the context requires.
- 1.1.6 Neither the organization of the *Specifications* nor the arrangement of *Drawings* shall control the *Contractor* in dividing the work among *Subcontractors* and *Suppliers*.
- 1.1.7 If there is a conflict within the *Contract Documents*:
- .1 the order of priority of documents, from highest to lowest, shall be
 - the Agreement between the *Owner* and the *Contractor*,
 - the Definitions,
 - Supplementary Conditions,
 - the General Conditions,
 - Division 1 of the *Specifications*,
 - technical *Specifications*,
 - material and finishing schedules,
 - the *Drawings*.
 - .2 *Drawings* of larger scale shall govern over those of smaller scale of the same date.
 - .3 dimensions shown on *Drawings* shall govern over dimensions scaled from *Drawings*.
 - .4 later dated documents shall govern over earlier documents of the same type.
- 1.1.8 The *Owner* shall provide the *Contractor*, without charge, sufficient copies of the *Contract Documents* to perform the *Work*.
- 1.1.9 *Specifications*, *Drawings*, models, and copies thereof furnished by the *Consultant* are and shall remain the *Consultant's* property, with the exception of the signed *Contract* sets, which shall belong to each party to the *Contract*. All *Specifications*, *Drawings* and models furnished by the *Consultant* are to be used only with respect to the *Work* and are not to be used on other work. These *Specifications*, *Drawings* and models are not to be copied or altered in any manner without the written authorization of the *Consultant*.
- 1.1.10 Models furnished by the *Contractor* at the *Owner's* expense are the property of the *Owner*.

GC 1.2 LAW OF THE CONTRACT

- 1.2.1 The law of the *Place of the Work* shall govern the interpretation of the *Contract*.

GC 1.3 RIGHTS AND REMEDIES

- 1.3.1 Except as expressly provided in the *Contract Documents*, the duties and obligations imposed by the *Contract Documents* and the rights and remedies available thereunder shall be in addition to and not a limitation of any duties, obligations, rights, and remedies otherwise imposed or available by law.
- 1.3.2 No action or failure to act by the *Owner*, *Consultant* or *Contractor* shall constitute a waiver of any right or duty afforded any of them under the *Contract*, nor shall any such action or failure to act constitute an approval of or acquiescence in any breach thereunder, except as may be specifically agreed in writing.

GC 1.4 ASSIGNMENT

- 1.4.1 Neither party to the *Contract* shall assign the *Contract* or a portion thereof without the written consent of the other, which consent shall not be unreasonably withheld.

PART 2 ADMINISTRATION OF THE CONTRACT

GC 2.1 AUTHORITY OF THE CONSULTANT

- 2.1.1 The *Consultant* will have authority to act on behalf of the *Owner* only to the extent provided in the *Contract Documents*, unless otherwise modified by written agreement as provided in paragraph 2.1.2.
- 2.1.2 The duties, responsibilities and limitations of authority of the *Consultant* as set forth in the *Contract Documents* shall be modified or extended only with the written consent of the *Owner*, the *Contractor* and the *Consultant*.
- 2.1.3 If the *Consultant's* employment is terminated, the *Owner* shall immediately appoint or reappoint a *Consultant* against whom the *Contractor* makes no reasonable objection and whose status under the *Contract Documents* shall be that of the former *Consultant*.

GC 2.2 ROLE OF THE CONSULTANT

- 2.2.1 The *Consultant* will provide administration of the *Contract* as described in the *Contract Documents*.
- 2.2.2 The *Consultant* will visit the *Place of the Work* at intervals appropriate to the progress of construction to become familiar with the progress and quality of the work and to determine if the *Work* is proceeding in general conformity with the *Contract Documents*.
- 2.2.3 If the *Owner* and the *Consultant* agree, the *Consultant* will provide at the *Place of the Work*, one or more project representatives to assist in carrying out the *Consultant's* responsibilities. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in writing to the *Contractor*.
- 2.2.4 The *Consultant* will promptly inform the *Owner* of the date of receipt of the *Contractor's* applications for payment as provided in paragraph 5.3.1.1 of GC 5.3 – PROGRESS PAYMENT.
- 2.2.5 Based on the *Consultant's* observations and evaluation of the *Contractor's* applications for payment, the *Consultant* will determine the amounts owing to the *Contractor* under the *Contract* and will issue certificates for payment as provided in Article A-5 of the Agreement - PAYMENT, GC 5.3 - PROGRESS PAYMENT and GC 5.7 - FINAL PAYMENT.
- 2.2.6 The *Consultant* will not be responsible for and will not have control, charge or supervision of construction means, methods, techniques, sequences, or procedures, or for safety precautions and programs required in connection with the *Work* in accordance with the applicable construction safety legislation, other regulations or general construction practice. The *Consultant* will not be responsible for the *Contractor's* failure to carry out the *Work* in accordance with the *Contract Documents*. The *Consultant* will not have control over, charge of or be responsible for the acts or omissions of the *Contractor*, *Subcontractors*, *Suppliers*, or their agents, employees, or any other persons performing portions of the *Work*.
- 2.2.7 Except with respect to GC 5.1 - FINANCING INFORMATION REQUIRED OF THE OWNER, the *Consultant* will be, in the first instance, the interpreter of the requirements of the *Contract Documents*.
- 2.2.8 Matters in question relating to the performance of the *Work* or the interpretation of the *Contract Documents* shall be initially referred in writing to the *Consultant* by the party raising the question for interpretations and findings and copied to the other party.
- 2.2.9 Interpretations and findings of the *Consultant* shall be consistent with the intent of the *Contract Documents*. In making such interpretations and findings the *Consultant* will not show partiality to either the *Owner* or the *Contractor*.
- 2.2.10 The *Consultant's* interpretations and findings will be given in writing to the parties within a reasonable time.
- 2.2.11 With respect to claims for a change in *Contract Price*, the *Consultant* will make findings as set out in GC 6.6 – CLAIMS FOR A CHANGE IN CONTRACT PRICE.
- 2.2.12 The *Consultant* will have authority to reject work which in the *Consultant's* opinion does not conform to the requirements of the *Contract Documents*. Whenever the *Consultant* considers it necessary or advisable, the *Consultant* will have authority to require inspection or testing of work, whether or not such work is fabricated, installed or completed. However, neither the authority of the *Consultant* to act nor any decision either to exercise or not to exercise such authority shall give rise to any duty or responsibility of the *Consultant* to the *Contractor*, *Subcontractors*, *Suppliers*, or their agents, employees, or other persons performing any of the *Work*.

- 2.2.13 During the progress of the *Work* the *Consultant* will furnish *Supplemental Instructions* to the *Contractor* with reasonable promptness or in accordance with a schedule for such instructions agreed to by the *Consultant* and the *Contractor*.
- 2.2.14 The *Consultant* will review and take appropriate action upon *Shop Drawings*, samples and other *Contractor's* submittals, in accordance with the *Contract Documents*.
- 2.2.15 The *Consultant* will prepare *Change Orders* and *Change Directives* as provided in GC 6.2 - CHANGE ORDER and GC 6.3 - CHANGE DIRECTIVE.
- 2.2.16 The *Consultant* will conduct reviews of the *Work* to determine the date of *Substantial Performance of the Work* as provided in GC 5.4 - SUBSTANTIAL PERFORMANCE OF THE WORK.
- 2.2.17 All certificates issued by the *Consultant* will be to the best of the *Consultant's* knowledge, information and belief. By issuing any certificate, the *Consultant* does not guarantee the *Work* is correct or complete.
- 2.2.18 The *Consultant* will receive and review written warranties and related documents required by the *Contract* and provided by the *Contractor* and will forward such warranties and documents to the *Owner* for the *Owner's* acceptance.

GC 2.3 REVIEW AND INSPECTION OF THE WORK

- 2.3.1 The *Owner* and the *Consultant* shall have access to the *Work* at all times. The *Contractor* shall provide sufficient, safe and proper facilities at all times for the review of the *Work* by the *Consultant* and the inspection of the *Work* by authorized agencies. If parts of the *Work* are in preparation at locations other than the *Place of the Work*, the *Owner* and the *Consultant* shall be given access to such work whenever it is in progress.
- 2.3.2 If work is designated for tests, inspections or approvals in the *Contract Documents*, or by the *Consultant's* instructions, or by the laws or ordinances of the *Place of the Work*, the *Contractor* shall give the *Consultant* reasonable notification of when the work will be ready for review and inspection. The *Contractor* shall arrange for and shall give the *Consultant* reasonable notification of the date and time of inspections by other authorities.
- 2.3.3 The *Contractor* shall furnish promptly to the *Consultant* two copies of certificates and inspection reports relating to the *Work*.
- 2.3.4 If the *Contractor* covers, or permits to be covered, work that has been designated for special tests, inspections or approvals before such special tests, inspections or approvals are made, given or completed, the *Contractor* shall, if so directed, uncover such work, have the inspections or tests satisfactorily completed, and make good covering work at the *Contractor's* expense.
- 2.3.5 The *Consultant* may order any portion or portions of the *Work* to be examined to confirm that such work is in accordance with the requirements of the *Contract Documents*. If the work is not in accordance with the requirements of the *Contract Documents*, the *Contractor* shall correct the work and pay the cost of examination and correction. If the work is in accordance with the requirements of the *Contract Documents*, the *Owner* shall pay the cost of examination and restoration.
- 2.3.6 The *Contractor* shall pay the cost of making any test or inspection, including the cost of samples required for such test or inspection, if such test or inspection is designated in the *Contract Documents* to be performed by the *Contractor* or is designated by the laws or ordinances applicable to the *Place of the Work*.
- 2.3.7 The *Contractor* shall pay the cost of samples required for any test or inspection to be performed by the *Consultant* or the *Owner* if such test or inspection is designated in the *Contract Documents*.

GC 2.4 DEFECTIVE WORK

- 2.4.1 The *Contractor* shall promptly correct defective work that has been rejected by the *Consultant* as failing to conform to the *Contract Documents* whether or not the defective work has been incorporated in the *Work* and whether or not the defect is the result of poor workmanship, use of defective products or damage through carelessness or other act or omission of the *Contractor*.
- 2.4.2 The *Contractor* shall make good promptly other contractors' work destroyed or damaged by such corrections at the *Contractor's* expense.
- 2.4.3 If in the opinion of the *Consultant* it is not expedient to correct defective work or work not performed as provided in the *Contract Documents*, the *Owner* may deduct from the amount otherwise due to the *Contractor* the difference in value between the work as performed and that called for by the *Contract Documents*. If the *Owner* and the *Contractor* do not agree on the difference in value, they shall refer the matter to the *Consultant* for a determination.

PART 3 EXECUTION OF THE WORK

GC 3.1 CONTROL OF THE WORK

- 3.1.1 The *Contractor* shall have total control of the *Work* and shall effectively direct and supervise the *Work* so as to ensure conformity with the *Contract Documents*.
- 3.1.2 The *Contractor* shall be solely responsible for construction means, methods, techniques, sequences, and procedures and for co-ordinating the various parts of the *Work* under the *Contract*.

GC 3.2 CONSTRUCTION BY OWNER OR OTHER CONTRACTORS

- 3.2.1 The *Owner* reserves the right to award separate contracts in connection with other parts of the *Project* to other contractors and to perform work with own forces.
- 3.2.2 When separate contracts are awarded for other parts of the *Project*, or when work is performed by the *Owner's* own forces, the *Owner* shall:
- .1 provide for the co-ordination of the activities and work of other contractors and *Owner's* own forces with the *Work* of the *Contract*;
 - .2 assume overall responsibility for compliance with the applicable health and construction safety legislation at the *Place of the Work*;
 - .3 enter into separate contracts with other contractors under conditions of contract which are compatible with the conditions of the *Contract*;
 - .4 ensure that insurance coverage is provided to the same requirements as are called for in GC 11.1 - INSURANCE and co-ordinate such insurance with the insurance coverage of the *Contractor* as it affects the *Work*; and
 - .5 take all reasonable precautions to avoid labour disputes or other disputes on the *Project* arising from the work of other contractors or the *Owner's* own forces.
- 3.2.3 When separate contracts are awarded for other parts of the *Project*, or when work is performed by the *Owner's* own forces, the *Contractor* shall:
- .1 afford the *Owner* and other contractors reasonable opportunity to store their products and execute their work;
 - .2 cooperate with other contractors and the *Owner* in reviewing their construction schedules; and
 - .3 promptly report to the *Consultant* in writing any apparent deficiencies in the work of other contractors or of the *Owner's* own forces, where such work affects the proper execution of any portion of the *Work*, prior to proceeding with that portion of the *Work*.
- 3.2.4 Where the *Contract Documents* identify work to be performed by other contractors or the *Owner's* own forces, the *Contractor* shall co-ordinate and schedule the *Work* with the work of other contractors and the *Owner's* own forces as specified in the *Contract Documents*.
- 3.2.5 Where a change in the *Work* is required as a result of the co-ordination and integration of the work of other contractors or *Owner's* own forces with the *Work*, the changes shall be authorized and valued as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 - CHANGE ORDER and GC 6.3 - CHANGE DIRECTIVE.
- 3.2.6 Disputes and other matters in question between the *Contractor* and other contractors shall be dealt with as provided in Part 8 of the General Conditions - DISPUTE RESOLUTION provided the other contractors have reciprocal obligations. The *Contractor* shall be deemed to have consented to arbitration of any dispute with any other contractor whose contract with the *Owner* contains a similar agreement to arbitrate.

GC 3.3 TEMPORARY WORK

- 3.3.1 The *Contractor* shall have the sole responsibility for the design, erection, operation, maintenance, and removal of *Temporary Work*.
- 3.3.2 The *Contractor* shall engage and pay for registered professional engineering personnel skilled in the appropriate disciplines to perform those functions referred to in paragraph 3.3.1 where required by law or by the *Contract Documents* and in all cases where such *Temporary Work* is of such a nature that professional engineering skill is required to produce safe and satisfactory results.

- 3.3.3 Notwithstanding the provisions of GC 3.1 - CONTROL OF THE WORK, paragraphs 3.3.1 and 3.3.2 or provisions to the contrary elsewhere in the *Contract Documents* where such *Contract Documents* include designs for *Temporary Work* or specify a method of construction in whole or in part, such designs or methods of construction shall be considered to be part of the design of the *Work* and the *Contractor* shall not be held responsible for that part of the design or the specified method of construction. The *Contractor* shall, however, be responsible for the execution of such design or specified method of construction in the same manner as for the execution of the *Work*.

GC 3.4 DOCUMENT REVIEW

- 3.4.1 The *Contractor* shall review the *Contract Documents* and shall report promptly to the *Consultant* any error, inconsistency or omission the *Contractor* may discover. Such review by the *Contractor* shall be to the best of the *Contractor's* knowledge, information and belief and in making such review the *Contractor* does not assume any responsibility to the *Owner* or the *Consultant* for the accuracy of the review. The *Contractor* shall not be liable for damage or costs resulting from such errors, inconsistencies or omissions in the *Contract Documents*, which the *Contractor* did not discover. If the *Contractor* does discover any error, inconsistency or omission in the *Contract Documents*, the *Contractor* shall not proceed with the work affected until the *Contractor* has received corrected or missing information from the *Consultant*.

GC 3.5 CONSTRUCTION SCHEDULE

- 3.5.1 The *Contractor* shall:
- .1 prepare and submit to the *Owner* and the *Consultant* prior to the first application for payment, a construction schedule that indicates the timing of the major activities of the *Work* and provides sufficient detail of the critical events and their inter-relationship to demonstrate the *Work* will be performed in conformity with the *Contract Time*;
 - .2 monitor the progress of the *Work* relative to the construction schedule and update the schedule on a monthly basis or as stipulated by the *Contract Documents*; and
 - .3 advise the *Consultant* of any revisions required to the schedule as the result of extensions of the *Contract Time* as provided in Part 6 of the General Conditions - CHANGES IN THE WORK.

GC 3.6 SUPERVISION

- 3.6.1 The *Contractor* shall provide all necessary supervision and appoint a competent representative who shall be in attendance at the *Place of the Work* while work is being performed. The appointed representative shall not be changed except for valid reason.
- 3.6.2 The appointed representative shall represent the *Contractor* at the *Place of the Work*. Information and instructions provided by the *Consultant* to the *Contractor's* appointed representative shall be deemed to have been received by the *Contractor*, except with respect to Article A-6 of the Agreement – RECEIPT OF AND ADDRESSES FOR NOTICES IN WRITING.

GC 3.7 SUBCONTRACTORS AND SUPPLIERS

- 3.7.1 The *Contractor* shall preserve and protect the rights of the parties under the *Contract* with respect to work to be performed under subcontract, and shall:
- .1 enter into contracts or written agreements with *Subcontractors* and *Suppliers* to require them to perform their work as provided in the *Contract Documents*;
 - .2 incorporate the terms and conditions of the *Contract Documents* into all contracts or written agreements with *Subcontractors* and *Suppliers*; and
 - .3 be as fully responsible to the *Owner* for acts and omissions of *Subcontractors*, *Suppliers* and of persons directly or indirectly employed by them as for acts and omissions of persons directly employed by the *Contractor*.
- 3.7.2 The *Contractor* shall indicate in writing, if requested by the *Owner*, those *Subcontractors* or *Suppliers* whose bids have been received by the *Contractor* which the *Contractor* would be prepared to accept for the performance of a portion of the *Work*. Should the *Owner* not object before signing the *Contract*, the *Contractor* shall employ those *Subcontractors* or *Suppliers* so identified by the *Contractor* in writing for the performance of that portion of the *Work* to which their bid applies.
- 3.7.3 The *Owner* may, for reasonable cause, at any time before the *Owner* has signed the *Contract*, object to the use of a proposed *Subcontractor* or *Supplier* and require the *Contractor* to employ one of the other subcontract bidders.
- 3.7.4 If the *Owner* requires the *Contractor* to change a proposed *Subcontractor* or *Supplier*, the *Contract Price* and *Contract Time* shall be adjusted by the differences occasioned by such required change.

- 3.7.5 The *Contractor* shall not be required to employ as a *Subcontractor* or *Supplier*, a person or firm to which the *Contractor* may reasonably object.
- 3.7.6 The *Owner*, through the *Consultant*, may provide to a *Subcontractor* or *Supplier* information as to the percentage of the *Subcontractor's* or *Supplier's* work which has been certified for payment.

GC 3.8 LABOUR AND PRODUCTS

- 3.8.1 The *Contractor* shall provide and pay for labour, *Products*, tools, *Construction Equipment*, water, heat, light, power, transportation, and other facilities and services necessary for the performance of the *Work* in accordance with the *Contract*.
- 3.8.2 Unless otherwise specified in the *Contract Documents*, *Products* provided shall be new. *Products* which are not specified shall be of a quality consistent with those specified and their use acceptable to the *Consultant*.
- 3.8.3 The *Contractor* shall maintain good order and discipline among the *Contractor's* employees engaged on the *Work* and shall not employ on the *Work* anyone not skilled in the tasks assigned.

GC 3.9 DOCUMENTS AT THE SITE

- 3.9.1 The *Contractor* shall keep one copy of current *Contract Documents*, submittals, reports, and records of meetings at the *Place of the Work*, in good order and available to the *Owner* and the *Consultant*.

GC 3.10 SHOP DRAWINGS

- 3.10.1 The *Contractor* shall provide *Shop Drawings* as required in the *Contract Documents*.
- 3.10.2 The *Contractor* shall provide *Shop Drawings* to the *Consultant* to review in orderly sequence and sufficiently in advance so as to cause no delay in the *Work* or in the work of other contractors.
- 3.10.3 Upon request of the *Contractor* or the *Consultant*, they shall jointly prepare a schedule of the dates for provision, review and return of *Shop Drawings*.
- 3.10.4 The *Contractor* shall provide *Shop Drawings* in the form specified, or if not specified, as directed by the *Consultant*.
- 3.10.5 *Shop Drawings* provided by the *Contractor* to the *Consultant* shall indicate by stamp, date and signature of the person responsible for the review that the *Contractor* has reviewed each one of them.
- 3.10.6 The *Consultant's* review is for conformity to the design concept and for general arrangement only.
- 3.10.7 *Shop Drawings* which require approval of any legally constituted authority having jurisdiction shall be provided to such authority by the *Contractor* for approval.
- 3.10.8 The *Contractor* shall review all *Shop Drawings* before providing them to the *Consultant*. The *Contractor* represents by this review that:
- .1 the *Contractor* has determined and verified all applicable field measurements, field construction conditions, *Product* requirements, catalogue numbers and similar data, or will do so, and
 - .2 the *Contractor* has checked and co-ordinated each *Shop Drawing* with the requirements of the *Work* and of the *Contract Documents*.
- 3.10.9 At the time of providing *Shop Drawings*, the *Contractor* shall expressly advise the *Consultant* in writing of any deviations in a *Shop Drawing* from the requirements of the *Contract Documents*. The *Consultant* shall indicate the acceptance or rejection of such deviation expressly in writing.
- 3.10.10 The *Consultant's* review shall not relieve the *Contractor* of responsibility for errors or omissions in the *Shop Drawings* or for meeting all requirements of the *Contract Documents*.
- 3.10.11 The *Contractor* shall provide revised *Shop Drawings* to correct those which the *Consultant* rejects as inconsistent with the *Contract Documents*, unless otherwise directed by the *Consultant*. The *Contractor* shall notify the *Consultant* in writing of any revisions to the *Shop Drawings* other than those requested by the *Consultant*.
- 3.10.12 The *Consultant* will review and return *Shop Drawings* in accordance with the schedule agreed upon, or, in the absence of such schedule, with reasonable promptness so as to cause no delay in the performance of the *Work*.

GC 3.11 USE OF THE WORK

- 3.11.1 The *Contractor* shall confine *Construction Equipment*, *Temporary Work*, storage of *Products*, waste products and debris, and operations of employees and *Subcontractors* to limits indicated by laws, ordinances, permits, or the *Contract Documents* and shall not unreasonably encumber the *Place of the Work*.
- 3.11.2 The *Contractor* shall not load or permit to be loaded any part of the *Work* with a weight or force that will endanger the safety of the *Work*.

GC 3.12 CUTTING AND REMEDIAL WORK

- 3.12.1 The *Contractor* shall perform the cutting and remedial work required to make the affected parts of the *Work* come together properly.
- 3.12.2 The *Contractor* shall co-ordinate the *Work* to ensure that the cutting and remedial work is kept to a minimum.
- 3.12.3 Should the *Owner*, the *Consultant*, other contractors or anyone employed by them be responsible for ill-timed work necessitating cutting or remedial work to be performed, the cost of such cutting or remedial work shall be valued as provided in GC 6.1 – OWNER’S RIGHT TO MAKE CHANGES, GC 6.2 - CHANGE ORDER and GC 6.3 - CHANGE DIRECTIVE.
- 3.12.4 Cutting and remedial work shall be performed by specialists familiar with the *Products* affected and shall be performed in a manner to neither damage nor endanger the *Work*.

GC 3.13 CLEANUP

- 3.13.1 The *Contractor* shall maintain the *Work* in a safe and tidy condition and free from the accumulation of waste products and debris, other than that caused by the *Owner*, other contractors or their employees.
- 3.13.2 Before applying for *Substantial Performance of the Work* as provided in GC 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK, the *Contractor* shall remove waste products and debris, other than that resulting from the work of the *Owner*, other contractors or their employees, and shall leave the *Place of the Work* clean and suitable for use or occupancy by the *Owner*. The *Contractor* shall remove products, tools, *Construction Equipment*, and *Temporary Work* not required for the performance of the remaining work.
- 3.13.3 Prior to application for the final payment, the *Contractor* shall remove any remaining products, tools, *Construction Equipment*, *Temporary Work*, and waste products and debris, other than those resulting from the work of the *Owner*, other contractors or their employees.

PART 4 ALLOWANCES

GC 4.1 CASH ALLOWANCES

- 4.1.1 The *Contract Price* includes the cash allowances, if any, stated in the *Contract Documents*. The scope of work or costs included in such cash allowances shall be as described in the *Contract Documents*.
- 4.1.2 The *Contract Price*, and not the cash allowances, includes the *Contractor's* overhead and profit in connection with such cash allowances.
- 4.1.3 Expenditures under cash allowances shall be authorized by the *Owner* through the *Consultant*.
- 4.1.4 Where the actual cost of the *Work* under any cash allowance exceeds the amount of the allowance, the *Contractor* shall be compensated for the excess incurred and substantiated plus an amount for overhead and profit on the excess as set out in the *Contract Documents*. Where the actual cost of the *Work* under any cash allowance is less than the amount of the allowance, the *Owner* shall be credited for the unexpended portion of the cash allowance, but not for the *Contractor's* overhead and profit on such amount. Multiple cash allowances shall not be combined for the purpose of calculating the foregoing.
- 4.1.5 The *Contract Price* shall be adjusted by *Change Order* to provide for any difference between the amount of each cash allowance and the actual cost of the work under that cash allowance.
- 4.1.6 The value of the work performed under a cash allowance is eligible to be included in progress payments.
- 4.1.7 The *Contractor* and the *Consultant* shall jointly prepare a schedule that shows when the *Consultant* and *Owner* must authorize ordering of items called for under cash allowances to avoid delaying the progress of the *Work*.

GC 4.2 CONTINGENCY ALLOWANCE

- 4.2.1 The *Contract Price* includes the contingency allowance, if any, stated in the *Contract Documents*.
- 4.2.2 The contingency allowance includes the *Contractor's* overhead and profit in connection with such contingency allowance.
- 4.2.3 Expenditures under the contingency allowance shall be authorized and valued as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 - CHANGE ORDER and GC 6.3 - CHANGE DIRECTIVE.
- 4.2.4 The *Contract Price* shall be adjusted by *Change Order* to provide for any difference between the expenditures authorized under paragraph 4.2.3 and the contingency allowance.

PART 5 PAYMENT

GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

- 5.1.1 The *Owner* shall, at the request of the *Contractor*, before signing the *Contract*, and promptly from time to time thereafter, furnish to the *Contractor* reasonable evidence that financial arrangements have been made to fulfill the *Owner's* obligations under the *Contract*.
- 5.1.2 The *Owner* shall give the *Contractor Notice in Writing* of any material change in the *Owner's* financial arrangements to fulfill the *Owner's* obligations under the *Contract* during the performance of the *Contract*.

GC 5.2 APPLICATIONS FOR PROGRESS PAYMENT

- 5.2.1 Applications for payment on account as provided in Article A-5 of the Agreement - PAYMENT may be made monthly as the *Work* progresses.
- 5.2.2 Applications for payment shall be dated the last day of each payment period, which is the last day of the month or an alternative day of the month agreed in writing by the parties.
- 5.2.3 The amount claimed shall be for the value, proportionate to the amount of the *Contract*, of *Work* performed and *Products* delivered to the *Place of the Work* as of the last day of the payment period.
- 5.2.4 The *Contractor* shall submit to the *Consultant*, at least 15 calendar days before the first application for payment, a schedule of values for the parts of the *Work*, aggregating the total amount of the *Contract Price*, so as to facilitate evaluation of applications for payment.
- 5.2.5 The schedule of values shall be made out in such form and supported by such evidence as the *Consultant* may reasonably direct and when accepted by the *Consultant*, shall be used as the basis for applications for payment, unless it is found to be in error.
- 5.2.6 The *Contractor* shall include a statement based on the schedule of values with each application for payment.
- 5.2.7 Applications for payment for *Products* delivered to the *Place of the Work* but not yet incorporated into the *Work* shall be supported by such evidence as the *Consultant* may reasonably require to establish the value and delivery of the *Products*.

GC 5.3 PROGRESS PAYMENT

- 5.3.1 After receipt by the *Consultant* of an application for payment submitted by the *Contractor* in accordance with GC 5.2 - APPLICATIONS FOR PROGRESS PAYMENT:
 - .1 the *Consultant* will promptly inform the *Owner* of the date of receipt of the *Contractor's* application for payment,
 - .2 the *Consultant* will issue to the *Owner* and copy to the *Contractor*, no later than 10 calendar days after the receipt of the application for payment, a certificate for payment in the amount applied for, or in such other amount as the *Consultant* determines to be properly due. If the *Consultant* amends the application, the *Consultant* will promptly advise the *Contractor* in writing giving reasons for the amendment,
 - .3 the *Owner* shall make payment to the *Contractor* on account as provided in Article A-5 of the Agreement - PAYMENT on or before 20 calendar days after the later of:
 - receipt by the *Consultant* of the application for payment, or
 - the last day of the monthly payment period for which the application for payment is made.

GC 5.4 SUBSTANTIAL PERFORMANCE OF THE WORK

- 5.4.1 When the *Contractor* considers that the *Work* is substantially performed, or if permitted by the lien legislation applicable to the *Place of the Work* a designated portion thereof which the *Owner* agrees to accept separately is substantially performed, the *Contractor* shall, within one *Working Day*, deliver to the *Consultant* and to the *Owner* a comprehensive list of items to be completed or corrected, together with a written application for a review by the *Consultant* to establish *Substantial Performance of the Work* or substantial performance of the designated portion of the *Work*. Failure to include an item on the list does not alter the responsibility of the *Contractor* to complete the *Contract*.
- 5.4.2 The *Consultant* will review the *Work* to verify the validity of the application and shall promptly, and in any event, no later than 20 calendar days after receipt of the *Contractor's* list and application:
- .1 advise the *Contractor* in writing that the *Work* or the designated portion of the *Work* is not substantially performed and give reasons why, or
 - .2 state the date of *Substantial Performance of the Work* or a designated portion of the *Work* in a certificate and issue a copy of that certificate to each of the *Owner* and the *Contractor*.
- 5.4.3 Immediately following the issuance of the certificate of *Substantial Performance of the Work*, the *Contractor*, in consultation with the *Consultant*, shall establish a reasonable date for finishing the *Work*.

GC 5.5 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK

- 5.5.1 After the issuance of the certificate of *Substantial Performance of the Work*, the *Contractor* shall:
- .1 submit an application for payment of the holdback amount,
 - .2 submit CCDC 9A 'Statutory Declaration' to state that all accounts for labour, subcontracts, *Products*, *Construction Equipment*, and other indebtedness which may have been incurred by the *Contractor* in the *Substantial Performance of the Work* and for which the *Owner* might in any way be held responsible have been paid in full, except for amounts properly retained as a holdback or as an identified amount in dispute.
- 5.5.2 After the receipt of an application for payment from the *Contractor* and the statement as provided in paragraph 5.5.1, the *Consultant* will issue a certificate for payment of the holdback amount.
- 5.5.3 Where the holdback amount required by the applicable lien legislation has not been placed in a separate holdback account, the *Owner* shall, 10 calendar days prior to the expiry of the holdback period stipulated in the lien legislation applicable to the *Place of the Work*, place the holdback amount in a bank account in the joint names of the *Owner* and the *Contractor*.
- 5.5.4 In the common law jurisdictions, the holdback amount authorized by the certificate for payment of the holdback amount is due and payable on the first calendar day following the expiration of the holdback period stipulated in the lien legislation applicable to the *Place of the Work*. Where lien legislation does not exist or apply, the holdback amount shall be due and payable in accordance with other legislation, industry practice or provisions which may be agreed to between the parties. The *Owner* may retain out of the holdback amount any sums required by law to satisfy any liens against the *Work* or, if permitted by the lien legislation applicable to the *Place of the Work*, other third party monetary claims against the *Contractor* which are enforceable against the *Owner*.
- 5.5.5 In the Province of Quebec, the holdback amount authorized by the certificate for payment of the holdback amount is due and payable 30 calendar days after the issuance of the certificate. The *Owner* may retain out of the holdback amount any sums required to satisfy any legal hypothecs that have been taken, or could be taken, against the *Work* or other third party monetary claims against the *Contractor* which are enforceable against the *Owner*.

GC 5.6 PROGRESSIVE RELEASE OF HOLDBACK

- 5.6.1 In the common law jurisdictions, where legislation permits and where, upon application by the *Contractor*, the *Consultant* has certified that the work of a *Subcontractor* or *Supplier* has been performed prior to *Substantial Performance of the Work*, the *Owner* shall pay the *Contractor* the holdback amount retained for such subcontract work, or the *Products* supplied by such *Supplier*, on the first calendar day following the expiration of the holdback period for such work stipulated in the lien legislation applicable to the *Place of the Work*. The *Owner* may retain out of the holdback amount any sums required by law to satisfy any liens against the *Work* or, if permitted by the lien legislation applicable to the *Place of the Work*, other third party monetary claims against the *Contractor* which are enforceable against the *Owner*.

- 5.6.2 In the Province of Quebec, where, upon application by the *Contractor*, the *Consultant* has certified that the work of a *Subcontractor* or *Supplier* has been performed prior to *Substantial Performance of the Work*, the *Owner* shall pay the *Contractor* the holdback amount retained for such subcontract work, or the *Products* supplied by such *Supplier*, no later than 30 calendar days after such certification by the *Consultant*. The *Owner* may retain out of the holdback amount any sums required to satisfy any legal hypothecs that have been taken, or could be taken, against the *Work* or other third party monetary claims against the *Contractor* which are enforceable against the *Owner*.
- 5.6.3 Notwithstanding the provisions of the preceding paragraphs, and notwithstanding the wording of such certificates, the *Contractor* shall ensure that such subcontract work or *Products* are protected pending the issuance of a final certificate for payment and be responsible for the correction of defects or work not performed regardless of whether or not such was apparent when such certificates were issued.

GC 5.7 FINAL PAYMENT

- 5.7.1 When the *Contractor* considers that the *Work* is completed, the *Contractor* shall submit an application for final payment.
- 5.7.2 The *Consultant* will, no later than 10 calendar days after the receipt of an application from the *Contractor* for final payment, review the *Work* to verify the validity of the application and advise the *Contractor* in writing that the application is valid or give reasons why it is not valid.
- 5.7.3 When the *Consultant* finds the *Contractor's* application for final payment valid, the *Consultant* will promptly issue a final certificate for payment.
- 5.7.4 Subject to the provision of paragraph 10.4.1 of GC 10.4 - WORKERS' COMPENSATION, and any lien legislation applicable to the *Place of the Work*, the *Owner* shall, no later than 5 calendar days after the issuance of a final certificate for payment, pay the *Contractor* as provided in Article A-5 of the Agreement - PAYMENT.

GC 5.8 WITHHOLDING OF PAYMENT

- 5.8.1 If because of climatic or other conditions reasonably beyond the control of the *Contractor*, there are items of work that cannot be performed, payment in full for that portion of the *Work* which has been performed as certified by the *Consultant* shall not be withheld or delayed by the *Owner* on account thereof, but the *Owner* may withhold, until the remaining portion of the *Work* is finished, only such an amount that the *Consultant* determines is sufficient and reasonable to cover the cost of performing such remaining work.

GC 5.9 NON-CONFORMING WORK

- 5.9.1 No payment by the *Owner* under the *Contract* nor partial or entire use or occupancy of the *Work* by the *Owner* shall constitute an acceptance of any portion of the *Work* or *Products* which are not in accordance with the requirements of the *Contract Documents*.

PART 6 CHANGES IN THE WORK

GC 6.1 OWNER'S RIGHT TO MAKE CHANGES

- 6.1.1 The *Owner*, through the *Consultant*, without invalidating the *Contract*, may make:
- .1 changes in the *Work* consisting of additions, deletions or other revisions to the *Work* by *Change Order* or *Change Directive*, and
 - .2 changes to the *Contract Time* for the *Work*, or any part thereof, by *Change Order*.
- 6.1.2 The *Contractor* shall not perform a change in the *Work* without a *Change Order* or a *Change Directive*.

GC 6.2 CHANGE ORDER

- 6.2.1 When a change in the *Work* is proposed or required, the *Consultant* will provide the *Contractor* with a written description of the proposed change in the *Work*. The *Contractor* shall promptly present, in a form acceptable to the *Consultant*, a method of adjustment or an amount of adjustment for the *Contract Price*, if any, and the adjustment in the *Contract Time*, if any, for the proposed change in the *Work*.
- 6.2.2 When the *Owner* and *Contractor* agree to the adjustments in the *Contract Price* and *Contract Time* or to the method to be used to determine the adjustments, such agreement shall be effective immediately and shall be recorded in a *Change Order*. The value of the work performed as the result of a *Change Order* shall be included in the application for progress payment.

GC 6.3 CHANGE DIRECTIVE

- 6.3.1 If the *Owner* requires the *Contractor* to proceed with a change in the *Work* prior to the *Owner* and the *Contractor* agreeing upon the corresponding adjustment in *Contract Price* and *Contract Time*, the *Owner*, through the *Consultant*, shall issue a *Change Directive*.
- 6.3.2 A *Change Directive* shall only be used to direct a change in the *Work* which is within the general scope of the *Contract Documents*.
- 6.3.3 A *Change Directive* shall not be used to direct a change in the *Contract Time* only.
- 6.3.4 Upon receipt of a *Change Directive*, the *Contractor* shall proceed promptly with the change in the *Work*.
- 6.3.5 For the purpose of valuing *Change Directives*, changes in the *Work* that are not substitutions or otherwise related to each other shall not be grouped together in the same *Change Directive*.
- 6.3.6 The adjustment in the *Contract Price* for a change carried out by way of a *Change Directive* shall be determined on the basis of the cost of the *Contractor's* actual expenditures and savings attributable to the *Change Directive*, valued in accordance with paragraph 6.3.7 and as follows:
- .1 If the change results in a net increase in the *Contractor's* cost, the *Contract Price* shall be increased by the amount of the net increase in the *Contractor's* cost, plus the *Contractor's* percentage fee on such net increase.
 - .2 If the change results in a net decrease in the *Contractor's* cost, the *Contract Price* shall be decreased by the amount of the net decrease in the *Contractor's* cost, without adjustment for the *Contractor's* percentage fee.
 - .3 The *Contractor's* fee shall be as specified in the *Contract Documents* or as otherwise agreed by the parties.
- 6.3.7 The cost of performing the work attributable to the *Change Directive* shall be limited to the actual cost of the following:
- .1 salaries, wages and benefits paid to personnel in the direct employ of the *Contractor* under a salary or wage schedule agreed upon by the *Owner* and the *Contractor*, or in the absence of such a schedule, actual salaries, wages and benefits paid under applicable bargaining agreement, and in the absence of a salary or wage schedule and bargaining agreement, actual salaries, wages and benefits paid by the *Contractor*, for personnel
 - (1) stationed at the *Contractor's* field office, in whatever capacity employed;
 - (2) engaged in expediting the production or transportation of material or equipment, at shops or on the road;
 - (3) engaged in the preparation or review of *Shop Drawings*, fabrication drawings, and coordination drawings; or
 - (4) engaged in the processing of changes in the *Work*.
 - .2 contributions, assessments or taxes incurred for such items as employment insurance, provincial or territorial health insurance, workers' compensation, and Canada or Quebec Pension Plan, insofar as such cost is based on wages, salaries or other remuneration paid to employees of the *Contractor* and included in the cost of the *Work* as provided in paragraph 6.3.7.1;
 - .3 travel and subsistence expenses of the *Contractor's* personnel described in paragraph 6.3.7.1;
 - .4 all *Products* including cost of transportation thereof;
 - .5 materials, supplies, *Construction Equipment*, *Temporary Work*, and hand tools not owned by the workers, including transportation and maintenance thereof, which are consumed in the performance of the *Work*; and cost less salvage value on such items used but not consumed, which remain the property of the *Contractor*;
 - .6 all tools and *Construction Equipment*, exclusive of hand tools used in the performance of the *Work*, whether rented from or provided by the *Contractor* or others, including installation, minor repairs and replacements, dismantling, removal, transportation, and delivery cost thereof;
 - .7 all equipment and services required for the *Contractor's* field office;
 - .8 deposits lost;
 - .9 the amounts of all subcontracts;
 - .10 quality assurance such as independent inspection and testing services;
 - .11 charges levied by authorities having jurisdiction at the *Place of the Work*;
 - .12 royalties, patent licence fees and damages for infringement of patents and cost of defending suits therefor subject always to the *Contractor's* obligations to indemnify the *Owner* as provided in paragraph 10.3.1 of GC 10.3 - PATENT FEES;
 - .13 any adjustment in premiums for all bonds and insurance which the *Contractor* is required, by the *Contract Documents*, to purchase and maintain;
 - .14 any adjustment in taxes, other than *Value Added Taxes*, and duties for which the *Contractor* is liable;
 - .15 charges for long distance telephone and facsimile communications, courier services, expressage, and petty cash items incurred in relation to the performance of the *Work*;
 - .16 removal and disposal of waste products and debris; and
 - .17 safety measures and requirements.

- 6.3.8 Notwithstanding any other provisions contained in the General Conditions of the *Contract*, it is the intention of the parties that the cost of any item under any cost element referred to in paragraph 6.3.7 shall cover and include any and all costs or liabilities attributable to the *Change Directive* other than those which are the result of or occasioned by any failure on the part of the *Contractor* to exercise reasonable care and diligence in the *Contractor's* attention to the *Work*. Any cost due to failure on the part of the *Contractor* to exercise reasonable care and diligence in the *Contractor's* attention to the *Work* shall be borne by the *Contractor*.
- 6.3.9 The *Contractor* shall keep full and detailed accounts and records necessary for the documentation of the cost of performing the *Work* attributable to the *Change Directive* and shall provide the *Consultant* with copies thereof when requested.
- 6.3.10 For the purpose of valuing *Change Directives*, the *Owner* shall be afforded reasonable access to all of the *Contractor's* pertinent documents related to the cost of performing the *Work* attributable to the *Change Directive*.
- 6.3.11 Pending determination of the final amount of a *Change Directive*, the undisputed value of the *Work* performed as the result of a *Change Directive* is eligible to be included in progress payments.
- 6.3.12 If the *Owner* and the *Contractor* do not agree on the proposed adjustment in the *Contract Time* attributable to the change in the *Work*, or the method of determining it, the adjustment shall be referred to the *Consultant* for determination.
- 6.3.13 When the *Owner* and the *Contractor* reach agreement on the adjustment to the *Contract Price* and to the *Contract Time*, this agreement shall be recorded in a *Change Order*.

GC 6.4 CONCEALED OR UNKNOWN CONDITIONS

- 6.4.1 If the *Owner* or the *Contractor* discover conditions at the *Place of the Work* which are:
- .1 subsurface or otherwise concealed physical conditions which existed before the commencement of the *Work* which differ materially from those indicated in the *Contract Documents*; or
 - .2 physical conditions, other than conditions due to weather, that are of a nature which differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the *Contract Documents*,
- then the observing party shall give *Notice in Writing* to the other party of such conditions before they are disturbed and in no event later than 5 *Working Days* after first observance of the conditions.
- 6.4.2 The *Consultant* will promptly investigate such conditions and make a finding. If the finding is that the conditions differ materially and this would cause an increase or decrease in the *Contractor's* cost or time to perform the *Work*, the *Consultant*, with the *Owner's* approval, will issue appropriate instructions for a change in the *Work* as provided in GC 6.2 - CHANGE ORDER or GC 6.3 - CHANGE DIRECTIVE.
- 6.4.3 If the *Consultant* finds that the conditions at the *Place of the Work* are not materially different or that no change in the *Contract Price* or the *Contract Time* is justified, the *Consultant* will report the reasons for this finding to the *Owner* and the *Contractor* in writing.
- 6.4.4 If such concealed or unknown conditions relate to toxic and hazardous substances and materials, artifacts and fossils, or mould, the parties will be governed by the provisions of GC 9.2 - TOXIC AND HAZARDOUS SUBSTANCES, GC 9.3 - ARTIFACTS AND FOSSILS and GC 9.5 - MOULD.

GC 6.5 DELAYS

- 6.5.1 If the *Contractor* is delayed in the performance of the *Work* by an action or omission of the *Owner*, *Consultant* or anyone employed or engaged by them directly or indirectly, contrary to the provisions of the *Contract Documents*, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor*. The *Contractor* shall be reimbursed by the *Owner* for reasonable costs incurred by the *Contractor* as the result of such delay.
- 6.5.2 If the *Contractor* is delayed in the performance of the *Work* by a stop work order issued by a court or other public authority and providing that such order was not issued as the result of an act or fault of the *Contractor* or any person employed or engaged by the *Contractor* directly or indirectly, then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor*. The *Contractor* shall be reimbursed by the *Owner* for reasonable costs incurred by the *Contractor* as the result of such delay.

- 6.5.3 If the *Contractor* is delayed in the performance of the *Work* by:
- .1 labour disputes, strikes, lock-outs (including lock-outs decreed or recommended for its members by a recognized contractors' association, of which the *Contractor* is a member or to which the *Contractor* is otherwise bound),
 - .2 fire, unusual delay by common carriers or unavoidable casualties,
 - .3 abnormally adverse weather conditions, or
 - .4 any cause beyond the *Contractor's* control other than one resulting from a default or breach of *Contract* by the *Contractor*,
- then the *Contract Time* shall be extended for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor*. The extension of time shall not be less than the time lost as the result of the event causing the delay, unless the *Contractor* agrees to a shorter extension. The *Contractor* shall not be entitled to payment for costs incurred by such delays unless such delays result from actions by the *Owner*, *Consultant* or anyone employed or engaged by them directly or indirectly.
- 6.5.4 No extension shall be made for delay unless *Notice in Writing* of the cause of delay is given to the *Consultant* not later than 10 *Working Days* after the commencement of the delay. In the case of a continuing cause of delay only one *Notice in Writing* shall be necessary.
- 6.5.5 If no schedule is made under paragraph 2.2.13 of GC 2.2 - ROLE OF THE CONSULTANT, then no request for extension shall be made because of failure of the *Consultant* to furnish instructions until 10 *Working Days* after demand for such instructions has been made.

GC 6.6 CLAIMS FOR A CHANGE IN CONTRACT PRICE

- 6.6.1 If the *Contractor* intends to make a claim for an increase to the *Contract Price*, or if the *Owner* intends to make a claim against the *Contractor* for a credit to the *Contract Price*, the party that intends to make the claim shall give timely *Notice in Writing* of intent to claim to the other party and to the *Consultant*.
- 6.6.2 Upon commencement of the event or series of events giving rise to a claim, the party intending to make the claim shall:
- .1 take all reasonable measures to mitigate any loss or expense which may be incurred as a result of such event or series of events, and
 - .2 keep such records as may be necessary to support the claim.
- 6.6.3 The party making the claim shall submit within a reasonable time to the *Consultant* a detailed account of the amount claimed and the grounds upon which the claim is based.
- 6.6.4 Where the event or series of events giving rise to the claim has a continuing effect, the detailed account submitted under paragraph 6.6.3 shall be considered to be an interim account and the party making the claim shall, at such intervals as the *Consultant* may reasonably require, submit further interim accounts giving the accumulated amount of the claim and any further grounds upon which it is based. The party making the claim shall submit a final account after the end of the effects resulting from the event or series of events.
- 6.6.5 The *Consultant's* findings, with respect to a claim made by either party, will be given by *Notice in Writing* to both parties within 30 *Working Days* after receipt of the claim by the *Consultant*, or within such other time period as may be agreed by the parties.
- 6.6.6 If such finding is not acceptable to either party, the claim shall be settled in accordance with Part 8 of the General Conditions - DISPUTE RESOLUTION.

PART 7 DEFAULT NOTICE

GC 7.1 OWNER'S RIGHT TO PERFORM THE WORK, TERMINATE THE CONTRACTOR'S RIGHT TO CONTINUE WITH THE WORK OR TERMINATE THE CONTRACT

- 7.1.1 If the *Contractor* is adjudged bankrupt, or makes a general assignment for the benefit of creditors because of the *Contractor's* insolvency, or if a receiver is appointed because of the *Contractor's* insolvency, the *Owner* may, without prejudice to any other right or remedy the *Owner* may have, terminate the *Contractor's* right to continue with the *Work*, by giving the *Contractor* or receiver or trustee in bankruptcy *Notice in Writing* to that effect.
- 7.1.2 If the *Contractor* neglects to prosecute the *Work* properly or otherwise fails to comply with the requirements of the *Contract* to a substantial degree and if the *Consultant* has given a written statement to the *Owner* and *Contractor* that sufficient cause exists to justify such action, the *Owner* may, without prejudice to any other right or remedy the *Owner* may have, give the *Contractor* *Notice in Writing* that the *Contractor* is in default of the *Contractor's* contractual obligations and instruct the *Contractor* to correct the default in the 5 *Working Days* immediately following the receipt of such *Notice in Writing*.

- 7.1.3 If the default cannot be corrected in the 5 *Working Days* specified or in such other time period as may be subsequently agreed in writing by the parties, the *Contractor* shall be in compliance with the *Owner's* instructions if the *Contractor*:
- .1 commences the correction of the default within the specified time, and
 - .2 provides the *Owner* with an acceptable schedule for such correction, and
 - .3 corrects the default in accordance with the *Contract* terms and with such schedule.
- 7.1.4 If the *Contractor* fails to correct the default in the time specified or in such other time period as may be subsequently agreed in writing by the parties, without prejudice to any other right or remedy the *Owner* may have, the *Owner* may:
- .1 correct such default and deduct the cost thereof from any payment then or thereafter due the *Contractor* provided the *Consultant* has certified such cost to the *Owner* and the *Contractor*, or
 - .2 terminate the *Contractor's* right to continue with the *Work* in whole or in part or terminate the *Contract*.
- 7.1.5 If the *Owner* terminates the *Contractor's* right to continue with the *Work* as provided in paragraphs 7.1.1 and 7.1.4, the *Owner* shall be entitled to:
- .1 take possession of the *Work* and *Products* at the *Place of the Work*; subject to the rights of third parties, utilize the *Construction Equipment* at the *Place of the Work*; finish the *Work* by whatever method the *Owner* may consider expedient, but without undue delay or expense, and
 - .2 withhold further payment to the *Contractor* until a final certificate for payment is issued, and
 - .3 charge the *Contractor* the amount by which the full cost of finishing the *Work* as certified by the *Consultant*, including compensation to the *Consultant* for the *Consultant's* additional services and a reasonable allowance as determined by the *Consultant* to cover the cost of corrections to work performed by the *Contractor* that may be required under GC 12.3 - WARRANTY, exceeds the unpaid balance of the *Contract Price*; however, if such cost of finishing the *Work* is less than the unpaid balance of the *Contract Price*, the *Owner* shall pay the *Contractor* the difference, and
 - .4 on expiry of the warranty period, charge the *Contractor* the amount by which the cost of corrections to the *Contractor's* work under GC 12.3 - WARRANTY exceeds the allowance provided for such corrections, or if the cost of such corrections is less than the allowance, pay the *Contractor* the difference.
- 7.1.6 The *Contractor's* obligation under the *Contract* as to quality, correction and warranty of the work performed by the *Contractor* up to the time of termination shall continue after such termination of the *Contract*.

GC 7.2 CONTRACTOR'S RIGHT TO SUSPEND THE WORK OR TERMINATE THE CONTRACT

- 7.2.1 If the *Owner* is adjudged bankrupt, or makes a general assignment for the benefit of creditors because of the *Owner's* insolvency, or if a receiver is appointed because of the *Owner's* insolvency, the *Contractor* may, without prejudice to any other right or remedy the *Contractor* may have, terminate the *Contract* by giving the *Owner* or receiver or trustee in bankruptcy *Notice in Writing* to that effect.
- 7.2.2 If the *Work* is suspended or otherwise delayed for a period of 20 *Working Days* or more under an order of a court or other public authority and providing that such order was not issued as the result of an act or fault of the *Contractor* or of anyone directly or indirectly employed or engaged by the *Contractor*, the *Contractor* may, without prejudice to any other right or remedy the *Contractor* may have, terminate the *Contract* by giving the *Owner* *Notice in Writing* to that effect.
- 7.2.3 The *Contractor* may give *Notice in Writing* to the *Owner*, with a copy to the *Consultant*, that the *Owner* is in default of the *Owner's* contractual obligations if:
- .1 the *Owner* fails to furnish, when so requested by the *Contractor*, reasonable evidence that financial arrangements have been made to fulfill the *Owner's* obligations under the *Contract*, or
 - .2 the *Consultant* fails to issue a certificate as provided in GC 5.3 - PROGRESS PAYMENT, or
 - .3 the *Owner* fails to pay the *Contractor* when due the amounts certified by the *Consultant* or awarded by arbitration or court, or
 - .4 the *Owner* violates the requirements of the *Contract* to a substantial degree and the *Consultant*, except for GC 5.1 - FINANCING INFORMATION REQUIRED OF THE OWNER, confirms by written statement to the *Contractor* that sufficient cause exists.
- 7.2.4 The *Contractor's* *Notice in Writing* to the *Owner* provided under paragraph 7.2.3 shall advise that if the default is not corrected within 5 *Working Days* following the receipt of the *Notice in Writing*, the *Contractor* may, without prejudice to any other right or remedy the *Contractor* may have, suspend the *Work* or terminate the *Contract*.
- 7.2.5 If the *Contractor* terminates the *Contract* under the conditions set out above, the *Contractor* shall be entitled to be paid for all work performed including reasonable profit, for loss sustained upon *Products* and *Construction Equipment*, and such other damages as the *Contractor* may have sustained as a result of the termination of the *Contract*.

PART 8 DISPUTE RESOLUTION

GC 8.1 AUTHORITY OF THE CONSULTANT

- 8.1.1 Differences between the parties to the *Contract* as to the interpretation, application or administration of the *Contract* or any failure to agree where agreement between the parties is called for, herein collectively called disputes, which are not resolved in the first instance by findings of the *Consultant* as provided in GC 2.2 - ROLE OF THE CONSULTANT, shall be settled in accordance with the requirements of Part 8 of the General Conditions - DISPUTE RESOLUTION.
- 8.1.2 If a dispute arises under the *Contract* in respect of a matter in which the *Consultant* has no authority under the *Contract* to make a finding, the procedures set out in paragraph 8.1.3 and paragraphs 8.2.3 to 8.2.8 of GC 8.2 - NEGOTIATION, MEDIATION AND ARBITRATION, and in GC 8.3 - RETENTION OF RIGHTS apply to that dispute with the necessary changes to detail as may be required.
- 8.1.3 If a dispute is not resolved promptly, the *Consultant* will give such instructions as in the *Consultant's* opinion are necessary for the proper performance of the *Work* and to prevent delays pending settlement of the dispute. The parties shall act immediately according to such instructions, it being understood that by so doing neither party will jeopardize any claim the party may have. If it is subsequently determined that such instructions were in error or at variance with the *Contract Documents*, the *Owner* shall pay the *Contractor* costs incurred by the *Contractor* in carrying out such instructions which the *Contractor* was required to do beyond what the *Contract Documents* correctly understood and interpreted would have required, including costs resulting from interruption of the *Work*.

GC 8.2 NEGOTIATION, MEDIATION AND ARBITRATION

- 8.2.1 In accordance with the Rules for Mediation of Construction Disputes as provided in CCDC 40 in effect at the time of bid closing, the parties shall appoint a Project Mediator
- .1 within 20 *Working Days* after the *Contract* was awarded, or
 - .2 if the parties neglected to make an appointment within the 20 *Working Days*, within 10 *Working Days* after either party by *Notice in Writing* requests that the Project Mediator be appointed.
- 8.2.2 A party shall be conclusively deemed to have accepted a finding of the *Consultant* under GC 2.2 - ROLE OF THE CONSULTANT and to have expressly waived and released the other party from any claims in respect of the particular matter dealt with in that finding unless, within 15 *Working Days* after receipt of that finding, the party sends a *Notice in Writing* of dispute to the other party and to the *Consultant*, which contains the particulars of the matter in dispute and the relevant provisions of the *Contract Documents*. The responding party shall send a *Notice in Writing* of reply to the dispute within 10 *Working Days* after receipt of such *Notice in Writing* setting out particulars of this response and any relevant provisions of the *Contract Documents*.
- 8.2.3 The parties shall make all reasonable efforts to resolve their dispute by amicable negotiations and agree to provide, without prejudice, frank, candid and timely disclosure of relevant facts, information and documents to facilitate these negotiations.
- 8.2.4 After a period of 10 *Working Days* following receipt of a responding party's *Notice in Writing* of reply under paragraph 8.2.2, the parties shall request the Project Mediator to assist the parties to reach agreement on any unresolved dispute. The mediated negotiations shall be conducted in accordance with the Rules for Mediation of Construction Disputes as provided in CCDC 40 in effect at the time of bid closing.
- 8.2.5 If the dispute has not been resolved within 10 *Working Days* after the Project Mediator was requested under paragraph 8.2.4 or within such further period agreed by the parties, the Project Mediator shall terminate the mediated negotiations by giving *Notice in Writing* to the *Owner*, the *Contractor* and the *Consultant*.
- 8.2.6 By giving a *Notice in Writing* to the other party and the *Consultant*, not later than 10 *Working Days* after the date of termination of the mediated negotiations under paragraph 8.2.5, either party may refer the dispute to be finally resolved by arbitration under the Rules for Arbitration of Construction Disputes as provided in CCDC 40 in effect at the time of bid closing. The arbitration shall be conducted in the jurisdiction of the *Place of the Work*.
- 8.2.7 On expiration of the 10 *Working Days*, the arbitration agreement under paragraph 8.2.6 is not binding on the parties and, if a *Notice in Writing* is not given under paragraph 8.2.6 within the required time, the parties may refer the unresolved dispute to the courts or to any other form of dispute resolution, including arbitration, which they have agreed to use.

- 8.2.8 If neither party, by *Notice in Writing*, given within 10 *Working Days* of the date of *Notice in Writing* requesting arbitration in paragraph 8.2.6, requires that a dispute be arbitrated immediately, all disputes referred to arbitration as provided in paragraph 8.2.6 shall be
- .1 held in abeyance until
 - (1) *Substantial Performance of the Work*,
 - (2) the *Contract* has been terminated, or
 - (3) the *Contractor* has abandoned the *Work*,whichever is earlier; and
 - .2 consolidated into a single arbitration under the rules governing the arbitration under paragraph 8.2.6.

GC 8.3 RETENTION OF RIGHTS

- 8.3.1 It is agreed that no act by either party shall be construed as a renunciation or waiver of any rights or recourses, provided the party has given the *Notice in Writing* required under Part 8 of the General Conditions - DISPUTE RESOLUTION and has carried out the instructions as provided in paragraph 8.1.3 of GC 8.1 – AUTHORITY OF THE CONSULTANT.
- 8.3.2 Nothing in Part 8 of the General Conditions - DISPUTE RESOLUTION shall be construed in any way to limit a party from asserting any statutory right to a lien under applicable lien legislation of the jurisdiction of the *Place of the Work* and the assertion of such right by initiating judicial proceedings is not to be construed as a waiver of any right that party may have under paragraph 8.2.6 of GC 8.2 – NEGOTIATION, MEDIATION AND ARBITRATION to proceed by way of arbitration to adjudicate the merits of the claim upon which such a lien is based.

PART 9 PROTECTION OF PERSONS AND PROPERTY

GC 9.1 PROTECTION OF WORK AND PROPERTY

- 9.1.1 The *Contractor* shall protect the *Work* and the *Owner's* property and property adjacent to the *Place of the Work* from damage which may arise as the result of the *Contractor's* operations under the *Contract*, and shall be responsible for such damage, except damage which occurs as the result of:
- .1 errors in the *Contract Documents*;
 - .2 acts or omissions by the *Owner*, the *Consultant*, other contractors, their agents and employees.
- 9.1.2 Before commencing any work, the *Contractor* shall determine the location of all underground utilities and structures indicated in the *Contract Documents* or that are reasonably apparent in an inspection of the *Place of the Work*.
- 9.1.3 Should the *Contractor* in the performance of the *Contract* damage the *Work*, the *Owner's* property or property adjacent to the *Place of the Work*, the *Contractor* shall be responsible for making good such damage at the *Contractor's* expense.
- 9.1.4 Should damage occur to the *Work* or *Owner's* property for which the *Contractor* is not responsible, as provided in paragraph 9.1.1, the *Contractor* shall make good such damage to the *Work* and, if the *Owner* so directs, to the *Owner's* property. The *Contract Price* and *Contract Time* shall be adjusted as provided in GC 6.1 – OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 - CHANGE ORDER and GC 6.3 - CHANGE DIRECTIVE.

GC 9.2 TOXIC AND HAZARDOUS SUBSTANCES

- 9.2.1 For the purposes of applicable legislation related to toxic and hazardous substances, the *Owner* shall be deemed to have control and management of the *Place of the Work* with respect to existing conditions.
- 9.2.2 Prior to the *Contractor* commencing the *Work*, the *Owner* shall,
- .1 take all reasonable steps to determine whether any toxic or hazardous substances are present at the *Place of the Work*, and
 - .2 provide the *Consultant* and the *Contractor* with a written list of any such substances that are known to exist and their locations.
- 9.2.3 The *Owner* shall take all reasonable steps to ensure that no person's exposure to any toxic or hazardous substances exceeds the time weighted levels prescribed by applicable legislation at the *Place of the Work* and that no property is damaged or destroyed as a result of exposure to, or the presence of, toxic or hazardous substances which were at the *Place of the Work* prior to the *Contractor* commencing the *Work*.
- 9.2.4 Unless the *Contract* expressly provides otherwise, the *Owner* shall be responsible for taking all necessary steps, in accordance with applicable legislation in force at the *Place of the Work*, to dispose of, store or otherwise render harmless toxic or hazardous substances which were present at the *Place of the Work* prior to the *Contractor* commencing the *Work*.

- 9.2.5 If the *Contractor*
- .1 encounters toxic or hazardous substances at the *Place of the Work*, or
 - .2 has reasonable grounds to believe that toxic or hazardous substances are present at the *Place of the Work*, which were not brought to the *Place of the Work* by the *Contractor* or anyone for whom the *Contractor* is responsible and which were not disclosed by the *Owner* or which were disclosed but have not been dealt with as required under paragraph 9.2.4, the *Contractor* shall
 - .3 take all reasonable steps, including stopping the *Work*, to ensure that no person's exposure to any toxic or hazardous substances exceeds any applicable time weighted levels prescribed by applicable legislation at the *Place of the Work*, and
 - .4 immediately report the circumstances to the *Consultant* and the *Owner* in writing.
- 9.2.6 If the *Owner* and *Contractor* do not agree on the existence, significance of, or whether the toxic or hazardous substances were brought onto the *Place of the Work* by the *Contractor* or anyone for whom the *Contractor* is responsible, the *Owner* shall retain and pay for an independent qualified expert to investigate and determine such matters. The expert's report shall be delivered to the *Owner* and the *Contractor*.
- 9.2.7 If the *Owner* and *Contractor* agree or if the expert referred to in paragraph 9.2.6 determines that the toxic or hazardous substances were not brought onto the place of the *Work* by the *Contractor* or anyone for whom the *Contractor* is responsible, the *Owner* shall promptly at the *Owner's* own expense:
- .1 take all steps as required under paragraph 9.2.4;
 - .2 reimburse the *Contractor* for the costs of all steps taken pursuant to paragraph 9.2.5;
 - .3 extend the *Contract* time for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor* and the expert referred to in 9.2.6 and reimburse the *Contractor* for reasonable costs incurred as a result of the delay; and
 - .4 indemnify the *Contractor* as required by GC 12.1 - INDEMNIFICATION.
- 9.2.8 If the *Owner* and *Contractor* agree or if the expert referred to in paragraph 9.2.6 determines that the toxic or hazardous substances were brought onto the place of the *Work* by the *Contractor* or anyone for whom the *Contractor* is responsible, the *Contractor* shall promptly at the *Contractor's* own expense:
- .1 take all necessary steps, in accordance with applicable legislation in force at the *Place of the Work*, to safely remove and dispose the toxic or hazardous substances;
 - .2 make good any damage to the *Work*, the *Owner's* property or property adjacent to the place of the *Work* as provided in paragraph 9.1.3 of GC 9.1 – PROTECTION OF WORK AND PROPERTY;
 - .3 reimburse the *Owner* for reasonable costs incurred under paragraph 9.2.6; and
 - .4 indemnify the *Owner* as required by GC 12.1 - INDEMNIFICATION.
- 9.2.9 If either party does not accept the expert's findings under paragraph 9.2.6, the disagreement shall be settled in accordance with Part 8 of the General Conditions - Dispute Resolution. If such disagreement is not resolved promptly, the parties shall act immediately in accordance with the expert's determination and take the steps required by paragraph 9.2.7 or 9.2.8 it being understood that by so doing, neither party will jeopardize any claim that party may have to be reimbursed as provided by GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES.

GC 9.3 ARTIFACTS AND FOSSILS

- 9.3.1 Fossils, coins, articles of value or antiquity, structures and other remains or things of scientific or historic interest discovered at the *Place or Work* shall, as between the *Owner* and the *Contractor*, be deemed to be the absolute property of the *Owner*.
- 9.3.2 The *Contractor* shall take all reasonable precautions to prevent removal or damage to discoveries as identified in paragraph 9.3.1, and shall advise the *Consultant* upon discovery of such items.
- 9.3.3 The *Consultant* will investigate the impact on the *Work* of the discoveries identified in paragraph 9.3.1. If conditions are found that would cause an increase or decrease in the *Contractor's* cost or time to perform the *Work*, the *Consultant*, with the *Owner's* approval, will issue appropriate instructions for a change in the *Work* as provided in GC 6.2 - CHANGE ORDER or GC 6.3 CHANGE DIRECTIVE.

GC 9.4 CONSTRUCTION SAFETY

- 9.4.1 Subject to paragraph 3.2.2.2 of GC 3.2 - CONSTRUCTION BY OWNER OR OTHER CONTRACTORS, the *Contractor* shall be solely responsible for construction safety at the *Place of the Work* and for compliance with the rules, regulations and practices required by the applicable construction health and safety legislation and shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the *Work*.

GC 9.5 MOULD

- 9.5.1 If the *Contractor* or *Owner* observes or reasonably suspects the presence of mould at the *Place of the Work*, the remediation of which is not expressly part of the *Work*,
- .1 the observing party shall promptly report the circumstances to the other party in writing, and
 - .2 the *Contractor* shall promptly take all reasonable steps, including stopping the *Work* if necessary, to ensure that no person suffers injury, sickness or death and that no property is damaged as a result of exposure to or the presence of the mould, and
 - .3 if the *Owner* and *Contractor* do not agree on the existence, significance or cause of the mould or as to what steps need be taken to deal with it, the *Owner* shall retain and pay for an independent qualified expert to investigate and determine such matters. The expert's report shall be delivered to the *Owner* and *Contractor*.
- 9.5.2 If the *Owner* and *Contractor* agree, or if the expert referred to in paragraph 9.5.1.3 determines that the presence of mould was caused by the *Contractor*'s operations under the *Contract*, the *Contractor* shall promptly, at the *Contractor*'s own expense:
- .1 take all reasonable and necessary steps to safely remediate or dispose of the mould, and
 - .2 make good any damage to the *Work*, the *Owner*'s property or property adjacent to the *Place of the Work* as provided in paragraph 9.1.3 of GC 9.1 - PROTECTION OF WORK AND PROPERTY, and
 - .3 reimburse the *Owner* for reasonable costs incurred under paragraph 9.5.1.3, and
 - .4 indemnify the *Owner* as required by GC 12.1 - INDEMNIFICATION.
- 9.5.3 If the *Owner* and *Contractor* agree, or if the expert referred to in paragraph 9.5.1.3 determines that the presence of mould was not caused by the *Contractor*'s operations under the *Contract*, the *Owner* shall promptly, at the *Owner*'s own expense:
- .1 take all reasonable and necessary steps to safely remediate or dispose of the mould, and
 - .2 reimburse the *Contractor* for the cost of taking the steps under paragraph 9.5.1.2 and making good any damage to the *Work* as provided in paragraph 9.1.4 of GC 9.1 - PROTECTION OF WORK AND PROPERTY, and
 - .3 extend the *Contract Time* for such reasonable time as the *Consultant* may recommend in consultation with the *Contractor* and the expert referred to in paragraph 9.5.1.3 and reimburse the *Contractor* for reasonable costs incurred as a result of the delay, and
 - .4 indemnify the *Contractor* as required by GC 12.1 - INDEMNIFICATION.
- 9.5.4 If either party does not accept the expert's finding under paragraph 9.5.1.3, the disagreement shall be settled in accordance with Part 8 of the General Conditions - DISPUTE RESOLUTION. If such disagreement is not resolved promptly, the parties shall act immediately in accordance with the expert's determination and take the steps required by paragraphs 9.5.2 or 9.5.3, it being understood that by so doing neither party will jeopardize any claim the party may have to be reimbursed as provided by GC 9.5 - MOULD.

PART 10 GOVERNING REGULATIONS

GC 10.1 TAXES AND DUTIES

- 10.1.1 The *Contract Price* shall include all taxes and customs duties in effect at the time of the bid closing except for *Value Added Taxes* payable by the *Owner* to the *Contractor* as stipulated in Article A-4 of the Agreement - CONTRACT PRICE.
- 10.1.2 Any increase or decrease in costs to the *Contractor* due to changes in such included taxes and duties after the time of the bid closing shall increase or decrease the *Contract Price* accordingly.

GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

- 10.2.1 The laws of the *Place of the Work* shall govern the *Work*.
- 10.2.2 The *Owner* shall obtain and pay for development approvals, building permit, permanent easements, rights of servitude, and all other necessary approvals and permits, except for the permits and fees referred to in paragraph 10.2.3 or for which the *Contract Documents* specify as the responsibility of the *Contractor*.
- 10.2.3 The *Contractor* shall be responsible for the procurement of permits, licences, inspections, and certificates, which are necessary for the performance of the *Work* and customarily obtained by contractors in the jurisdiction of the *Place of the Work* after the issuance of the building permit. The *Contract Price* includes the cost of these permits, licences, inspections, and certificates, and their procurement.
- 10.2.4 The *Contractor* shall give the required notices and comply with the laws, ordinances, rules, regulations, or codes which are or become in force during the performance of the *Work* and which relate to the *Work*, to the preservation of the public health, and to construction safety.

- 10.2.5 The *Contractor* shall not be responsible for verifying that the *Contract Documents* are in compliance with the applicable laws, ordinances, rules, regulations, or codes relating to the *Work*. If the *Contract Documents* are at variance therewith, or if, subsequent to the time of bid closing, changes are made to the applicable laws, ordinances, rules, regulations, or codes which require modification to the *Contract Documents*, the *Contractor* shall advise the *Consultant* in writing requesting direction immediately upon such variance or change becoming known. The *Consultant* will make the changes required to the *Contract Documents* as provided in GC 6.1 - OWNER'S RIGHT TO MAKE CHANGES, GC 6.2 - CHANGE ORDER and GC 6.3 - CHANGE DIRECTIVE.
- 10.2.6 If the *Contractor* fails to advise the *Consultant* in writing; and fails to obtain direction as required in paragraph 10.2.5; and performs work knowing it to be contrary to any laws, ordinances, rules, regulations, or codes; the *Contractor* shall be responsible for and shall correct the violations thereof; and shall bear the costs, expenses and damages attributable to the failure to comply with the provisions of such laws, ordinances, rules, regulations, or codes.
- 10.2.7 If, subsequent to the time of bid closing, changes are made to applicable laws, ordinances, rules, regulations, or codes of authorities having jurisdiction which affect the cost of the *Work*, either party may submit a claim in accordance with the requirements of GC 6.6 – CLAIMS FOR A CHANGE IN CONTRACT PRICE.

GC 10.3 PATENT FEES

- 10.3.1 The *Contractor* shall pay the royalties and patent licence fees required for the performance of the *Contract*. The *Contractor* shall hold the *Owner* harmless from and against claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of the *Contractor's* performance of the *Contract* which are attributable to an infringement or an alleged infringement of a patent of invention by the *Contractor* or anyone for whose acts the *Contractor* may be liable.
- 10.3.2 The *Owner* shall hold the *Contractor* harmless against claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of the *Contractor's* performance of the *Contract* which are attributable to an infringement or an alleged infringement of a patent of invention in executing anything for the purpose of the *Contract*, the model, plan or design of which was supplied to the *Contractor* as part of the *Contract Documents*.

GC 10.4 WORKERS' COMPENSATION

- 10.4.1 Prior to commencing the *Work*, again with the *Contractor's* application for payment of the holdback amount following *Substantial Performance of the Work* and again with the *Contractor's* application for final payment, the *Contractor* shall provide evidence of compliance with workers' compensation legislation at the *Place of the Work*, including payments due thereunder.
- 10.4.2 At any time during the term of the *Contract*, when requested by the *Owner*, the *Contractor* shall provide such evidence of compliance by the *Contractor* and *Subcontractors*.

PART 11 INSURANCE AND CONTRACT SECURITY

GC 11.1 INSURANCE

- 11.1.1 Without restricting the generality of GC 12.1 - INDEMNIFICATION, the *Contractor* shall provide, maintain and pay for the following insurance coverages, the minimum requirements of which are specified in CCDC 41 – CCDC Insurance Requirements in effect at the time of bid closing except as hereinafter provided:
- .1 General liability insurance in the name of the *Contractor* and include, or in the case of a single, blanket policy, be endorsed to name, the *Owner* and the *Consultant* as insureds but only with respect to liability, other than legal liability arising out of their sole negligence, arising out of the operations of the *Contractor* with regard to the *Work*. General liability insurance shall be maintained from the date of commencement of the *Work* until one year from the date of *Substantial Performance of the Work*. Liability coverage shall be provided for completed operations hazards from the date of *Substantial Performance of the Work*, as set out in the certificate of *Substantial Performance of the Work*, on an ongoing basis for a period of 6 years following *Substantial Performance of the Work*.
 - .2 Automobile Liability Insurance from the date of commencement of the *Work* until one year after the date of *Substantial Performance of the Work*.
 - .3 Aircraft or Watercraft Liability Insurance when owned or non-owned aircraft or watercraft are used directly or indirectly in the performance of the *Work*
 - .4 "Broad form" property insurance in the joint names of the *Contractor*, the *Owner* and the *Consultant*. The policy shall include as insureds all *Subcontractors*. The "Broad form" property insurance shall be provided from the date of commencement of the *Work* until the earliest of:
 - (1) 10 calendar days after the date of *Substantial Performance of the Work*;

- (2) on the commencement of use or occupancy of any part or section of the *Work* unless such use or occupancy is for construction purposes, habitational, office, banking, convenience store under 465 square metres in area, or parking purposes, or for the installation, testing and commissioning of equipment forming part of the *Work*;
 - (3) when left unattended for more than 30 consecutive calendar days or when construction activity has ceased for more than 30 consecutive calendar days.
5. Boiler and machinery insurance in the joint names of the *Contractor*, the *Owner* and the *Consultant*. The policy shall include as insureds all *Subcontractors*. The coverage shall be maintained continuously from commencement of use or operation of the boiler and machinery objects insured by the policy and until 10 calendar days after the date of *Substantial Performance of the Work*.
6. The "Broad form" property and boiler and machinery policies shall provide that, in the case of a loss or damage, payment shall be made to the *Owner* and the *Contractor* as their respective interests may appear. In the event of loss or damage:
- (1) the *Contractor* shall act on behalf of the *Owner* for the purpose of adjusting the amount of such loss or damage payment with the insurers. When the extent of the loss or damage is determined, the *Contractor* shall proceed to restore the *Work*. Loss or damage shall not affect the rights and obligations of either party under the *Contract* except that the *Contractor* shall be entitled to such reasonable extension of *Contract Time* relative to the extent of the loss or damage as the *Consultant* may recommend in consultation with the *Contractor*;
 - (2) the *Contractor* shall be entitled to receive from the *Owner*, in addition to the amount due under the *Contract*, the amount which the *Owner's* interest in restoration of the *Work* has been appraised, such amount to be paid as the restoration of the *Work* proceeds in accordance with the progress payment provisions. In addition the *Contractor* shall be entitled to receive from the payments made by the insurer the amount of the *Contractor's* interest in the restoration of the *Work*; and
 - (3) to the *Work* arising from the work of the *Owner*, the *Owner's* own forces or another contractor, the *Owner* shall, in accordance with the *Owner's* obligations under the provisions relating to construction by *Owner* or other contractors, pay the *Contractor* the cost of restoring the *Work* as the restoration of the *Work* proceeds and as in accordance with the progress payment provisions.
7. *Contractors' Equipment Insurance* from the date of commencement of the *Work* until one year after the date of *Substantial Performance of the Work*.
- 11.1.2 Prior to commencement of the *Work* and upon the placement, renewal, amendment, or extension of all or any part of the insurance, the *Contractor* shall promptly provide the *Owner* with confirmation of coverage and, if required, a certified true copy of the policies certified by an authorized representative of the insurer together with copies of any amending endorsements applicable to the *Work*.
- 11.1.3 The parties shall pay their share of the deductible amounts in direct proportion to their responsibility in regards to any loss for which the above policies are required to pay, except where such amounts may be excluded by the terms of the *Contract*.
- 11.1.4 If the *Contractor* fails to provide or maintain insurance as required by the *Contract Documents*, then the *Owner* shall have the right to provide and maintain such insurance and give evidence to the *Contractor* and the *Consultant*. The *Contractor* shall pay the cost thereof to the *Owner* on demand or the *Owner* may deduct the cost from the amount which is due or may become due to the *Contractor*.
- 11.1.5 All required insurance policies shall be with insurers licensed to underwrite insurance in the jurisdiction of the *Place of the Work*.
- 11.1.6 If a revised version of CCDC 41 – INSURANCE REQUIREMENTS is published, which specifies reduced insurance requirements, the parties shall address such reduction, prior to the *Contractor's* insurance policy becoming due for renewal, and record any agreement in a *Change Order*.
- 11.1.7 If a revised version of CCDC 41 – INSURANCE REQUIREMENTS is published, which specifies increased insurance requirements, the *Owner* may request the increased coverage from the *Contractor* by way of a *Change Order*.
- 11.1.8 A *Change Directive* shall not be used to direct a change in the insurance requirements in response to the revision of CCDC 41 – INSURANCE REQUIREMENTS.

GC 11.2 CONTRACT SECURITY

- 11.2.1 The *Contractor* shall, prior to commencement of the *Work* or within the specified time, provide to the *Owner* any *Contract* security specified in the *Contract Documents*.

11.2.2 If the *Contract Documents* require surety bonds to be provided, such bonds shall be issued by a duly licensed surety company authorized to transact the business of suretyship in the province or territory of the *Place of the Work* and shall be maintained in good standing until the fulfillment of the *Contract*. The form of such bonds shall be in accordance with the latest edition of the CCDC approved bond forms.

PART 12 INDEMNIFICATION, WAIVER OF CLAIMS AND WARRANTY

GC 12.1 INDEMNIFICATION

- 12.1.1 Without restricting the parties' obligation to indemnify as described in paragraphs 12.1.4 and 12.1.5, the *Owner* and the *Contractor* shall each indemnify and hold harmless the other from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings whether in respect to losses suffered by them or in respect to claims by third parties that arise out of, or are attributable in any respect to their involvement as parties to this *Contract*, provided such claims are:
- .1 caused by:
 - (1) the negligent acts or omissions of the party from whom indemnification is sought or anyone for whose acts or omissions that party is liable, or
 - (2) a failure of the party to the *Contract* from whom indemnification is sought to fulfill its terms or conditions; and
 - .2 made by *Notice in Writing* within a period of 6 years from the date of *Substantial Performance of the Work* as set out in the certificate of *Substantial Performance of the Work* issued pursuant to paragraph 5.4.2.2 of GC 5.4 – SUBSTANTIAL PERFORMANCE OF THE WORK or within such shorter period as may be prescribed by any limitation statute of the province or territory of the *Place of the Work*.
- The parties expressly waive the right to indemnity for claims other than those provided for in this *Contract*.
- 12.1.2 The obligation of either party to indemnify as set forth in paragraph 12.1.1 shall be limited as follows:
- .1 In respect to losses suffered by the *Owner* and the *Contractor* for which insurance is to be provided by either party pursuant to GC 11.1 – INSURANCE, the general liability insurance limit for one occurrence as referred to in CCDC 41 in effect at the time of bid closing.
 - .2 In respect to losses suffered by the *Owner* and the *Contractor* for which insurance is not required to be provided by either party in accordance with GC 11.1 – INSURANCE, the greater of the *Contract Price* as recorded in Article A-4 – CONTRACT PRICE or \$2,000,000, but in no event shall the sum be greater than \$20,000,000.
 - .3 In respect to claims by third parties for direct loss resulting from bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, the obligation to indemnify is without limit. In respect to all other claims for indemnity as a result of claims advanced by third parties, the limits of indemnity set forth in paragraphs 12.1.2.1 and 12.1.2.2 shall apply.
- 12.1.3 The obligation of either party to indemnify the other as set forth in paragraphs 12.1.1 and 12.1.2 shall be inclusive of interest and all legal costs.
- 12.1.4 The *Owner* and the *Contractor* shall indemnify and hold harmless the other from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of their obligations described in GC 9.2 – TOXIC AND HAZARDOUS SUBSTANCES.
- 12.1.5 The *Owner* shall indemnify and hold harmless the *Contractor* from and against all claims, demands, losses, costs, damages, actions, suits, or proceedings:
- .1 as described in paragraph 10.3.2 of GC 10.3 – PATENT FEES, and
 - .2 arising out of the *Contractor's* performance of the *Contract* which are attributable to a lack of or defect in title or an alleged lack of or defect in title to the *Place of the Work*.
- 12.1.6 In respect to any claim for indemnity or to be held harmless by the *Owner* or the *Contractor*:
- .1 *Notice in Writing* of such claim shall be given within a reasonable time after the facts upon which such claim is based became known;
 - .2 should any party be required as a result of its obligation to indemnify another to pay or satisfy a final order, judgment or award made against the party entitled by this contract to be indemnified, then the indemnifying party upon assuming all liability for any costs that might result shall have the right to appeal in the name of the party against whom such final order or judgment has been made until such rights of appeal have been exhausted.

GC 12.2 WAIVER OF CLAIMS

- 12.2.1 Subject to any lien legislation applicable to the *Place of the Work*, as of the fifth calendar day before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work*, the *Contractor* waives and releases the *Owner* from all claims which the *Contractor* has or reasonably ought to have knowledge of that could be advanced by the *Contractor* against the *Owner* arising from the *Contractor's* involvement in the *Work*, including, without limitation, those arising from negligence or breach of contract in respect to which the cause of action is based upon acts or omissions which occurred prior to or on the date of *Substantial Performance of the Work*, except as follows:
- .1 claims arising prior to or on the date of *Substantial Performance of the Work* for which *Notice in Writing* of claim has been received by the *Owner* from the *Contractor* no later than the sixth calendar day before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work*;
 - .2 indemnification for claims advanced against the *Contractor* by third parties for which a right of indemnification may be asserted by the *Contractor* against the *Owner* pursuant to the provisions of this *Contract*;
 - .3 claims for which a right of indemnity could be asserted by the *Contractor* pursuant to the provisions of paragraphs 12.1.4 or 12.1.5 of GC 12.1 – INDEMNIFICATION; and
 - .4 claims resulting from acts or omissions which occur after the date of *Substantial Performance of the Work*.
- 12.2.2 The *Contractor* waives and releases the *Owner* from all claims referenced in paragraph 12.2.1.4 except for those referred in paragraphs 12.2.1.2 and 12.2.1.3 and claims for which *Notice in Writing* of claim has been received by the *Owner* from the *Contractor* within 395 calendar days following the date of *Substantial Performance of the Work*.
- 12.2.3 Subject to any lien legislation applicable to the *Place of the Work*, as of the fifth calendar day before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work*, the *Owner* waives and releases the *Contractor* from all claims which the *Owner* has or reasonably ought to have knowledge of that could be advanced by the *Owner* against the *Contractor* arising from the *Owner's* involvement in the *Work*, including, without limitation, those arising from negligence or breach of contract in respect to which the cause of action is based upon acts or omissions which occurred prior to or on the date of *Substantial Performance of the Work*, except as follows:
- .1 claims arising prior to or on the date of *Substantial Performance of the Work* for which *Notice in Writing* of claim has been received by the *Contractor* from the *Owner* no later than the sixth calendar day before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work*;
 - .2 indemnification for claims advanced against the *Owner* by third parties for which a right of indemnification may be asserted by the *Owner* against the *Contractor* pursuant to the provisions of this *Contract*;
 - .3 claims for which a right of indemnity could be asserted by the *Owner* against the *Contractor* pursuant to the provisions of paragraph 12.1.4 of GC 12.1 - INDEMNIFICATION;
 - .4 damages arising from the *Contractor's* actions which result in substantial defects or deficiencies in the *Work*. "Substantial defects or deficiencies" mean those defects or deficiencies in the *Work* which affect the *Work* to such an extent or in such a manner that a significant part or the whole of the *Work* is unfit for the purpose intended by the *Contract Documents*;
 - .5 claims arising pursuant to GC 12.3 - WARRANTY; and
 - .6 claims arising from acts or omissions which occur after the date of *Substantial Performance of the Work*.
- 12.2.4 The *Owner* waives and releases the *Contractor* from all claims referred to in paragraph 12.2.3.4 except claims for which *Notice in Writing* of claim has been received by the *Contractor* from the *Owner* within a period of six years from the date of *Substantial Performance of the Work* should any limitation statute of the Province or Territory of the *Place of the Work* permit such agreement. If the applicable limitation statute does not permit such agreement, within such shorter period as may be prescribed by:
- .1 any limitation statute of the Province or Territory of the *Place of the Work*; or
 - .2 if the *Place of the Work* is the Province of Quebec, then Article 2118 of the Civil Code of Quebec.
- 12.2.5 The *Owner* waives and releases the *Contractor* from all claims referenced in paragraph 12.2.3.6 except for those referred in paragraph 12.2.3.2, 12.2.3.3 and those arising under GC 12.3 – WARRANTY and claims for which *Notice in Writing* has been received by the *Contractor* from the *Owner* within 395 calendar days following the date of *Substantial Performance of the Work*.
- 12.2.6 "Notice in Writing of claim" as provided for in GC 12.2 – WAIVER OF CLAIMS to preserve a claim or right of action which would otherwise, by the provisions of GC 12.2 – WAIVER OF CLAIMS, be deemed to be waived, must include the following:
- .1 a clear and unequivocal statement of the intention to claim;
 - .2 a statement as to the nature of the claim and the grounds upon which the claim is based; and
 - .3 a statement of the estimated quantum of the claim.
- 12.2.7 The party giving "Notice in Writing of claim" as provided for in GC 12.2 – WAIVER OF CLAIMS shall submit within a reasonable time a detailed account of the amount claimed.

- 12.2.8 Where the event or series of events giving rise to a claim made under paragraphs 12.2.1 or 12.2.3 has a continuing effect, the detailed account submitted under paragraph 12.2.7 shall be considered to be an interim account and the party making the claim shall submit further interim accounts, at reasonable intervals, giving the accumulated amount of the claim and any further grounds upon which it is based. The party making the claim shall submit a final account after the end of the effects resulting from the event or series of events.
- 12.2.9 If a *Notice in Writing* of claim pursuant to paragraph 12.2.1.1 is received on the seventh or sixth calendar day before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work*, the period within which *Notice in Writing* of claim shall be received pursuant to paragraph 12.2.3.1 shall be extended to two calendar days before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work*.
- 12.2.10 If a *Notice in Writing* of claim pursuant to paragraph 12.2.3.1 is received on the seventh or sixth calendar day before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work*, the period within which *Notice in Writing* of claim shall be received pursuant to paragraph 12.2.1.1 shall be extended to two calendar days before the expiry of the lien period provided by the lien legislation applicable at the *Place of the Work*.

GC 12.3 WARRANTY

- 12.3.1 Except for extended warranties as described in paragraph 12.3.6, the warranty period under the *Contract* is one year from the date of *Substantial Performance of the Work*.
- 12.3.2 The *Contractor* shall be responsible for the proper performance of the *Work* to the extent that the design and *Contract Documents* permit such performance.
- 12.3.3 The *Owner*, through the *Consultant*, shall promptly give the *Contractor* *Notice in Writing* of observed defects and deficiencies which occur during the one year warranty period.
- 12.3.4 Subject to paragraph 12.3.2, the *Contractor* shall correct promptly, at the *Contractor's* expense, defects or deficiencies in the *Work* which appear prior to and during the one year warranty period.
- 12.3.5 The *Contractor* shall correct or pay for damage resulting from corrections made under the requirements of paragraph 12.3.4.
- 12.3.6 Any extended warranties required beyond the one year warranty period as described in paragraph 12.3.1, shall be as specified in the *Contract Documents*. Extended warranties shall be issued by the warrantor to the benefit of the *Owner*. The *Contractor's* responsibility with respect to extended warranties shall be limited to obtaining any such extended warranties from the warrantor. The obligations under such extended warranties are solely the responsibilities of the warrantor.

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CANADIAN CONSTRUCTION DOCUMENTS COMMITTEE
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CCDC 41 CCDC INSURANCE REQUIREMENTS

PUBLICATION DATE: JANUARY 21, 2008

1. General liability insurance shall be with limits of not less than \$5,000,000 per occurrence, an aggregate limit of not less than \$5,000,000 within any policy year with respect to completed operations, and a deductible not exceeding \$5,000. The insurance coverage shall not be less than the insurance provided by IBC Form 2100 (including an extension for a standard provincial and territorial form of non-owned automobile liability policy) and IBC Form 2320. To achieve the desired limit, umbrella or excess liability insurance may be used. Subject to satisfactory proof of financial capability by the *Contractor*, the *Owner* may agree to increase the deductible amounts.
2. Automobile liability insurance in respect of vehicles that are required by law to be insured under a contract by a Motor Vehicle Liability Policy, shall have limits of not less than \$5,000,000 inclusive per occurrence for bodily injury, death and damage to property, covering all vehicles owned or leased by the *Contractor*. Where the policy has been issued pursuant to a government-operated automobile insurance system, the *Contractor* shall provide the *Owner* with confirmation of automobile insurance coverage for all automobiles registered in the name of the *Contractor*.
3. Aircraft and watercraft liability insurance with respect to owned or non-owned aircraft and watercraft (if used directly or indirectly in the performance of the *Work*), including use of additional premises, shall have limits of not less than \$5,000,000 inclusive per occurrence for bodily injury, death and damage to property including loss of use thereof and limits of not less than \$5,000,000 for aircraft passenger hazard. Such insurance shall be in a form acceptable to the *Owner*.
4. "Broad form" property insurance shall have limits of not less than the sum of 1.1 times *Contract Price* and the full value, as stated in the *Contract*, of *Products* and design services that are specified to be provided by the *Owner* for incorporation into the *Work*, with a deductible not exceeding \$5,000. The insurance coverage shall not be less than the insurance provided by IBC Forms 4042 and 4047 (excluding flood and earthquake) or their equivalent replacement. Subject to satisfactory proof of financial capability by the *Contractor*, the *Owner* may agree to increase the deductible amounts.
5. Boiler and machinery insurance shall have limits of not less than the replacement value of the permanent or temporary boilers and pressure vessels, and other insurable objects forming part of the *Work*. The insurance coverage shall not be less than the insurance provided by a comprehensive boiler and machinery policy.
6. "Broad form" contractors' equipment insurance coverage covering *Construction Equipment* used by the *Contractor* for the performance of the *Work*, shall be in a form acceptable to the *Owner* and shall not allow subrogation claims by the insurer against the *Owner*. Subject to satisfactory proof of financial capability by the *Contractor* for self-insurance, the *Owner* may agree to waive the equipment insurance requirement.
7. Standard Exclusions
 - 7.1 In addition to the broad form property exclusions identified in IBC forms 4042(1995), and 4047(2000), the *Contractor* is not required to provide the following insurance coverage:
 - Asbestos
 - Cyber Risk
 - Mould
 - Terrorism

Association
of Canadian
Engineering
Companies

Canadian
Construction
Association

Construction
Specifications
Canada

The Royal
Architectural
Institute of Canada

APPENDIX C

FUEL PRICE ADJUSTMENT

Payment Adjustment for Fuel Cost

Compensation payable to the Department or the Contractor shall be based on the difference in the IRAC posted wholesale price of diesel 24 hours prior to tender closing of the Contract (Tender Fuel Price) and the IRAC posted wholesale price when the work was completed for the applicable item. This shall be calculated in accordance with the following:

The Department shall adjust payments to the Contractor under the applicable Item in the Contract Document based on the Island Regulatory and Appeals Commission (IRAC) historical Petroleum prices for Wholesale Diesel . The price is available on the IRAC website: <https://irac.pe.ca/petrol/current-petroleum-prices/>

The payment adjustment will be established for each IRAC approved adjustment during the time that Work is performed on any of the items in Table 1 and when the Wholesale Price (WP) differed from the Tender Fuel Price (TFP) by more than 5%.

The adjustments will be calculated using the Nominal Fuel Consumption Rates (NFCR) in Table 1 and the formulae shown below. The Department shall submit a statement to the Contractor identifying, by Item, the Fuel Adjustment (FA), the associated NFCA, and the Material Quantity (MQ) as identified on the previous Progress Estimate

**Table 1
Nominal Fuel Consumption Rates (NFCRs) by Item**

Item #	Description	NFCR
20306/20307/20401	Excavation	1.0 L/m ³
20601/20602/20603/20604	Borrow	0.5 L/t or 1.0 L/m ³
20701	Aggregate Base/Subbase	0.6 L/t
60301/60326/60350/61003	Asphalt Base/Seal	5.0 L/t

The payment adjustment shall be calculated as follows, where:

FA = Fuel Adjustment

WP = Wholesale Price

TFP = Tender Fuel Price (posted price 24 hrs prior to tender closing)

NFCR = Nominal Fuel Consumption Rate

MQ = Material Quantity

When $WP > 1.05 TFP$, the FA is an additional payment to the Contractor as follows:

$$FA = (WP - 1.05TFP) \times NFCR \times MQ$$

When $WP < 0.95 TFP$, the FA is a deduction from payments due to the Contractor as follows:

$$FA = (WP - 0.95TFP) \times NFCR \times MQ$$

Examples:

1. A Contractor completes placement of 10,000 tonnes of select borrow and 5,000 tonnes of granular A. During the work period, IRAC approved four adjustments to the Wholesale diesel price which are as follows: \$1.11/L, \$1.15/L, \$1.23/L & \$1.26/L. The price of wholesale diesel 24 hours prior to the tender closing was \$0.90/L.

Within the first fuel adjustment IE. when the diesel price was \$1.11/L, 8,000 tonnes of borrow was placed and no granular was placed.

Within the second fuel adjustment IE. when the diesel price was \$1.15/L, 2,000 tonnes of borrow was placed and 1,500 tonnes of granular was placed.

Within the third adjustment IE. when the diesel price was \$1.23/L, 2,000 tonnes of granular was placed.

Within the final adjustment IE. when the diesel price was \$1.26/L, 1,500 tonnes of granular was placed.

Calculation

FA = Fuel Adjustment

NFCR = Nominal Fuel Consumption Rate, = 0.5l/t for borrow, = 0.6l/t for granular

MQ = Material Quantity

	Borrow	Granular
Work @ \$1.11 =	8,000t	0
Work @ \$1.15 =	2,000t	1,500t
Work @ \$1.23 =	0	2,000t
Work @ \$1.26 =	0	1,500t

TFP = Tender Fuel Price = \$0.90/L

WP is greater than 1.05*TFP therefore FA = (WP – 1.05TFP) x NFCR x MQ

		WP	(WP – 1.05TFP) (\$/l)	NFCR (l/t)	MQ (t)	Payment (\$)
Work @ \$1.11	Borrow	\$1.11	\$0.17	0.5	8000	\$680.00
	Granular	\$1.11	\$0.17	0.6	0	\$0.00
Work @ \$1.15	Borrow	\$1.15	\$0.21	0.5	2000	\$210.00
	Granular	\$1.15	\$0.21	0.6	1500	\$189.00
Work @ \$1.23	Borrow	\$1.23	\$0.29	0.5	0	\$0.00
	Granular	\$1.23	\$0.29	0.6	2000	\$348.00
Work @ \$1.26	Borrow	\$1.26	\$0.32	0.5	0	\$0.00
	Granular	\$1.26	\$0.32	0.6	1500	\$288.00

\$1,715.00 Payment

2. A Contractor completes placement of 4,500 tonnes of asphalt. During the work period, IRAC approved four adjustments to the Wholesale diesel price which are as follows: \$0.80/L, \$0.82/L, \$0.88/L & \$0.80/L. The price of wholesale diesel 24 hours prior to tender closing was \$1.35/L.

Within the first adjustment IE. when the diesel price was \$0.80/L, 1,200 tonnes of asphalt was placed.

Within the second fuel adjustment IE. when the diesel price was \$0.82/L, 1,000 tonnes of asphalt was placed

Within the third fuel adjustment IE. when the diesel price was \$0.88/L, 900 tonnes of asphalt was placed.

Within the final fuel adjustment IE. when the diesel price was \$0.80L, 1,400 tonnes of asphalt was placed.

Calculation

FA = Fuel Adjustment

NFCR = Nominal Fuel Consumption Rate = 5 l/t for seal

MQ = Material Quantity

Work @ \$0.80 = 1,200t

Work @ \$0.82 = 1,000t

Work @ \$0.88 = 900t

Work @ \$0.80 = 1,400t

TFP = Tender Fuel Price = \$1.35/L

WP is less than 0.95*TFP therefore FA = (WP - 0.95*TFP) x NFCR x MQ

	WP	(WP-0.95*TFP) (\$/l)	NFCR (l/t)	MQ (t)	Payment (\$)
Work @ \$0.80	\$0.80	-\$0.48	5	1200	-\$2,880.00
Work @ \$0.82	\$0.82	-\$0.46	5	1000	-\$2,300.00
Work @ \$0.88	\$0.88	-\$0.40	5	900	-\$1,800.00
Work @ \$0.80	\$0.80	-\$0.48	5	1400	-\$3,360.00

-\$10,340.00 Deduction

APPENDIX D

SMOKE FREE PLACES BYLAW

SMOKE FREE PLACES BYLAW

BYLAW # 2018-01

BEING A BYLAW OF THE CITY OF CHARLOTTETOWN WITH REPECT TO SMOKING. PURSUANT TO THE PROVISIONS OF SECTION 180 (a) OF **THE MUNICIPAL GOVERNMENT ACT OF P.E.I.**, R.S.P.E.I., 1988, Cap. M-12.1

AND WHEREAS IT IS DESIRABLE FOR THE SAFETY HEALTH AND WELFARE OF ITS RESIDENTS TO PROHIBIT SMOKING AND THE USE OF TOBACCO RELATED PRODUCTS AT CITY OWNED AND OPERATED INDOOR AND OUTDOOR SPORT AND RECREATION FACILITIES/PROPERTIES;

AND WHEREAS SECTION 3 OF THE PROVINCIAL SMOKE-FREE PLACES ACT, R.S.P.E.I. 1988, S-4.2 PERMITS A BYLAW OF A MUNICIPALITY OR CITY TO IMPOSE A MORE STRINGENT REQUIREMENT OR RESTRICTION.

BE IT ENACTED BY THE COUNCIL OF THE CITY OF CHARLOTTETOWN AS FOLLOWS:

PART I: TITLE

1.
 - 1.1 This Bylaw may be known and may be cited as the “Charlottetown Smoke Free Places Bylaw”.

PART II: DEFINITIONS

2. In this Bylaw:
 - 2.1 “City” means the City of Charlottetown established under Section 3 of the Charlottetown Area Municipalities Act;
 - 2.2 “Council” means the Council of the City;
 - 2.3 “Recreation and Sport Facility/Property” means all city owned or operated indoor and outdoor sport and recreation facilities/properties, including but not limited to: community centres, sport fields, sport courts, parks, playgrounds, green spaces, arenas, swimming pools, boardwalks, trails, viewing areas, park benches, and parking lots;

- 2.4 “Smoke or Smoking” means to smoke, utilize, hold or otherwise have control over an ignited tobacco product or operating electronic smoking device, water pipe or other device or instrument used or intended to be used to deliver vapour or smoke by inhalation from the device in a manner that resembles smoking;
- 2.5 “Tobacco product” means a product manufactured from tobacco and intended to be smoked.

PART III: SCOPE

3.
3.1 This Bylaw shall apply to all City owned or operated indoor and outdoor Recreation and Sport Facilities/Properties.

PART IV: ADMINISTRATION

4.
4.1 This Bylaw shall be administered and enforced by the City.

PART V: GENERAL PROVISIONS

5.
5.1 No person shall smoke at any Recreation and Sport Facilities/Properties.
- 5.2 At all Recreation and Sport Facility/Property smoke free places, a sign indicating that smoking is not permitted in or at the Recreation and Sport Facility/Property shall be posted conspicuously near every entrance to the Recreation and Sport Facility/Property.
- 5.3 A sign posted in accordance with this Bylaw shall measure at least 21 cm or 8 1/2 inches in width and at least 28 cm or 11 inches in height.
- 5.4 Any employee of a Recreation and Sport Facility/Property who observes any person smoking or using an electronic smoking device in violation of this Bylaw shall immediately require such person to desist therefrom. If such person declines to desist therefrom, that person shall be required to leave the facility/property forthwith. Failure to comply will result in police intervention.

PART VI: PENALTIES FOR NON-COMPLIANCE

- 6.
- 6.1 Any person who violates any provision of this Bylaw is guilty of an offense and liable on summary of conviction to a fine of not less than Fifty (\$50.00) Dollars and not more than Five Hundred (\$500.00) and in default of payment, to imprisonment for term not exceeding thirty (30) days.
- 6.2 Any person who has been found guilty twice of this offense shall be prohibited from using or attending the sport or recreation facility for fourteen (14) days.

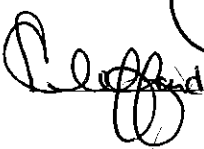
PART VII – COMPLAINTS

- 7.
- 7.1 A complaint alleging that there has been a contravention of this Bylaw, may be made by any person to the Parks and Recreation Department management.
- 7.2 A complaint shall be made in a manner or in a form acceptable to, and shall provide the information required by, the Parks and Recreation Department management.

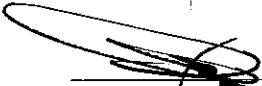
PART VIII: EFFECTIVE DATE

- 8.
- 8.1 This Bylaw shall come into force effective March 12, 2018.
- 8.2 The coming into force of this Bylaw repeals the City's Smoking Bylaw which came into effect December 11, 1995.

This Smoke Free Places Bylaw was adopted by the Council of the City of Charlottetown on this 12th day of March, 2018 and is certified to be a true copy.



Mayor



Chief Administrative Officer

SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT

t: 902-566-5548 | 199 QUEEN STREET, 3RD FLOOR, CHARLOTTETOWN, PE, C1A 4B7



TP 6 COMMUNITY BUILDING, ARENA INTERIOR AND SITE WORKS PACKAGE
ISSUED FOR TENDER
APR 10 2023

DRAWING LIST

CIVIL

C100 OVERALL SITE PLAN
C101 STANDARD DETAILS

LANDSCAPING

L1.01 SITE PLAN, SITE GRADING AND LANDSCAPING

STRUCTURAL

S0.01 TYPICAL NOTES
S0.02 TYPICAL DETAILS
S1.01 OVERALL FOUNDATION PLAN
S1.02 OVERALL LOW ROOF / SECOND FLOOR
S1.10 FOUNDATION PLAN - ARENA
S1.11 FOUNDATION PLAN - FRONT ENTRANCE - POOL AND MECHANICAL ROOM
S1.12 LOW ROOF FRAMING - FRONT ENTRANCE / POOL AND STAIR ROOF PLAN
S1.13 SECOND FLOOR PLAN - ARENA
S2.01 BRACING ELEVATIONS
S2.02 BRACING ELEVATIONS
S3.01 FOUNDATION SECTIONS
S3.02 FOUNDATION SECTIONS
S3.05 PLAN DETAILS
S3.06 STEEL DETAILS

ARCHITECTURAL

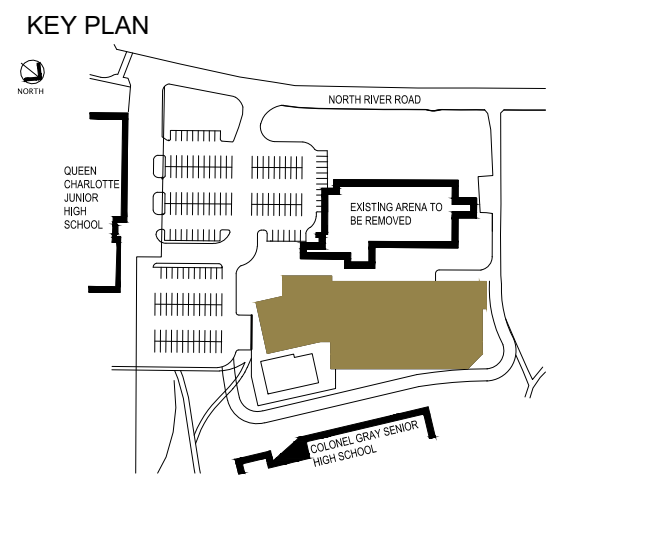
0.00 COVER PAGE & LIST OF DRAWINGS
A0.01 SITE PLAN
A0.02 CONSTRUCTION ASSEMBLIES, GENERAL NOTES AND LEGENDS
A0.10 LIFE SAFETY PLANS & CODE MATRIX
A1.01 BUILDING FLOOR PLAN
A1.10 FLOOR PLAN - LEVEL 1 (A)
A1.11 FLOOR PLAN - LEVELS 1 (B) & BASEMENT
A1.12 FLOOR PLAN - LEVEL 2 (A)
A2.01 ROOF PLAN
A2.11 REFLECTED CEILING PLAN - LEVEL 1 ARENA
A2.12 REFLECTED CEILING PLAN - FRONT ADDITION
A2.13 REFLECTED CEILING PLANS - LEVEL 2
A2.20 FLOOR FINISHES PLAN-ARENA-LEVEL 1
A2.21 FLOOR FINISHES PLAN-LEVEL 1 & -1- FRONT ADDITION
A2.22 FLOOR FINISHES PLAN - LEVEL - 2 - ARENA
A3.01 BUILDING ELEVATIONS
A3.02 INTERIOR ELEVATIONS
A4.01 BUILDING SECTIONS
A4.11 WALL SECTIONS
A4.12 WALL SECTIONS
A5.01 CHANGE ROOM, DRESSING ROOM & REF PLANS & ELEVATIONS
A5.02 WASHROOMS
A5.03 WASHROOMS
A5.05 KITCHEN & CANTEEN DETAILS
A7.01 SECTION DETAILS
A7.02 SECTION DETAILS
A7.03 SECTION DETAILS
A7.04 SECTION DETAILS
A7.05 SECTION DETAILS
A7.06 SECTION DETAILS
A7.07 SECTION DETAILS & ROOF HATCH
A7.10 PLAN DETAILS
A7.11 PLAN DETAILS
A7.12 PLAN DETAILS
A7.13 PLAN DETAILS
A8.01 GLAZING ELEVATIONS
A8.02 GLAZING ELEVATIONS
A8.10 STAIR & RAMP PLANS, SECTIONS, DETAILS
A8.11 STAIR PLANS, SECTIONS AND DETAILS
A8.12 STAIR PLANS, SECTIONS AND LADDER
A8.13 ELEVATOR, LIFT & LADDER
A8.14 RAILING DETAILS
A8.15 RAILING & EXT. FENCE DETAILS
A10.01 DOOR SCHEDULE
A10.02 ROOM SCHEDULE
A11.01 MILLWORK
A11.02 MILLWORK
A11.10 MULTI-PURPOSE ROOM - CEILING, SCREEN WALL & MILLWORK

ELECTRICAL

E0.00 ELECTRICAL COVER SHEET
E1.01 ELECTRICAL SITE PLAN NEW WORK
E1.02 ELECTRICAL SITE AND CONDUIT DETAILS
E1.03 ELECTRICAL UNDERGROUND PLAN
E2.00 ELECTRICAL FLOOR PLAN LEVEL 1(A) ARENA - LIGHTING
E2.01 ELECTRICAL FLOOR PLAN LEVEL 1(B) - LIGHTING
E2.02 ELECTRICAL FLOOR PLAN LEVEL 2 ARENA - LIGHTING
E3.00 ELECTRICAL FLOOR PLAN LEVEL 1(A) ARENA - POWER & SYSTEMS
E3.01 ELECTRICAL FLOOR PLAN LEVEL 1(B) - POWER & SYSTEMS
E3.02 ELECTRICAL FLOOR PLAN LEVEL 2 ARENA - POWER & SYSTEMS
E3.03 ELECTRICAL ROOF PLAN - POWER & SYSTEMS
E4.00 ELECTRICAL SCHEDULES
E5.00 ELECTRICAL POWER RISER
E5.01 ELECTRICAL RISERS
E6.00 ELECTRICAL PANEL SCHEDULES

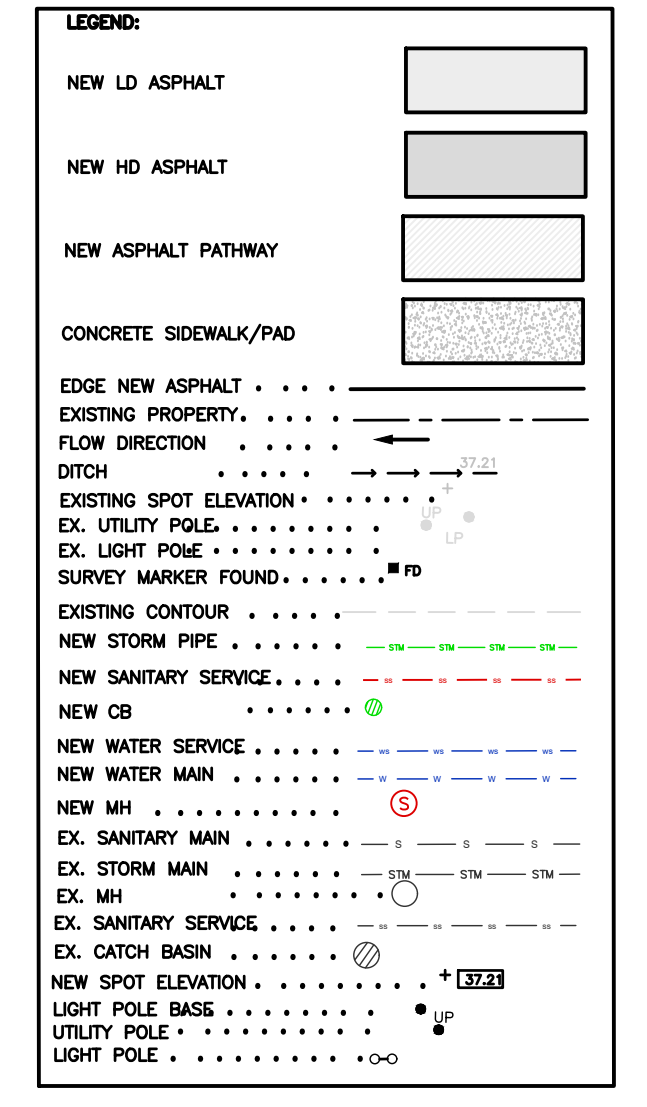
MECHANICAL

M0.00 COVER SHEET - MECHANICAL
M0.01 SITE PLAN - MECHANICAL
M1.00 ARENA ZONING FLOOR PLANS AND DESIGN APPROACH - FIRE PROTECTION
M1.01 LEVEL 1 (A) ARENA FLOOR PLAN - FIRE PROTECTION
M1.02 LEVEL 1 (B) & BASEMENT FLOOR PLANS - FIRE PROTECTION
M1.03 LEVEL 2 ARENA FLOOR PLAN - FIRE PROTECTION
M1.04 DETAILS - FIRE PROTECTION
M2.01 LEVEL 1 (A) ARENA UNDERGROUND FLOOR PLAN - SANITARY & STORM
M2.02 LEVEL 1(B) BASEMENT UNDERGROUND FLOOR PLANS - SANITARY & STORM
M2.03 LEVEL 1 (A) ARENA FLOOR - PLAN SANITARY & STORM
M2.04 LEVEL 1 (B) & BASEMENT FLOOR PLANS - SANITARY & STORM
M2.05 LEVEL 2 ARENA FLOOR PLAN - SANITARY & STORM
M2.06 ROOF PLAN - SANITARY & STORM
M2.07 LEVEL 1 (A) ARENA FLOOR PLAN - DOMESTIC WATER
M2.08 LEVEL 1 (B) & BASEMENT FLOOR PLANS - DOMESTIC WATER
M2.09 LEVEL 2 ARENA FLOOR PLAN - DOMESTIC WATER
M2.10 DETAILS - PLUMBING
M3.00 PROPANE GAS PIPING



CONSULTANT

- GENERAL NOTES:
- CONTRACTOR TO VERIFY LOCATION AND INVERT OF EXISTING SERVICES (BY OTHERS) PRIOR TO CONSTRUCTION. ALL DAMAGE TO EXISTING INFRASTRUCTURE IS THE RESPONSIBILITY OF THE CONTRACTOR.
 - IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT ALL UTILITY COMPANIES AND HAVE THEM LOCATE ALL EXISTING UNDERGROUND INFRASTRUCTURE PRIOR TO START OF CONSTRUCTION. CONTRACTOR TO EXPOSE AND WORK AROUND ALL EXISTING INFRASTRUCTURE WITHIN AREAS TO BE EXCAVATED.
 - FIELD WORK FOR TOPOGRAPHICAL SURVEY WAS COMPLETED BY DELTA SURVEYS AND SEE SURVEYS IN 2021 & 2022.
 - WATER, SANITARY AND STORM INFRASTRUCTURE MATERIALS, INSTALLATION AND TESTING TO BE IN ACCORDANCE WITH THE CITY OF CHARLOTTETOWN MUNICIPAL SERVING STANDARDS AND SPECIFICATIONS.
 - ALL AREAS DISTURBED DURING CONSTRUCTION ARE TO BE RESTORED TO THE ORIGINAL CONDITION TO THE APPROVAL OF THE ENGINEER. ALL COSTS FOR RESTORATION ARE THE RESPONSIBILITY OF THE CONTRACTOR.
 - MEASUREMENTS ARE IN METERS. EXISTING ELEVATIONS ARE SHOWN IN METERS.
 - NEW TOPSOIL AND SEEDING AREAS TO HAVE A MINIMUM OF 100mm OF TOPSOIL. SEED MATURE TO BE 50% KENTUCKY BLUEGRASS, 40% CREEPING RED FESCUE AND 10% PERENNIAL RYE.
 - ASPHALT PARKING LOT/PATHWAY AND CONCRETE CURB/SEWER/STORM CONSTRUCTION AND TESTING TO BE IN ACCORDANCE TO THE 2022 RES POT GENERAL PROVISIONS AND CONTRACT SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.
 - CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND DISPOSAL OF EXCESS AND UNSUITABLE FULL MATERIALS OFF SITE OR AS DIRECTED BY OWNER.
 - MINIMUM COVER TO TOP OF WATERMAIN IS 1.8m BELOW FINISHED GRADE UNLESS NOTED OTHERWISE.
 - INSTALL WATERMAIN WITHOUT REVERSE GRADES OR ISOLATED HIGH POINTS.
 - INSULATION AS PER DETAIL TO BE PLACED ON ALL WATER SERVICES WITH DEPTH OF COVER LESS THAN 1.8 METERS. 25mm H-60 INSULATION FOR EVERY 300mm LESS THAN 1.8 METERS.

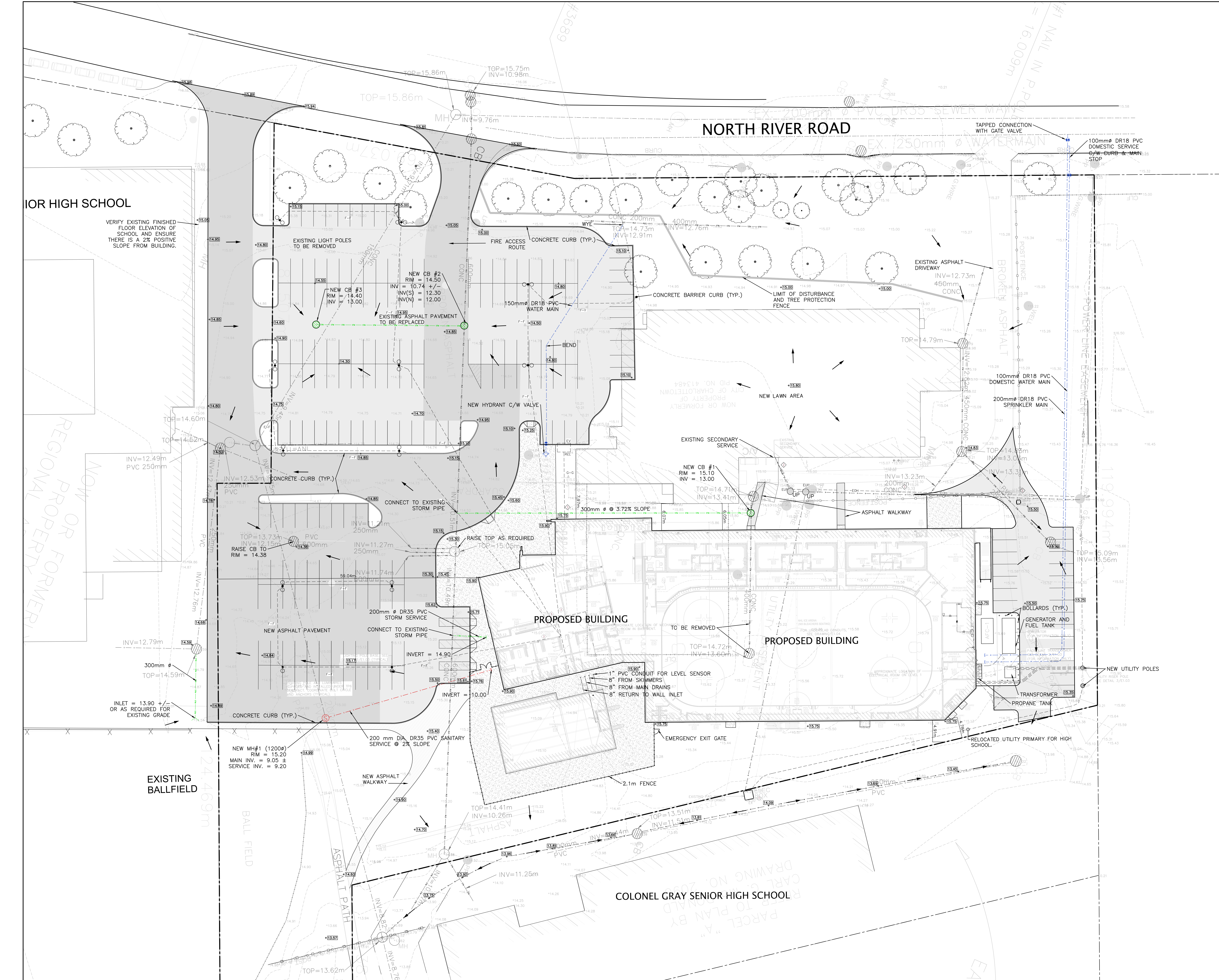


NO.	DESCRIPTION	DATE
0	TPE Issued for Tender	2023 04 10
1	REVISION	

STAMP

PROJECT NAME
SIMMONS SPORT CENTER
 CHARLOTTETOWN, PE

OVERALL SITE GRADING PLAN
 PROJECT NO. 21111
 DRAWN BY: K.K.
 CHECKED BY: C.M.
 SCALE: 1:250



VERIFIER HIGH SCHOOL

VERIFY EXISTING FINISHED FLOOR ELEVATION OF SCHOOL AND ENSURE THERE IS A 2% POSITIVE SLOPE FROM BUILDING.

REGIONAL PROPERTY
 NOW OR FORMERLY

EXISTING BALLFIELD

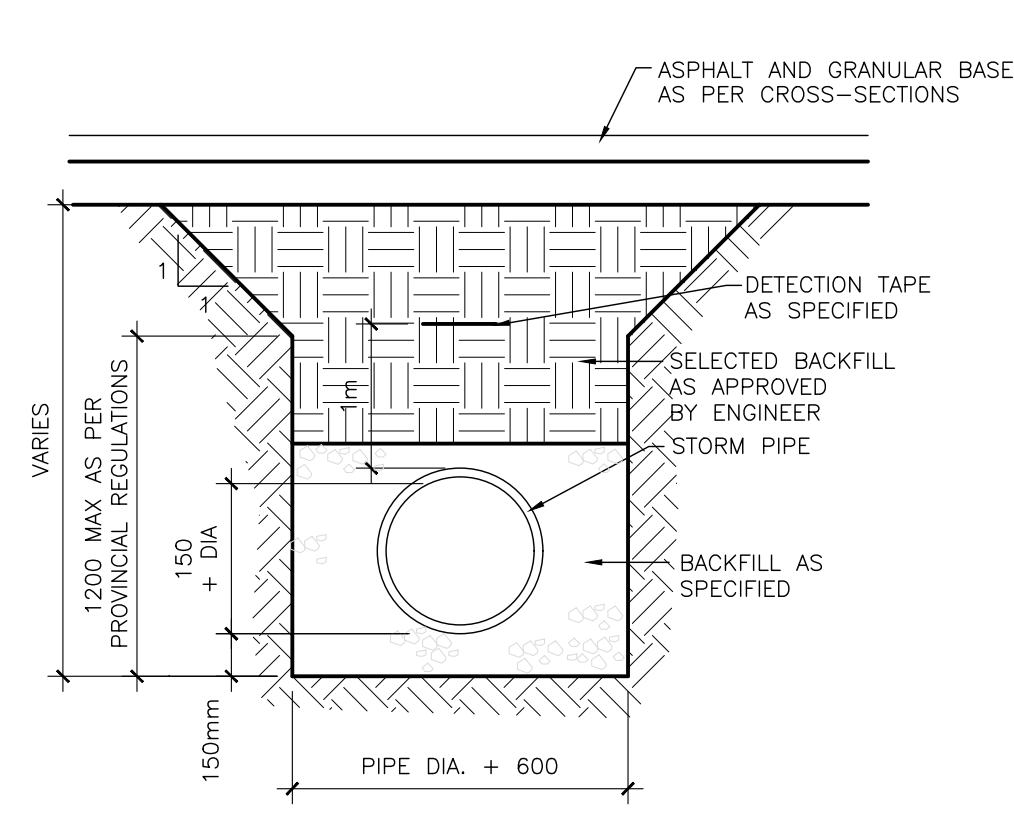
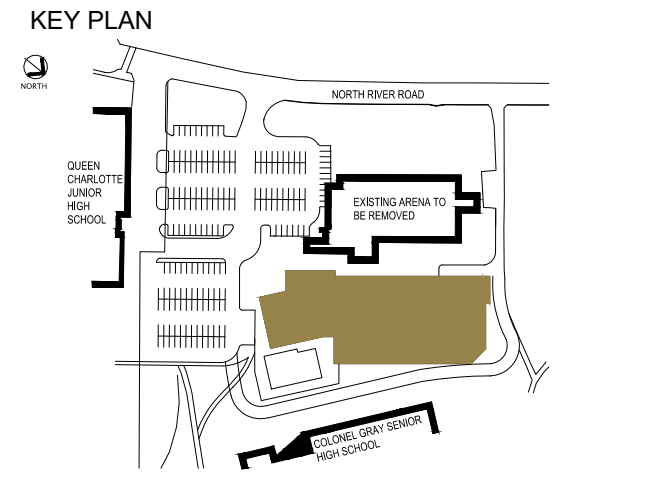
COLONEL GRAY SENIOR HIGH SCHOOL

NORTH RIVER ROAD

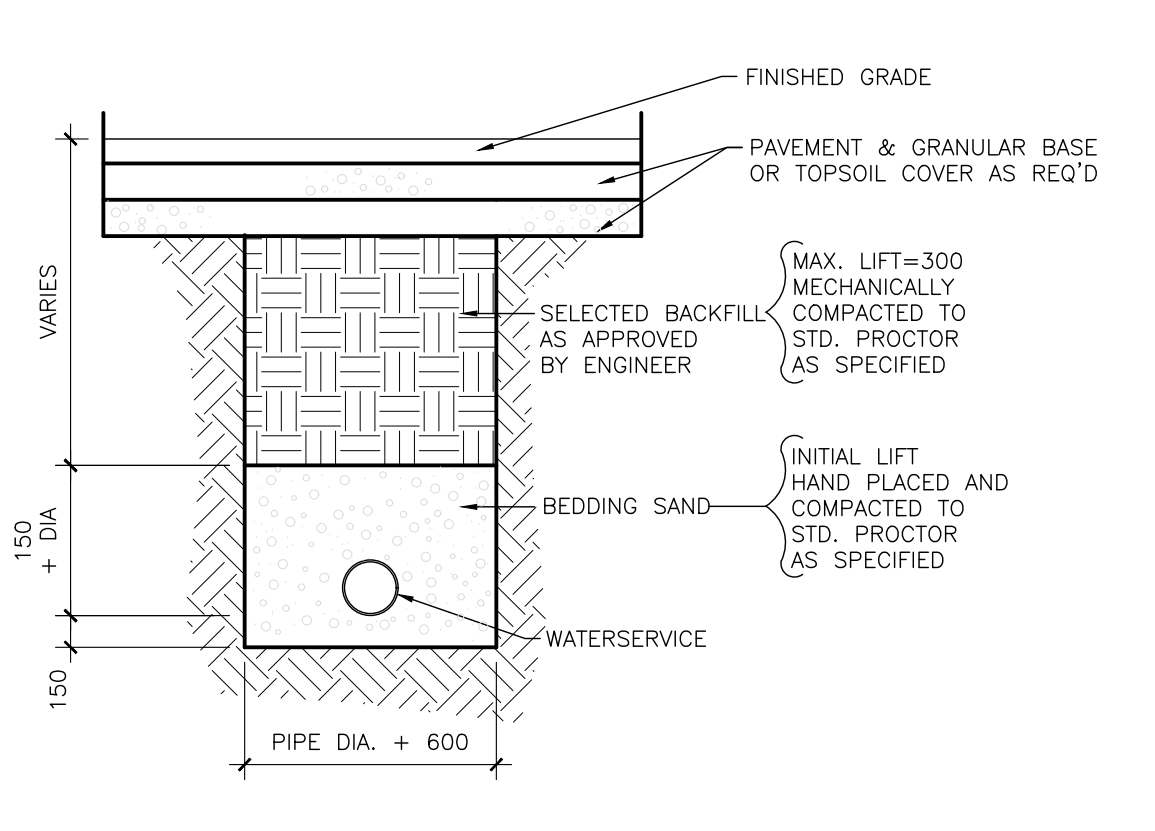
PROPOSED BUILDING

PROPOSED BUILDING

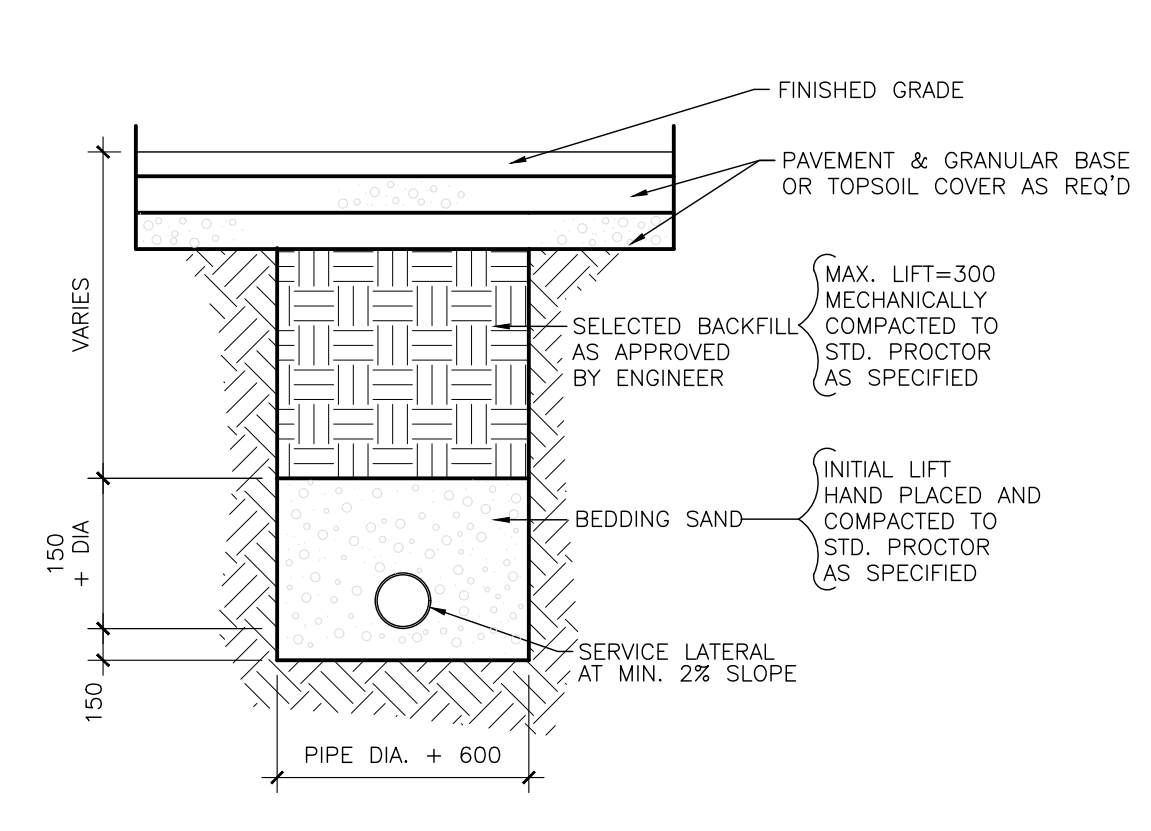
COLONEL GRAY SENIOR HIGH SCHOOL



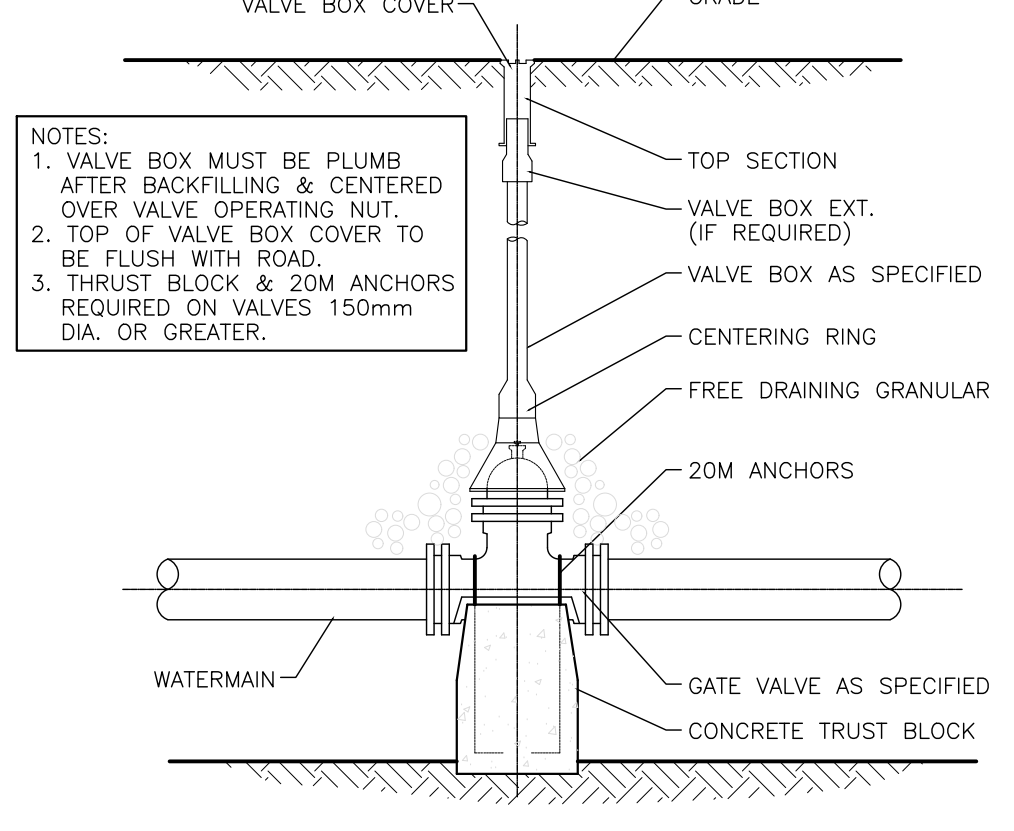
1 STORM SEWER TRENCH DETAIL
SCALE N.T.S.



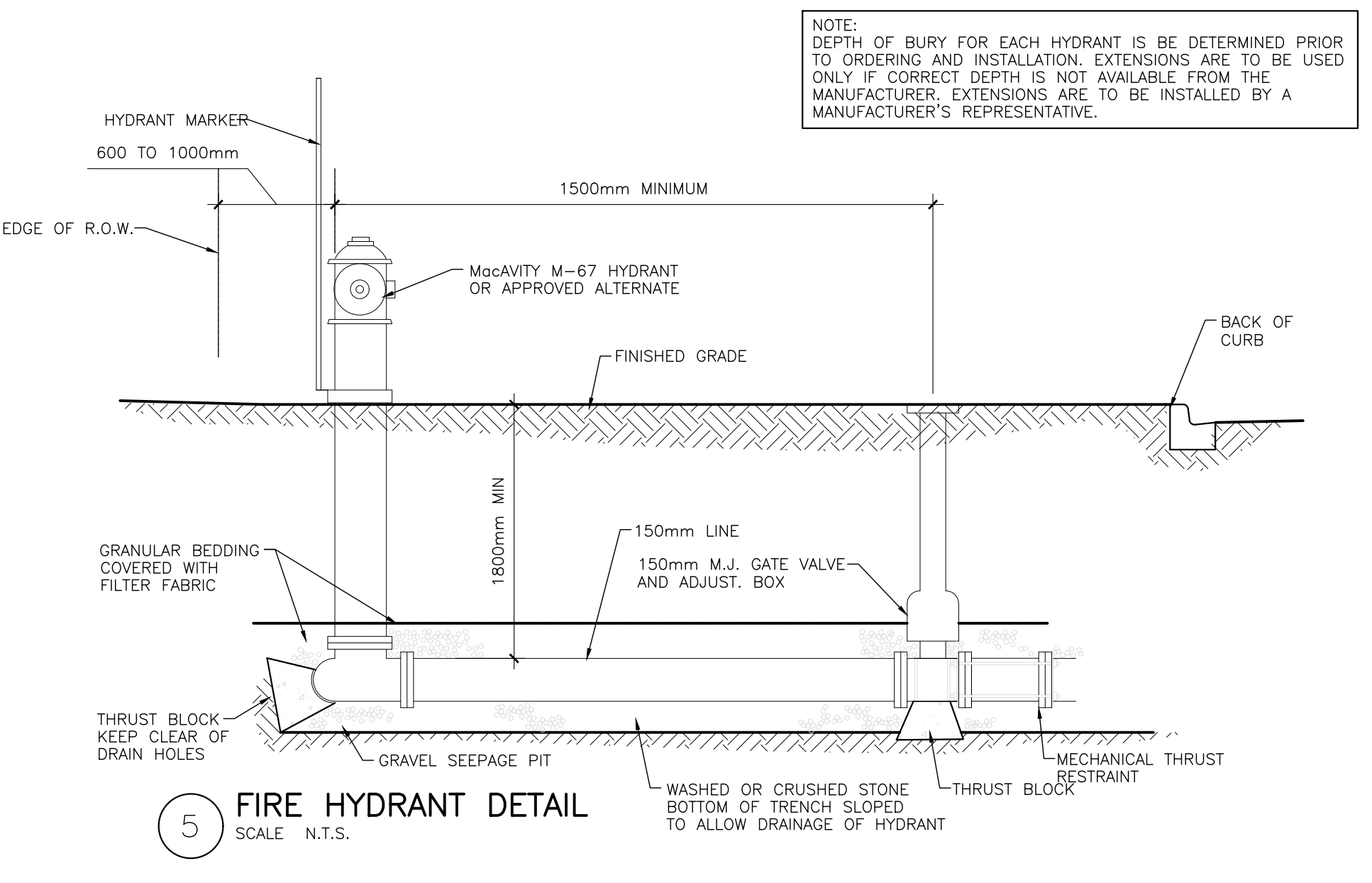
2 WATERMAIN/SERVICE TRENCH
SCALE N.T.S.



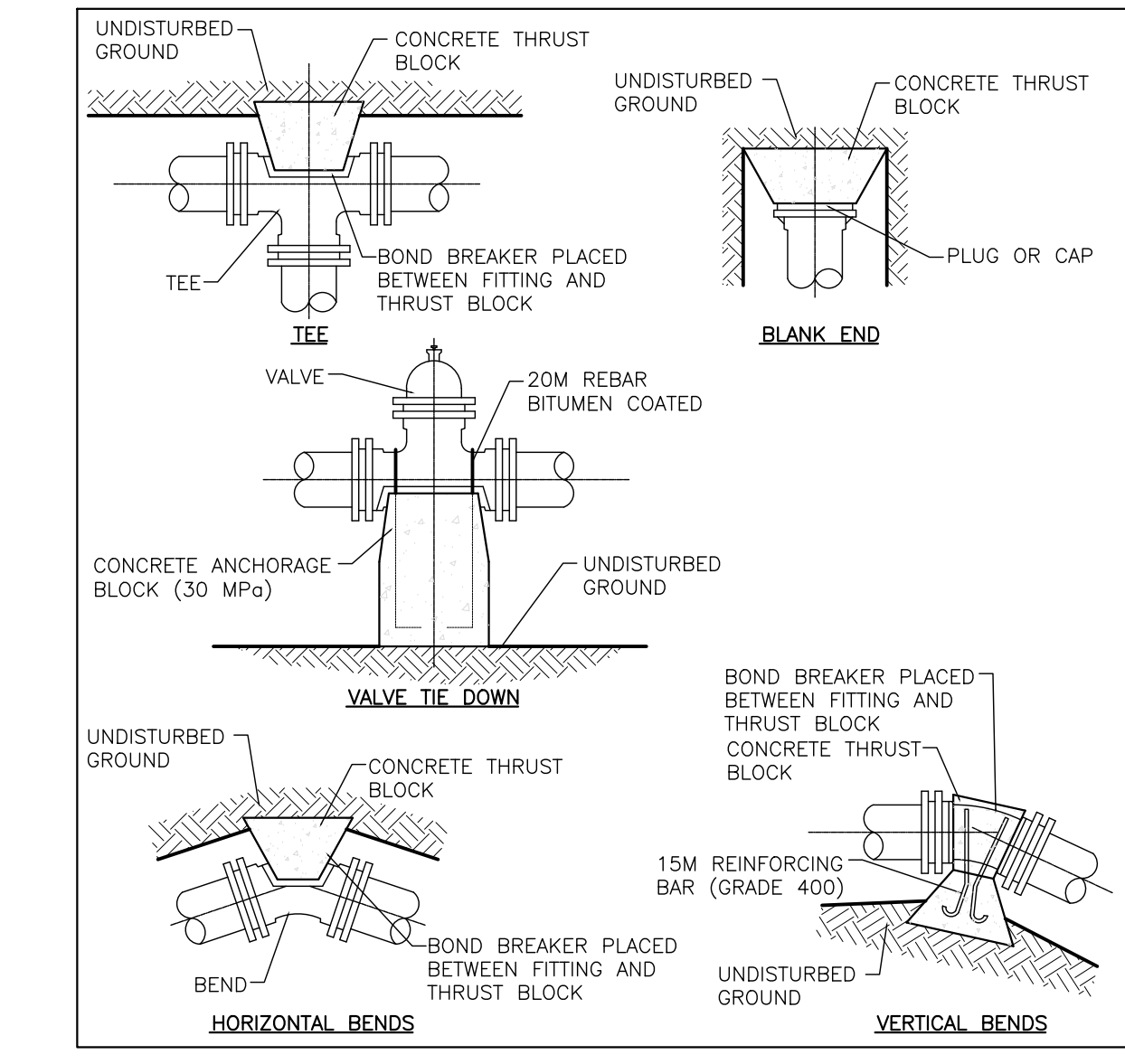
3 SEWER SERVICE TRENCH
SCALE N.T.S.



4 VALVE BOX DETAIL
SCALE N.T.S.

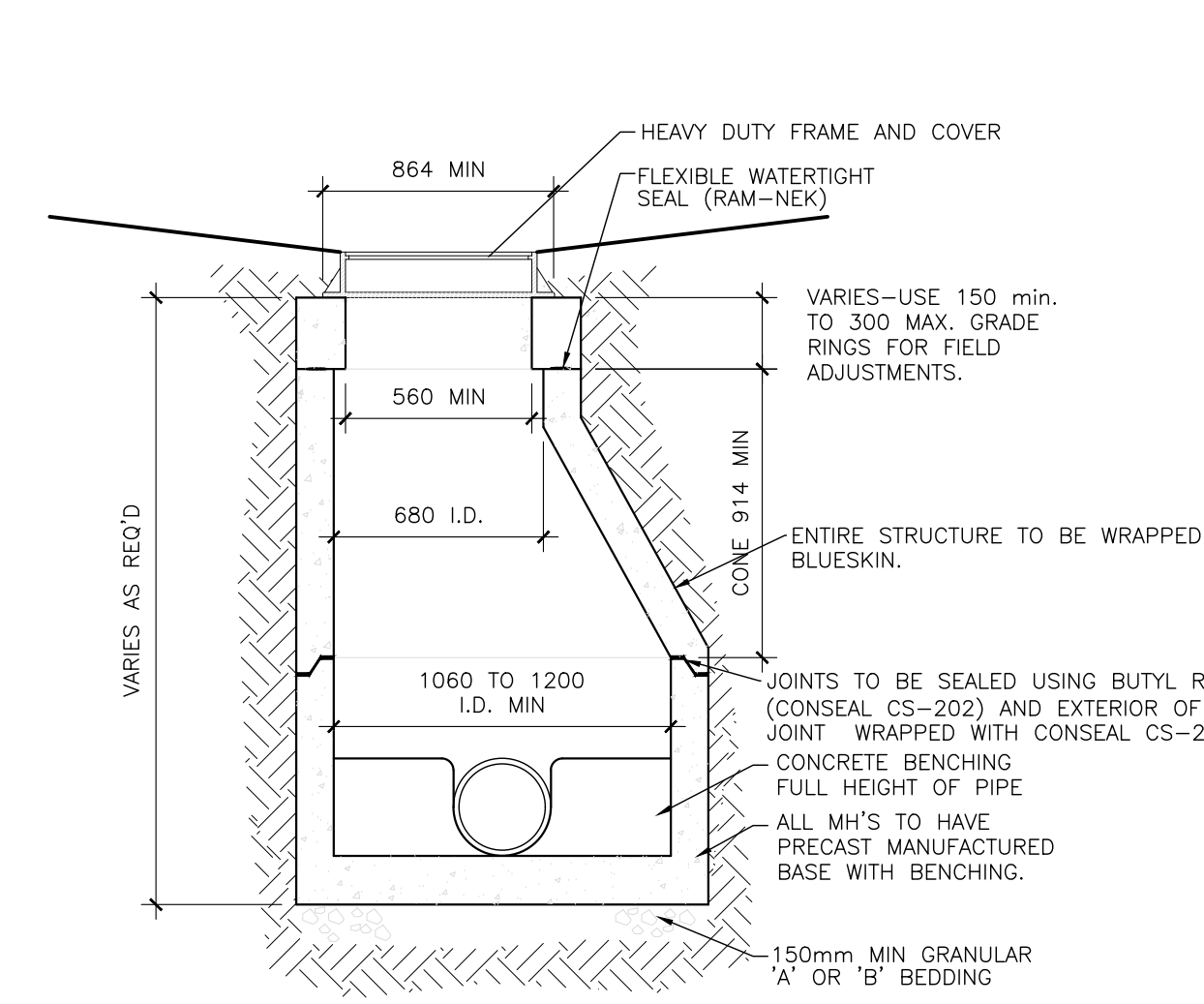


5 FIRE HYDRANT DETAIL
SCALE N.T.S.

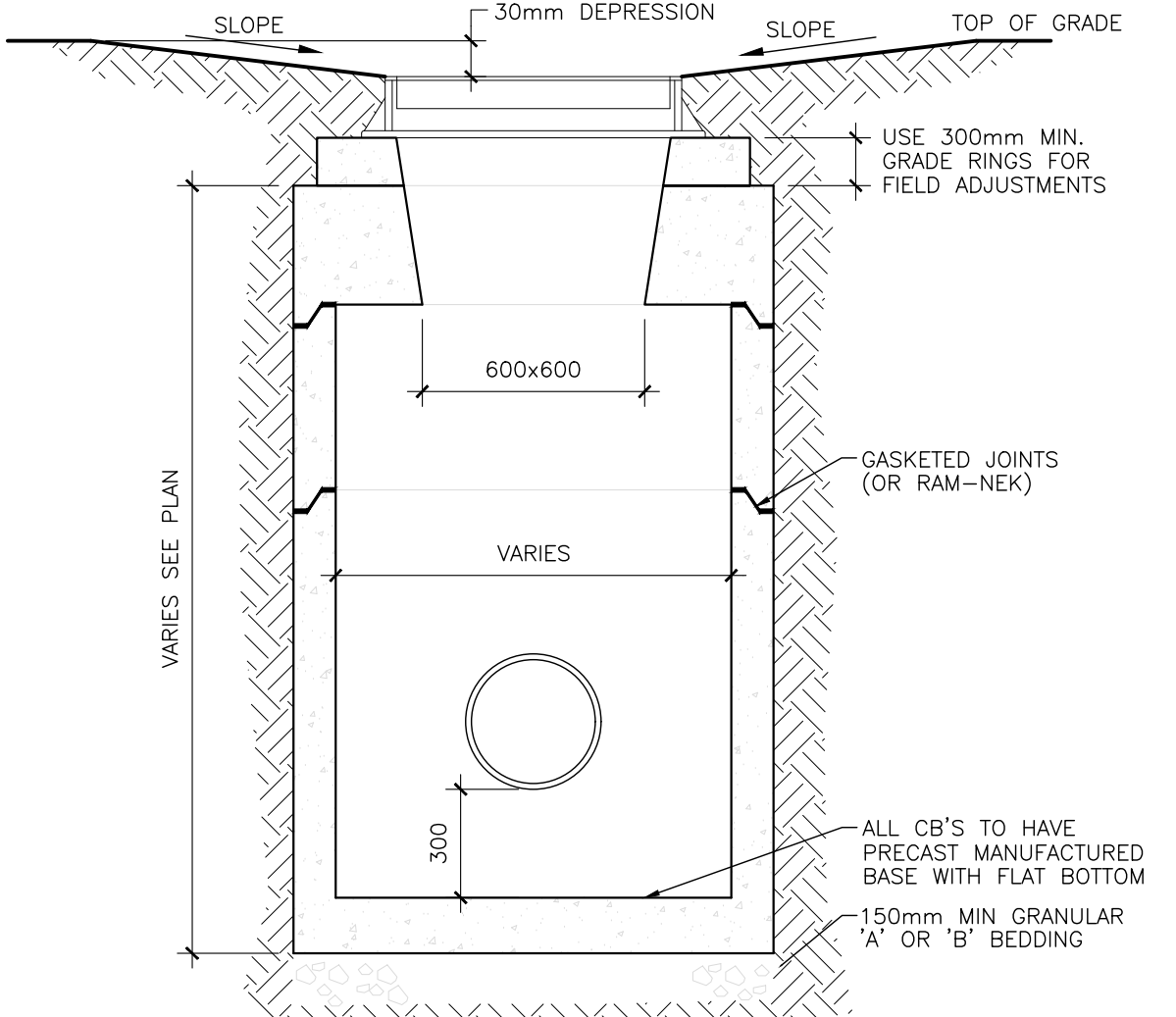


PIPE DIA.	CONCRETE THRUST BLOCK DIA.	MIN. CONTACT AREA (m ²)
100	150	0.18
150	200	0.31
200	250	0.47
250	300	0.64
300	350	0.81

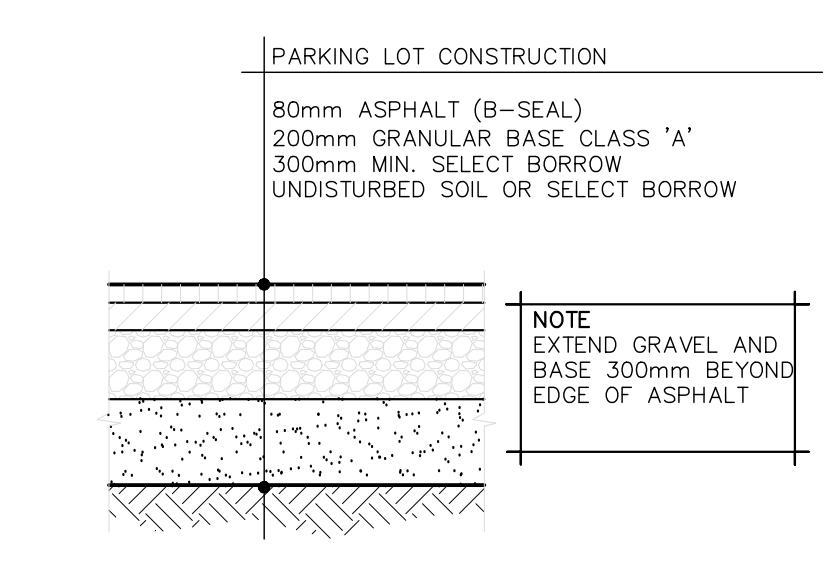
6 TYPICAL THRUST BLOCK DETAILS
SCALE N.T.S.



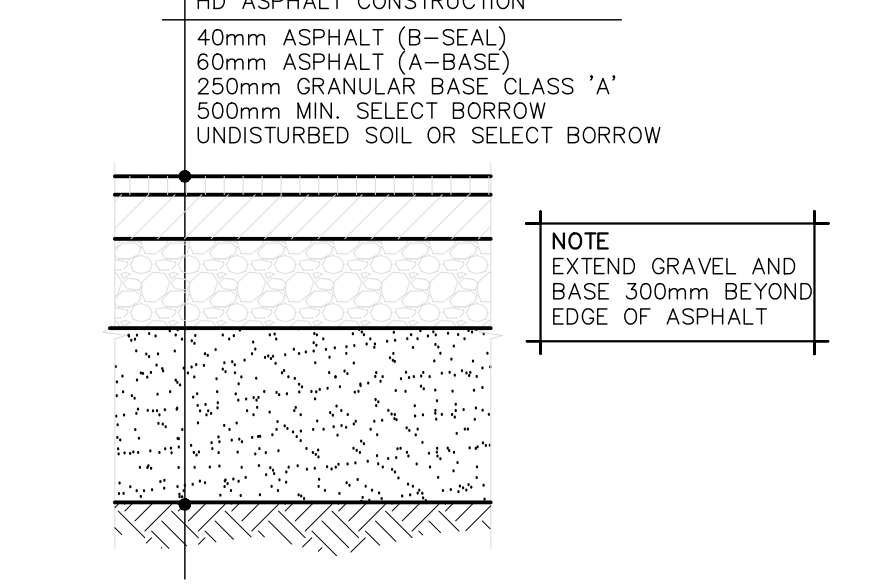
7 TYPICAL MANHOLE
SCALE N.T.S.



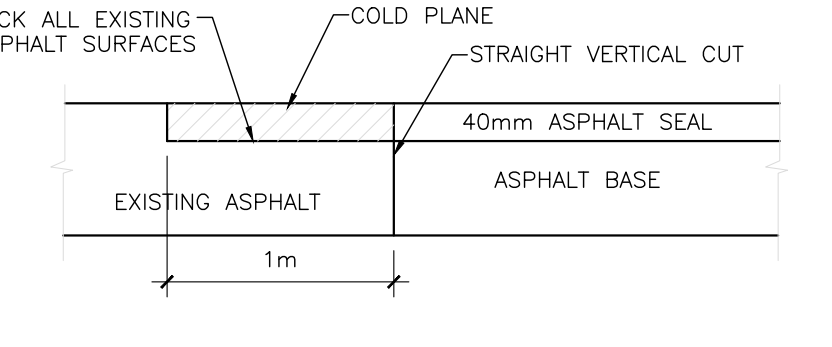
8 CATCHBASIN / CATCHPIT (TYP)
SCALE N.T.S.



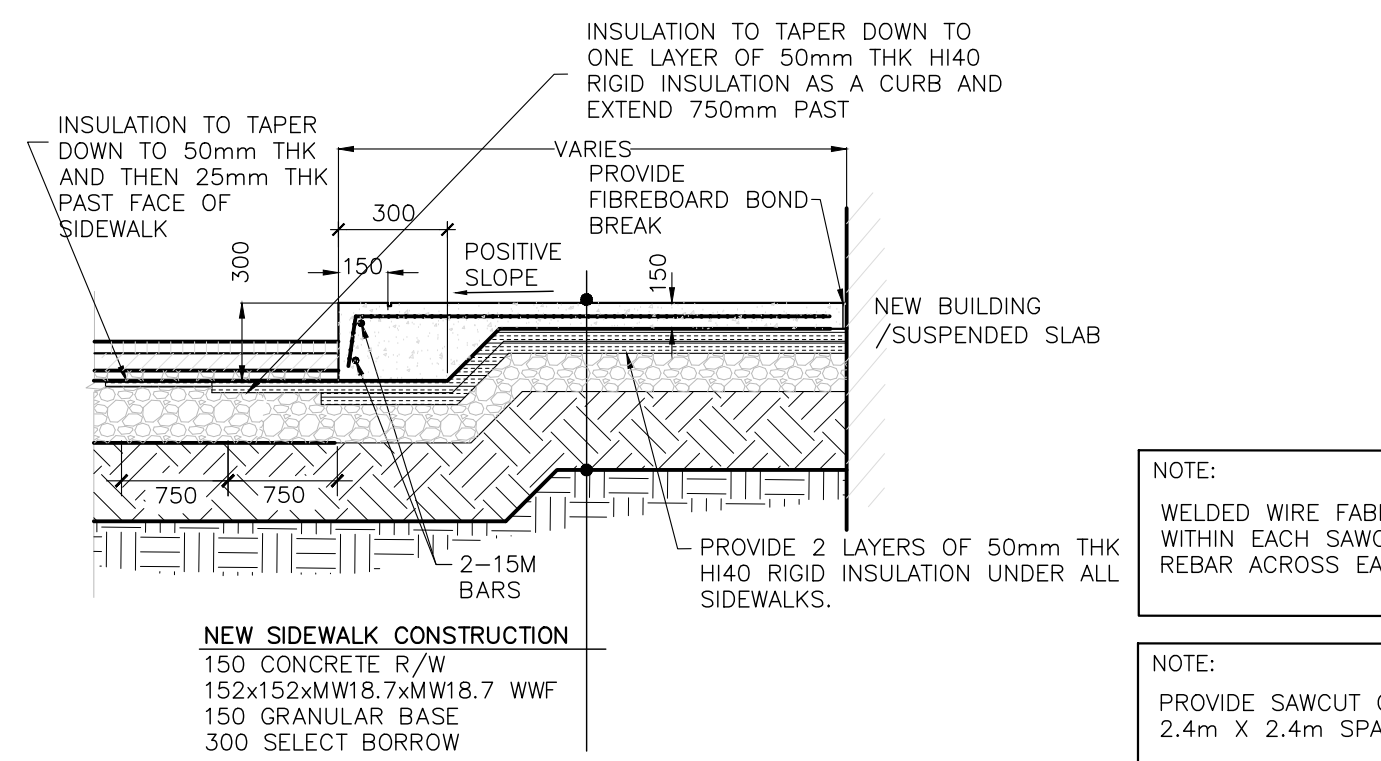
9 LIGHT DUTY ASPHALT SECTION
SCALE N.T.S.



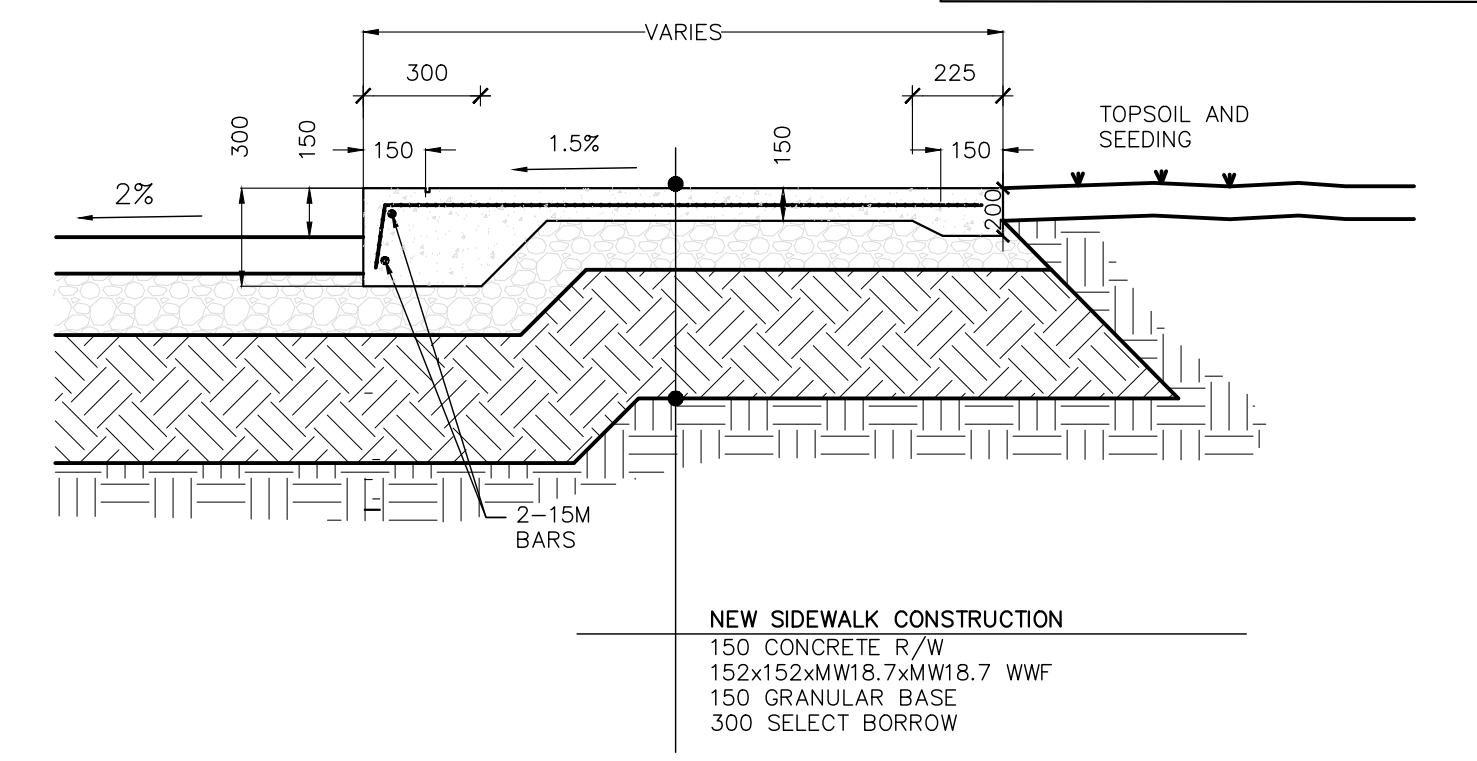
10 HEAVY DUTY ASPHALT SECTION
SCALE N.T.S.



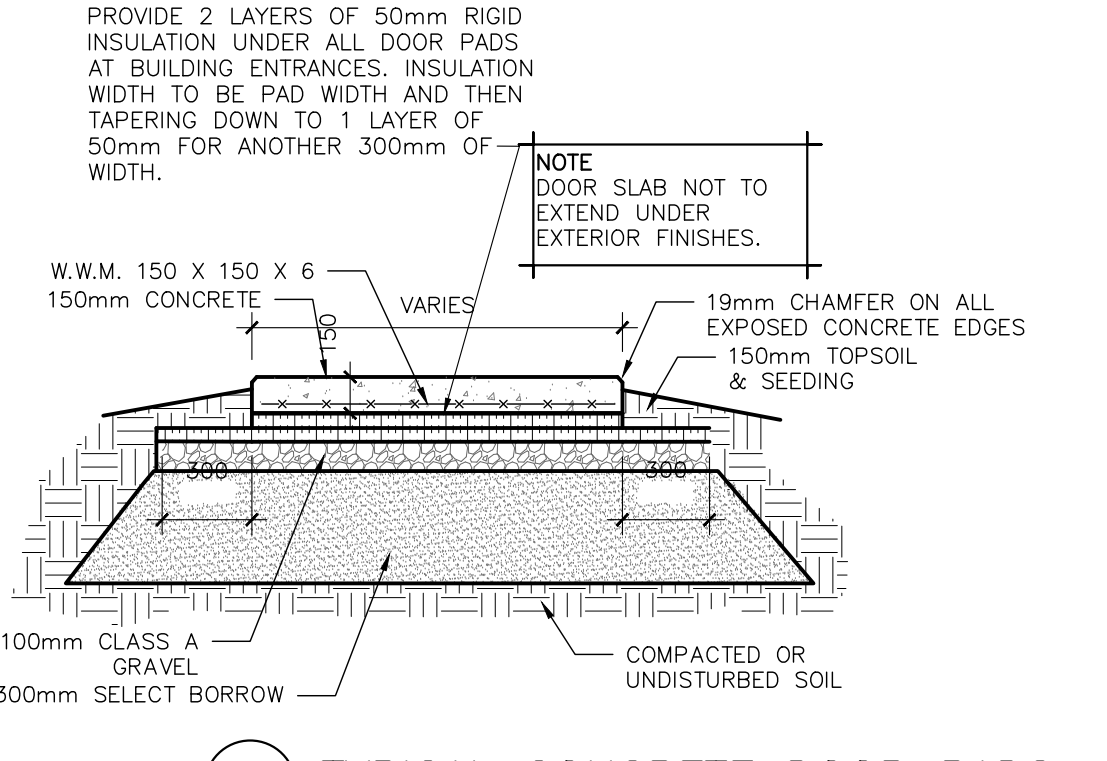
11 TRANSVERSE JOINT DETAIL
(NEW TO EXISTING ASPHALT)
SCALE N.T.S.



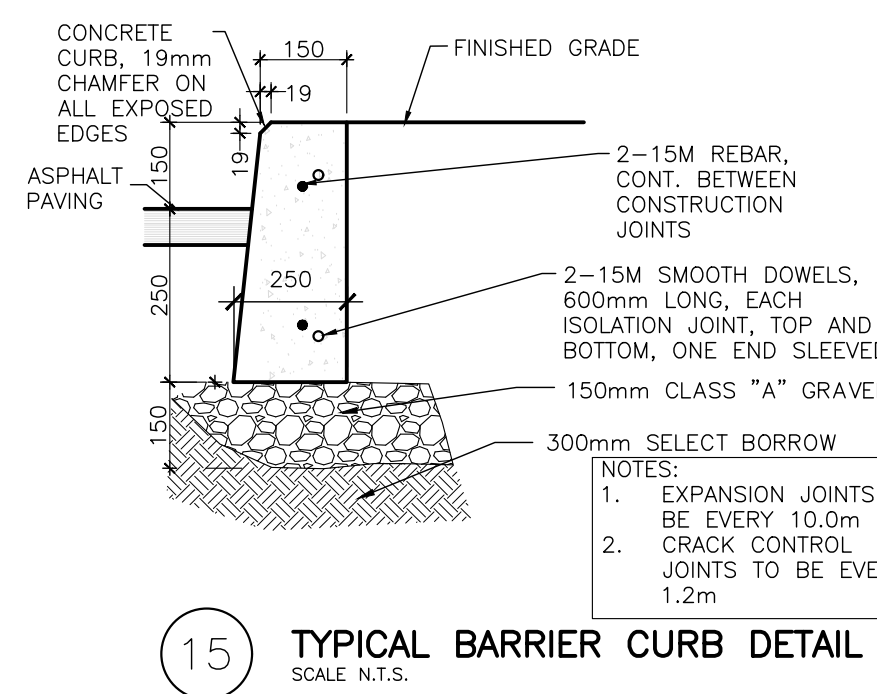
12 TYPICAL BUILDING ENTRANCE
SIDEWALK SECTION
SCALE N.T.S.



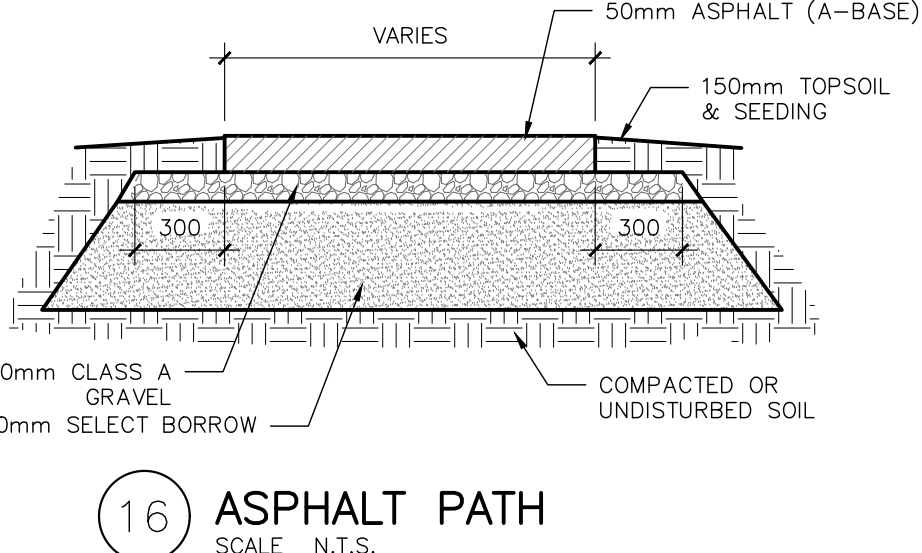
13 TYPICAL SIDEWALK/CURB SECTION
SCALE N.T.S.



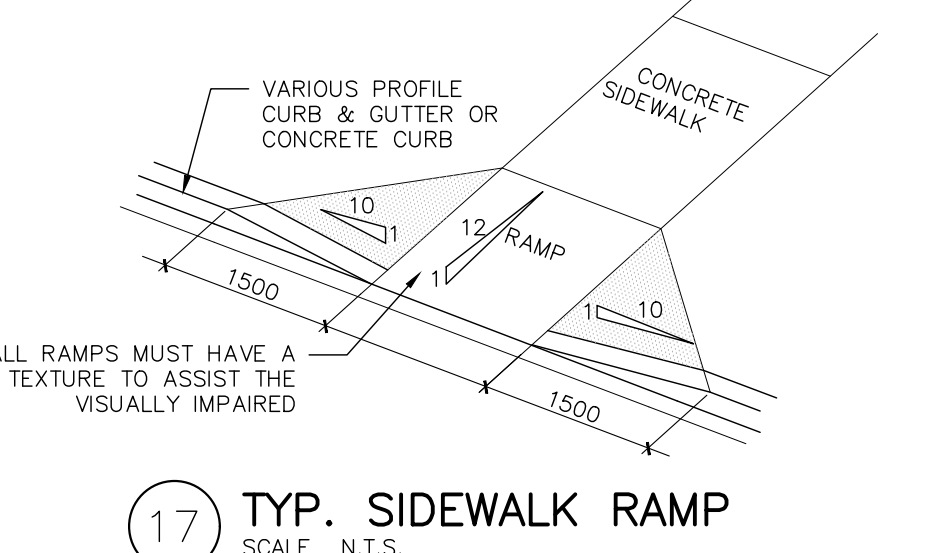
14 TYPICAL CONCRETE DOOR PADS
SCALE N.T.S.



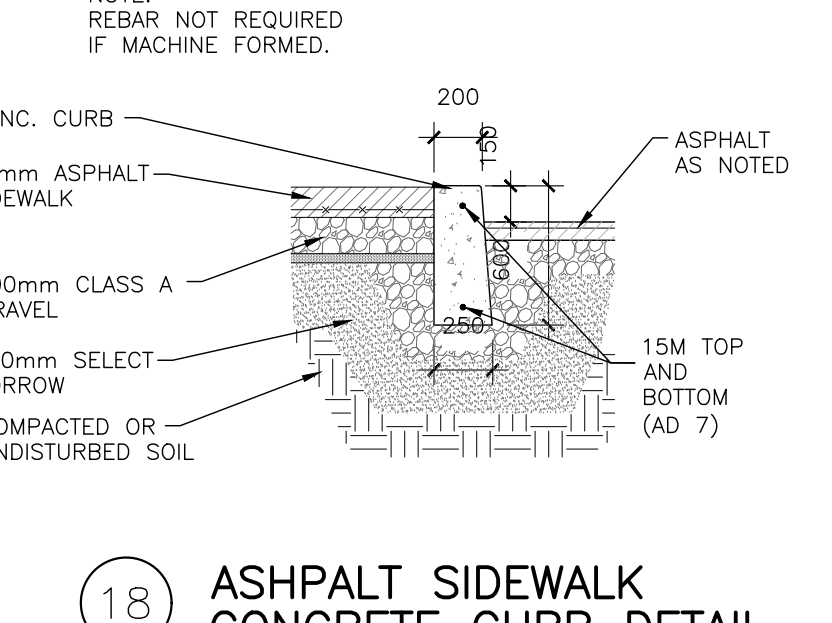
15 TYPICAL BARRIER CURB DETAIL
SCALE N.T.S.



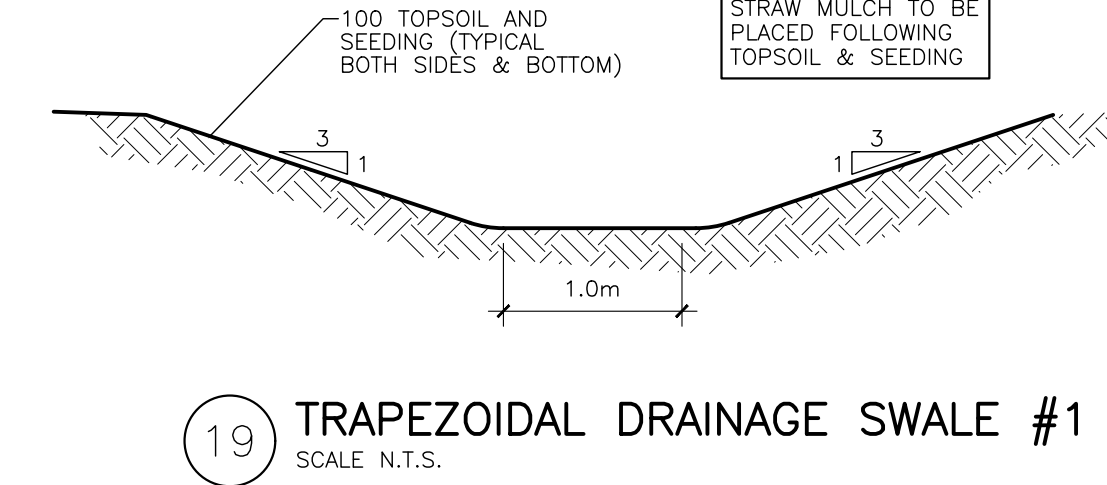
16 ASPHALT PATH
SCALE N.T.S.



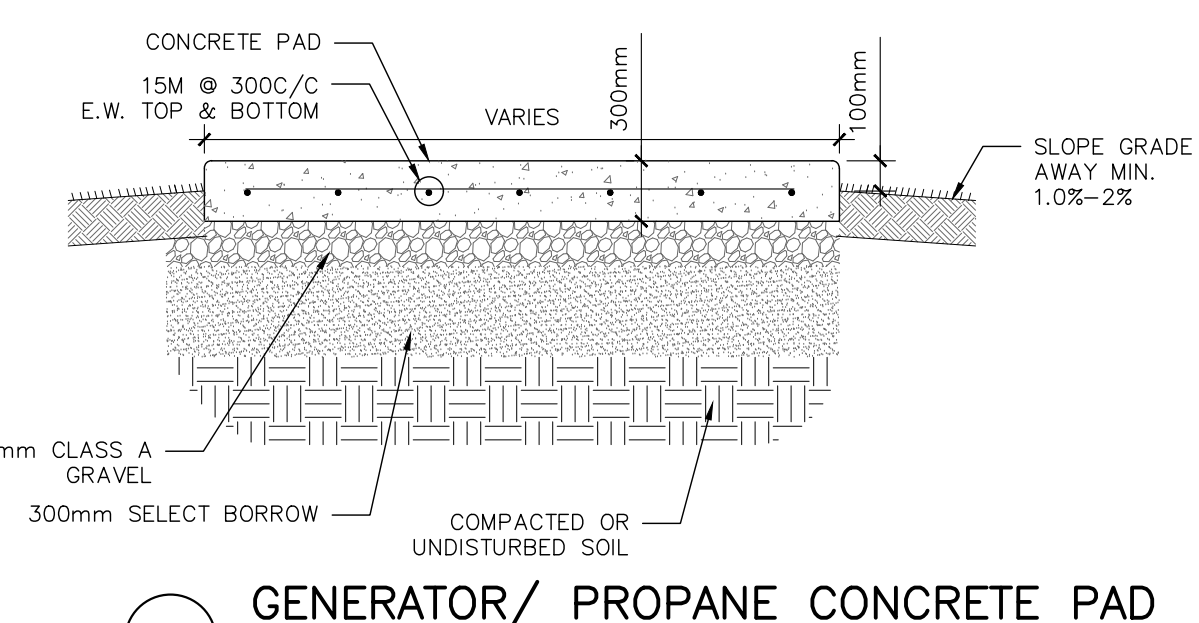
17 TYP. SIDEWALK RAMP
SCALE N.T.S.



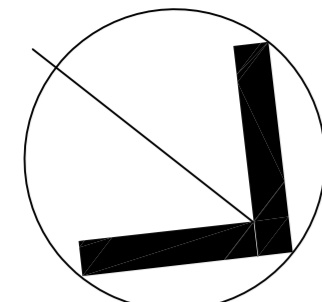
18 ASPHALT SIDEWALK
CONCRETE CURB DETAIL
SCALE N.T.S.



19 TRAPEZOIDAL DRAINAGE SWALE #1 DETAIL
SCALE N.T.S.



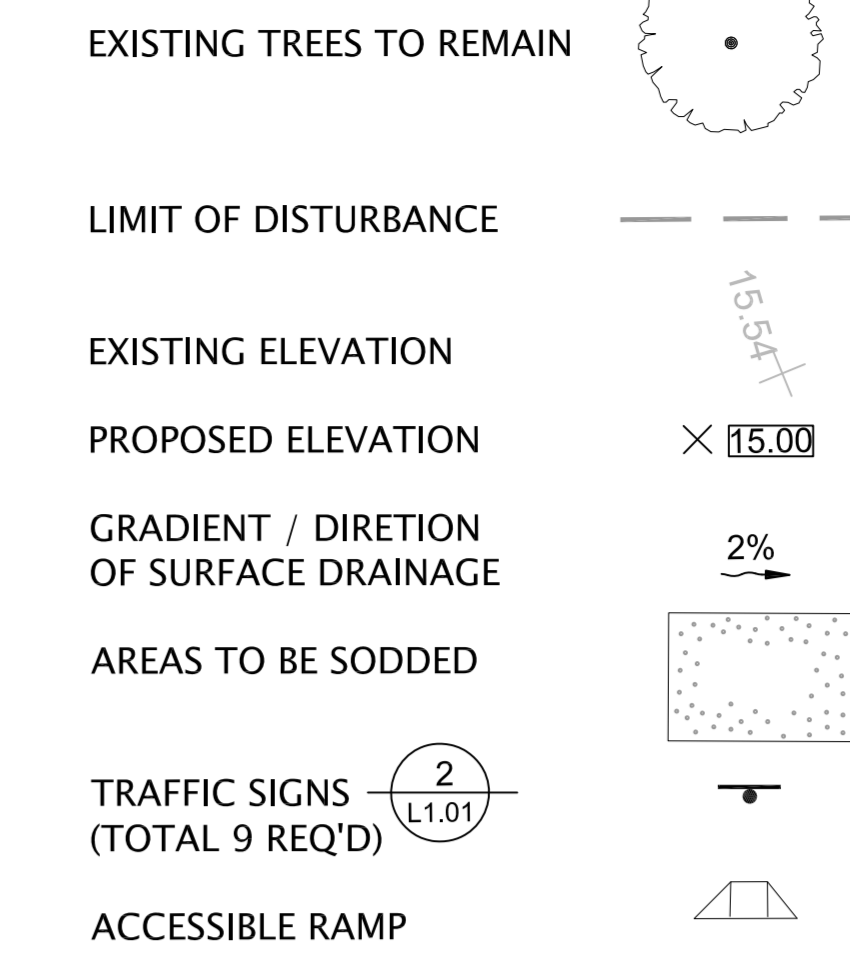
20 GENERATOR/ PROPANE CONCRETE PAD
DETAIL
SCALE N.T.S.



NORTH

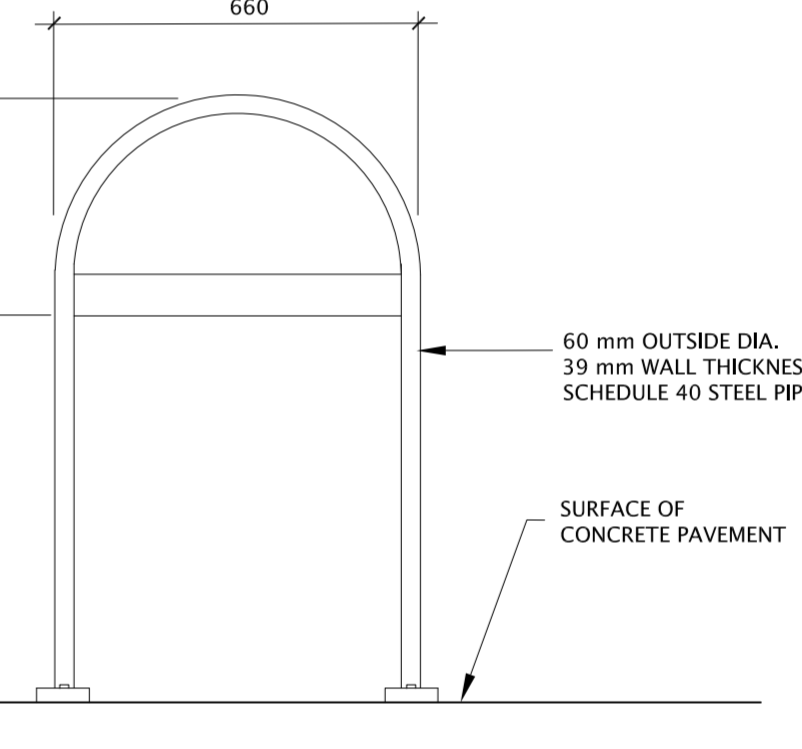
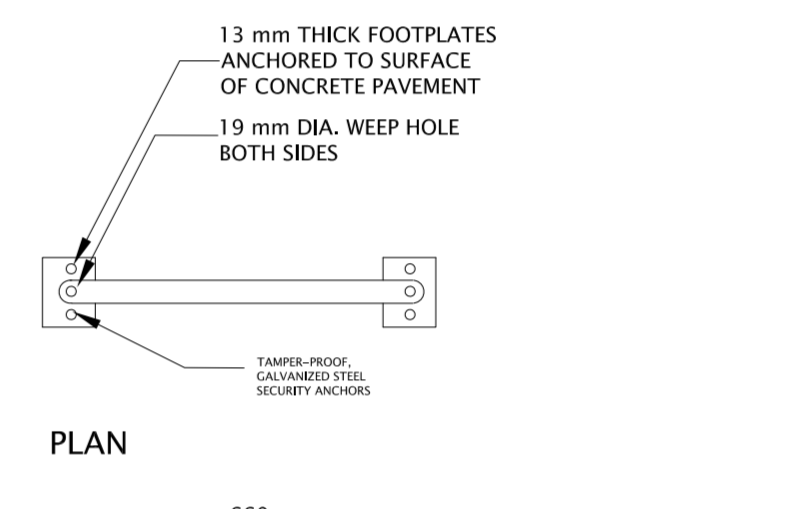


LEGEND

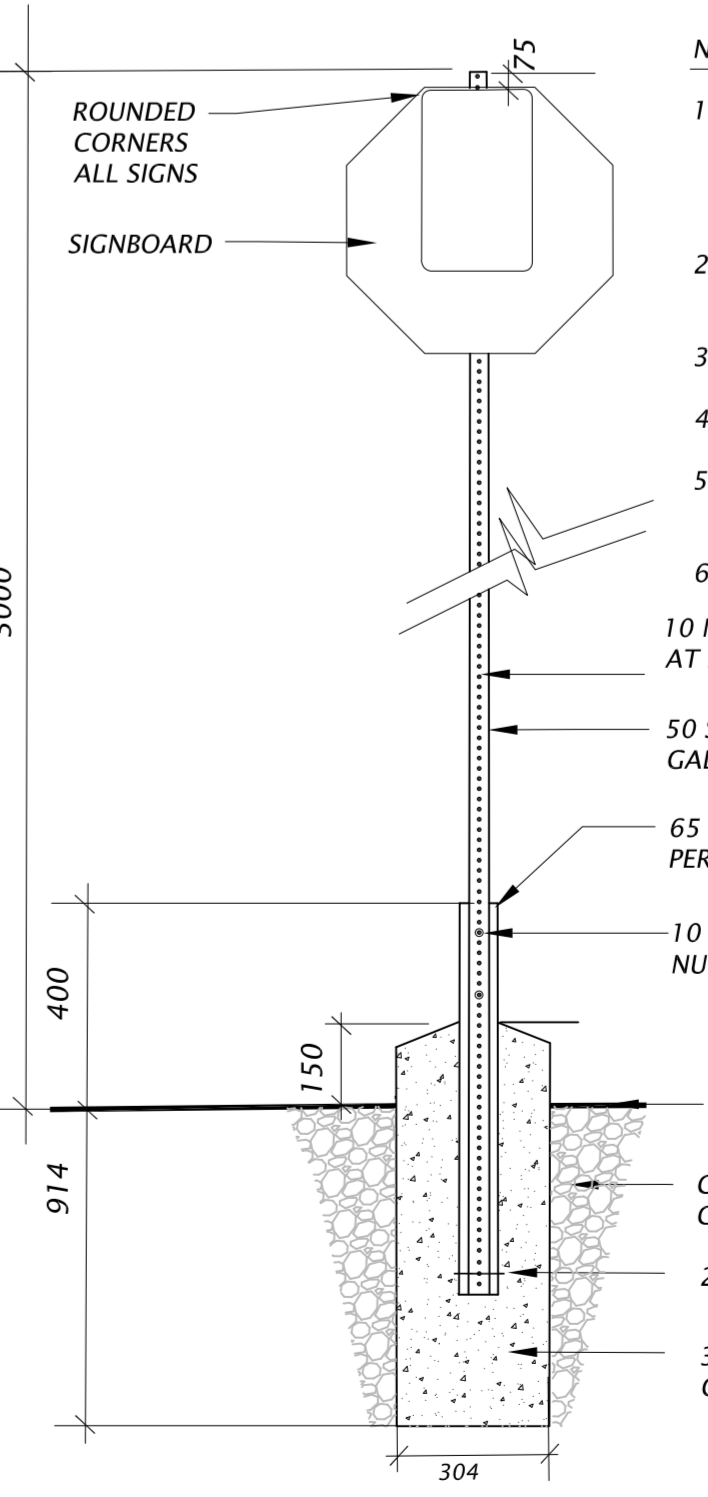


NOTES

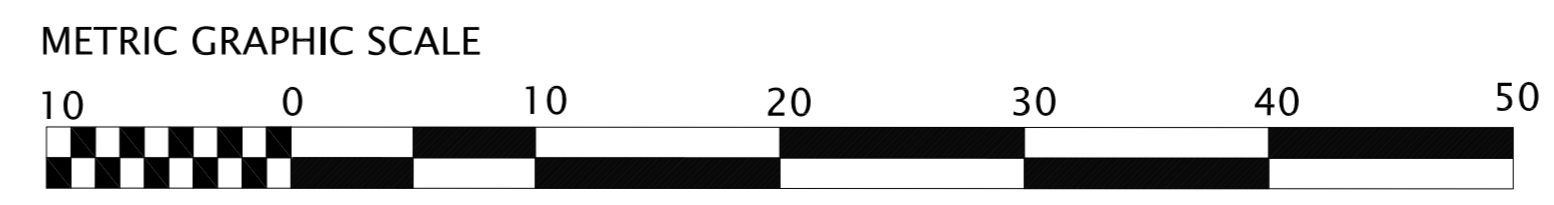
- 1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE CIVIL DRAWINGS AND THE PROJECT SPECIFICATIONS.
2. EXISTING LOCATIONS AND ELEVATIONS TAKEN FROM TOPOGRAPHIC SURVEY PREPARED BY DELTA SURVEYS - DESIGNER SURVEYS INC. JUNE 8, 2021.
3. FOR CURB AND PAVEMENT DETAILS, SEE CIVIL DRAWINGS.
4. ALL LOCATIONS AND ELEVATIONS TO BE MARKED ON SITE BY CONTRACTOR AND APPROVED BY CONSULTANT PRIOR TO CONSTRUCTION.
5. TREE PROTECTION FENCE TO BE INSTALLED ALONG LIMIT OF DISTURBANCE LINE PRIOR TO COMMENCEMENT OF CONSTRUCTION AND DEMOLITION. FENCE TO BE STEEL T-BAR STAKES DRIVEN SECURE AND PLUMB AT 2400 O/C WITH 1200 HIGH ORANGE VINYL SNOW FENCE TIED SECURELY TO POSTS. FENCE TO BE MAINTAINED IN GOOD CONDITION THROUGHOUT THE CONSTRUCTION PERIOD AND REMOVED AT COMPLETION OF CONSTRUCTION WHEN DIRECTED BY PROJECT MANAGER.
6. ALL DISTURBED AREAS TO BE GRADED EVEN, COVERED WITH 150 MM OF TOPSOIL AND SODDED.



- ELEVATION
NOTES:
1. BIKE RACK TO HAVE HOT-DIPPED GALVANIZED FINISH.
2. ACCEPTABLE PRODUCT: URBAN STAPLE, AS MANUFACTURED BY URBAN RACKS, OR APPROVED EQUAL.



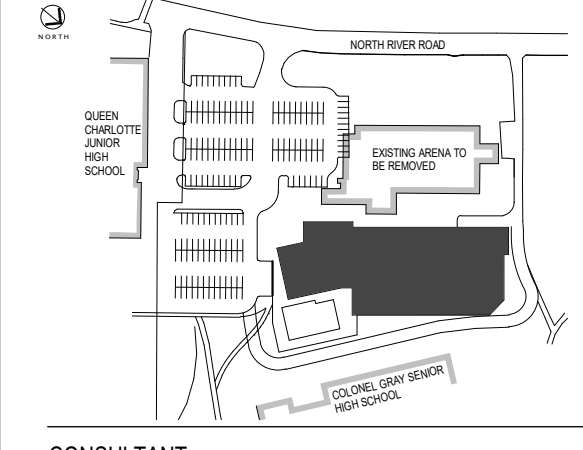
- NOTES:
1. SIGNBOARD SHALL BE IN ACCORDANCE WITH THE TAC MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION, AND CAN CSA B551-18 NATIONAL STANDARD OF CANADA ACCESSIBLE DESIGN FOR THE BUILT ENVIRONMENT.
2. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS TO CONSULTANT FOR APPROVAL PRIOR TO FABRICATION OF SIGNBOARDS.
3. METAL STANDARD TO BE TELSPAR PERFORATED TELESCOPIC TUBING OR APPROVED EQUAL.
4. FOR SIGN LOCATION AND DESCRIPTION SEE DRAWING E-101.
5. ALL SIGN LOCATIONS TO BE MARKED ON SITE BY CONTRACTOR AND APPROVED BY CONSULTANT PRIOR TO INSTALLATION OF SIGN POSTS.
6. FASTENERS TO BE SELF-LOCKING, STAINLESS STEEL.
10 MM DIA. PERFORATIONS AT 25 MM O/C
50 SQ. X 2743 LONG PERFORATED GALV-STEEL TUBING SIGN POST
65 MM SQ. X 914 LONG PERFORATED ANCHOR SLEEVE
10 MM DIA. X 70 MM BOLT C/W NUT & LOCK WASHER (2 REQ'D)
FINISH GRADE
COMPACTED TYPE 2 GRAVEL BACKFILL
200 ANCHOR NAIL
304 DIA. CAST-IN-PLACE CONCRETE



CLIENT: CHARLOTTETOWN
KEY PLAN: [Map of Charlotte Town]
CONSULTANT: Gordon Ratcliffe LANDSCAPE ARCHITECTS
2015 Highway 325, THE CROSS, NEW SCOTIA, CANADA, B0J 1T0. TEL: (902) 478-3869 FAX: (902) 857-1188 gpr@landscap.com

TPS ISSUED FOR TENDER 2023.04.10
REVISION: [Table with NO, REVISION, DATE]
PROJECT NAME: SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
PROJECT NO.: 21111
DRAWN BY:
CHECKED BY:
SCALE: 1:125
SITE PLAN
SITE GRADING AND LANDSCAPING
L1.01

KEY PLAN



CONSULTANT



5413 Duple Street
Halifax, Nova Scotia B3J 1H9
ph. (902) 429-3321 fax. (902) 423-8849
BMR Project No. 2022-024

STRUCTURAL STEEL NOTES

- 1. ALL STRUCTURAL STEEL SHALL BE FABRICATED AND ERRECTED IN ACCORDANCE WITH CSA S16. CONTRACTOR SHALL MAINTAIN ERECTION BRACING UNTIL COMPLETION OF ENTIRE STRUCTURE, INCLUDING FLOOR/ROOF DECKS AND OTHER ELEMENTS WHICH ARE PART OF THE LATERAL LOAD RESISTING SYSTEM.
2. ALL STRUCTURAL STEEL SHALL BE NEW STOCK AND CONFORM TO THE FOLLOWING GRADES AND STANDARDS:
2.1. CSA-G40 21 TYPE 350W UNLESS NOTED.
2.2. HOLLOW STRUCTURAL SECTIONS: ASTM A500 GRADE C.
2.3. COLD FORMED SECTIONS: CSA S136, 350 MPa MIN. YIELD STRENGTH.
2.4. CHANNELS, ANGLES, PLATE & ROD MATERIAL: TYPE 300W.
3. ALL WELDING SHALL BE CARRIED OUT IN ACCORDANCE WITH CSA W59 AND W58.3 BY A FABRICATOR FULLY APPROVED UNDER CSA W47.1 DIVISION No.1 OR No.2.
4. ALL BOLTS, NUTS AND WASHERS FOR STRUCTURAL STEEL CONNECTIONS SHALL CONFORM TO ASTM F3120M.
5. ALL ANCHOR BOLTS, NUTS AND WASHERS SHALL CONFORM TO CSA-G40.21 TYPE 300W.
6. ALL STEEL SHEAR STUDS SHALL CONFORM TO ASTM A108.
7. INSPECTION AND TESTING OF STRUCTURAL STEEL FRAME WORK (SUCH AS BOLT TORQUE, SHEAR STUDS, ALIGNMENT, ETC.) SHALL BE IN ACCORDANCE WITH CSA S16 BY A QUALIFIED INSPECTION COMPANY ENGAGED BY THE OWNER. COST OF RETESTING DEFECTIVE WELDS SHALL BE BORNE BY THE STRUCTURAL STEEL FABRICATOR.
8. SPLICES IN STEEL MEMBERS, OTHER THAN THOSE SHOWN ON THE DRAWINGS, SHALL BE DESIGNED TO DEVELOP THE FULL CAPACITY OF THE MEMBER AT THE POINT OF THE SPLICE. MEMBERS SHALL NOT BE SPICED AT POINTS OF MAXIMUM STRESS AND SHALL NOT BE PERMITTED WITHOUT THE WRITTEN PERMISSION OF BMR STRUCTURAL ENGINEERING.
10. ALL WELDED JOINTS IN ARCHITECTURALLY EXPOSED STRUCTURAL STEEL SHALL BE GROUND SMOOTH AND SHALL HAVE ALL WELD SPATTER REMOVED.
11. STEEL COATINGS - UNLESS NOTED OTHERWISE ALL STRUCTURAL STEEL SHALL BE CLEANED AND PREPARED:
11.1. ALL INTERIOR STEEL THAT IS TO BE PROTECTED BY A SPRAY APPLIED CEMENTIOUS FIRE PROOFING SHALL BE CLEANED TO CISC/CPMA 2-75 AND REMAIN UNCOATED.
11.2. ALL INTERIOR STRUCTURAL STEEL NOT TO RECEIVE FINISH PAINTING ON SITE SHALL BE SHOP PRIME PAINTED AS PER CSA/CAN-S-18. SHOP PRIMER SHALL CONFORM TO CISC/CPMA 1-73A.
11.3. ALL INTERIOR STRUCTURAL STEEL TO RECEIVE FINISH PAINTING ON SITE SHALL BE SHOP PRIME PAINTED AS PER CSA/CAN-S-18. SHOP PRIMER SHALL CONFORM TO CISC/CPMA 2-75.
11.4. ALL STEEL EXPOSED TO WEATHER IS TO BE HOT DIP GALVANIZED IN ACCORDANCE TO CSA G164 TOUCH UP OF WELDS, CUTS OR SCRATCHES TO GALVANIZED SHALL BE DONE WITH A MINIMUM OF 3 COATS OF ZINC RICH PAINT.
11.5. HOT DIPPED GALVANIZED STEEL REQUIRING AN ADDITIONAL FINISH PAINT COAT SHALL BE PREPARED TO ASTM D6386 STANDARDS.
12. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS TO BE PAINTED OR UNPAINTED.
13. OPEN WEB STEEL JOIST BRIDGING TO BE IN ACCORDANCE WITH CSA S16.
14. PROVIDE CAMBER FOR DEAD LOAD DEFLECTION OF STEEL JOISTS IN ACCORDANCE WITH CSA S16. PROVIDE CAMBER FOR DEAD LOAD DEFLECTION OF STEEL BEAMS AS INDICATED ON PLANS.
15. LIVE LOAD DEFLECTIONS OF STEEL JOISTS AND STEEL DECK SHALL NOT EXCEED L/240 FOR ROOFS AND L/360 FOR FLOORS UNLESS NOTED.
16. ALL STEEL DECK SHALL BE COATED TO Z7001 (A01) AS DESCRIBED BY ASTM A653. ALL STEEL DECK SHALL BE TRIPLE SPAN MINIMUM U.O.D.
17. STEEL DECK FASTENING REQUIREMENTS LISTED ON DRAWINGS:
17.1. ROOFLLOOR DECK:
17.1.1. 20mm DIA. TRANSVERSE PUDDLE WELDS @ 300 c/c
17.1.2. CLIMB SIDE LAPS @ 600 c/c
17.1.3. WELD DECK TO PERIMETER ANGLE OR SPANDREL BEAMS WITH 20mm DIA. PUDDLE WELDS @ 300 c/c
17.2. INVERTED AND NON-INVERTED COMPOSITE DECK IN STRICT ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.
17.3. WHERE STEEL DECK DIRECTION CHANGES PROVIDE 64mm THICK CONTINUOUS ANGLE (VERTICAL LEG TO EQUAL DEPTH OF JOIST SHOE.)
18. STEEL FABRICATOR, JOIST SUPPLIER, AND METAL DECK SUPPLIER SHALL SUBMIT SHOP DRAWINGS STAMPED BY A PROFESSIONAL ENGINEER REGISTERED IN THE PROVINCE OF CONSTRUCTION PRIOR TO COMMENCEMENT OF FABRICATION.
20. AT SLOTTED HOLE CONNECTIONS, BOLTS MUST BE INSTALLED SO AS TO ALLOW FREE MOVEMENT IN THE CONNECTION. SET NUT WITH A COLD CHISEL OR OTHER MEANS.
21. DESIGN ALL BEAM TO BEAM AND BEAM TO COLUMN CONNECTIONS FOR SHEAR CALCULATED FROM BEAM LOADED TO FLEXURAL CAPACITY WITH UDL LOAD BASED ON SPAN OF BEAM UNNOTED. BEAMS WITH SIGNIFICANT CONCENTRATED LOADS SHALL BE DESIGNED FOR ADDITIONAL SHEAR CONNECTIONS AS REQUIRED.
22. ALL BEAMS CANTILEVERED OR CONTINUOUS OVER A COLUMN OR OTHER SUPPORT, AND BEAMS SUPPORTING CONCENTRATED LOAD, SHALL HAVE A MIN. OF 2-10mm STEFFENERS EACH SIDE OF WEB UNLESS OTHERWISE NOTED.
23. BOLT WOOD NALERS TO STEEL BEAMS WHERE REQUIRED USING 12mm DIAMETER BOLTS @ 600mm c/c STAGGERED.

GENERAL NOTES

- 1. ALL WORK AND MATERIALS SHALL CONFORM TO THE 2015 EDITION OF THE NATIONAL BUILDING CODE OF CANADA (NBC). ALL WORK TO BE CARRIED OUT SHALL BE IN ACCORDANCE WITH CAN/CSA-S16 ALL STRUCTURAL TUBER ELEMENTS HAVE BEEN DESIGNED IN ACCORDANCE WITH CSA STANDARD S304.1.
2. THE DRAWINGS DO NOT INDICATE ELEMENTS THAT MAY BE NECESSARY FOR CONSTRUCTION SAFETY. THE CONTRACTOR IS RESPONSIBLE FOR ALL SAFETY MEASURES PERTAINING TO THE PROJECT.
3. DO NOT SCALE THE DRAWINGS. NO ALTERATIONS TO STRUCTURAL DETAILS SHALL BE MADE WITHOUT THE WRITTEN PERMISSION OF THE STRUCTURAL ENGINEER. CONSTRUCTION ERRORS ARE TO BE DOCUMENTED AND REPORTED TO THE STRUCTURAL ENGINEER BEFORE PROCEEDING WITH SUBSEQUENT WORK.
4. THE ELECTRONIC FILE REPRESENTS DRAWINGS WHICH WERE PREPARED FOR THE PURPOSE OF OPERATING GENERAL LAYOUT CONDITIONS. THE DRAWINGS MAY OR MAY NOT INCORPORATE REVISIONS FROM PREVIOUS DESIGN DRAWINGS, OR REVISIONS TO THE CONSTRUCTION PROCESS. CONSTRUCTED CONDITIONS RESULTING FROM THE USE OF THE DRAWINGS MAY VARY FROM THE DRAWING INFORMATION. BMR STRUCTURAL ENGINEERING ASSUMES NO LIABILITY FOR ERRORS OR OMISSIONS IN THE ELECTRONIC DRAWING FILES. THE RECIPIENT ASSUMES ALL RISK AND RESPONSIBILITY INCURRED WITH THE USE OF THE ELECTRONIC DRAWING FILES IN THE PRODUCTION OF THEIR WORK.
5. THE CONTRACTOR SHALL REVIEW ALL THE CONTRACT DRAWINGS & SPECIFICATIONS AND CHECK COORDINATE DIMENSIONS/ELEVATIONS BEFORE CONSTRUCTION. REPORT ANY DISCREPANCIES BETWEEN DRAWINGS AND OTHER DISCIPLINES DRAWINGS & SPECIFICATIONS FOR CLARIFICATION PRIOR TO PROCEEDING WITH WORK. ALL BUILDING DIMENSIONS, ELEVATIONS, DRAINAGE SLOPES, ETC. SHOWN ON STRUCTURAL DRAWINGS SHALL BE FULLY COORDINATED WITH THE CONTRACTOR WITH THE OTHER CONSULTANTS DRAWINGS.
6. THE CONTRACTOR SHALL EXAMINE ALL DRAWINGS AND CHECK ALL DIMENSIONS AGAINST SITE CONDITIONS AND REPORT ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK.
7. DO NOT IMPOSE CONSTRUCTION LOADS ON THE STRUCTURE IN EXCESS OF THE DESIGN LOADS.
8. FOR OPENINGS THROUGH FLOORS, ROOFS, AND WALLS. SEE OTHER CONSULTANTS DRAWINGS FOR SIZE AND LOCATION. NO NEW OPENINGS SHALL BE WITHOUT APPROVAL OF BMR STRUCTURAL ENGINEERING.
9. ALL OPENINGS IN SLABS OR WALLS ARE TO BE PRE-FORMED AND ALL HOLES SLEEVED.
10. INSTALL ALL ADHESIVE/EXPANSION ANCHORS AS PER MANUFACTURERS INSTRUCTIONS. ADHESIVE/EXPANSION ANCHORS TO BE INSTALLED BY REPRESENTATIVE APPLICATORS, TRAINED BY THE ANCHOR MANUFACTURER. CONTRACTOR SHALL SUBMIT TRAINING CERTIFICATE(S) TO OWNERS REPRESENTATIVE AND/OR CONSULTANT UPON REQUEST.
11. CONTRACTOR SHALL DESIGN, INSTALL AND MAINTAIN ADEQUATE TEMPORARY BRACING AND SHORING OF ALL STRUCTURAL ELEMENTS FOR STABILITY AND SAFETY THROUGHOUT CONSTRUCTION. THE ABOVE WORK IS BEYOND THE SCOPE OF BMR STRUCTURAL ENGINEERING.

FOUNDATION NOTES

- 1. INFORMATION RELATING TO THE VALUE OF THE BEARING CAPACITY UNDER FOOTINGS IS BASED ON INFORMATION SPECIFIED IN THE GEOTECHNICAL REPORT PREPARED BY THE CONSULTANT, DATED APRIL 26, 2022. THE CONTRACTOR IS TO FOLLOW ALL RECOMMENDATIONS WITHIN THE GEOTECHNICAL REPORT INCLUDING THE USE OF SOILS, FOUNDATION TYPES, SOILS AND REPLACEMENT WITH APPROVED STRUCTURAL FILLS, ETC. UNLESS SPECIFICALLY NOTED OTHERWISE. ALL ENGINEERED (STRUCTURAL) FILL & BACKFILLING IS TO BE PLACED UNDER THE CONTINUOUS SUPERVISION OF THE GEOTECHNICAL ENGINEER.
2. ALL FOOTINGS SHALL BEAR ON UNDISTURBED SOIL. STRUCTURAL FILL OR SOUND CLEAN BEDROCK HAVING A MINIMUM ALLOWABLE BEARING CAPACITY OF 175 kPa. DO NOT PLACE CONCRETE IN FOOTING FORMS UNTIL BEARING CAPACITIES ARE CHECKED AND APPROVED IN WRITING BY THE GEOTECHNICAL ENGINEER. FOOTINGS MAY HAVE TO BE LOWERED TO ACHIEVE PROPER BEARING. DURING COLD WEATHER, SOILS SHALL BE PROTECTED AGAINST FREEZING TO PREVENT FROST HEAVE. LOSS OF BEARING CAPACITY, OR OTHER DAMAGE TO STRUCTURAL MEMBERS, SLABS ON GRADE, MASONRY, FORMWORK, AND OTHER ITEMS SUPPORTED THEREON.
3. ALL FOOTINGS SUBJECT TO FREEZING CONDITIONS SHOULD HAVE A MINIMUM OF 150mm OF SOIL COVER FOR FROST PROTECTION UNLESS NOTED OTHERWISE.
4. REMOVE ALL LOOSE ROCK DOWN TO SOUND BEDROCK TO MAXIMUM REFUSAL DEPTH POSSIBLE WITH MECHANICAL EQUIPMENT. OBTAIN GEOTECHNICAL ENGINEERS APPROVAL, IN WRITING, OF ROCK BEARING CAPACITY BEFORE PLACING FOOTINGS.
5. ANY EXCAVATION IN PROXIMITY OF EXISTING FOOTINGS MUST BE APPROVED BY THE GEOTECHNICAL ENGINEER PRIOR TO COMMENCEMENT AND COMPLETED UNDER THEIR CONTINUAL SUPERVISION.
6. ANY FOOTING ELEVATIONS INDICATED ON THE DRAWINGS ARE GENERAL AND SHALL BE USED FOR ESTIMATING AND BIDDING PURPOSES ONLY. FOOTINGS MAY HAVE TO BE PLACED AT DIFFERENT ELEVATIONS AS A RESULT OF LOCAL SOIL CONDITIONS, UNDERGROUND SERVICES, AND TO ACCOMMODATE OTHER MECHANICAL AND ELECTRICAL SERVICES. FOLLOW TYPICAL DETAILS SHOWN ON THE DRAWINGS FOR FOOTING PLACEMENT RELATIVE TO ADJACENT FOOTINGS AND OTHER STRUCTURE SERVICES AND LOCATE AS DIRECTED BY TYPICAL DETAILS.
7. COORDINATE CONSTRUCTION WITH UNDERLAB SERVICES AS SHOWN ON MECHANICAL, ELECTRICAL, ARCHITECTURAL, AND CIVIL DRAWINGS.
8. ALL GEOTECHNICAL MATERIALS BENEATH SLABS ON GRADE INCLUDING REMOVAL OF NON-ACCEPTABLE MATERIALS AND REPLACEMENT WITH APPROVED MATERIALS SHALL BE PREPARED AS DETAILED IN THE GEOTECHNICAL REPORT UNLESS SPECIFICALLY NOTED OTHERWISE. SUB BASE UNDER SLABS ON GRADE SHALL BE COMPACTED TO 100% STANDARD PROCTOR DENSITY. COMPACTON SHALL BE VERIFIED IN WRITING BY THE GEOTECHNICAL ENGINEER PRIOR TO CASTING OF SLABS.

DESIGN NOTES

- 1. ALL REINFORCED CONCRETE ELEMENTS HAVE BEEN DESIGNED IN ACCORDANCE WITH CSA STANDARD A23.3. ALL STRUCTURAL STEEL ELEMENTS HAVE BEEN DESIGNED IN ACCORDANCE WITH CAN/CSA-S16. ALL STRUCTURAL TUBER ELEMENTS HAVE BEEN DESIGNED IN ACCORDANCE WITH CSA STANDARD S304.1.
2. ALL LOADS INDICATED ON DRAWINGS ARE SERVICE (UNFACTORED) LOADS UNLESS NOTED.
3. THE STRUCTURE HAS NOT BEEN DESIGNED FOR ANY FUTURE EXTENSIONS UNLESS OTHERWISE NOTED.
4. DESIGN LOAD CRITERIA:
IMPORTANCE CATEGORY: NORMAL (LOW/NORMAL/HIGH/POST DISASTER)
EARTHQUAKE DESIGN FACTORS:
S_d(0.2) = 0.183, S_d(0.5) = 0.077, S_d(1.0) = 0.051, S_d(2.0) = 0.028
S_d(5.0) = 0.014, S_d(10.0) = 0.009, P_GA = 0.000, P_GW = 0.000
R_s = 1.5, R_e = 1.3
SITE CLASS = B (REFER TO GEOTECHNICAL REPORT)
I_s = F_s(d/2) - 0.079 (SEISMIC HAZARD INDEX)
ALL NON-STRUCTURAL COMPONENTS & EQUIPMENT AND THEIR CONNECTIONS TO THE STRUCTURE (ALL BY OTHERS) AS DEFINED IN CLAUSE 4.1.8.18 OF THE 2015 NBC SHALL BE DESIGNED TO ACCOMMODATE DEFLECTIONS AND LOADS NOTED THEREIN FOR THE IMPORTANCE FACTOR NOTED ABOVE.
WIND LOAD:
q_w = 0.433 kPa
q_w = 0.56 kPa
SNOW LOADING: S_s = 2.7 kPa
RAIN LOAD: S_r = 0.6 kPa
5. ROOFS HAVE BEEN DESIGNED FOR CONTROL FLOW DRAINS. MAXIMUM DEPTH OF RETAINED WATER TO BE 150mm.

NON-STRUCTURAL ELEMENTS NOTES

- 1. "NON-STRUCTURAL" OR "SECONDARY STRUCTURAL" ELEMENTS ARE NOT PART OF THE STRUCTURAL DESIGN SHOWN ON THESE DRAWINGS. SUCH ELEMENTS ARE NOT TO BE CONSIDERED IN THE DESIGN OF THE STRUCTURE. WHERE STRUCTURAL ENGINEERING RESPONSIBILITY IS REQUIRED FOR THESE ELEMENTS, THIS WORK AND ANY ASSOCIATED SEALED DRAWINGS OR LETTERS REQUIRED BY AUTHORITIES SHALL BE PROVIDED BY SPECIALTY STRUCTURAL ENGINEERS ENGAGED BY THE CONTRACTOR AS PART OF THE CONTRACT PRICE.
2. EXAMPLES OF NON-STRUCTURAL ELEMENTS INCLUDE, BUT ARE NOT LIMITED TO:
2.1. ARCHITECTURAL COMPONENTS SUCH AS GUARDRAILS, HANDRAILS, FLAG POSTS, CEILING, MILLWORK, ETC.
2.2. LANDSCAPE ELEMENTS SUCH AS BENCHES, LIGHT POSTS, PLANTERS, ETC.
2.3. CLADDING, GLAZING, WINDOW MULLIONS, INTERIOR WALLS AND EXTERIOR WALLS.
2.4. ALL FIRE RATING/RESISTANCE SYSTEMS AND/OR SPECIFICATIONS.
2.5. ARCHITECTURAL PRECAST.
2.6. SLOUGHTS.
2.7. MECHANICAL AND ELECTRICAL EQUIPMENT, COMPONENTS, AND THEIR ATTACHMENT DETAILS.
2.8. WINDOW WASHING EQUIPMENT AND ITS ATTACHMENTS.
2.9. ESCALATORS, ELEVATORS, AND CONVEYING SYSTEMS.
2.10. GLASS BLOCK AND ITS ATTACHMENTS.
2.11. MASONRY VENEERS AND THEIR ATTACHMENTS.
2.12. NON-LOAD BEARING MASONRY.
2.13. NON-STRUCTURAL CONCRETE TOPPING.
2.14. SUPPORTS FOR LIGHTING, DUCTWORK, FURNITURE, ETC.
3. SHOP DRAWINGS FOR NON-STRUCTURAL ELEMENTS WHICH MAY AFFECT THE PRIMARY STRUCTURAL SYSTEM SHALL BE SUBMITTED TO BMR STRUCTURAL ENGINEERING. THESE DRAWINGS WILL BE REVIEWED ONLY FOR THE EFFECT OF THE ELEMENT ON THE PRIMARY STRUCTURAL SYSTEM.
4. THE MAXIMUM ALLOWABLE DEFLECTIONS FOR GLAZING, PARTITIONS AND CLADDING, ETC. SHALL MEET THE ARCHITECTURAL SPECIFICATIONS, THE NATIONAL BUILDING CODE AND THE MANUFACTURERS SPECIFICATIONS.

TEMPORARY WORKS NOTES

- 1. THE CONTRACTOR SHALL DESIGN, PROVIDE, ERECT, MAINTAIN, REMOVE, AND ASSUME FULL AND SOLE RESPONSIBILITY FOR ALL TEMPORARY WORKS REQUIRED FOR THE SAFE AND COMPLETE EXECUTION OF THE WORKS (E.G. BRACING, FORM & FALSEWORK, SHORING, ETC.) THE ABOVE WORK IS BEYOND THE SCOPE OF BMR STRUCTURAL ENGINEERING.
2. IN THE EXECUTION OF THE TEMPORARY WORKS AND FOR THE DURATION OF THE CONTRACT, THE CONTRACTOR SHALL MAKE ADEQUATE PROVISION FOR ALL LIKELY CONSTRUCTION LOADING AND PROVIDE SUFFICIENT BRACING AND/OR PROPS TO KEEP THE WORKS IN PLUMB AND ALIGNMENT AND FREE FROM EXCESSIVE DEFLECTION.
3. ACCESS OF HEAVY CONSTRUCTION EQUIPMENT AND ACCUMULATION OF CONSTRUCTION MATERIALS ON THE FLOORS ARE NOT PERMITTED, UNLESS SPECIFICALLY NOTED OTHERWISE. ALL TEMPORARY WORKS AND TEMPORARY WORK DESIGN TO THE SATISFACTION OF THE CONSULTANT.
4. COSTS OF ALL TEMPORARY WORKS ARE DEEMED TO HAVE BEEN INCLUDED IN THE CONTRACT PRICE.
5. ANY CONSTRUCTION SEQUENCES SHOWN ON THE DRAWINGS SHALL BE PART OF TEMPORARY WORKS AND ARE FOR THE CONTRACTOR'S CONSIDERATION ONLY. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR CONSTRUCTION SEQUENCING AND IS AT LIBERTY TO USE ANY OTHER SEQUENCE AS HE DEEMS APPROPRIATE, BUT AT NO TIME SHALL THE SAFETY AND INTEGRITY OF THE WORKS AND THE STRUCTURE BE COMPROMISED.

COLD WEATHER CONCRETE HEATING

- 1. CHECK AMBIENT TEMPERATURE FOR THE DAY BEFORE AND 3 DAYS AFTER CONCRETE POUR.
2. PLUS TEN (+10) DEGREES CELSIUS IS THE MINIMUM PERMISSIBLE CONCRETE TEMPERATURE AT TIME OF PLACING FOR 300mm OR LESS CONCRETE ELEMENT. CONCRETE GENERATES HEAT DURING ITS CURING PROCESS. THIS IS NOT A HEAT SOURCE FOR COLD WEATHER CONDITIONS AND ITEMS LISTED BELOW ARE TO BE IN PLACE WHEN AMBIENT TEMPERATURE IS BELOW PLUS FIVE (+5) DEGREES CELSIUS.
3. ENCLOSE AREA AROUND THE PERIMETER OF THE SLAB POUR WITH TARPS SECURING TO BOTH FORMWORK OF CURRENT POUR AREA AND STRUCTURE BELOW.
4. PROVIDE SUFFICIENT HEATING ELEMENTS TO ACHIEVE A TEMPERATURE OF PLUS TEN (+10) DEGREES CELSIUS WITHIN THE TARPED AREA UNDER SLAB TO BE Poured.
5. DEFENDING ON ITEM #1 HEATING MAY HAVE TO BEGIN ONE (1) DAY OR MAYBE HOURS BEFORE THE SCHEDULED CONCRETE POUR TO ACHIEVE PLUS TEN (+10) DEGREES CELSIUS DEPENDING ON THE UNITS PROVIDED FOR HEATING.
6. MAINTAIN HEAT UNDER THE SLAB AFTER CONCRETE HAS BEEN Poured FOR A MINIMUM OF THREE (3) DAYS IF OUTDOOR AMBIENT TEMPERATURE IS BELOW FIVE (+5) DEGREES CELSIUS. IF OUTDOOR AMBIENT TEMPERATURE IS ABOVE FIVE (+5) DEGREES CELSIUS FOR DAYS AHEAD HEATING UNDER THE SLAB CAN BE REDUCED BY A DAY.
7. DO NOT HEAT SPACE ABOVE TEN (+10) DEGREES CELSIUS AS EXCESSIVE HEAT TEMPERATURES CAN INCREASE EVAPORATION AND CRACKING WILL OCCUR IN SLAB.
8. DO NOT USE DE-ICING SALTS / MATERIAL ANYWHERE IF THERE IS ANY ACCUMULATION OF ICE AND OR SNOW TO AID OR PREVENT THE NEED FOR HEATING.
9. CALCIUM CHLORIDE SHALL NOT BE USED AS AN ACCELERATOR. A NON-CHLORIDE ADDITIVE SUCH AS POLARSET IS AN ACCEPTABLE ALTERNATIVE.
10. THE PROTECTION SHALL NOT BE COMPLETELY REMOVED UNTIL THE CONCRETE HAS COMPLETELY COOLED TO A TEMPERATURE DIFFERENTIAL NOTED IN CSA 293.1 (ITEM #6).
11. PROVIDE ADEQUATE EXHAUST AND VENTILATION OF COMBUSTION GASES FROM HEATING SOURCES THAT PRODUCE CARBON DIOXIDE AND OR CARBON MONOXIDE DURING PLACING AND CURING OF CONCRETE.

REINFORCED CONCRETE NOTES

- 1. ALL CONCRETE STRUCTURES SHALL CONFORM TO CSA A23.3 UNLESS NOTED OTHERWISE.
2. ALL CONCRETE, CONCRETE MATERIAL, FORMS, PRACTICE, ETC., SHALL CONFORM TO CSA-A23.1 UNLESS NOTED OTHERWISE.
3. MINIMUM COMPRESSIVE STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS:
3.1. CONCRETE ELEMENTS UNLESS NOTED OTHERWISE - 30 MPa
3.2. EXTERIOR CONCRETE ELEMENTS EXPOSED TO WEATHER, INCLUDING CURBS, SLABS, RAMPS, SIDEWALKS, ETC. - 35 MPa
3.3. MUD SLAB - 15 MPa
3.4. FOOTINGS - 25 MPa
4. ALL CONCRETE TESTING SHALL CONFORM TO CSA-A23.2.
5. FOR COMPRESSIVE STRENGTH TESTING CONCRETE A MINIMUM OF 3 CYLINDERS ARE REQUIRED FOR:
5.1. EACH DAYS POUR
5.2. EACH TYPE OR GRADE OF CONCRETE
5.3. EACH CHANGE OF SUPPLIER
5.4. EACH 15% OR FRACTION THEREOF FOR ALL OTHERS.
5.5. EACH 75% OR FRACTION THEREOF FOR ALL COLUMN CONCRETE.
6. ADDITIONAL TEST SPECIMENS SHALL BE TAKEN WHENEVER REQUESTED BY THE ENGINEER OR THE SUPERVISOR TO VERIFY THE CONCRETE QUALITY.
6. USE 20mm MAX. AGGREGATE SIZE THROUGHOUT UNLESS NOTED. SLUMP TO BE 75mm (125mm) THROUGHOUT UNLESS NOTED OR OTHERWISE REQUIRED IN CSA-A23.1.
7. ALL CONCRETE EXPOSED TO FREEZE/THAW CONDITIONS SHALL BE AIR ENTRAINED TO 0.5% (±1.5%) UNLESS NOTED OR OTHERWISE REQUIRED IN CSA-A23.1. INTERIOR SLABS WITH FREEZERS AND RINK SLABS ETC. SHALL NOT BE AIR ENTRAINED.
8. HOT AND COLD WEATHER CONCRETING SHALL COMPLY WITH ALL REQUIREMENTS OF CSA STANDARD A23.1. CALCIUM CHLORIDE ADDITIVES WILL NOT BE PERMITTED WITHOUT WRITTEN APPROVAL FROM BMR.
9. AT LEAST ONE SLUMP TEST SHALL BE TAKEN WITH EACH COMPRESSIVE STRENGTH TEST. AT LEAST ONE AIR ENTRAINMENT TEST SHALL BE TAKEN WITH EACH COMPRESSIVE STRENGTH TEST AS APPLICABLE.
10. NO ADMIXTURES SHALL BE USED WITHOUT PRIOR APPROVAL FROM THE STRUCTURAL ENGINEER. DO NOT ADD WATER TO CONCRETE ON SITE. IF HIGHER SLUMP CONCRETE IS DESIRED, CONTRACTOR SUPPLIER SHALL DESIGN AND SUPPLY ACCORDINGLY.
11. ALL BARS IN SLABS MUST BE SUPPORTED ACCURATELY ON CHAIRS TO GIVE SPECIFIED CONCRETE COVER, WHERE USE OF SLAB IS TO BE EXPOSED. USE SPECIALLY COATED CHAIRS OR APPROVED EQUAL TO SUPPORT TOP AND BOTTOM BARS.
12. ELECTRICAL CONDUITS SHALL NOT PASS THROUGH A COLUMN, CONDUITS IN SLABS OR WALLS SHALL NOT BE LARGER THAN 40mm OUTSIDE DIAMETER AND SHALL BE SPACED NO CLOSER THAN 150mm ON CENTRE. CONDUIT PARALLEL TO REINFORCING STEEL SHALL BE CENTRED BETWEEN BARS. CONDUIT TO BE PLACED IN AN ORGANIZED MANNER.
13. CONDUIT SHALL HAVE A MINIMUM CONCRETE COVER OF 20mm AND UNLESS SPECIALLY PERMITTED OTHERWISE, SHALL NOT RUN HORIZONTALLY IN A CONCRETE WALL.
14. THE CONTRACTOR SHALL PROVIDE CONTINUOUS SUPERVISION DURING THE PLACEMENT OF CONCRETE TO ENSURE THAT THE REINFORCING STEEL IS MAINTAINED IN ITS CORRECT POSITION.
15. CONSTRUCTION JOINTS SHALL BE LOCATED SO AS TO LEAST IMPAIR THE STRENGTH OF THE STRUCTURE.
16. AT LEAST SEVEN (7) DAYS SHAL ELAPSE AFTER CASTING CONCRETE WALLS BEFORE FLOOR MEMBERS OR PROP MEMBERS SUPPORTED THEREON ARE PLACED.
17. ALL ABUTTING MASONRY SHALL BE ANCHORED TO THE CONCRETE STRUCTURE. DO NOT INSTALL DOVETAIL ANCHOR SLOTS IN STRUCTURAL SLABS, BEAMS, COLUMNS OR WALLS.
18. ALL REINFORCING STEEL SHALL HAVE A MINIMUM YIELD STRENGTH OF 400 MPa AND SHALL CONFORM TO CSA G30.18. WHERE WELDING OF REBAR IS INDICATED, WELDABLE GRADE REBAR IS TO BE USED AND SHALL CONFORM TO CSA W186.
19. ALL WELDED WIRE MESH (WWM) SHALL CONFORM TO ASTM A-186. ALL WELDED WIRE PRODUCTS ARE TO BE SUPPLIED AS FLAT SHEETS AND SHALL BE LAPPED A MINIMUM OF 150mm AT JOINTS UNLESS NOTED.
20. ALL REINFORCING LAP SPLICES SHALL CONFORM TO THE LATEST CSA STANDARD A23.3 AND ALL BAR SPLICES SHALL BE CLASS 'B' TENSION SPLICES UNLESS NOTED.
21. ALL REINFORCING STEEL SHALL BE DETAILED, FABRICATED, PLACED AND SUPPORTED IN ACCORDANCE WITH "REINFORCING STEEL MANUAL OF STANDARD PRACTICE" BY THE REINFORCING STEEL INSTITUTE OF CANADA. SUBMIT SHOP DRAWINGS TO BMR STRUCTURAL ENGINEERING FOR REVIEW, INCLUDING PLACING OF REINFORCEMENT, INDICATE ON SHOP DRAWINGS, BAR BENDING DETAILS, LISTS, QUANTITIES OF REINFORCEMENT, SIZES, SPACING, LOCATION OF REINFORCEMENT TO PERMIT CORRECT PLACING WITHOUT REFERENCE TO STRUCTURAL DRAWINGS. INDICATE SIZES, SPACING AND LOCATIONS OF CHAIRS, SPACERS AND HANGERS.
22. WHEN PLACING "THIN" CONCRETE SLABS OVER METAL DECK/PAN FORMS, MEASURE CONCRETE FINISHES THICKNESS WITH A LASER OR SIMILAR DEVICE. TOP SURFACE OF SLABS IS TO BE "FLAT".
23. WHEN PLACING REINFORCED CONCRETE SLABS OVER FORMWORK THAT WILL BE REMOVED, MEASURE CONCRETE THICKNESS WITH A SUITABLE THICKNESS GAUGE USED LOCALLY UNLESS NOTED OTHERWISE. WHERE A CAMBER IS SPECIFIED ON STRUCTURAL DRAWINGS FOR CONCRETE SLABS/BEAMS, THIS IS MEANT TO INDICATE THE FINISHED ELEVATION OF THE TOP SURFACE OF THE SLAB/BEAM AFTER THE SLAB IS FINISHED.
24. ALL OIL, GREASE, MUD, AND DEBRIS SHALL BE ENTIRELY REMOVED FROM THE REINFORCING, ANCHOR BOLTS, AND FORM SURFACES PRIOR TO PLACEMENT OF CONCRETE.

MASONRY NOTES

- 1. ALL CONCRETE BLOCK WALLS SHALL BE OF STANDARD CONCRETE MASONRY UNITS TYPE A TO CSA-A165. CLASSIFICATION H1/5MM (UNLESS NOTED OTHERWISE). ALL MASONRY UNITS SHALL BE LAD DOWN IN RUNNING BOND.
2. CONTRACTOR IS RESPONSIBLE TO TEMPORARILY BRACE ALL CONCRETE BLOCK WALLS UNTIL MASONRY HAS BEEN PERMANENTLY ANCHORED TO THE STRUCTURE.
3. ALL MASONRY MORTAR FOR CONCRETE BLOCK WALLS SHALL BE TYPE 'S' FOR LOAD BEARING AND TYPE 'N' FOR NON-LOAD BEARING TO CSA A179.
4. ALL MASONRY MORTAR FOR BRICK VENEER SHALL BE TYPE 'N' TO CSA A179.
5. ALL CONCRETE GROUT SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 25 MPa TO CSA A179.
6. ALL REINFORCING STEEL SHALL HAVE A MINIMUM YIELD STRENGTH OF 400 MPa AND CONFORM TO CSA G30.18. ALL REINFORCING STEEL SHALL BE LAPPED A MINIMUM OF 36 BAR DIAMETERS UNLESS NOTED ON DRAWINGS.
7. FILL CELLS CONTAINING REINFORCING AND ANCHORS WITH GROUT UNLESS NOTED OTHERWISE ON THE DRAWINGS (TOP TO BOTTOM OF WALL). FILL OR VIBRATE TO FULL CORES COMPLETELY. FULL CORES IN LIFTS OF 1200mm MAXIMUM. PROVIDE CLEANOUT OPENINGS FOR LIFTS IN EXCESS OF 1200mm WHERE CONSULTANT HAS ACCEPTED LARGER LIFT. VERTICAL REINFORCEMENT SHALL BE CONTINUOUS TO WITHIN 50mm OF TOP OF DOWELS.
8. PROVIDE DOWNLAYS INTO SUPPORTING CONCRETE AT VERTICAL REINFORCING LOCATIONS AT SAME USE AND SPACING AS VERTICAL REINFORCEMENT UNLESS NOTED OTHERWISE.
9. STOP CONCRETE CURE FLAT 40mm BELOW TOP SURFACE OF LIFT WHENEVER FILLING WILL BE STOPPED FOR MORE THAN 1 HOUR TIME DURATION.
10. AT LEAST FIVE (5) MASONRY UNITS OF BRICK, FIVE (5) MASONRY UNITS OF CONCRETE BLOCK AND FIVE (5) 50mm CUBE SPECIMENS EACH OF MORTAR AND GROUT SHALL BE TESTED FOR STRENGTH AT THE HEIGHT OF THE BUILDING IN ACCORDANCE WITH THE FOLLOWING CSA STANDARDS:
10.1. BRICK CAN3-A82.2
10.2. CONCRETE BLOCK A165
10.3. MORTAR AND GROUT A179
11. ALL MORTAR JOINTS SHALL BE 10mm.
12. HOLLOW MASONRY UNITS SHALL BE LAD WITH FACE SHELL BED AND HEAD JOINTS. IN ADDITION, THE WEBS SHALL BE LAD IN A FULL BED IN CONCRETE BLOCK WALLS. CONDUIT SHALL BE LAPPED AT THE STARTING COURSE ON FOOTINGS, SOLID FOUNDATION WALLS AND WHERE ADJACENT TO CELLS OR CAVITIES THAT ARE TO BE REINFORCED OR FILLED WITH GROUT OR CONCRETE.
13. CONTROL JOINTS SHALL BE LOCATED AS SHOWN ON ARCHITECTURAL DRAWINGS.
14. ALL INTERSECTING OR ABUTTING MASONRY MUST BE BONDED BY MASONRY BONDING UNITS, OR TIED WITH METAL ANCHORS TO MEET CAN-1871.
15. ALL CONCRETE BLOCK WALLS SHALL BE REINFORCED WITH BLOK-LOK BL-30 HEAVY DUTY TRUSS TYPE HORIZONTAL BLOCK REINFORCEMENT TO MEET CAN-1871. REFER TO TYPICAL MASONRY DETAILS. HOT DIPPED GALVANIZED AFTER FABRICATION TO ASTM A193 CLASS B2 1.5 c/c. LAP REINFORCEMENT 150mm AT EACH SPLICE.
16. LAP CONCRETE UNITS WITH A PROPERLY EQUIPPED MASONRY SAW. BROKEN EDGES NOT ACCEPTABLE.
17. ALL EXTERIOR FACE BRICK SHALL BE TIED TO CONCRETE BLOCK BACK UP WITH BLOK-LOK BL-21 (EXTRA HEAVY DUTY) TO CSA A370 OR CONCRETE BLOCK WITH BLOK-LOK BL-21 (EXTRA HEAVY DUTY) TO CSA A370 OR FABRICATION TO ASTM A193 CLASS B2 1.5 c/c. LAP REINFORCEMENT 150mm AT EACH SPLICE UNLESS NOTED OTHERWISE.
18. TOP OF INTERIOR MASONRY WALLS SHALL BE ANCHORED TO US OF STRUCTURE. REFER TO TYPICAL MASONRY DETAILS.
19. UNLESS NOTED ON DRAWINGS WHERE STEEL BEAMS REST ON MASONRY USE THREE COURSES OF SOLID MASONRY UNDER BEARING PLATES EXCEEDING 200mm MINIMUM SPACING. PROVIDE 20mm MINIMUM HOLLOW BLOCK SHALL BE FILLED WITH 25 MPa GROUT CONTINUOUS.
20. MASONRY CONTRACTOR MUST EXERCISE UTMOST CARE TO PROVIDE THE FULL BEARING CAPACITY OF STRUCTURAL MASONRY WALLS. ANY MASONRY BUILDING SHORT OF THE ABOVE REQUIREMENTS MUST BE RE-PLACED.
21. GROUTED CONCRETE BLOCK SHALL BE INSPECTED BY DRILLING 10mm DIA. HOLES THROUGH FACE OF BLOCK IN LOCATIONS AS REQUESTED BY MASONRY CONTRACTOR TO VERIFY MASONRY QUALITY. IF GROUTING IS NOT SATISFACTORY ADDITIONAL TESTING AND CORRECTIVE MEASURES SHALL BE TAKEN OUT AT THE CONTRACTORS EXPENSE UP TO AND INCLUDING COMPLETE REPLACEMENT OF WORK.

FORMWORK NOTES

- 1. REFER TO ARCHITECTURAL DRAWINGS FOR CHAMBERS ON CORNERS OF COLUMNS, BEAMS AND WALLS. USE 20mm x 20mm FORMED CHAMBERS ON EXPOSED CORNERS UNLESS CHAMBERS' OR OTHER SIZES ARE SHOWN ON DRAWINGS.
2. FORMWORK MUST NOT BE REMOVED UNTIL CONCRETE HAS ATTAINED SUFFICIENT STRENGTH TO SUSTAIN ALL LOADING. FORMS FOR SLABS MAY BE REMOVED AFTER WORKING CURING CONDITIONS (SEE BELOW) PROVIDED THAT RESHORING IS INSTALLED IMMEDIATELY AT NO MORE THAN 3000mm SPACINGS AND MAINTAINED UNTIL THE CONCRETE HAS ATTAINED ITS 28 DAY STRENGTH. RESHORING SHALL NOT BE REMOVED BEFORE 21 DAYS AFTER SLAB WAS CAST. IN MULTI STOREY CONSTRUCTION, FORMWORK MUST REMAIN IN PLACE UNTIL SLABS HAVE ADEQUATE STRENGTH & STIFFNESS TO SUPPORT ALL LOADS FROM GREEN CONCRETE. FORMWORK CONSTRUCTION LOADS AND/OR RESHORING TO REMOVE FORMS SHALL BE DONE IN ACCORDANCE WITH CSA S269.1. FORMS SHALL NOT BE REMOVED BEFORE THE CONCRETE HAS SET AND REACHED 70% OF ITS DESIGN STRENGTH AND AS FOLLOWS:
2.1. BEAM SOFFITS 7 DAYS - RESHORE 28 DAYS
2.2. SLABS 7 DAYS - RESHORE 28 DAYS
2.3. SIDES OF BEAMS, COLUMNS, AND WALLS - 3 DAYS
3. THE DESIGN OF ALL FORMWORK, FALSEWORK, SCAFFOLDING, SHORING, ETC. SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND COMPLETED IN ACCORDANCE WITH CAN/CSA S269.1. ALL FORMWORK MUST BE DESIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF CONSTRUCTION. UPON REQUEST OF THE CONSULTANT, A PROFESSIONAL ENGINEER MUST SUPPLY WRITTEN CONFIRMATION THAT ALL FORMWORK HAS BEEN DESIGNED TO SUPPORT ALL APPROPRIATE LOADS AND IN ACCORDANCE WITH APPLICABLE STANDARDS.
4. FABRICATE AND ERECT FORMWORK IN ACCORDANCE WITH CAN/CSA S269.1 TO PRODUCE FINISHED CONCRETE CONFORMING TO SHAPE, DIMENSIONS, LOCATIONS AND LEVELS INDICATED WITHIN TOLERANCES REQUIRED BY CSA A23.1/A23.2.
5. ALIGN FORM JOINTS AND MAKE WATER TIGHT. KEEP FORM JOINTS TO A MINIMUM.
6. BUILD IN ANCHORS, SLEEVES, AND OTHER INSERTS REQUIRED TO ACCOMMODATE WORK SPECIFIED IN OTHER CONDITIONS. ASSURE THAT ANCHORS AND INSERTS WILL NOT PROTRUDE BEYOND SURFACES DESIGNATED TO RECEIVE APPLIED FINISHES, INCLUDING PAINTING. NO REINFORCING STEEL SHALL BE CUT TO PLACE SLEEVES, ETC.
7. FOR OPENINGS REQUIRED BY OTHER TRADES, SEE CONSULTANTS DRAWINGS. NO OPENINGS SHALL BE MADE IN FLOOR SLABS NEAR A COLUMN OR A WALL WITHOUT SPECIFIC APPROVAL FROM THE STRUCTURAL ENGINEER. WHERE SMALL DIAMETER PIPING IS ALLOWED, IT SHALL BE INDIVIDUALLY SLEEVED AND LOCATED SO THAT NO REINFORCING STEEL IS CUT.

FIELD AND SHOP DRAWING REVIEW NOTES

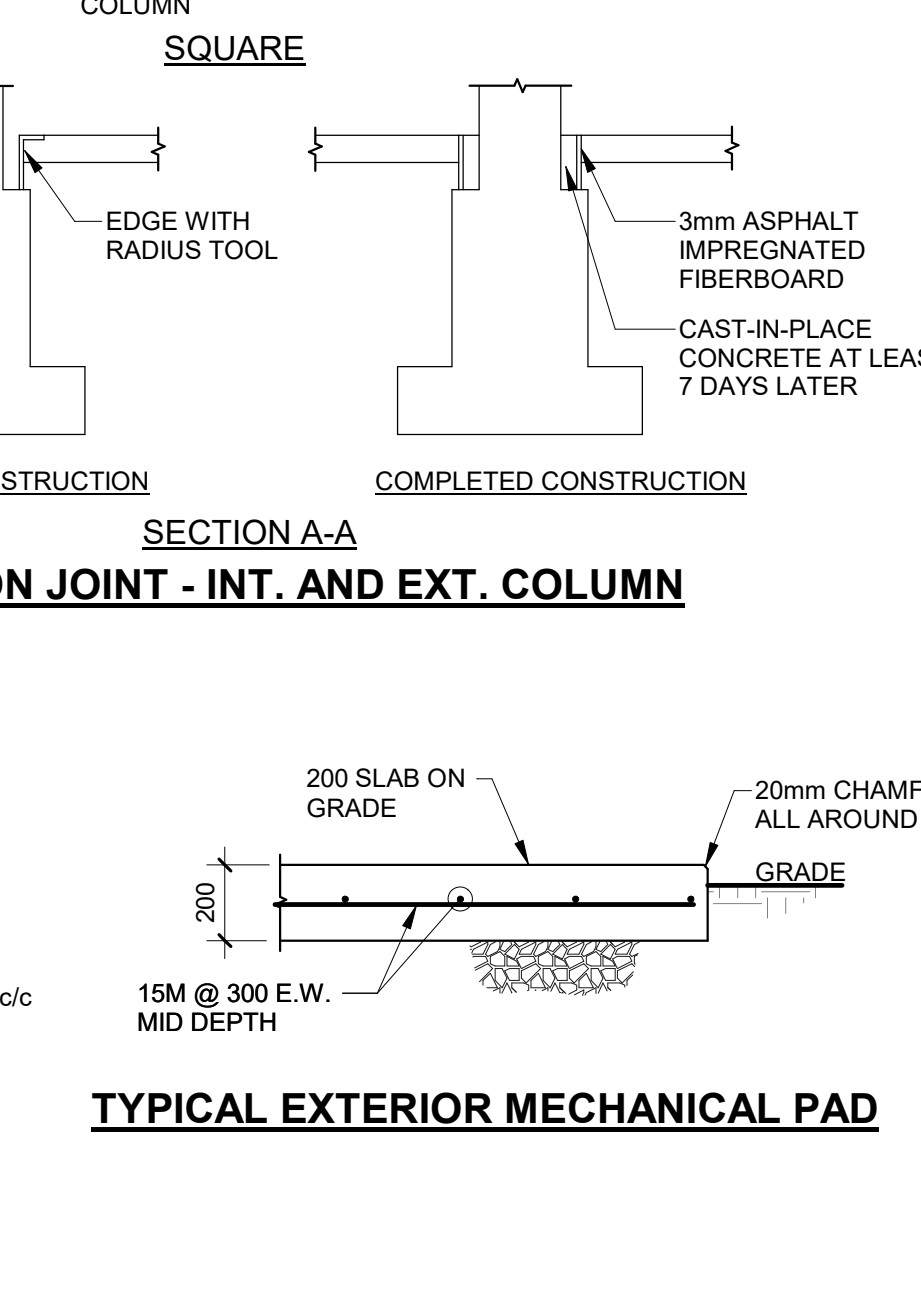
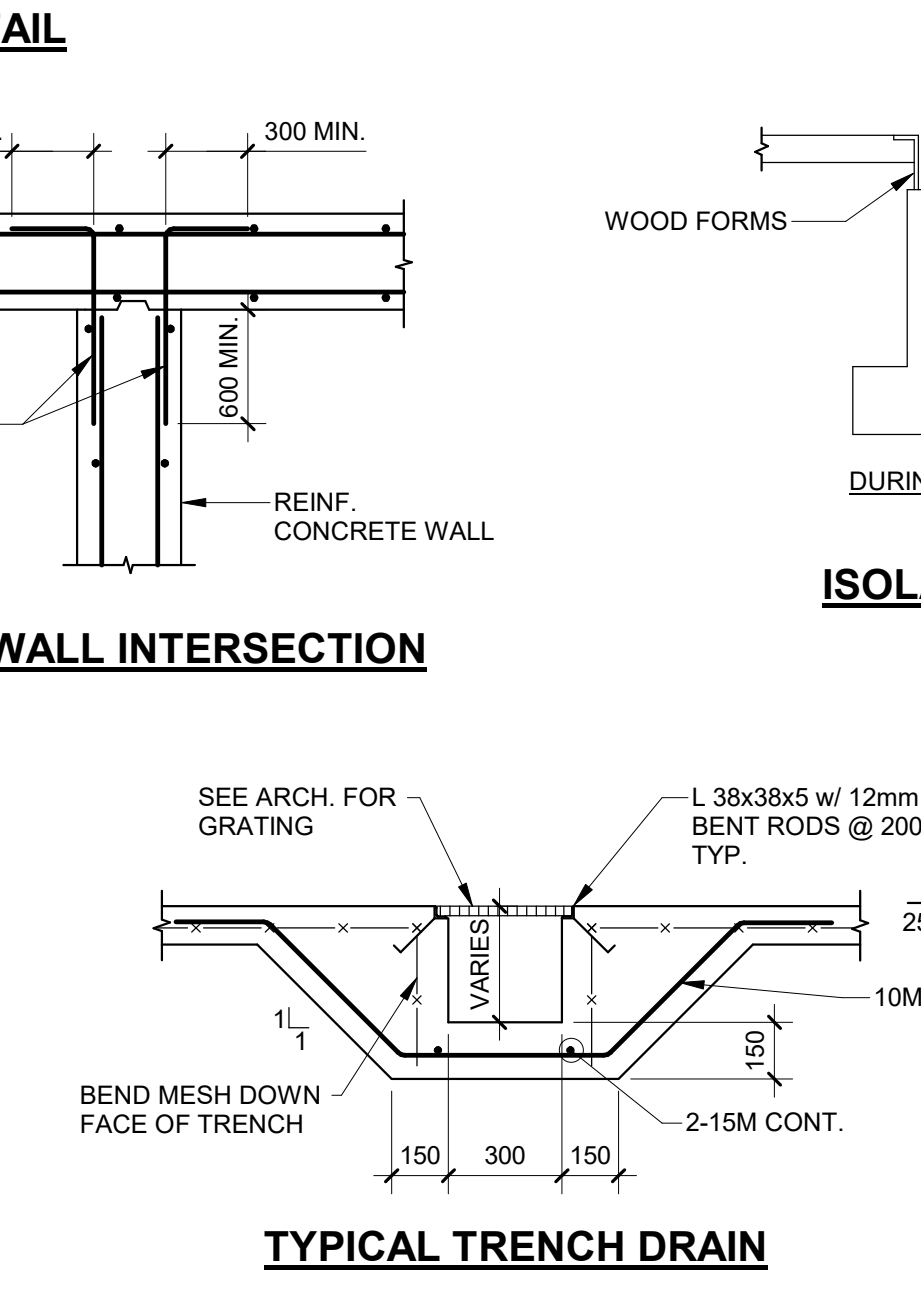
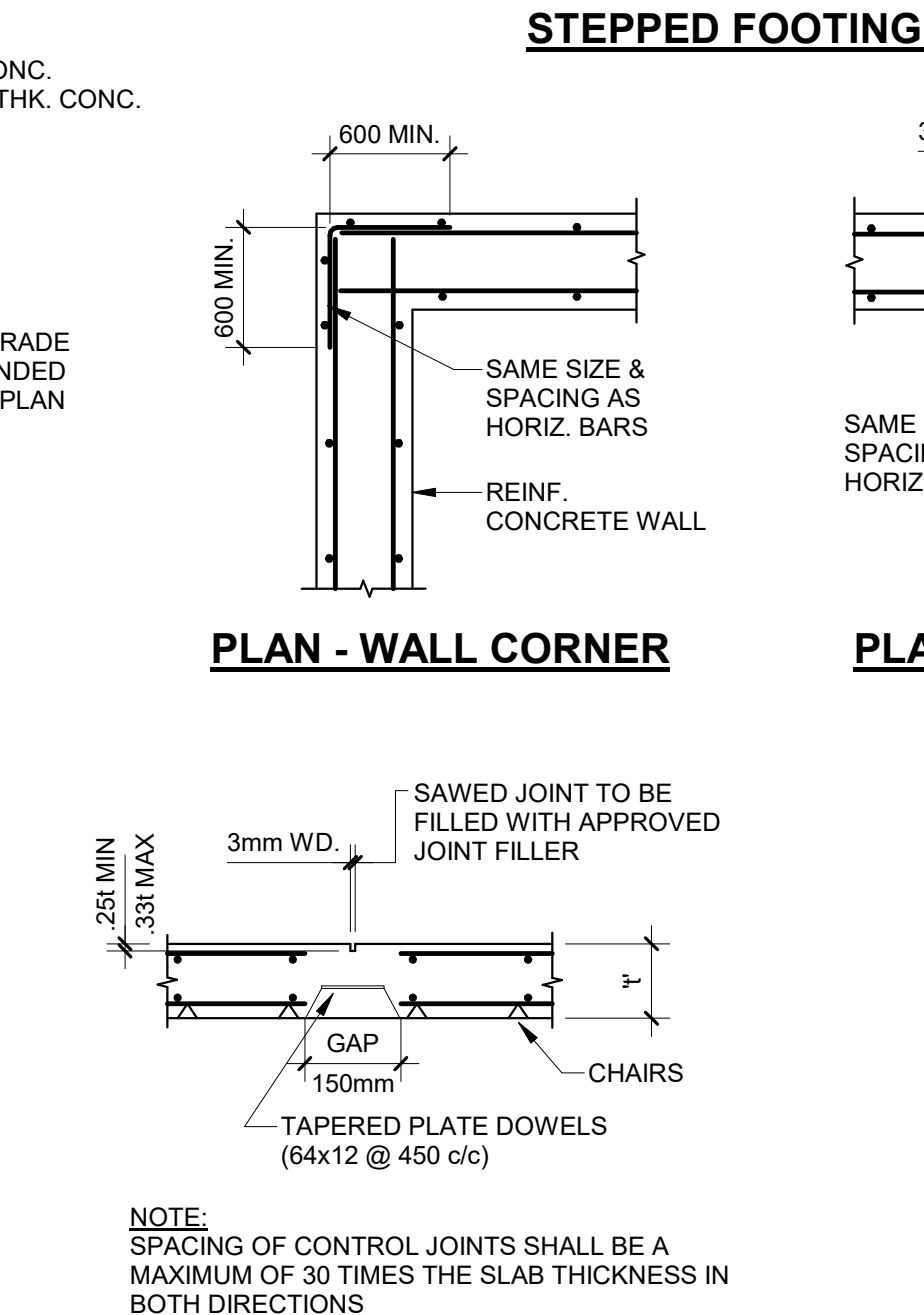
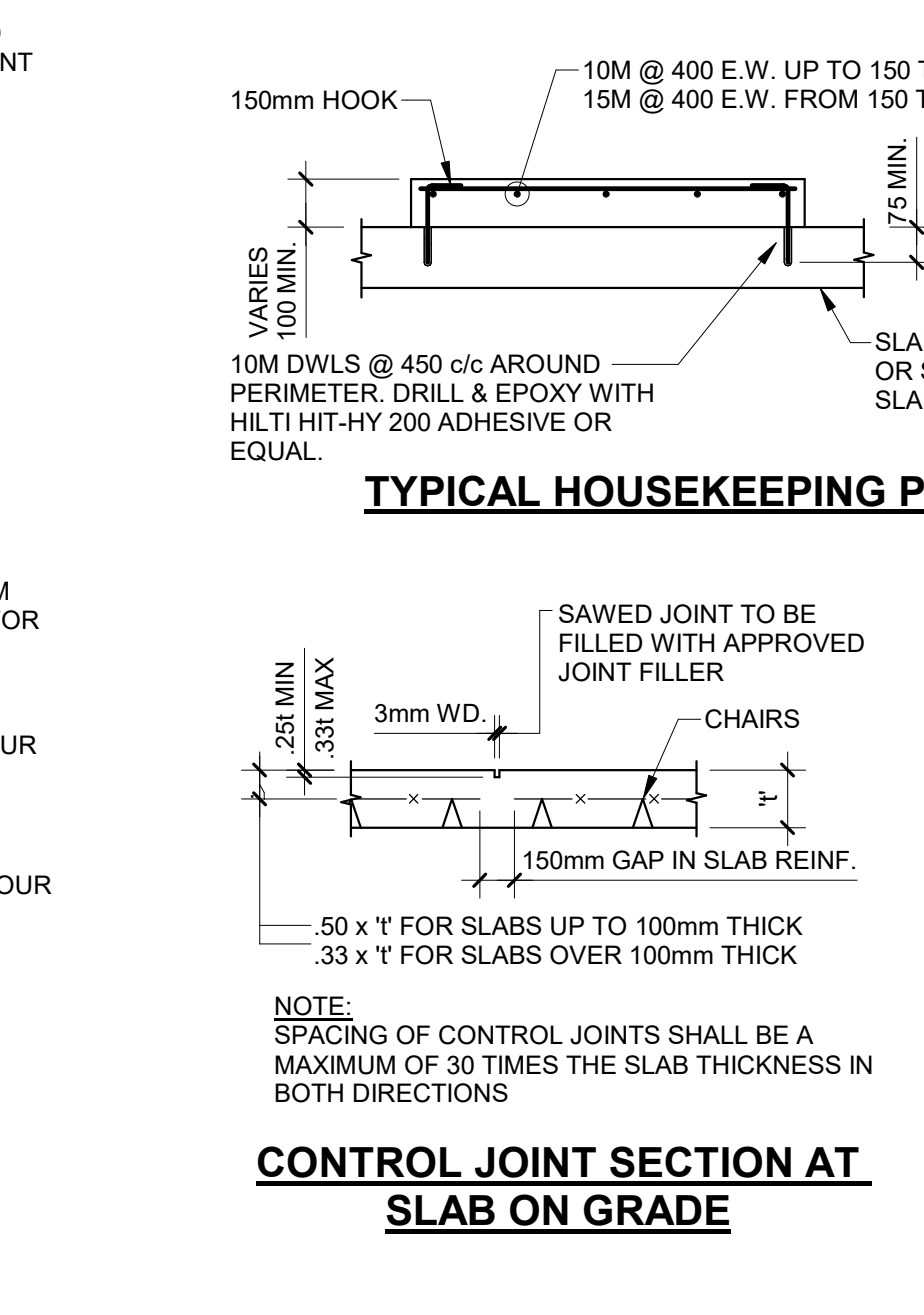
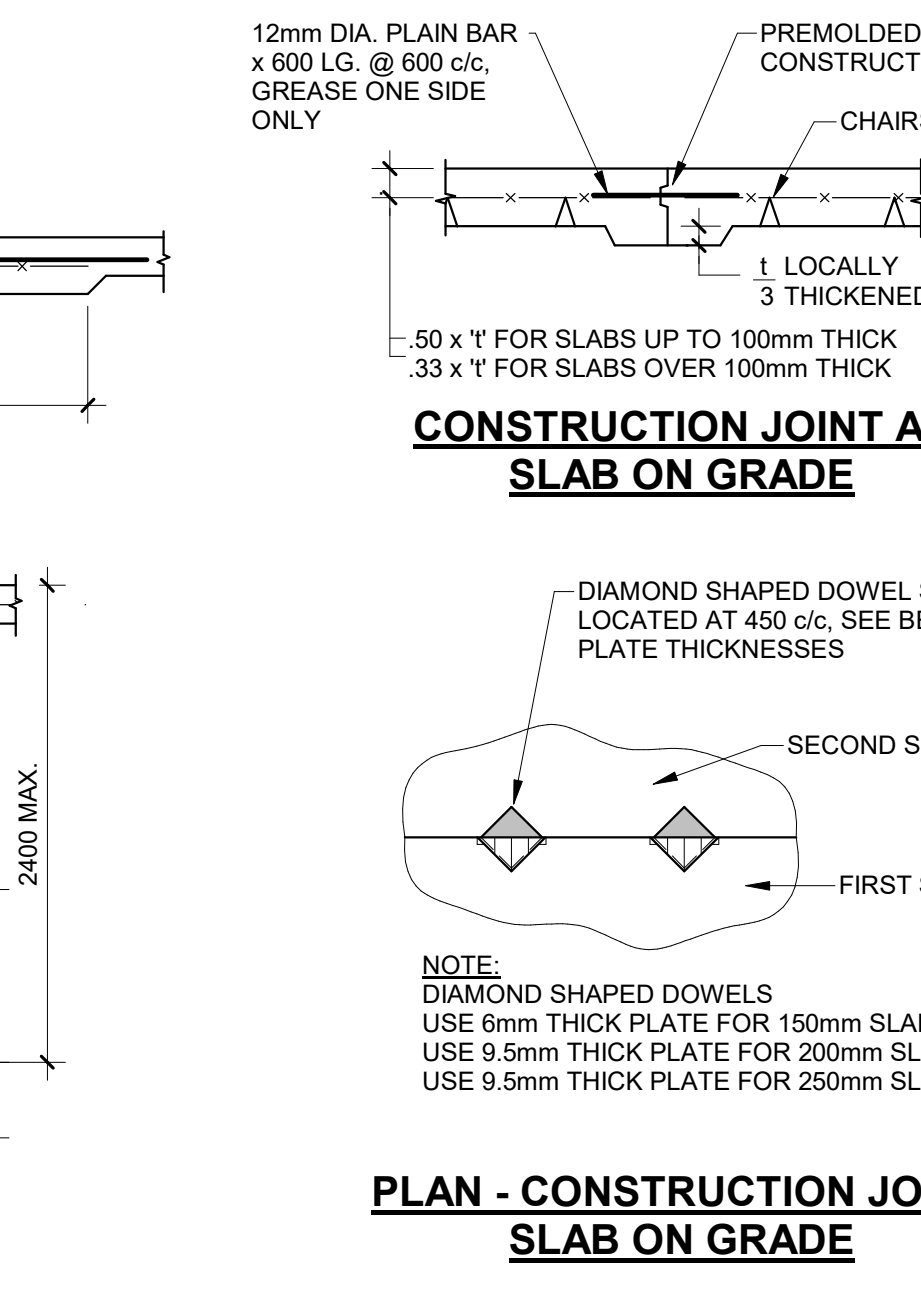
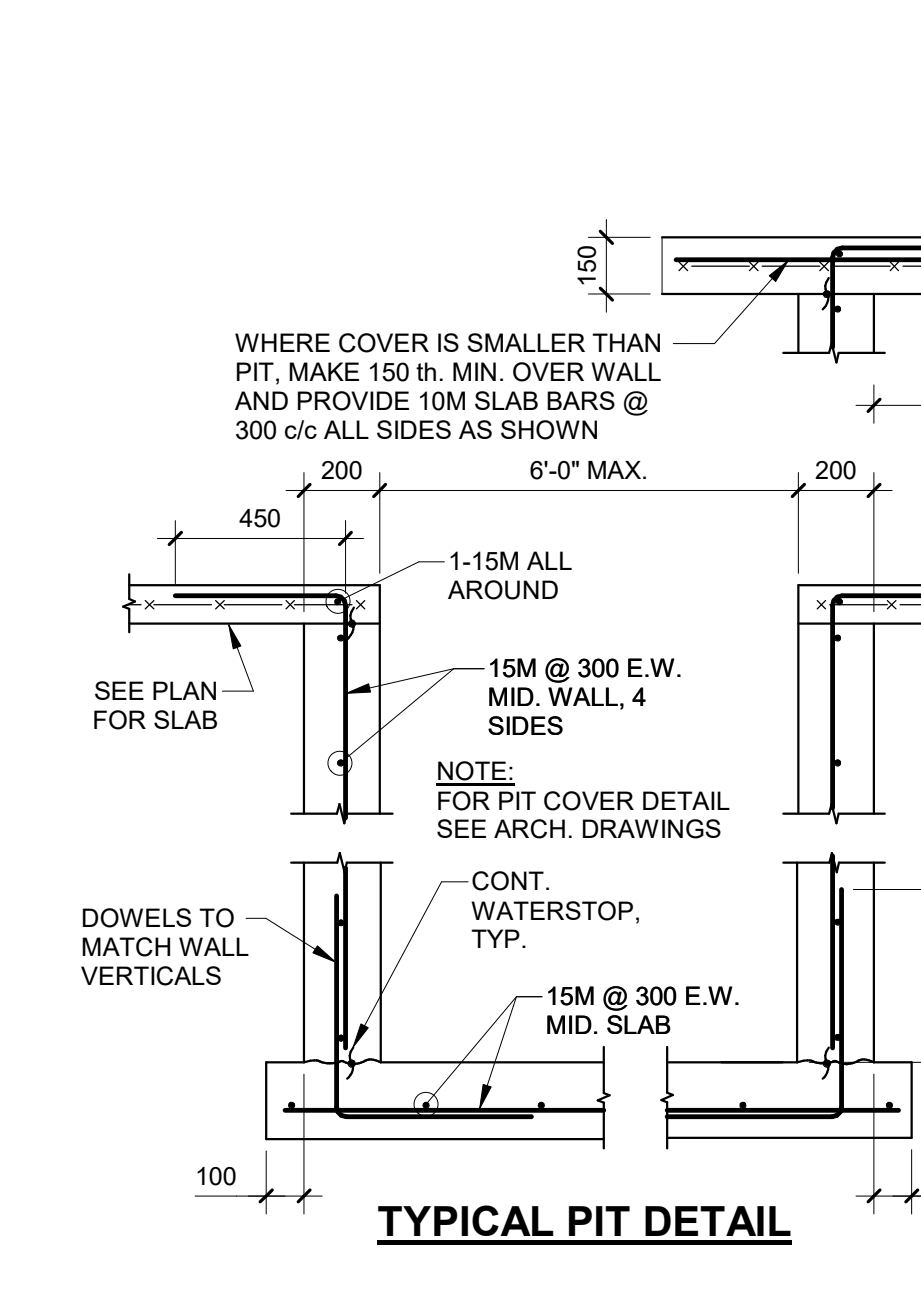
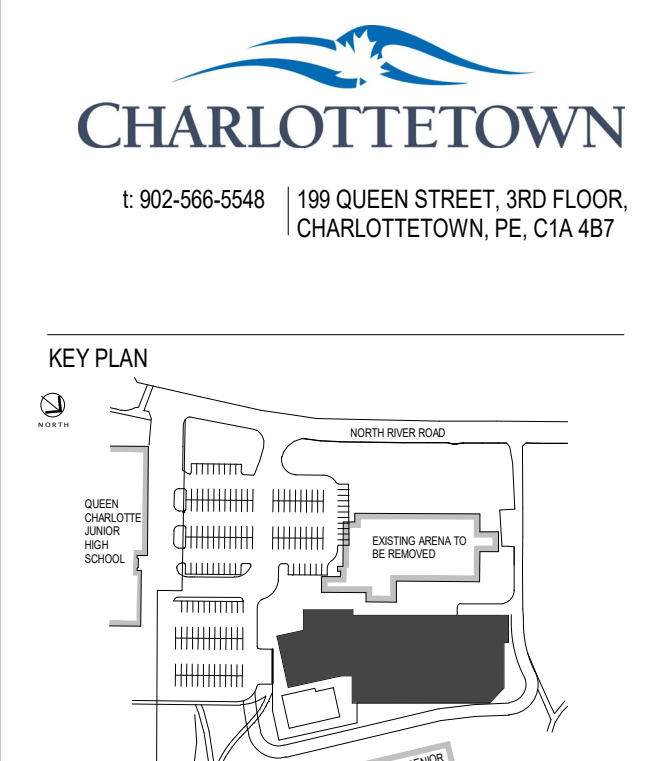
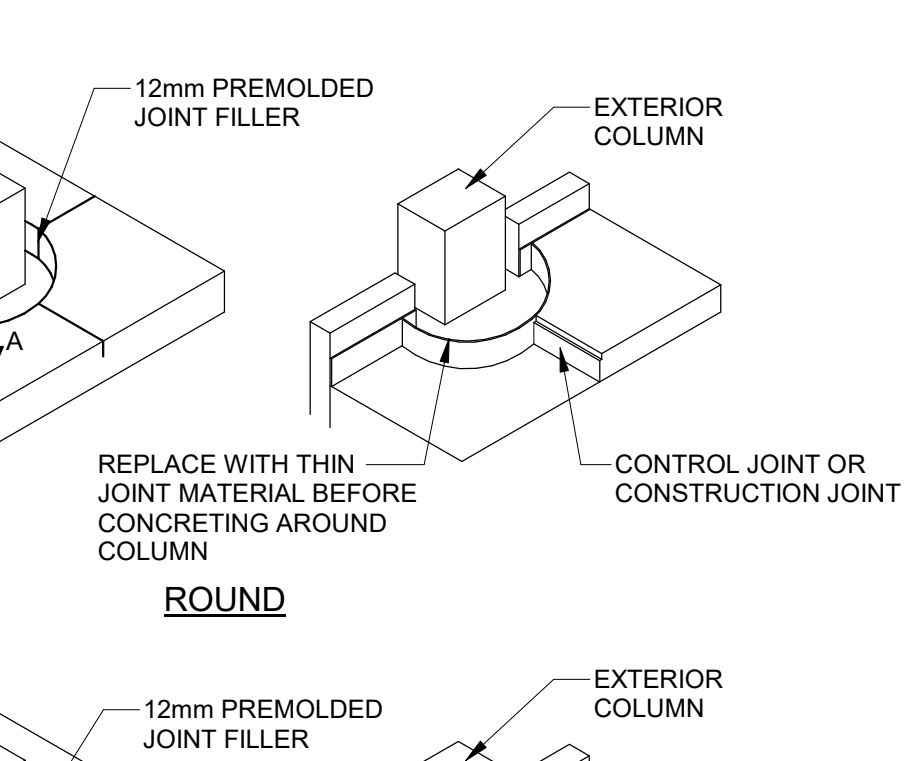
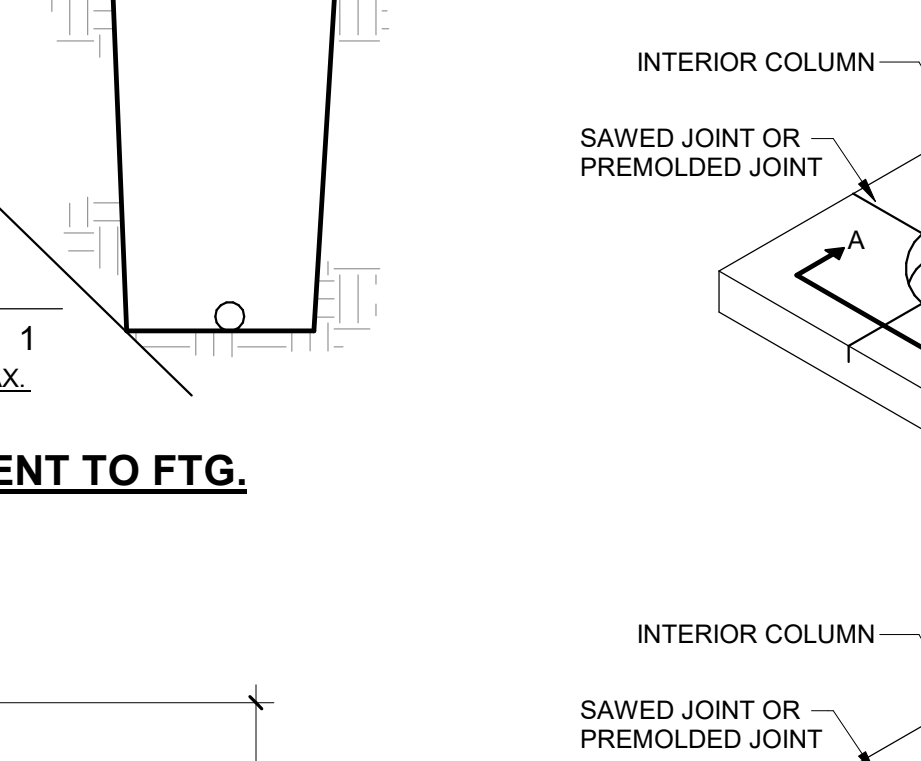
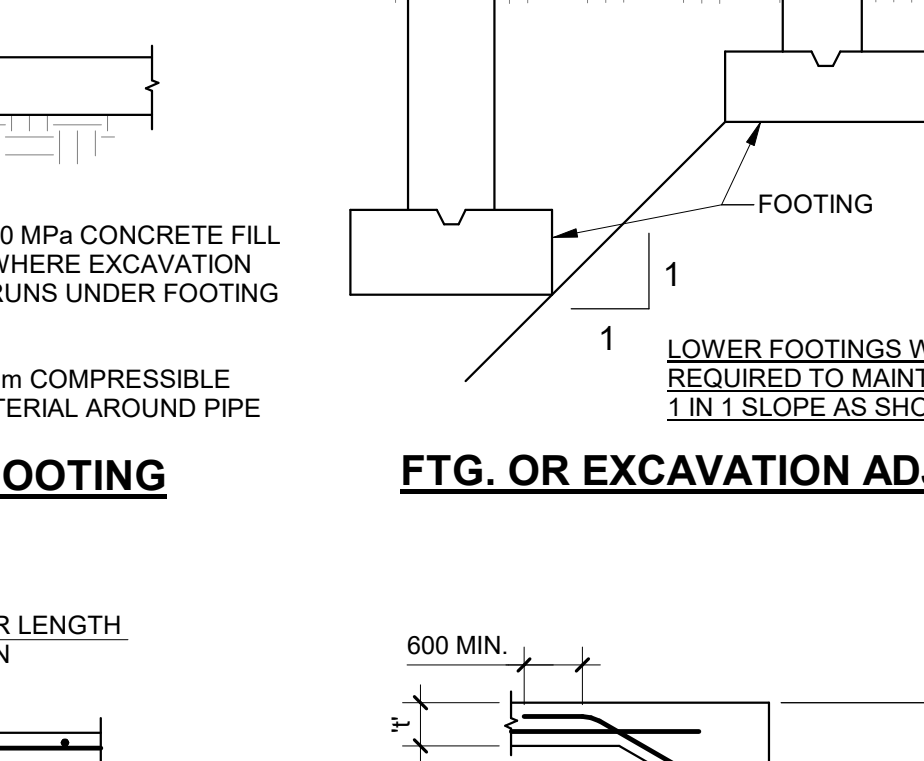
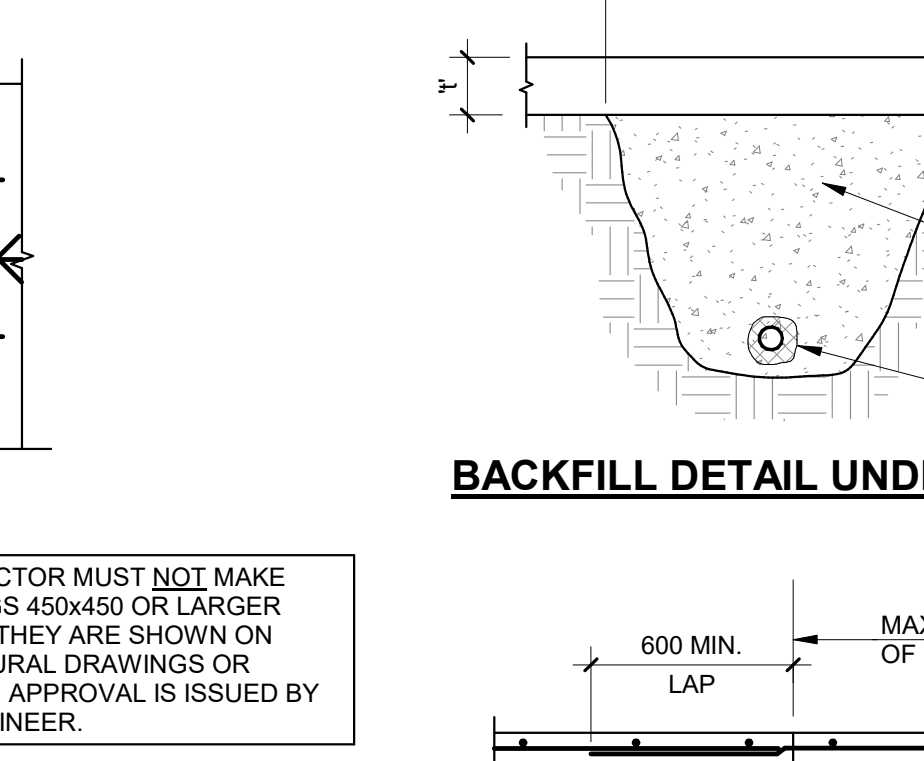
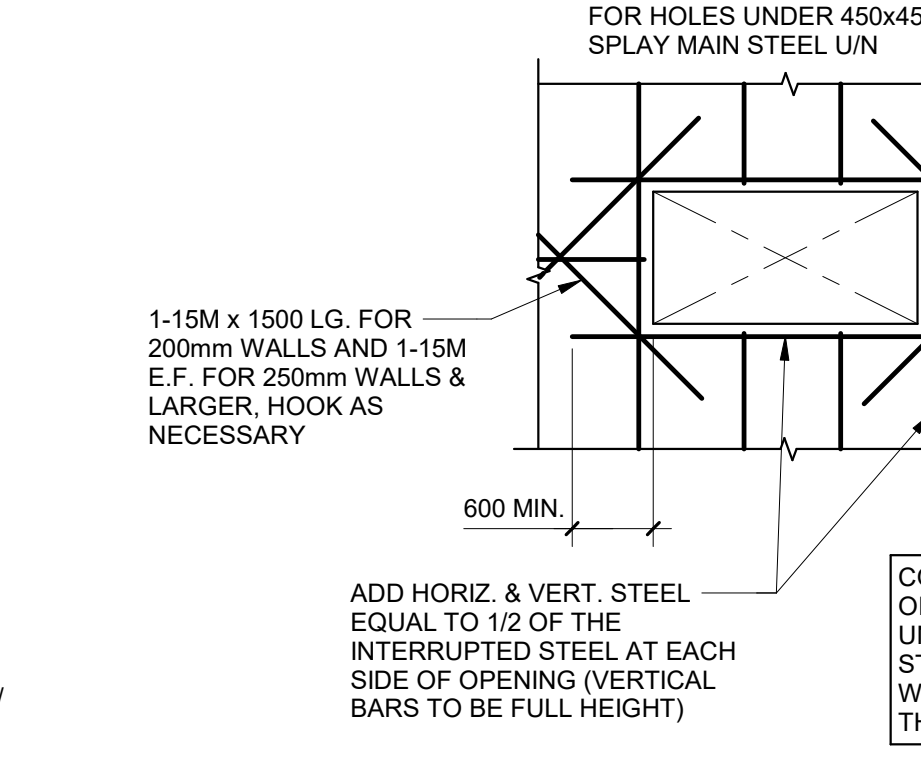
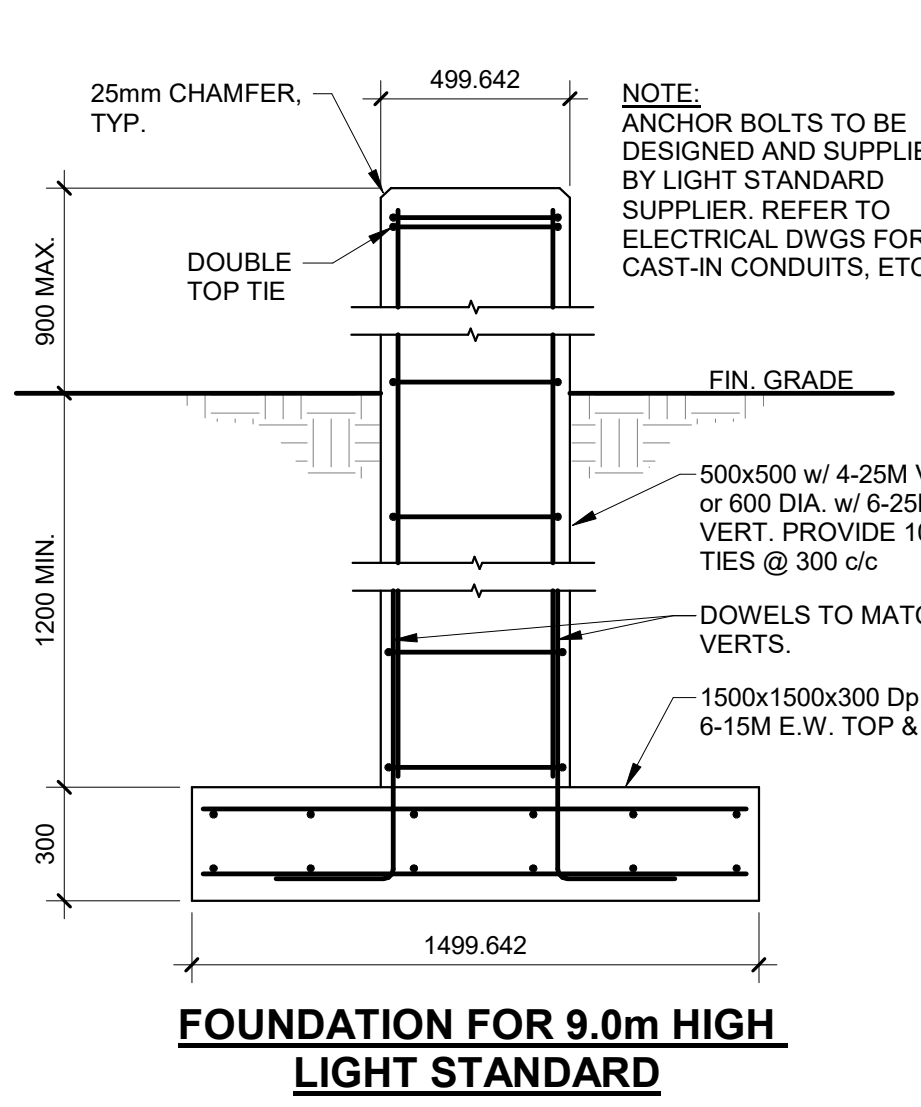
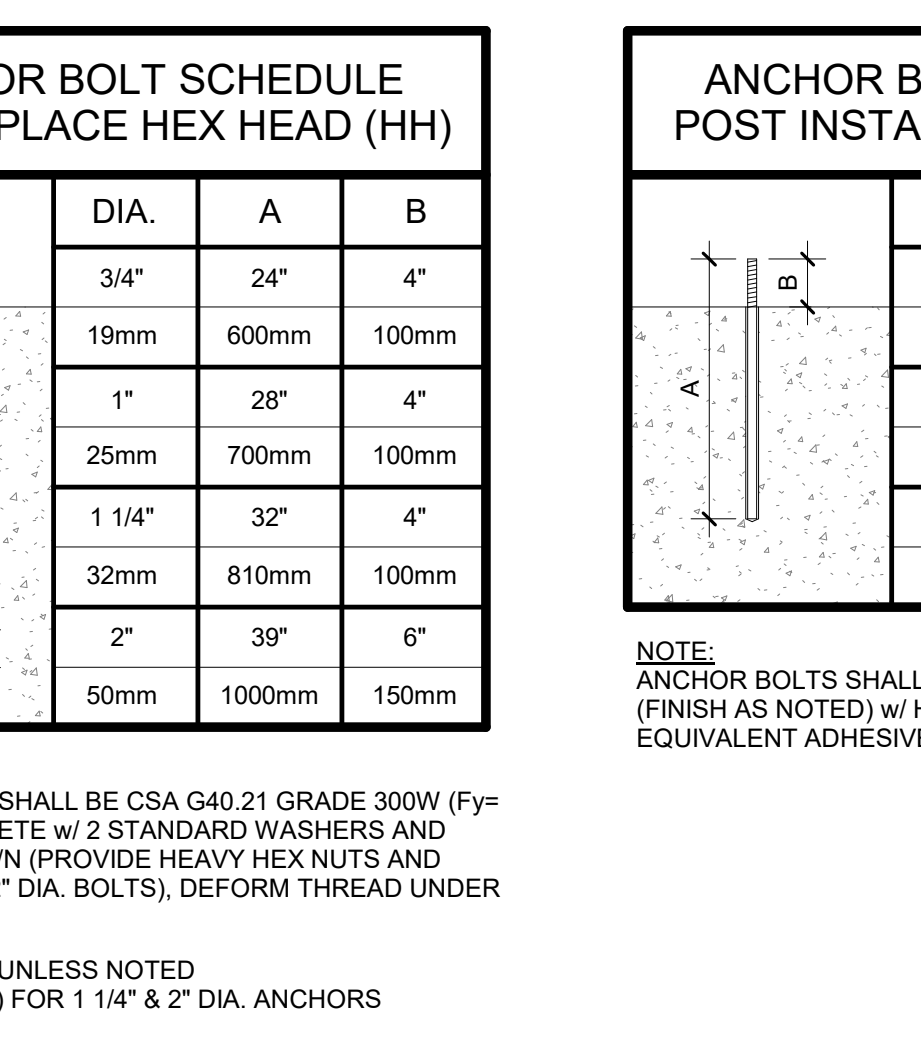
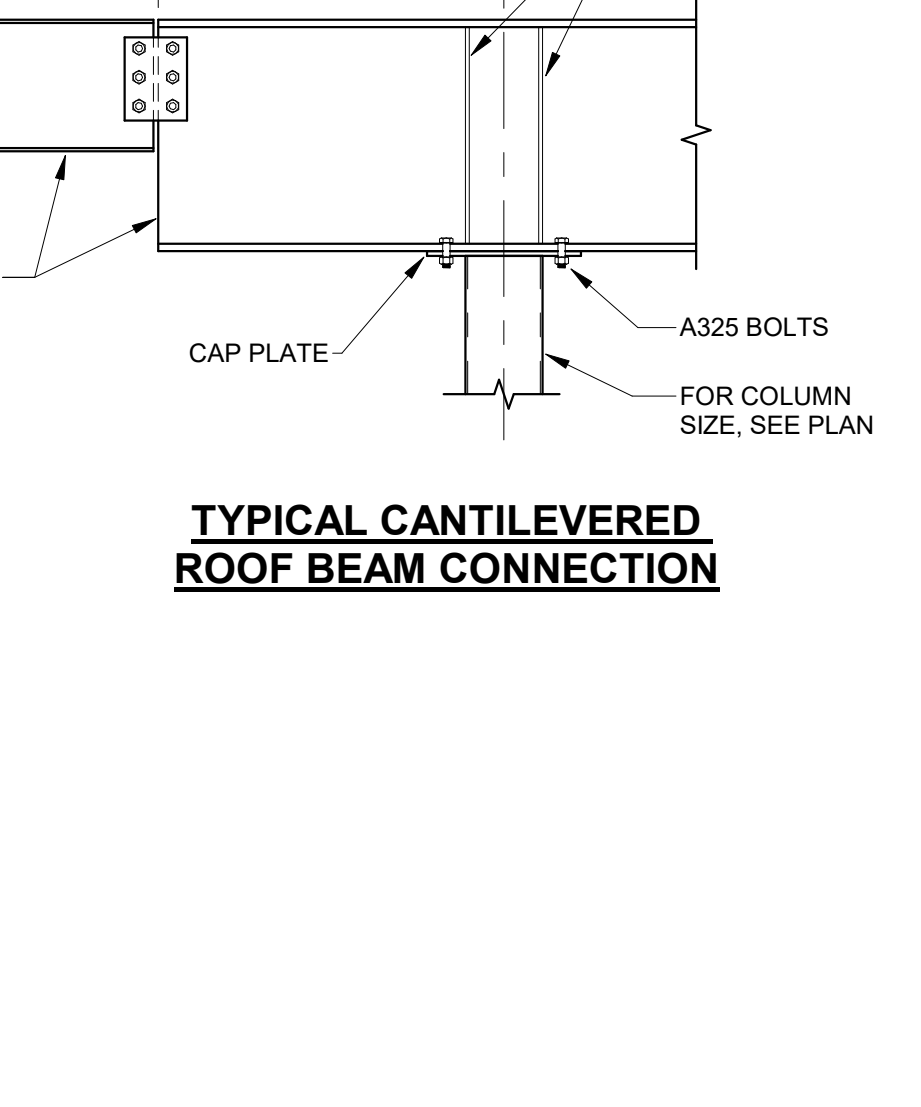
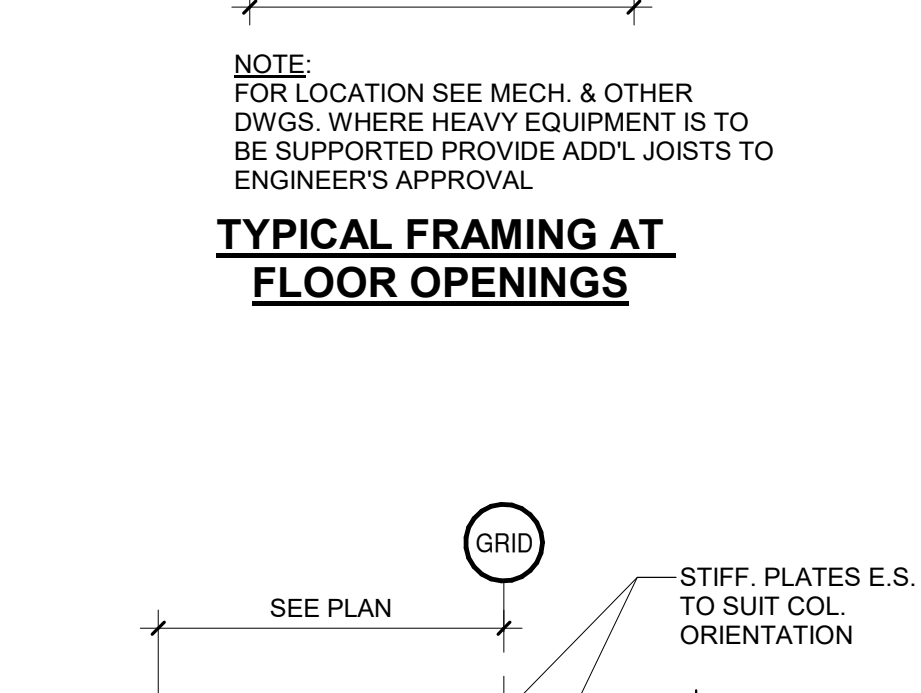
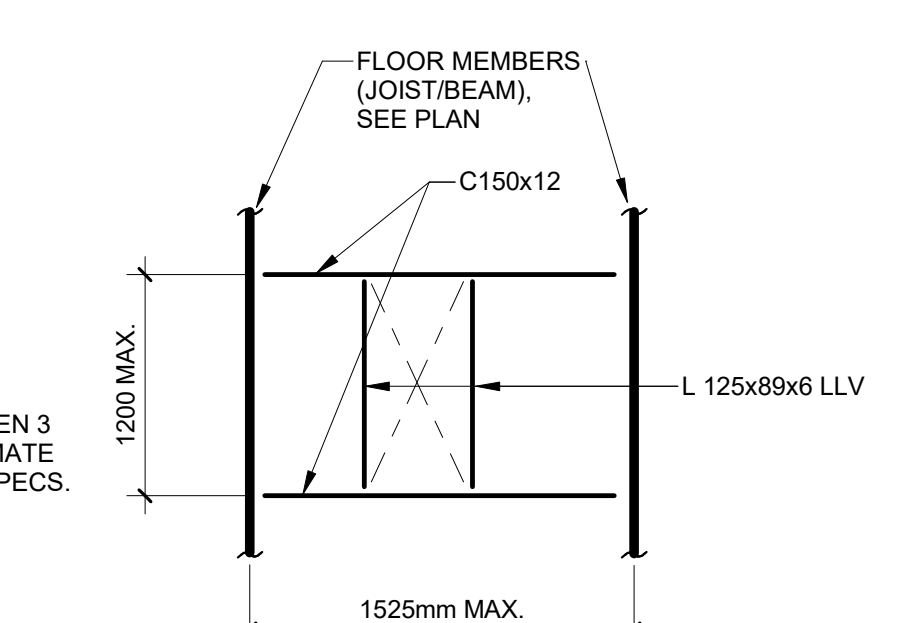
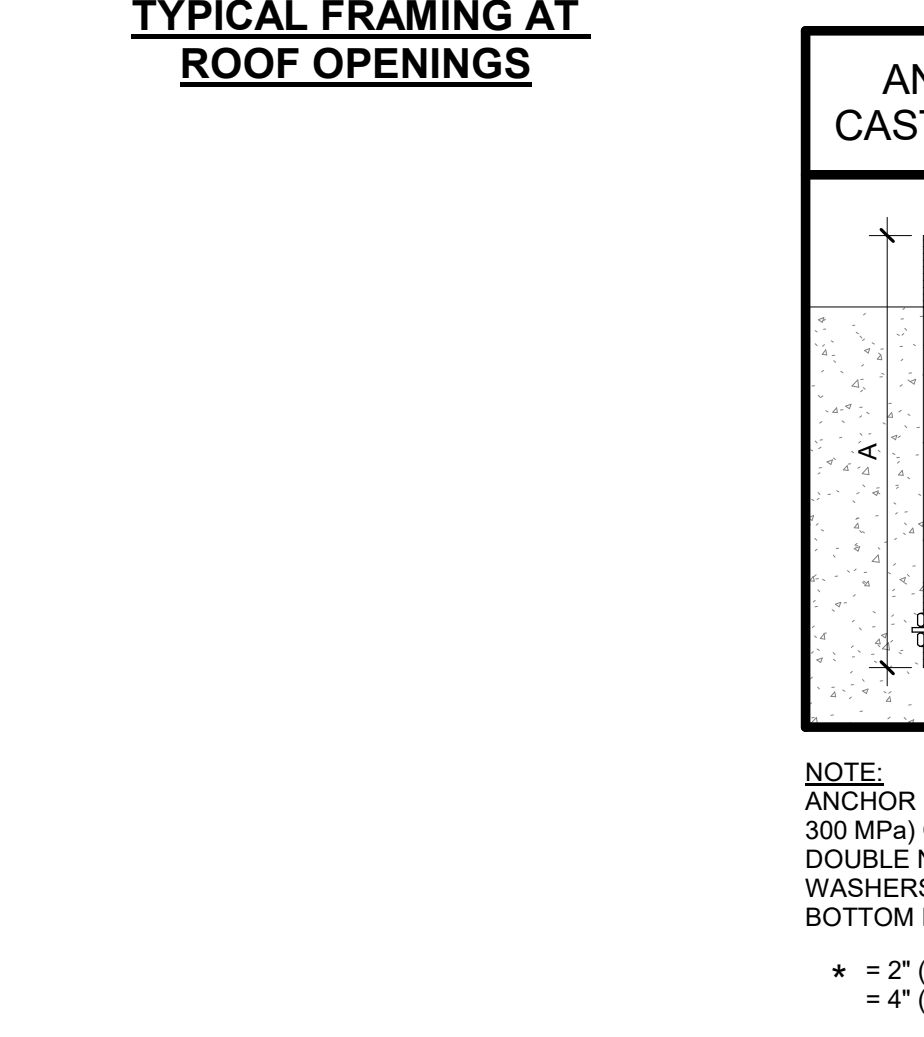
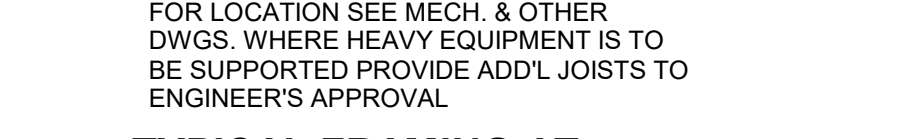
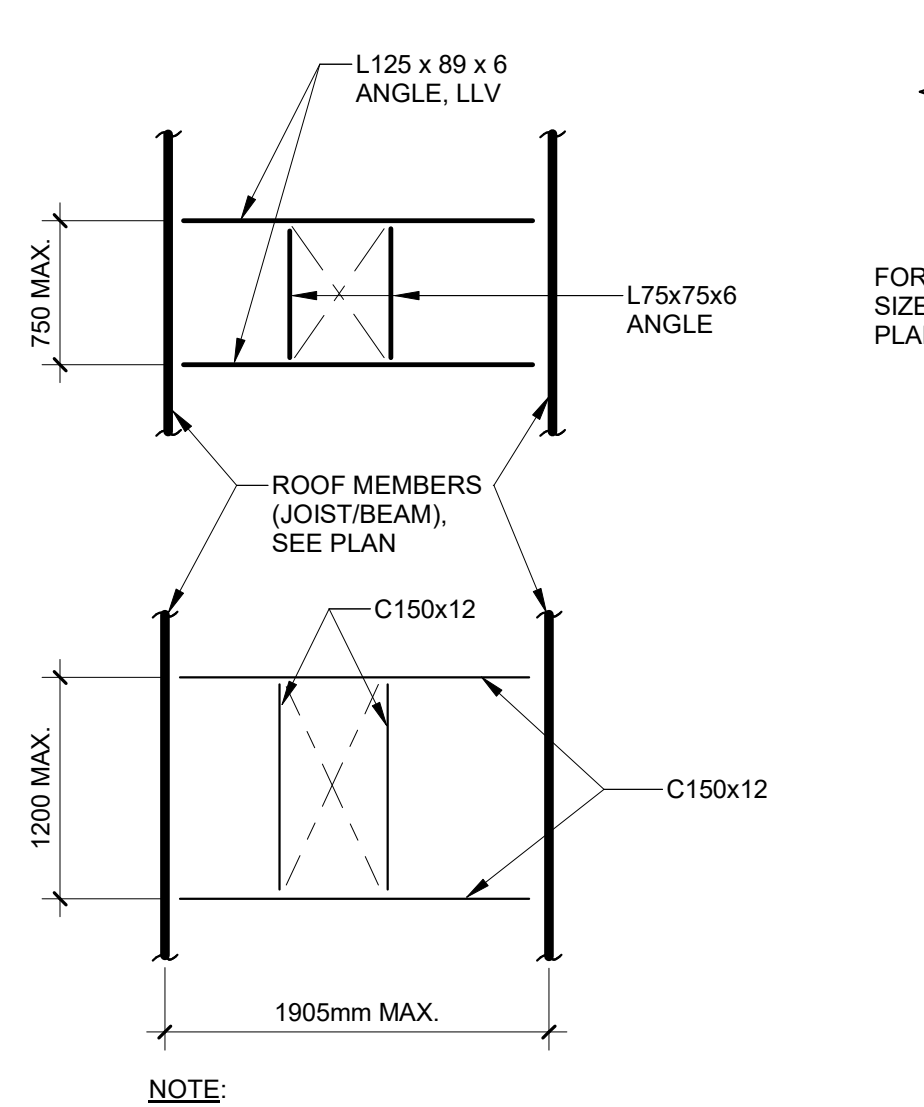
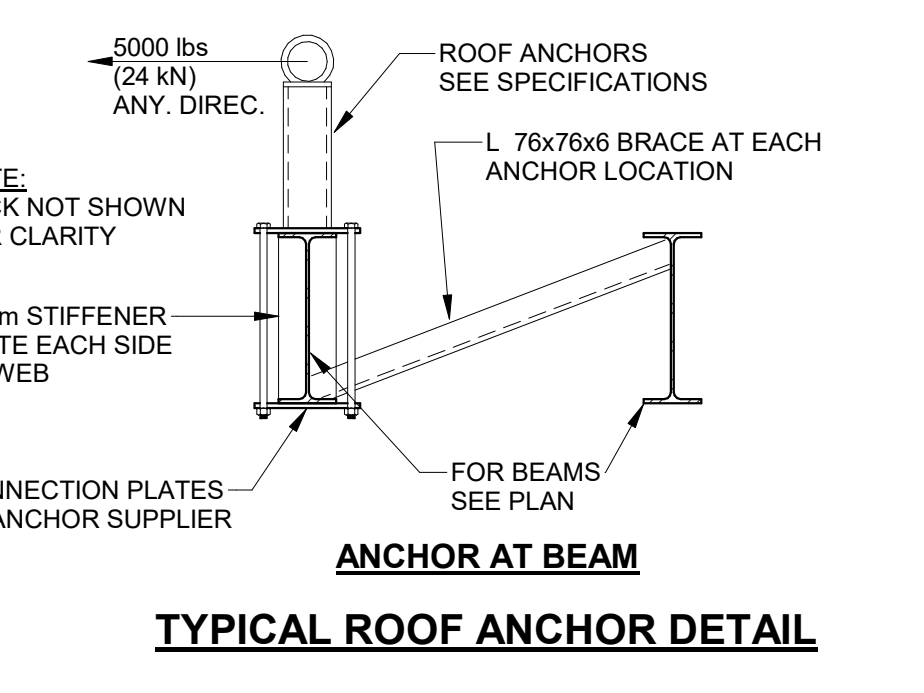
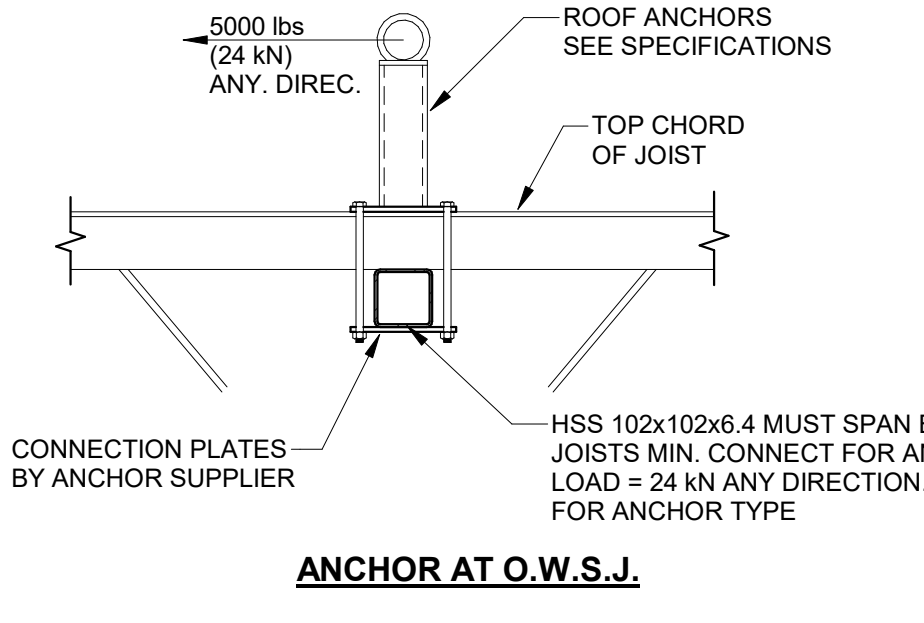
- 1. BMR STRUCTURAL ENGINEERING PROVIDES FIELD REVIEW ONLY FOR THE WORK SHOWN ON THESE STRUCTURAL DRAWINGS. THIS REVIEW IS NOT A "FULL TIME" REVIEW BUT IS CONDUCTED WITH SUCH FREQUENCY AS BMR DEEMES APPROPRIATE TO OBSERVE VARIOUS STAGES OF THE WORK AND TO ASCERTAIN THAT THE WORK IS IN GENERAL CONFORMANCE WITH THE PLANS AND SUPPORTING DOCUMENTS PREPARED BY BMR. FIELD REVIEW BY BMR IS NOT CONSIDERED TO BE THE CONTRACTOR'S BENEFIT. NOR DOES IT MAKE BMR GUARANTORS OF THE CONTRACTOR'S WORK. IT REMAINS THE CONTRACTOR'S RESPONSIBILITY TO BUILD THE WORK IN CONFORMANCE WITH THE CONTRACT DOCUMENTS. BMR SHALL NOT BE RESPONSIBLE FOR THE ACTS OR OMISSIONS OF THE CONTRACTOR, SUB-CONTRACTOR, OR ANY OTHER PERSONS PERFORMING ANY OF THE WORK OR FOR THE FAILURE OF ANY OF THEM TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
2. THE WORK TO BE REVIEWED SHALL BE GENERALLY COMPLETE.
3. PROVIDE 24 HOURS ADVANCE NOTICE OF EACH REQUIRED FIELD REVIEW. FIELD REVIEWS SHALL BE SCHEDULED TO BE CARRIED OUT DURING NORMAL BUSINESS HOURS UNLESS SPECIAL ARRANGEMENTS ARE MADE WITH BMR STRUCTURAL ENGINEERING.
4. BMR WILL REVIEW SHOP DRAWINGS PERTAINING TO WORK SHOWN ON BMR'S DRAWINGS ONLY. THE EXTENT OF THIS REVIEW IS AT THE SOLE DISCRETION OF BMR STRUCTURAL ENGINEERING AND IS FOR THE SOLE PURPOSE OF ACCERTAINING GENERAL CONFORMANCE WITH THE STRUCTURAL DESIGN CONCEPT. THE REVIEW IS NOT AN APPROVAL OF THE DESIGN, DETAILS, AND DIMENSIONS WHEREIN IN THE SHOP DRAWINGS. RESPONSIBILITY FOR WHICH SHALL REMAIN WITH THE CONTRACTOR OR SUB-CONTRACTOR SUBMITTING THEM. SUCH REVIEW SHALL NOT RELIEVE THE CONTRACTOR OR SUB-CONTRACTOR OF HIS OR HER RESPONSIBILITY FOR ERRORS AND OMISSIONS IN THE SHOP DRAWINGS OR FOR MEETING ALL REQUIREMENTS OF THE CONTRACT DOCUMENTS.

Table with 4 columns: NO., REVISION, DATE, and DATE. It lists revision dates from 2022.01.26 to 2023.03.24.

PROJECT NAME: SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT

PROJECT NO.: 2111
DRAWN BY: P.A.
CHECKED BY: S.U.
SCALE: 1:100

TYPICAL NOTES



ANCHOR BOLT SCHEDULE CAST IN PLACE HEX HEAD (HH)

DIA.	A		B	
	MIN.	MAX.	MIN.	MAX.
1/2"	19mm	600mm	100mm	
3/4"	24mm	700mm	100mm	
1"	28mm	810mm	100mm	
1 1/4"	32mm	1000mm	150mm	
1 1/2"	39mm	1000mm	150mm	

NOTE: ANCHOR BOLTS SHALL BE CSA G40.21 GRADE 300W (FY=300 MPa) COMPLETE W/ 2 STANDARD WASHERS AND DOUBLE NUTS UN (PROVIDE HEAVY HEX NUTS AND WASHERS FOR 2" DIA. BOLTS). DEFORM THREAD UNDER BOTTOM NUT

* = 2" (50mm) UNLESS NOTED
 * = 4" (100mm) FOR 1 1/4" & 2" DIA. ANCHORS

ANCHOR BOLT SCHEDULE POST INSTALLED (ADHESIVE)

DIA.	A		B	
	MIN.	MAX.	MIN.	MAX.
5/8"	9"	3'		
3/4"	12"	4'		
1"	16"	4'		
1 1/4"	25mm	400mm	100mm	

NOTE: ANCHOR BOLTS SHALL BE A307 THREADED RODS (FINISH AS NOTED) W/ HLT HY-200 OR APPROVED EQUIVALENT ADHESIVE.

NON-LOAD BEARING CONCRETE BLOCK WALLS - INTERIOR (PARTITION)

USE THIS TABLE IF SEISMIC HAZARD INDEX (InfPaS_{0.2}) ≤ 0.35
 ALL WALLS TO HAVE LATERAL SUPPORT AT TOP - BLOCK TYPE SHALL BE H15/S1M AND MORTAR TYPE S

THICKNESS	WALL WITH VERTICAL REINFORCING		UNREINFORCED WALL**	
	VERTICAL REINF.*	SERVICE LATERAL LOAD 10 psf (0.5 kPa)	SERVICE LATERAL LOAD 10 psf (0.5 kPa)	SERVICE LATERAL LOAD 10 psf (0.5 kPa)
6" (140mm)	10M @ 32" (800mm) c/c	16.5' (5.0m)	10.0' (3.0m)	
8" (190mm)	15M @ 48" (1200mm) c/c	22.5' (6.8m)	14.0' (4.2m)	
10" (240mm)	20M @ 48" (1200mm) c/c	28.5' (8.6m)	17.5' (5.3m)	
12" (290mm)	20M @ 40" (1000mm) c/c	34.5' (10.5m)	21.0' (6.4m)	

* - ADDITIONAL REINFORCING IS REQUIRED AROUND OPENINGS, AT TOP OF WALL AND AT ENDS OF WALLS - SEE DETAILS
 ** - REINFORCING IS REQUIRED AROUND OPENINGS, AT TOP OF WALL AND AT ENDS OF WALLS - SEE DETAILS

NON-LOAD BEARING CONCRETE BLOCK WALLS - INTERIOR (PARTITION)

USE THIS TABLE IF SEISMIC HAZARD INDEX (InfPaS_{0.2}) > 0.35 & ≤ 0.75
 BLOCK TYPE SHALL BE H15/S1M AND MORTAR TYPE S

THICKNESS	VERTICAL REINF.*	SERVICE LATERAL LOAD 10 psf (0.5 kPa) OR 25% OF WALL MASS	
		MAXIMUM HEIGHT	MAXIMUM HEIGHT
6" (140mm)	10M @ 32" (800mm) c/c	16.5' (5.0m)	
8" (190mm)	15M @ 48" (1200mm) c/c	22.5' (6.8m)	
10" (240mm)	20M @ 48" (1200mm) c/c	28.5' (8.6m)	
12" (290mm)	20M @ 40" (1000mm) c/c	34.5' (10.5m)	

* - ADDITIONAL REINFORCING IS REQUIRED AROUND OPENINGS, AT TOP OF WALL AND AT ENDS OF WALLS - SEE DETAILS

NON-LOAD BEARING CONCRETE BLOCK WALLS - EXTERIOR

ALL WALLS TO HAVE LATERAL SUPPORT AT TOP - BLOCK TYPE SHALL BE H15/S1M AND MORTAR TYPE S

THICKNESS	VERTICAL REINF.*	SERVICE WIND LD.	SERVICE WIND LD.	SERVICE WIND LD.
		20 psf (1.0 kPa)	25 psf (1.25 kPa)	30 psf (1.5 kPa)
6" (140mm)	10M @ 32" (800mm) c/c	12.5' (3.8m)	11.2' (3.4m)	10.0' (3.0m)
8" (190mm)	15M @ 48" (1200mm) c/c	16.7' (5.1m)	15.0' (4.5m)	13.5' (4.1m)
10" (240mm)	20M @ 48" (1200mm) c/c	23.0' (7.0m)	20.0' (6.2m)	18.5' (5.6m)
12" (290mm)	20M @ 40" (1000mm) c/c	28.0' (8.5m)	25.0' (7.6m)	23.0' (7.0m)

NON-LOAD BEARING CONCRETE BLOCK WALLS - EXTERIOR (CONT'D)

ALL WALLS TO HAVE LATERAL SUPPORT AT TOP - BLOCK TYPE SHALL BE H15/S1M AND MORTAR TYPE S

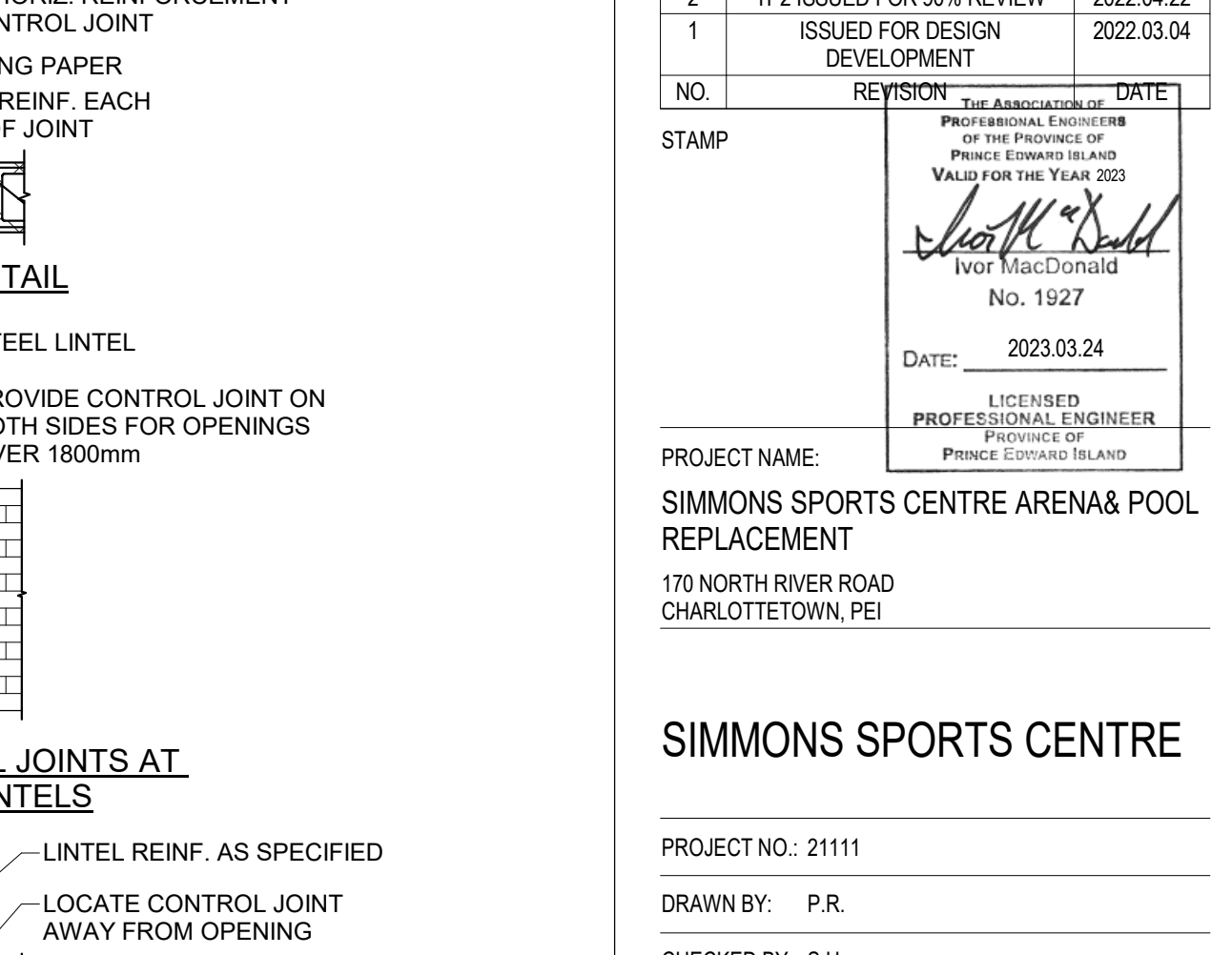
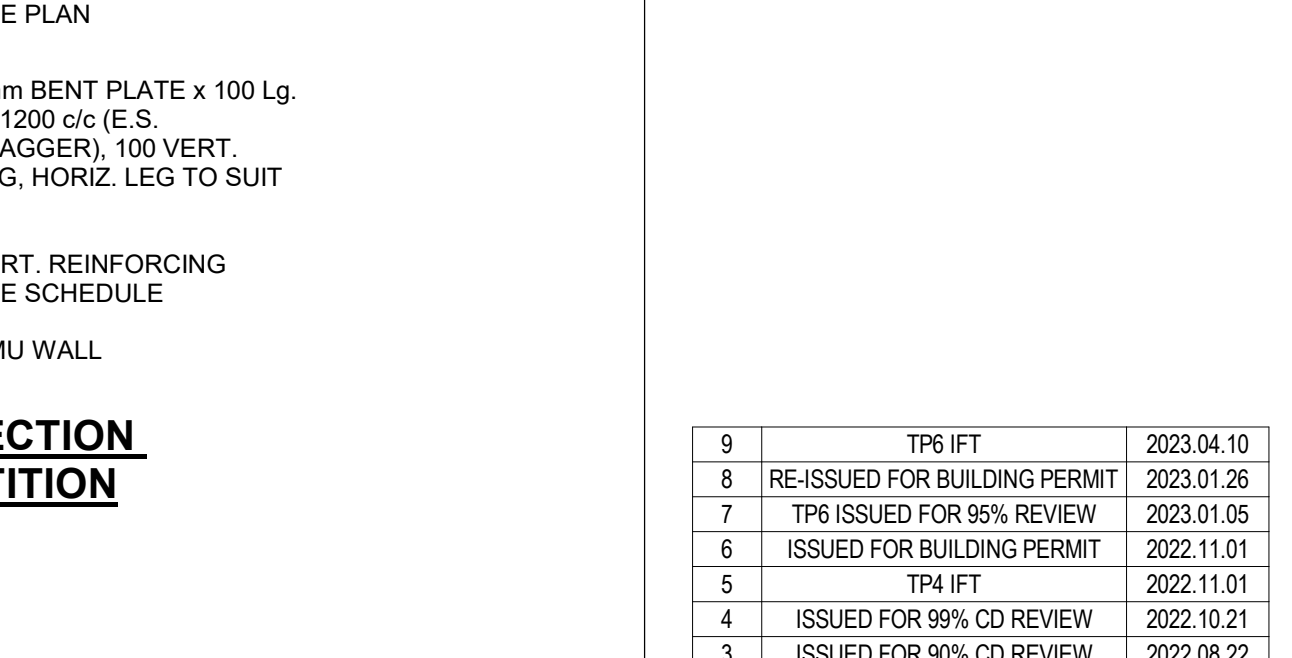
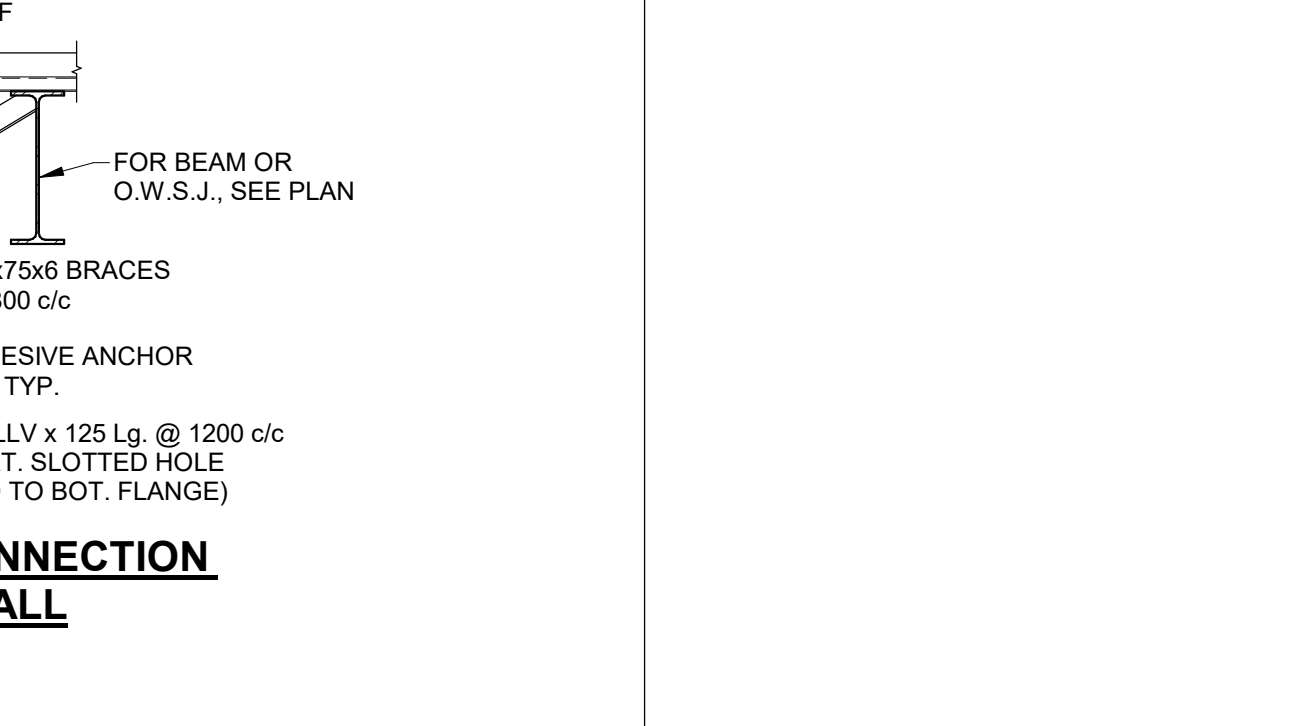
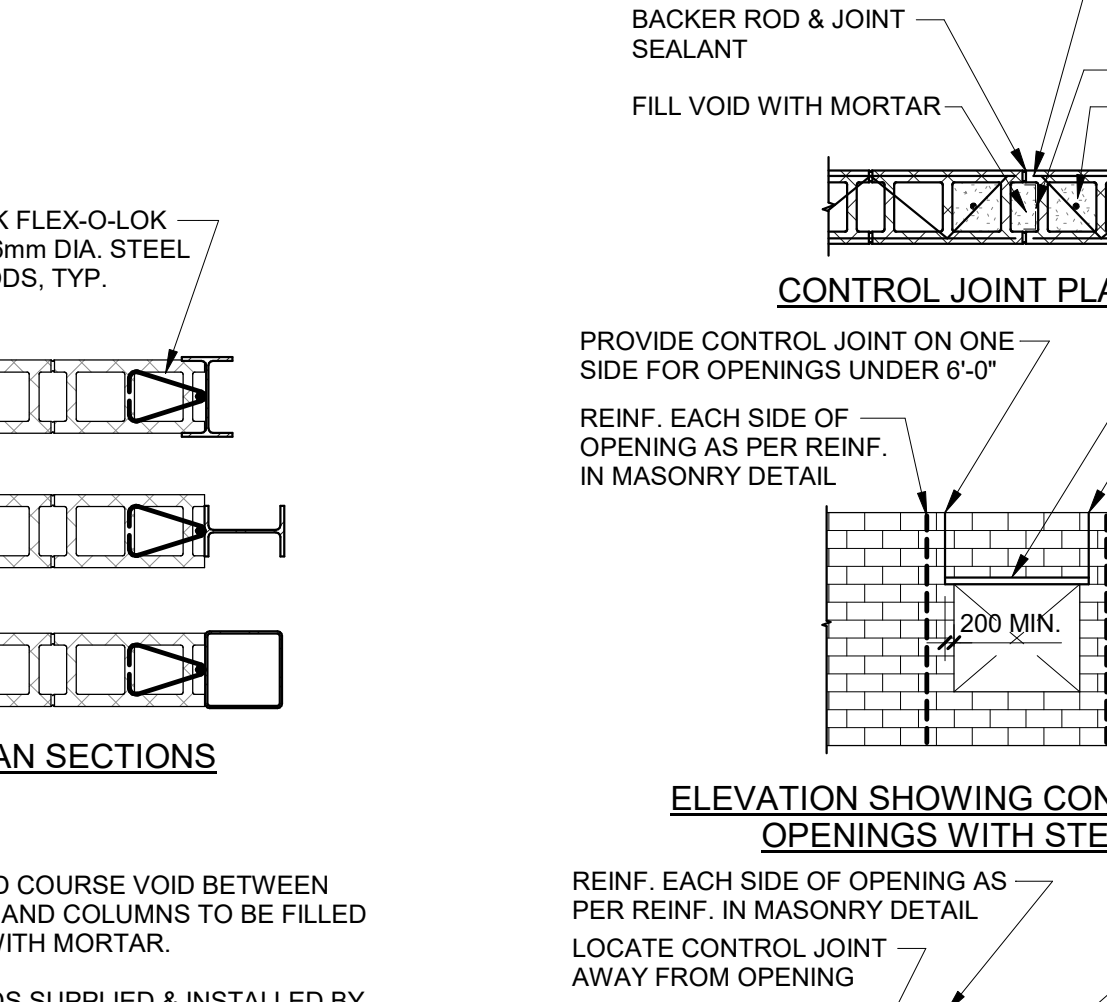
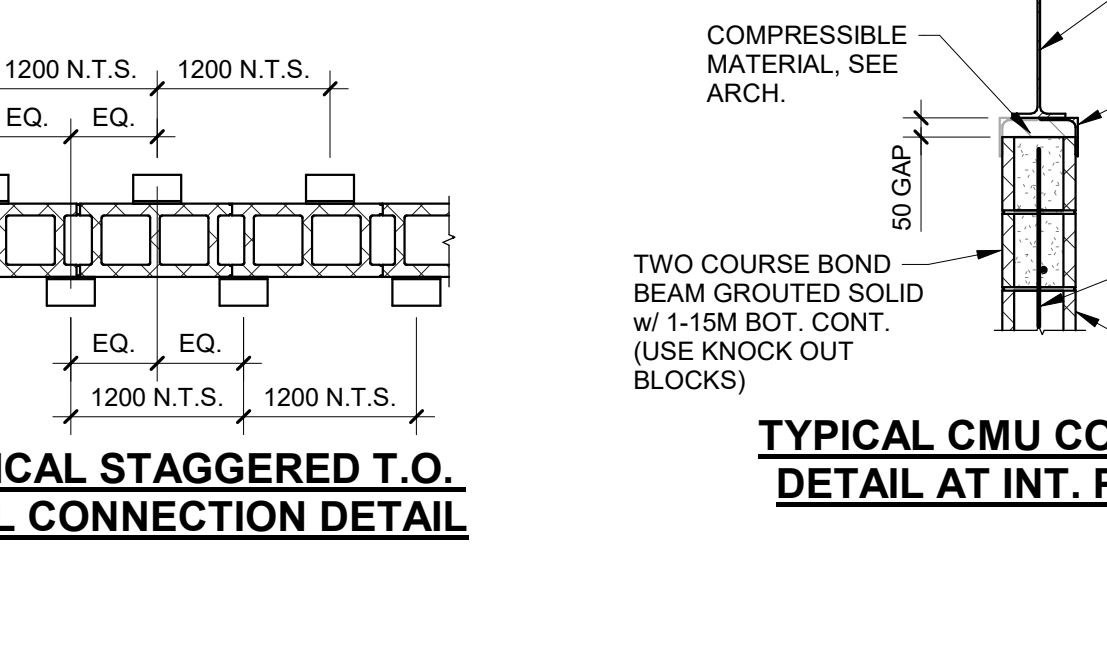
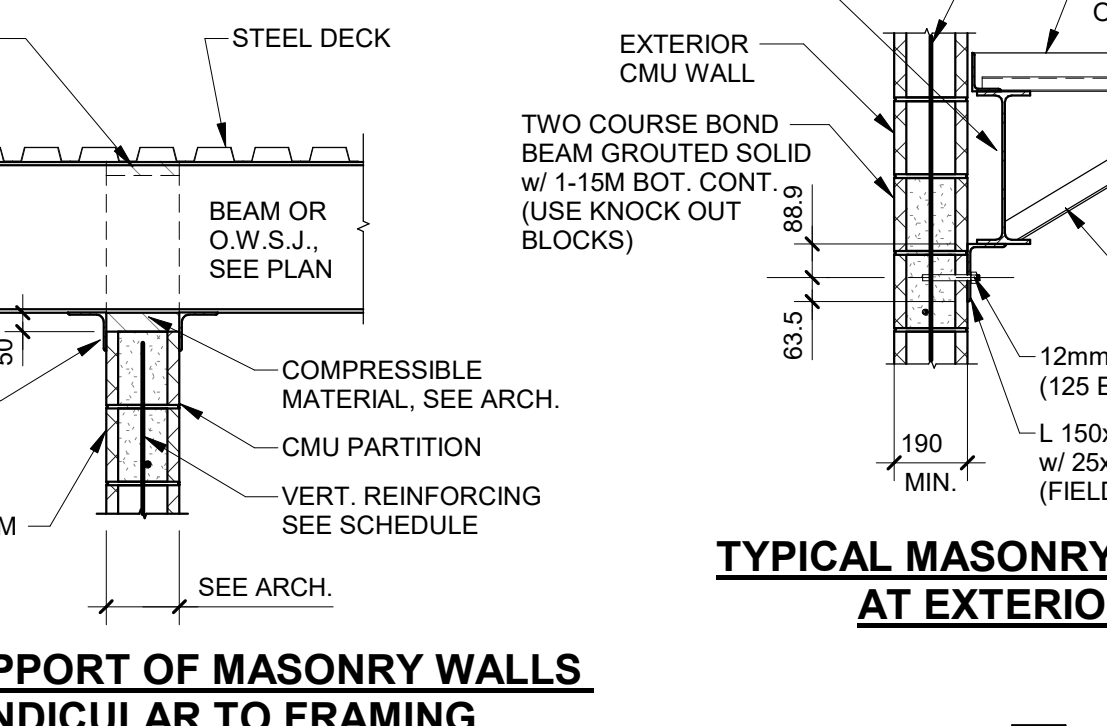
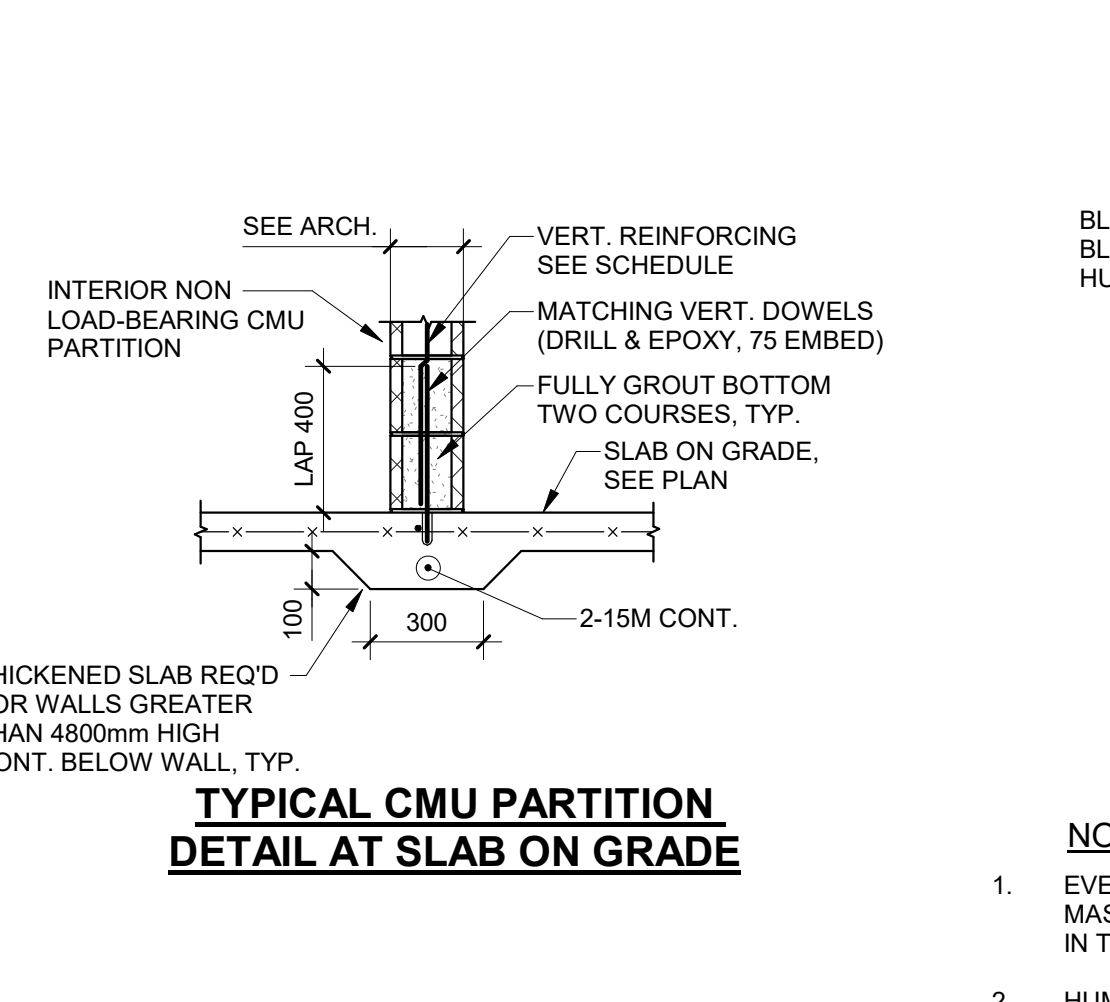
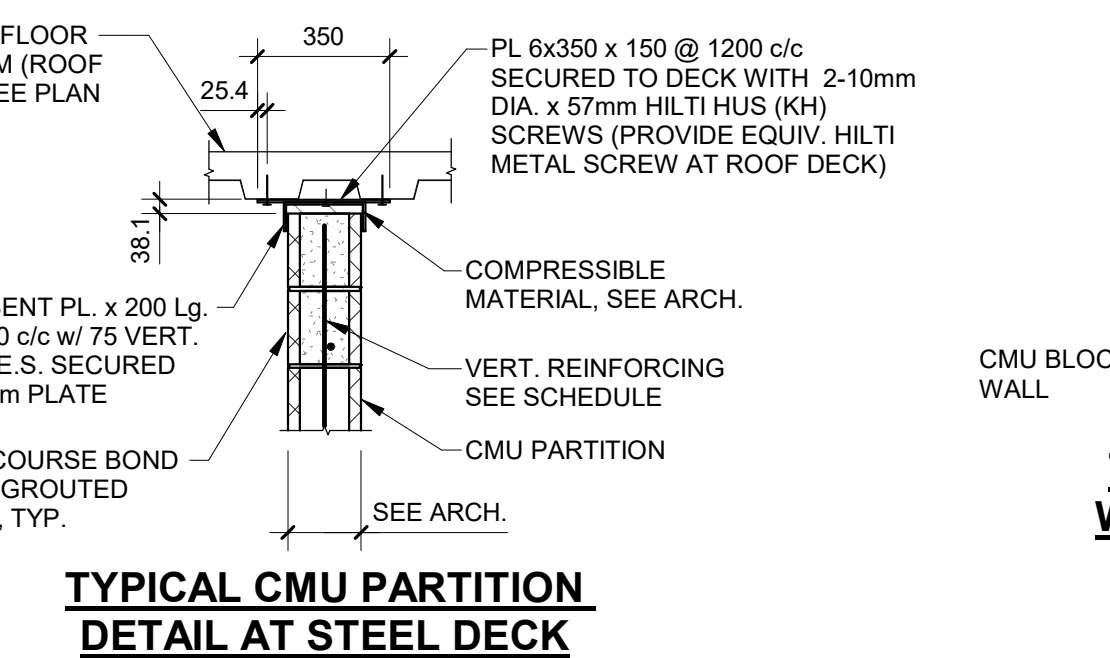
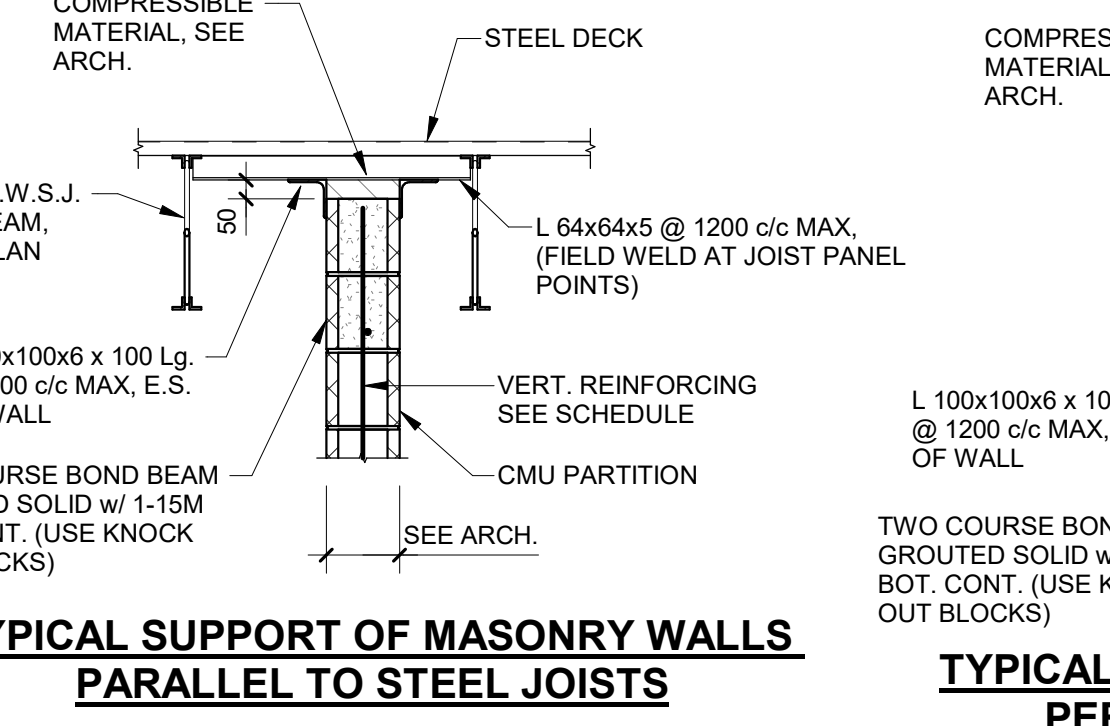
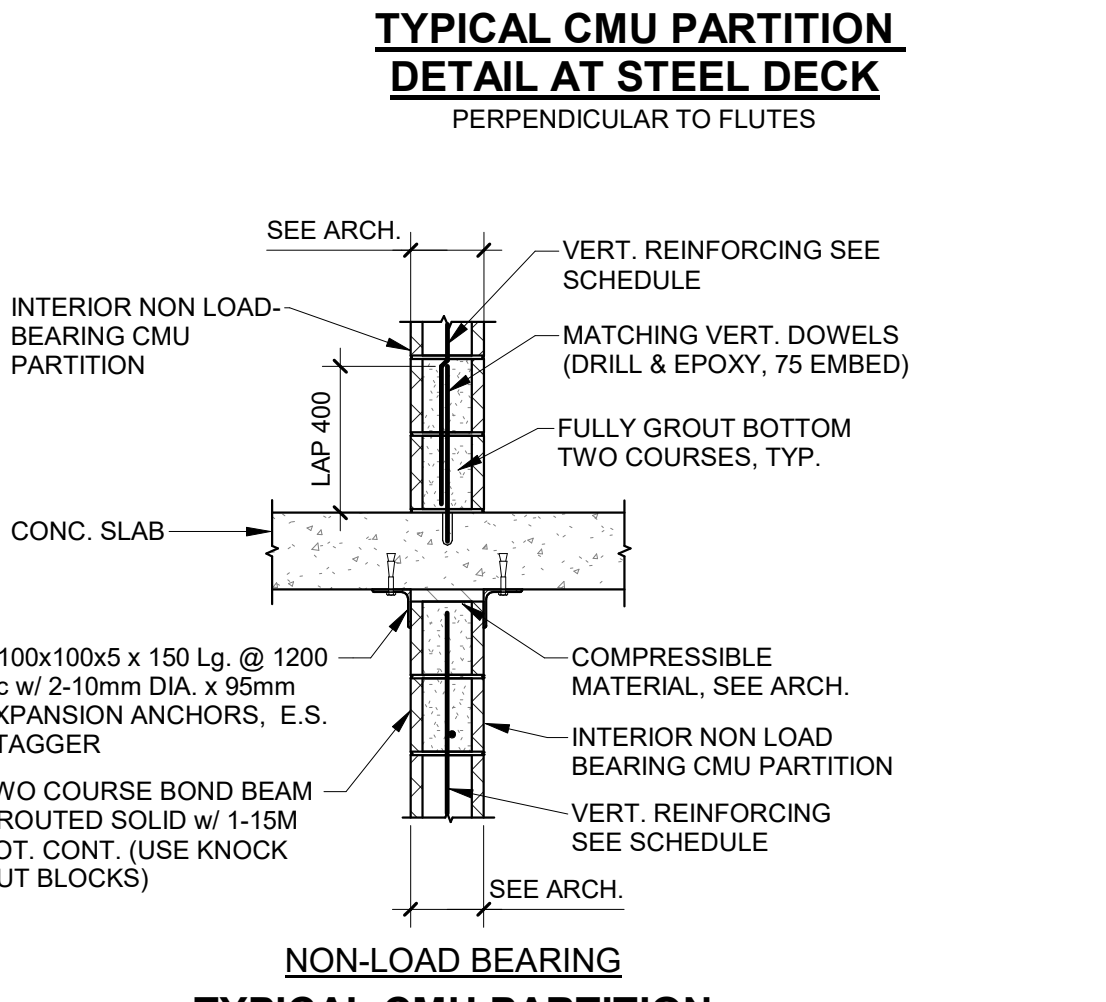
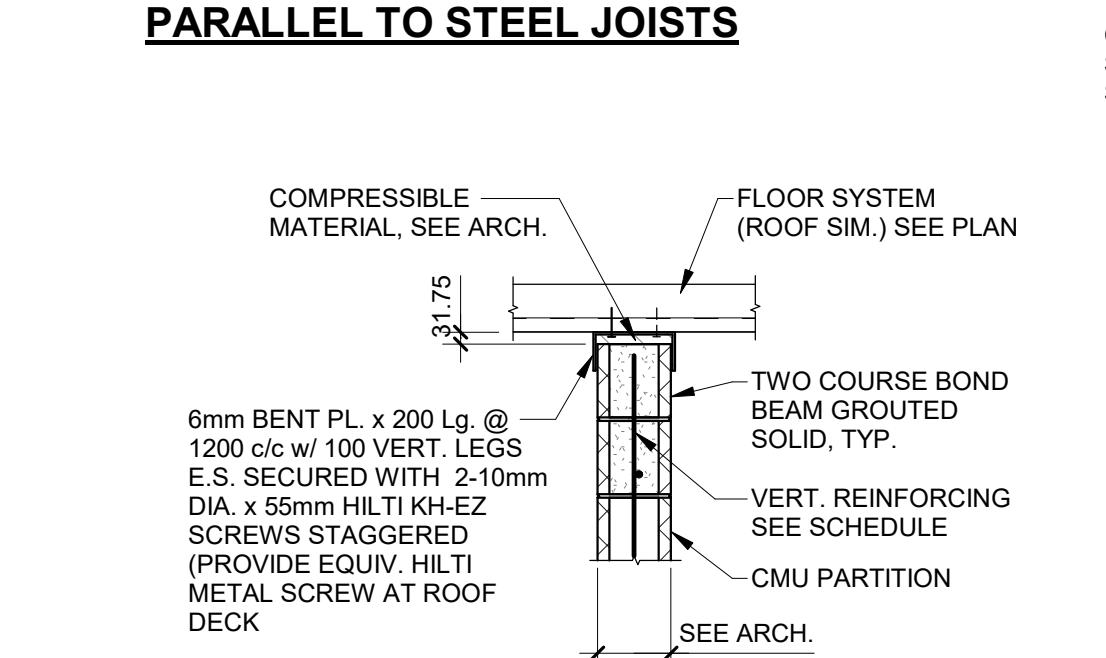
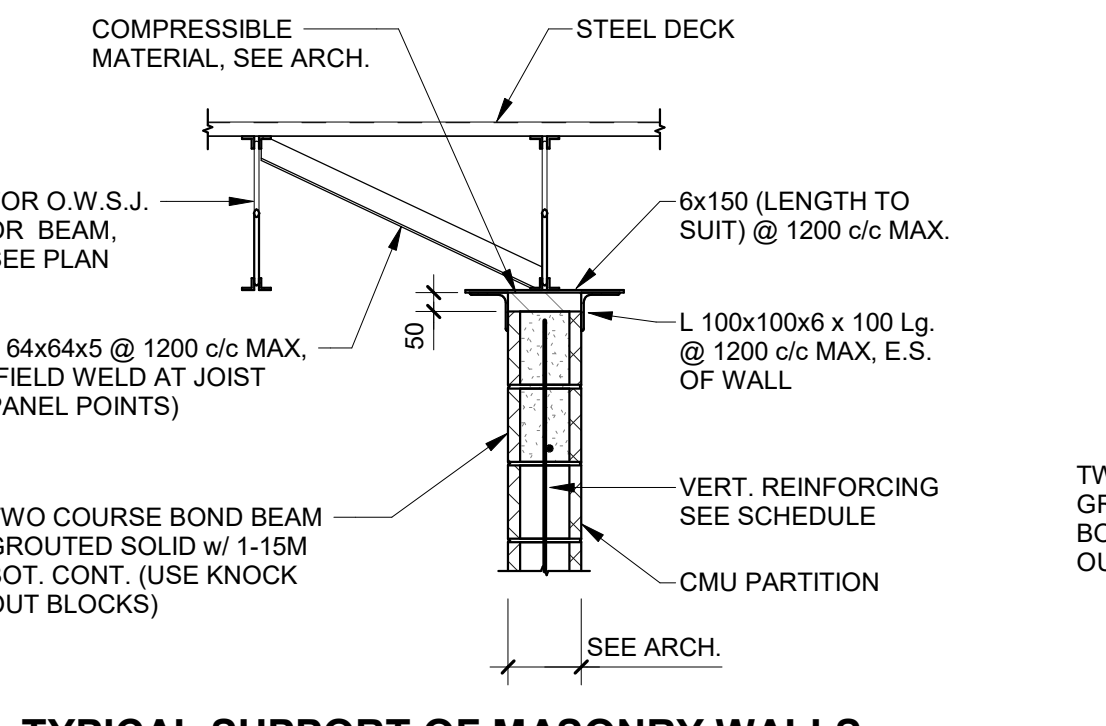
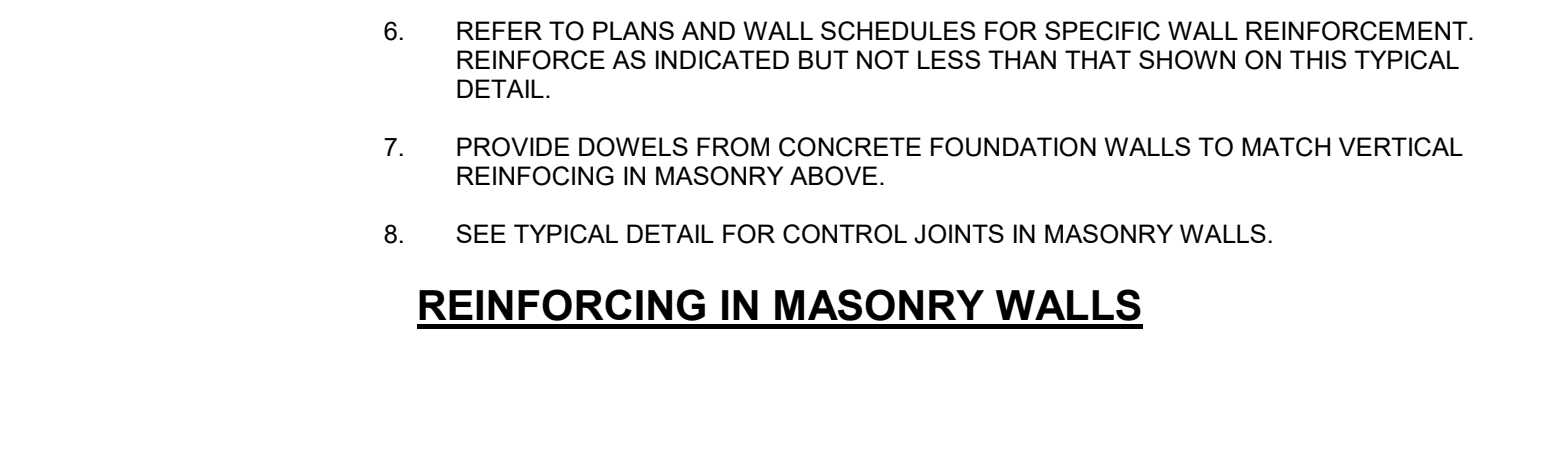
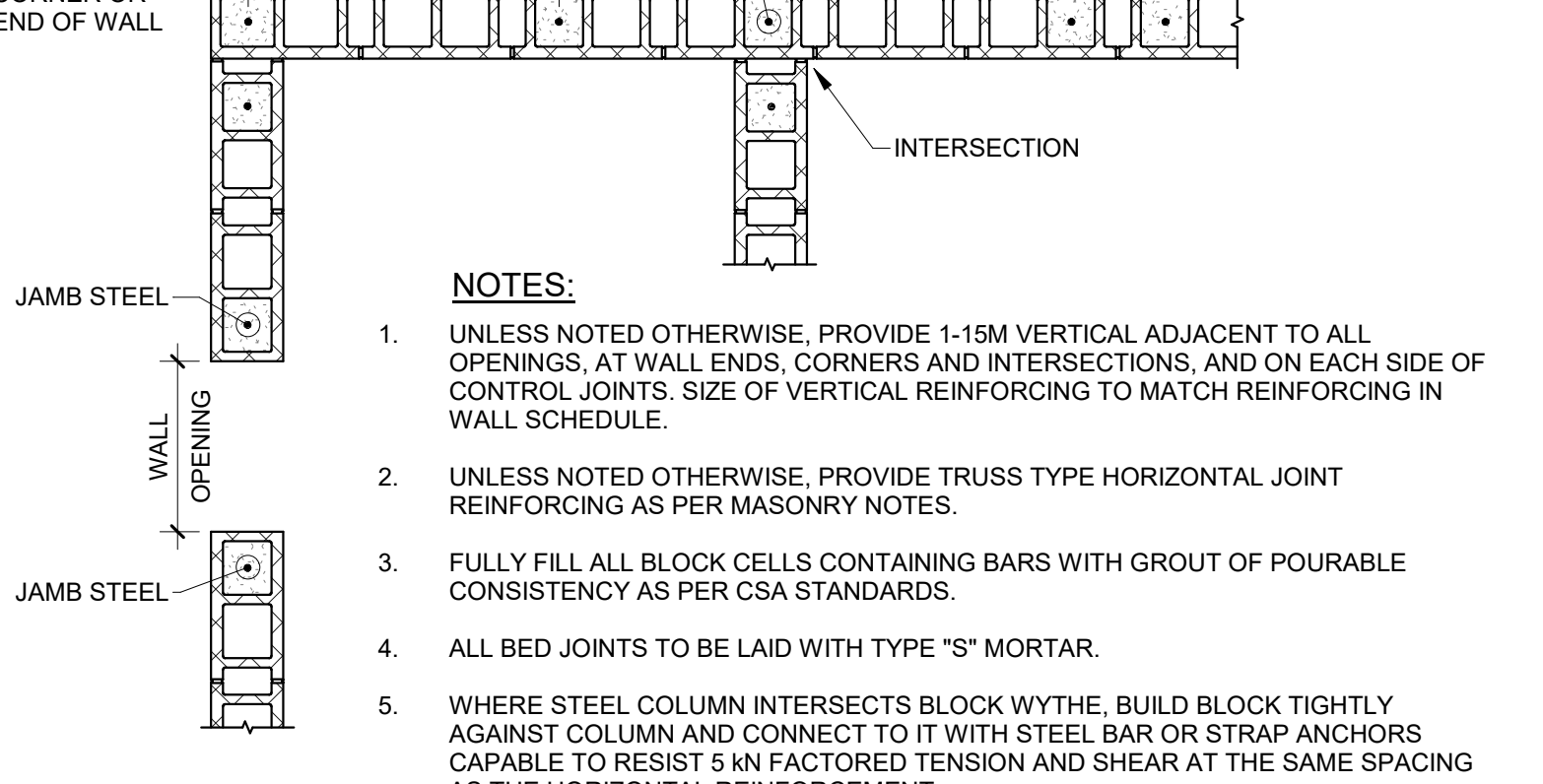
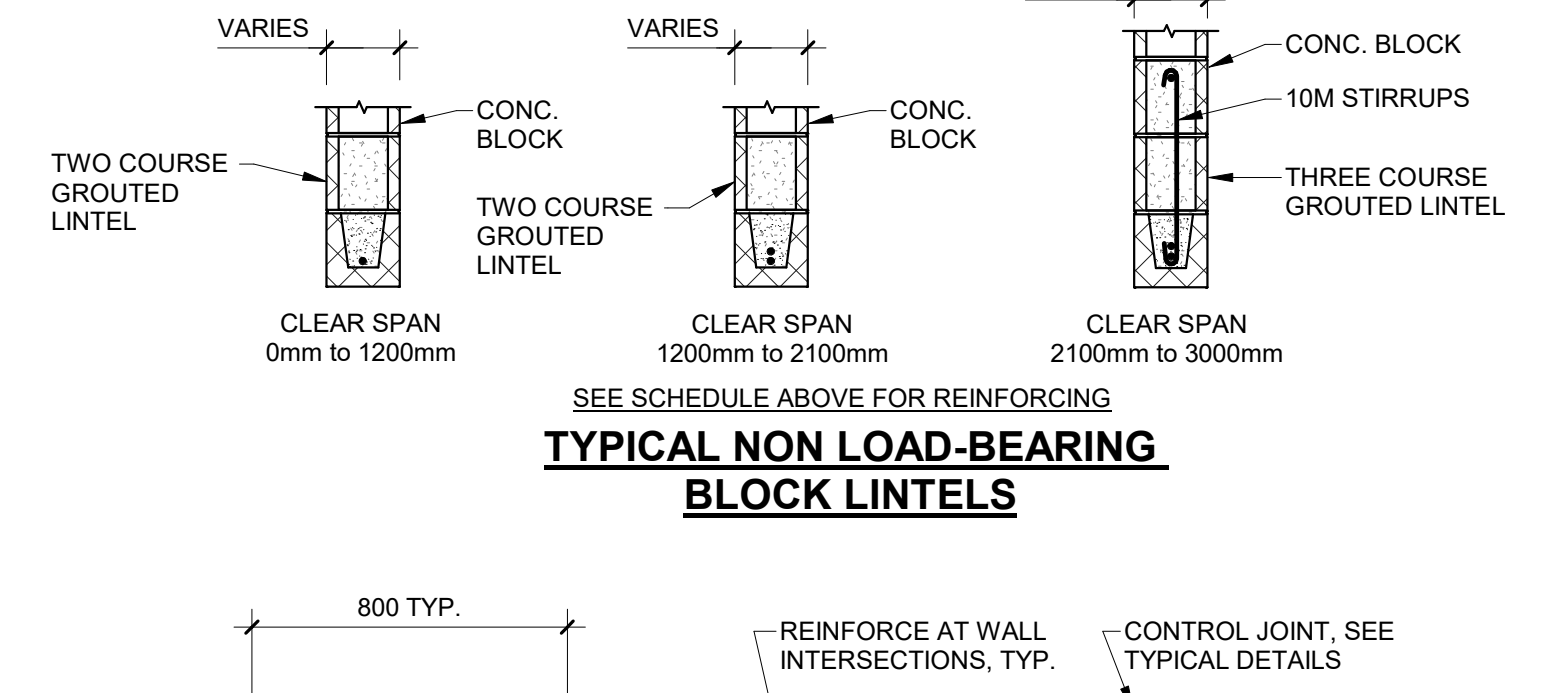
THICKNESS	VERTICAL REINF.*	SERVICE WIND LD.	SERVICE WIND LD.	SERVICE WIND LD.
		35 psf (1.75 kPa)	40 psf (2.0 kPa)	50 psf (2.5 kPa)
6" (140mm)	10M @ 32" (800mm) c/c	9.5' (2.9m)	9.0' (2.7m)	8.0' (2.4m)
8" (190mm)	15M @ 48" (1200mm) c/c	13.0' (4.0m)	12.2' (3.7m)	11.0' (3.3m)
10" (240mm)	20M @ 48" (1200mm) c/c	18.0' (5.5m)	16.0' (4.9m)	15.0' (4.5m)
12" (290mm)	20M @ 40" (1000mm) c/c	22.0' (6.7m)	20.5' (6.2m)	18.5' (5.6m)

* - ADDITIONAL REINFORCING IS REQUIRED AROUND OPENINGS, AT TOP OF WALL AND AT ENDS OF WALLS - SEE DETAILS

MASONRY LINTEL SCHEDULE FOR NON-LOAD BEARING MASONRY

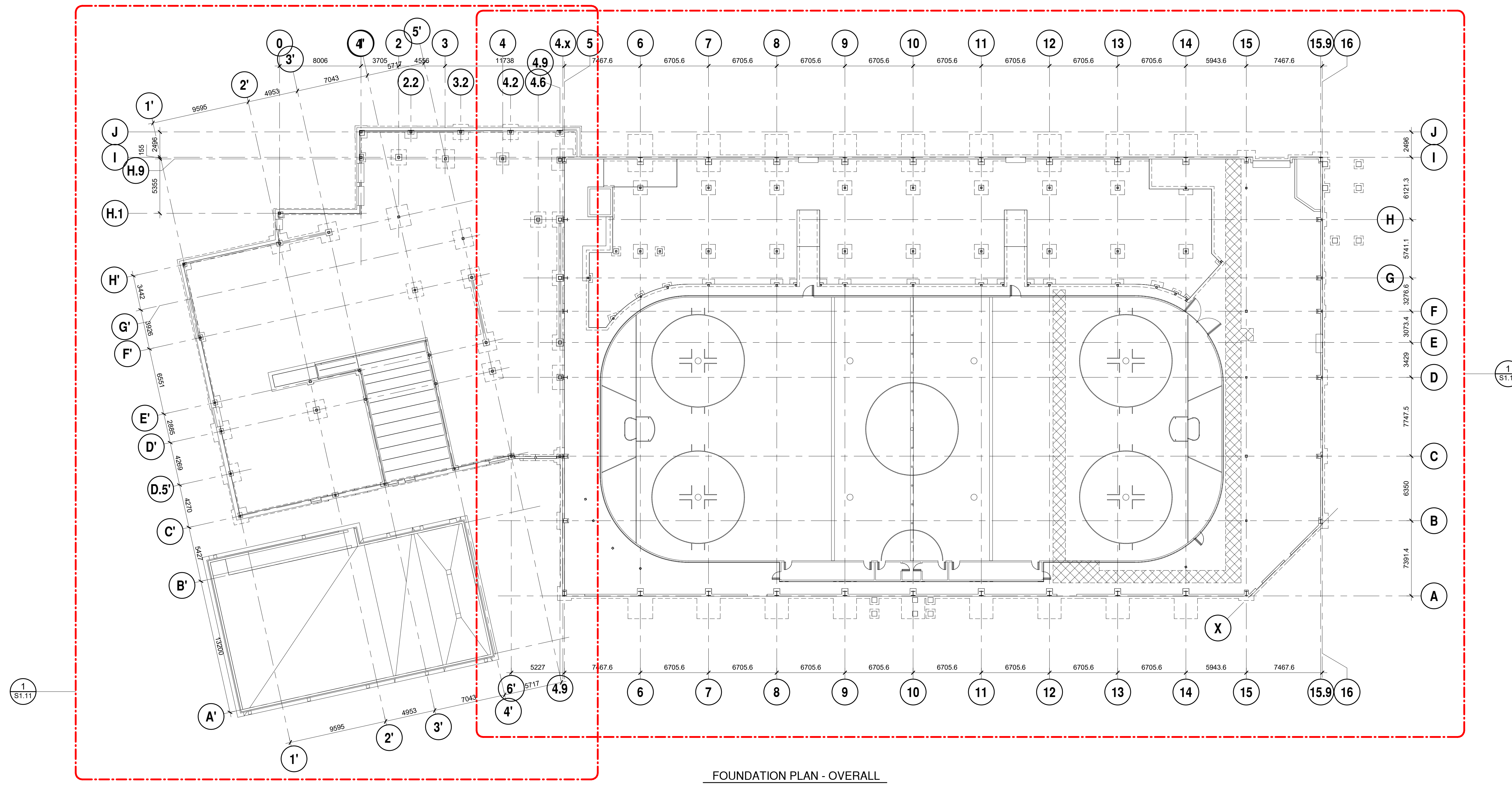
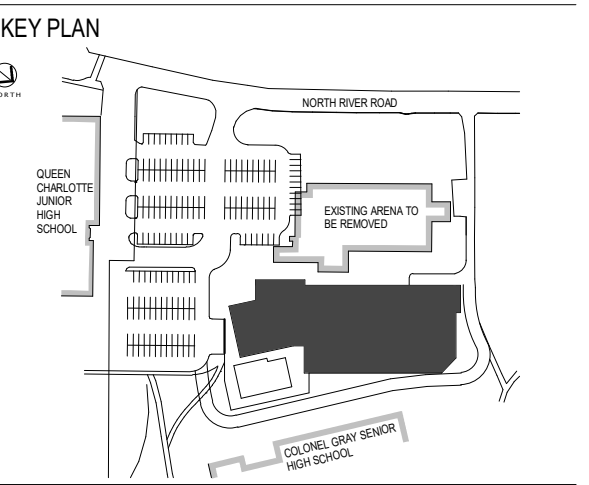
WALL TYPE	SPAN			SEE DETAIL ON DWGS.
	0m to 1.2m	1.2m to 2.1m	2.1m to 3.0m	
90 to 100 VENEER	L 90x90x8 GALV.	L 90x90x8 GALV.	L 125x90x10 LVL GALV.	
140 BLOCK	400 DEEP 1-15M BOTTOM	400 DEEP 1-15M BOTTOM	600 DEEP 1-15M TOP & BOTTOM 10M TIES @ 200 c/c	
190 BLOCK	400 DEEP 1-15M BOTTOM	400 DEEP 1-20M BOTTOM	600 DEEP 1-20M TOP & BOTTOM 10M TIES @ 200 c/c	
240 BLOCK	400 DEEP 1-20M BOTTOM	400 DEEP 2-15M BOTTOM	600 DEEP 2-15M TOP & BOTTOM 10M TIES @ 200 c/c	
290 BLOCK	400 DEEP 1-20M BOTTOM	400 DEEP 2-15M BOTTOM	600 DEEP 2-15M TOP & BOTTOM 10M TIES @ 200 c/c	

- NOTES:
 1. BLOCK TYPE SHALL BE H15/S1M
 2. MORTAR SHALL BE TYPE S
 3. LINTEL GROUT SHALL BE 3,000 psi (20 MPa)
 4. STEEL ANGLE LINTELS SHALL HAVE 150mm BEARING EACH END
 5. MASONRY LINTELS SHALL HAVE 20mm BEARING EACH END
 6. USE KNOCK OUT WEB BLOCK FOR LINTELS TO ACCOMMODATE HORIZONTAL AND VERTICAL REINFORCING



NO.	REVISION	DATE
1	ISSUED FOR BUILDING PERMIT	2021.04.10
2	ISSUED FOR 90% REVIEW	2021.05.26
3	ISSUED FOR 90% REVIEW	2021.05.26
4	ISSUED FOR 90% REVIEW	2021.05.26
5	ISSUED FOR 90% REVIEW	2021.11.01
6	ISSUED FOR 90% REVIEW	2022.01.21
7	ISSUED FOR 90% REVIEW	2022.08.22
8	ISSUED FOR 90% REVIEW	2022.04.22
9	ISSUED FOR DESIGN DEVELOPMENT	2022.03.04

PROJECT NAME: SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 120 NORTH BOWER ROAD CHARLOTTETOWN, PE
 DRAWN BY: P.A.
 CHECKED BY: S.U.
 SCALE: 1:20



FOUNDATION PLAN - OVERALL
1:200

NO.	REVISION	DATE
9	TP6 IFT	2022.04.10
8	RE-ISSUED FOR BUILDING PERMIT	2022.01.26
7	TP4 REVISIONS	2022.01.09
6	ISSUED FOR BUILDING PERMIT	2022.11.01
5	TP4 IFT	2022.11.01
4	ISSUED FOR 99% CD REVIEW	2022.10.21
3	ISSUED FOR 90% CD REVIEW	2022.08.22
2	TP2 ISSUED FOR 90% REVIEW	2022.04.22
1	ISSUED FOR DESIGN DEVELOPMENT	2022.03.04

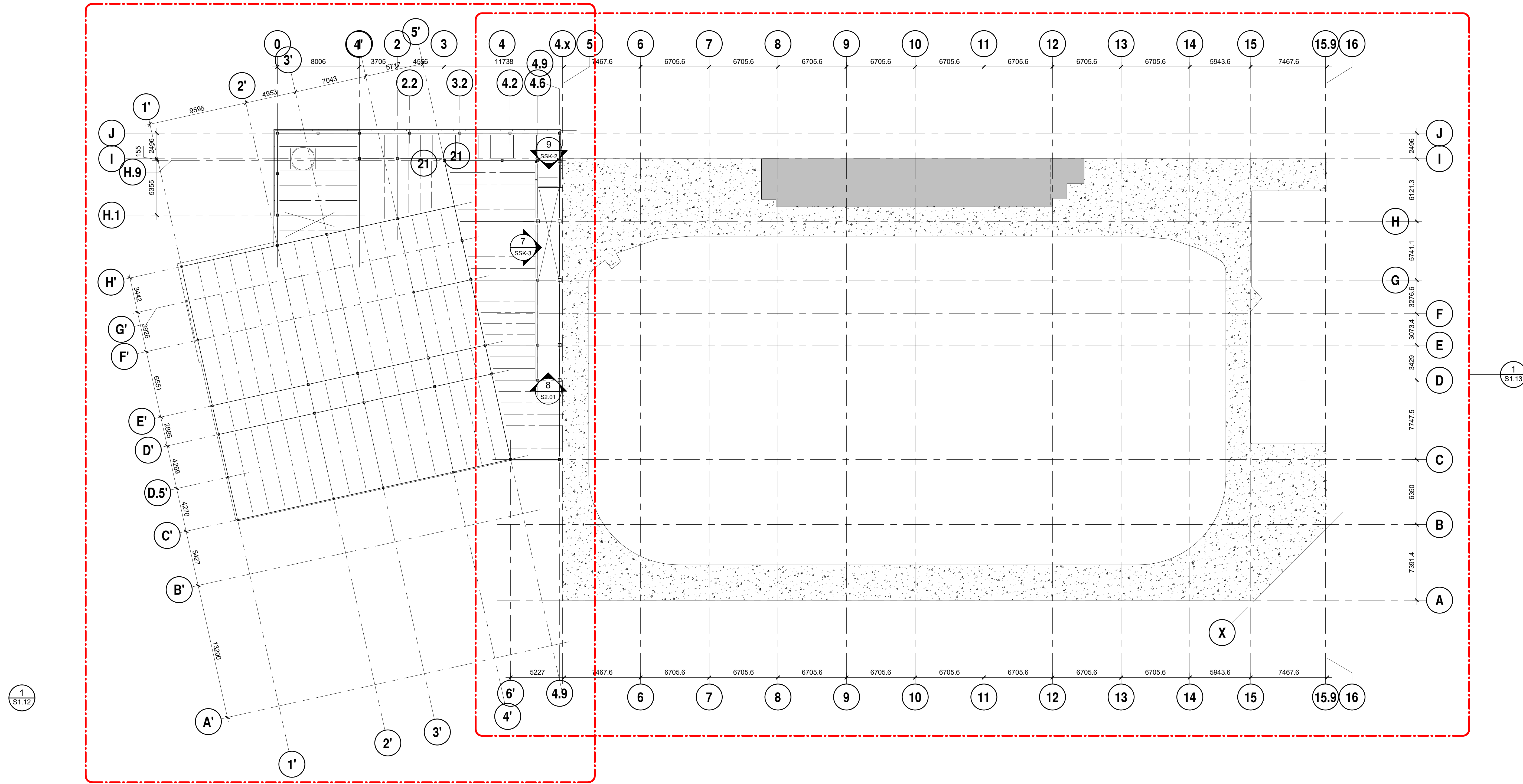
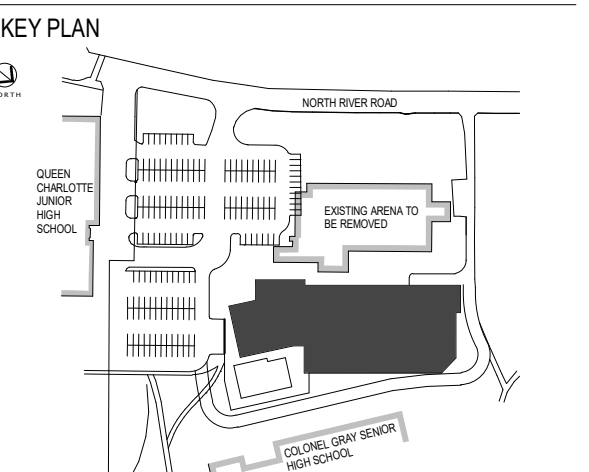
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 DATE: 2023.03.24
 PROFESSIONAL ENGINEER
 PROVINCE OF PELOTON

PROJECT NAME:
 SIMMONS SPORTS CENTRE ARENA & POOL
 REPLACEMENT
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

SIMMONS SPORTS CENTRE
 PROJECT NO.: 21111
 DRAWN BY: P.R.
 CHECKED BY: S.U.
 SCALE: 1:200

OVERALL FOUNDATION
 PLAN



LOW ROOF / SECOND FLOOR PLAN
1:200

NO.	REVISION	DATE
1	TP6 IFT	2023.04.10

STAMP

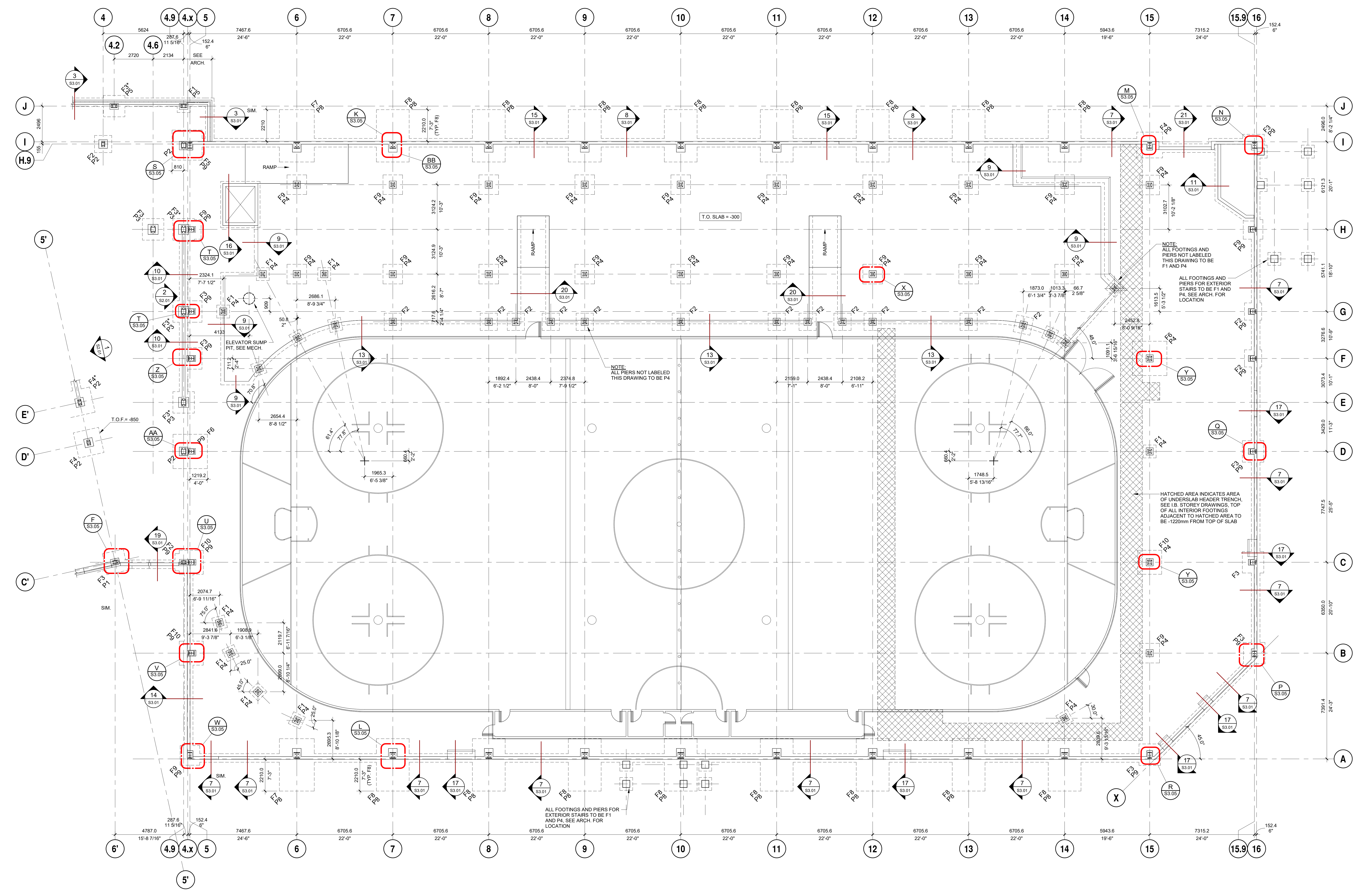
Scott Smith
Professional Engineer
No. 1927
Date: 2023.03.24
PROFESSIONAL ENGINEER
PROV. OF PE, PEI

PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL
REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

SIMMONS SPORTS CENTRE

PROJECT NO.: 21111
DRAWN BY: P.R.
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SCALE: 1:200

OVERALL LOW ROOF /
SECOND FLOOR



1 FOUNDATION PLAN - ARENA
 S1.01 1-100

FOOTING SCHEDULE - 175 kPa BEARING		
MARK	SIZE	REINFORCING
F1	900 x 900 x 300 Tpk.	4-19M E.W.B.
F2	1200 x 1200 x 300 Tpk.	6-19M E.W.B.
F3	1500 x 1500 x 300 Tpk.	6-19M E.W.B.
F3*	1500 x 1500 x 350 Tpk.	6-19M E.W.T.A.B.
F4	1800 x 1800 x 400 Tpk.	7-20M E.W.B.
F4*	1800 x 1800 x 450 Tpk.	7-20M E.W.T.A.B.
F5	2100 x 2100 x 450 Tpk.	8-20M E.W.B.
F6	2400 x 2400 x 500 Tpk.	9-20M E.W.B.
F7	2400 x 3600 x 762 Tpk.	10-30M L.W.B., 13-20M S.W.B.
F8	2250 x 3600 x 762 Tpk.	9-20M L.W.B., 13-20M S.W.B.
F9	1375 x 1375 x 350 Tpk.	5-19M E.W.B.
F10	1875 x 1875 x 400 Tpk.	6-20M E.W.B.

PILASTER SCHEDULE		
MARK	SIZE	REINF. TIES
P1	600 x 400	8-20M VERT. 15M TIES @ 300 c/c
P2	600 x 600	8-20M VERT. 15M TIES @ 300 c/c
P3	750 x 700	12-20M VERT. 15M TIES @ 300 c/c
P4	500 x 500	8-20M VERT. 15M TIES @ 300 c/c
P5	600 x 500	8-20M VERT. 15M TIES @ 300 c/c
P6	610 x 762	10-30M VERT. & 4-25M ADD. 15M TIES @ 300 c/c
P9	610 x 406	8-20M VERT. 15M TIES @ 300 c/c

NOTE:
 ALL PLASTERS TO HAVE DOUBLE TOP THE UNLESS NOTED

- NOTES:**
- ELEVATION TOP OF INTERIOR SLAB ON GRADE TO BE 0mm H.P. w/ ARCH. COORD. w/ ARCHITECTURAL DRAWINGS.
 - C.J. DENOTES CONTROL JOINT UNLITED ON DRAWINGS. CONTROL JOINTS TO BE SPACED NO MORE THAN 30 TIMES SLAB THICKNESS.
 - ELEVATION TOP OF ALL INTERIOR FOOTINGS OR PILASTERS TO BE 20mm BELOW TOP OF SLAB ON GRADE UNLITED.
 - ELEVATION TOP OF ALL INTERIOR PLASTERS TO BE 20mm BELOW TOP OF SLAB ON GRADE GRIDS 9 TO 16.
 - REFER TO TYPICAL DETAILS DRAWING S0.01 AND S0.02 FOR MORE INFORMATION.
 - WHERE FOOTINGS ARE TO BE LOWERED DUE TO UNDERGROUND PLUMBING ETC. PROVIDE P4 PILASTER AS REQUIRED. CONTRACTOR TO COORDINATE WITH MECHANICAL DRAWINGS.
 - COORDINATE EXACT LOCATION, SLOPE AND QUANTITY OF FLOOR DRAIN WITH ARCHITECTURAL AND MECHANICAL DRAWINGS.
 - UNLESS NOTED OTHERWISE, SLAB ON GRADE TO BE 100mm THICK CONCRETE SLAB w/ 150-150 MM 18 GA. PAN. 18" W/M. REFER TYPICAL DETAILS FOR CONTROL JOINTS, CONSTRUCTION JOINTS AND OTHER DETAILS.
 - COORDINATE EXACT SIZE AND LOCATION OF HOUSEKEEPING PADS WITH MECHANICAL DRAWINGS. SEE DWG. S0.02 FOR TYPICAL DETAIL.

NO.	REVISION	DATE
9	TRF IFT	2023.04.10
8	RE-ISSUED FOR BUILDING PERMIT	2023.01.26
7	TRF REVISIONS	2023.01.09
6	ISSUED FOR BUILDING PERMIT	2022.11.01
5	TRF IFT	2022.11.01
4	ISSUED FOR 90% CD REVIEW	2022.10.21
3	ISSUED FOR 80% CD REVIEW	2022.08.22
2	TRF IFT	2022.04.22
1	ISSUED FOR DESIGN DEVELOPMENT	2022.03.04

PROJECT NAME:
 SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 10 NORTH RIVER ROAD
 CHARLOTTETOWN, PE

PROJECT NO.: 2111
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 CHECKED BY: S.U.
 SCALE: 1:100

STEEL FRAMING NOTES:

- TOP OF FINISHED FLOOR TO BE 0m. ELEVATION w/ DECK TO BE -125mm UN. COORD. w/ ARCHITECTURAL DRAWINGS.
- FLOOR DESIGN LOADS:
 LL = 4.80 kPa
 DL = 3.80 kPa
- COORDINATE ALL EDGE OF DECK DIM'S (ON ALL STRUCT. DRAWINGS) WITH ARCH. DRAWINGS.
- REFER TO TYPICAL DETAILS DRAWING S0.01 AND S0.02 FOR MORE INFORMATION.
- ANY MODIFICATIONS AFFECTING THE STRUCTURE MUST BE APPROVED IN WRITING BY THE ENGINEER.

TYPICAL FLOOR CONSTRUCTION:

87 CONCRETE TOPPING REINF. w/ 152x152 MW18/7MM/18' ON 38mm DEEP x 0.76mm THICK COMPOSITE STEEL DECK, LIGHT ZINC COATING (125mm TOTAL THICKNESS)

NOTES:

- ELEVATION TOP OF INTERIOR SLAB ON GRADE TO BE 0mm H.P. UN. COORD. w/ ARCHITECTURAL DRAWINGS.
- C.J. DENOTES CONTROL JOINT UNNOTED ON DRAWINGS. CONTROL JOINTS TO BE SPACED NO MORE THAN 30 TIMES SLAB THICKNESS.
- ELEVATION TOP OF ALL INTERIOR FOOTINGS OR PILASTERS TO BE 200mm BELOW TOP OF SLAB ON GRADE UNNOTED.
- ELEVATION TOP OF ALL INTERIOR PILASTERS TO BE 200mm BELOW TOP OF SLAB ON GRADE GRIDS 2 W/ 16.
- REFER TO TYPICAL DETAILS DRAWING S0.01 AND S0.02 FOR MORE INFORMATION.
- WHERE FOOTINGS ARE TO BE LOWERED DUE TO UNDERGROUND PLUMBING ETC., PROVIDE P4 PILASTER AS REQUIRED. CONTRACTOR TO COORDINATE WITH MECHANICAL DRAWINGS.
- COORDINATE EXACT LOCATION, SLOPE AND QUANTITY OF FLOOR DRAINS WITH ARCHITECTURAL AND MECHANICAL DRAWINGS.
- UNLESS NOTED OTHERWISE, SLAB ON GRADE TO BE 100mm THICK CONCRETE SLAB w/ 152x152 MW18/7MM/18' W/M. REFER TYPICAL DETAILS FOR CONTROL JOINTS, CONSTRUCTION JOINTS AND OTHER DETAILS.
- COORDINATE EXACT SIZE AND LOCATION OF HOUSEKEEPING PADS WITH MECHANICAL DRAWINGS. SEE DWG. S0.02 FOR TYPICAL DETAIL.

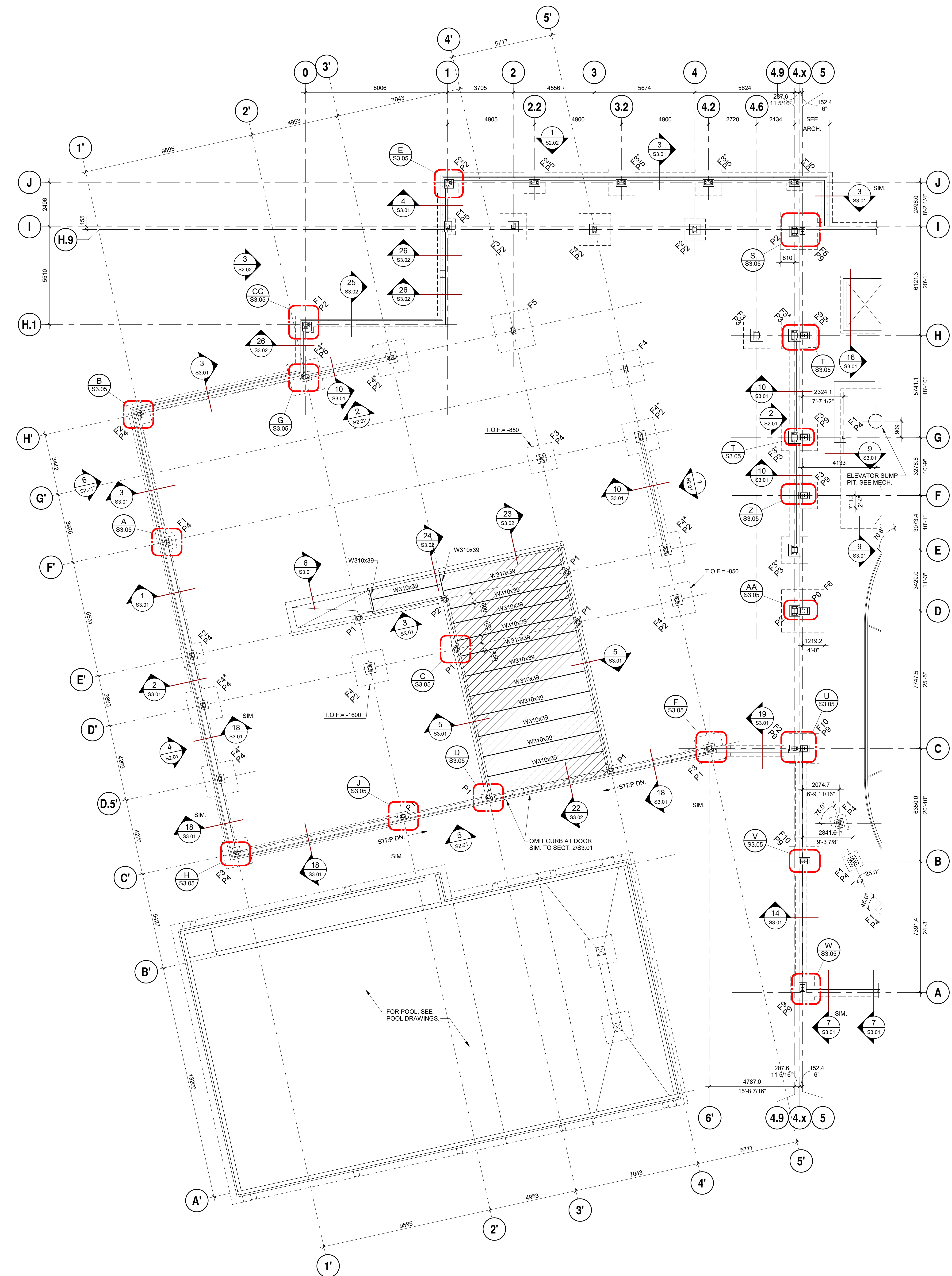
FOOTING SCHEDULE - 175 kPa BEARING

MARK	SIZE	REINFORCING
F1	800 x 800 x 300 Thk.	4-15M E.W.B.
F2	1200 x 1200 x 300 Thk.	5-15M E.W.B.
F3	1500 x 1500 x 350 Thk.	6-15M E.W.B.
F4	1800 x 1800 x 400 Thk.	7-20M E.W.B.
F5	2100 x 2100 x 450 Thk.	8-20M E.W.B.
F6	2400 x 2400 x 500 Thk.	9-25M E.W.B.
F7	2440 x 3660 x 762 Thk.	10-30M L.W.B. 13-25M S.W.B.
F8	2290 x 3650 x 762 Thk.	9-30M L.W.B. 13-25M S.W.B.
F9	1375 x 1375 x 350 Thk.	5-15M E.W.B.
F10	1675 x 1675 x 400 Thk.	6-20M E.W.B.

PILASTER SCHEDULE

MARK	SIZE	REINF.	TIES
P1	600 x 600	8-20M VERT.	15M TIES @ 300 c/c
P2	600 x 600	8-20M VERT.	15M TIES @ 300 c/c
P3	700 x 700	12-20M VERT.	15M TIES @ 300 c/c
P4	500 x 500	8-20M VERT.	15M TIES @ 300 c/c
P5	600 x 500	8-20M VERT.	15M TIES @ 300 c/c
P8	610 x 762	10-30M VERT. & 4-20MM A/D.	15M TIES @ 300 c/c
P9	610 x 406	8-20M VERT.	15M TIES @ 300 c/c

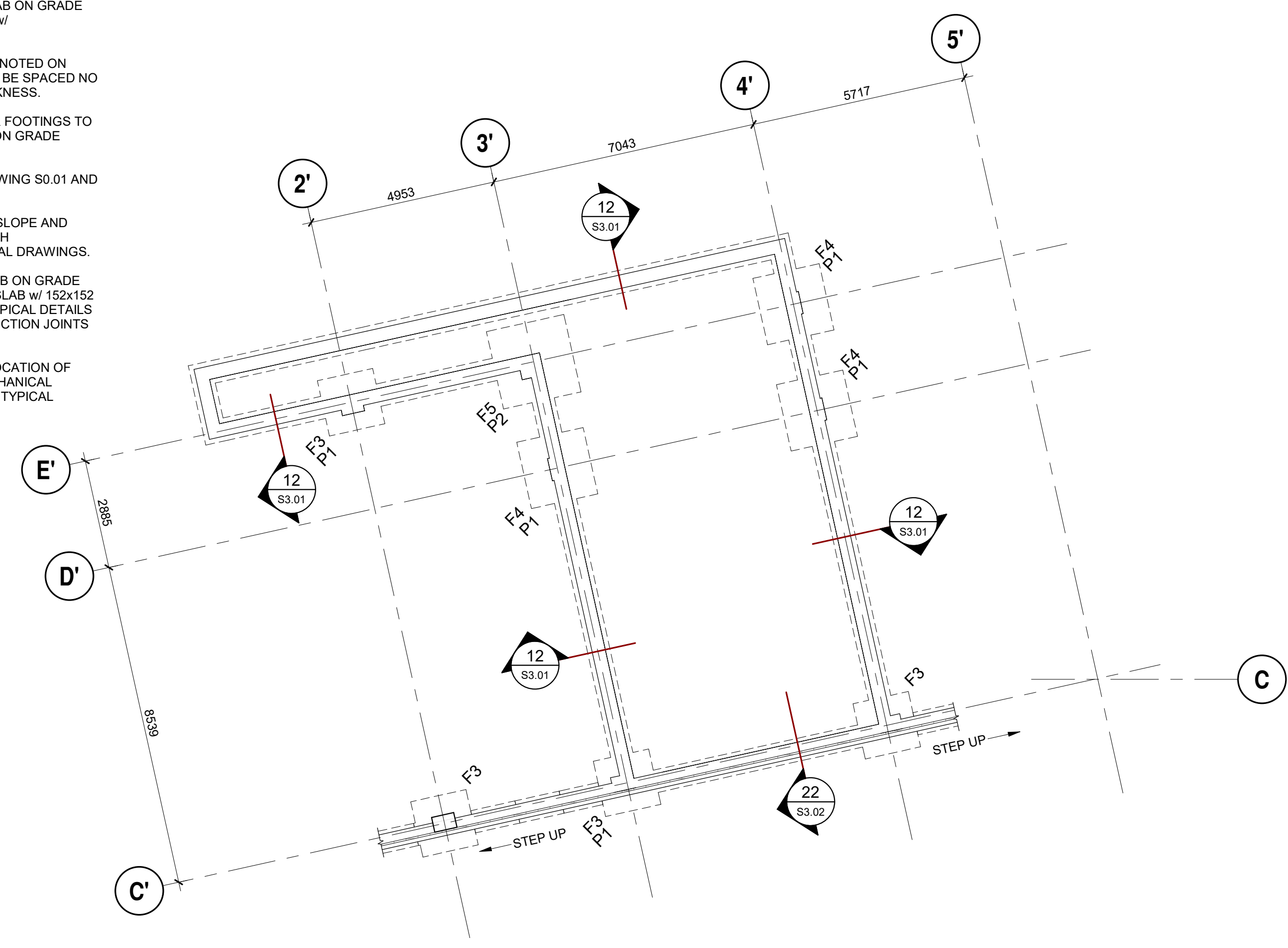
NOTE: ALL PILASTERS TO HAVE DOUBLE TOP TIE UNLESS NOTED



1 FOUNDATION PLAN - FRONT ENTRANCE / POOL
 S1.01 1:100

NOTES:

- ELEVATION TOP OF INTERIOR SLAB ON GRADE TO BE -450mm H.P. UN. COORD. w/ ARCHITECTURAL DRAWINGS.
- C.J. DENOTES CONTROL JOINT UNNOTED ON DRAWINGS. CONTROL JOINTS TO BE SPACED NO MORE THAN 30 TIMES SLAB THICKNESS.
- ELEVATION TOP OF ALL INTERIOR FOOTINGS TO BE 200mm BELOW TOP OF SLAB ON GRADE UNNOTED.
- REFER TO TYPICAL DETAILS DRAWING S0.01 AND S0.02 FOR MORE INFORMATION.
- COORDINATE EXACT LOCATION, SLOPE AND QUANTITY OF FLOOR DRAINS WITH ARCHITECTURAL AND MECHANICAL DRAWINGS.
- UNLESS NOTED OTHERWISE, SLAB ON GRADE TO BE 100mm THICK CONCRETE SLAB w/ 152x152 MW18/7MM/18' W/M. REFER TYPICAL DETAILS FOR CONTROL JOINTS, CONSTRUCTION JOINTS AND OTHER DETAILS.
- COORDINATE EXACT SIZE AND LOCATION OF HOUSEKEEPING PADS WITH MECHANICAL DRAWINGS. SEE DWG. S0.02 FOR TYPICAL DETAIL.



2 POOL MECH. ROOM
 S3.01 1:100

NO.	REVISION	DATE
9	ISSUED FOR PERMIT	2023.04.10
8	RE-ISSUED FOR BUILDING PERMIT	2023.01.26
7	TR4 REVISIONS	2023.01.09
6	ISSUED FOR BUILDING PERMIT	2022.11.01
5	TR4 IFT	2022.11.01
4	ISSUED FOR 90% CD REVIEW	2022.10.21
3	ISSUED FOR 80% CD REVIEW	2022.08.22
2	IP2 ISSUED FOR 90% REVIEW	2022.04.22
1	ISSUED FOR DESIGN DEVELOPMENT	2022.03.04

PROJECT NAME:
 SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 10 NORTH RIVER ROAD
 CHARLOTTETOWN, PE

PROJECT NO.: 21111
 DRAWN BY: P.R.
 CHECKED BY: S.U.
 SCALE: 1:100

FOUNDATION PLAN - FRONT ENTRANCE / POOL AND POOL MECHANICAL ROOM

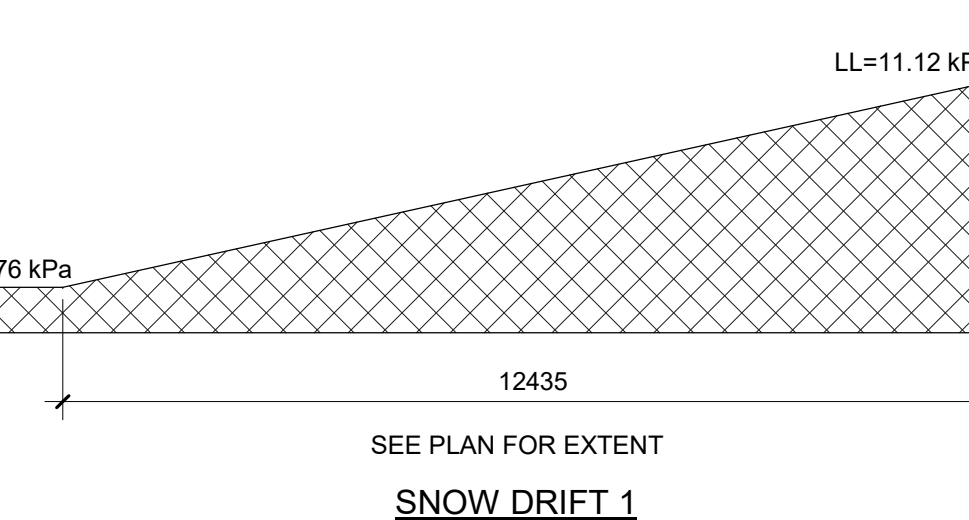
FRAMING NOTES:

- ELEVATION w/s DECK TO BE 4250mm u/h. COORD. w/ ARCHITECTURAL DRAWINGS.
- ROOF DESIGN LOADS:**
 SE = 2.78 kPa UNOTED + DRIFTS, SEE PLAN
 DL = 1.44 kPa UNOTED
 ADDITIONAL DL DUE TO PAVERS = 0.24 kPa (SEE ARCH.)
 GROSS WIND UPLIFT = 1.0 kPa
- BOTTOM CHORD OF ALL NEW JOISTS TO BE DESIGNED TO CARRY AN ADDITIONAL CONCENTRATED LIVE LOAD OF 250 kg AT ANY LOCATION BETWEEN PANEL POINTS.
- T.J. DENOTES TIE JOIST - WHERE INDICATED ON PLAN, BOTTOM CHORD TO HAVE HORIZONTALLY SLOTTED CONNECTION
- ALL CAP PLATES TO BE 12mm THICK MINIMUM.
- UIS OF ALL BASE PLATES TO BE 225mm u/h. (COORD. w/ FOUNDATIONS AND PLASTER DETAILS DWG. S3.05)
- ALL BASE PLATES TO HAVE 4-20mm dia. ANCHOR BOLTS POST INSTALLED (ADHESIVE) UNLESS NOTED.
- COORDINATE ALL EDGE OF DECK DIM'S (ON ALL STRUCT. DRAWINGS) WITH ARCH. DRAWINGS.
- FOR SIZE AND LOCATION OF OPENINGS REFER TO ARCHITECTURAL & MECHANICAL DRAWINGS.
- REFER TO TYPICAL DETAILS DRAWING S0.01 AND S0.02 FOR MORE INFORMATION.
- ANY MODIFICATIONS AFFECTING THE STRUCTURE MUST BE APPROVED IN WRITING BY THE ENGINEER.

B1 BRACE:
 L 76x76x6 HORIZONTAL BRACE FROM TOP OF COLUMN TO TOP CHORD PANEL POINT OF ADJACENT JOIST. DESIGN CONNECTION FOR AN AXIAL FORCE = +/-5 kN

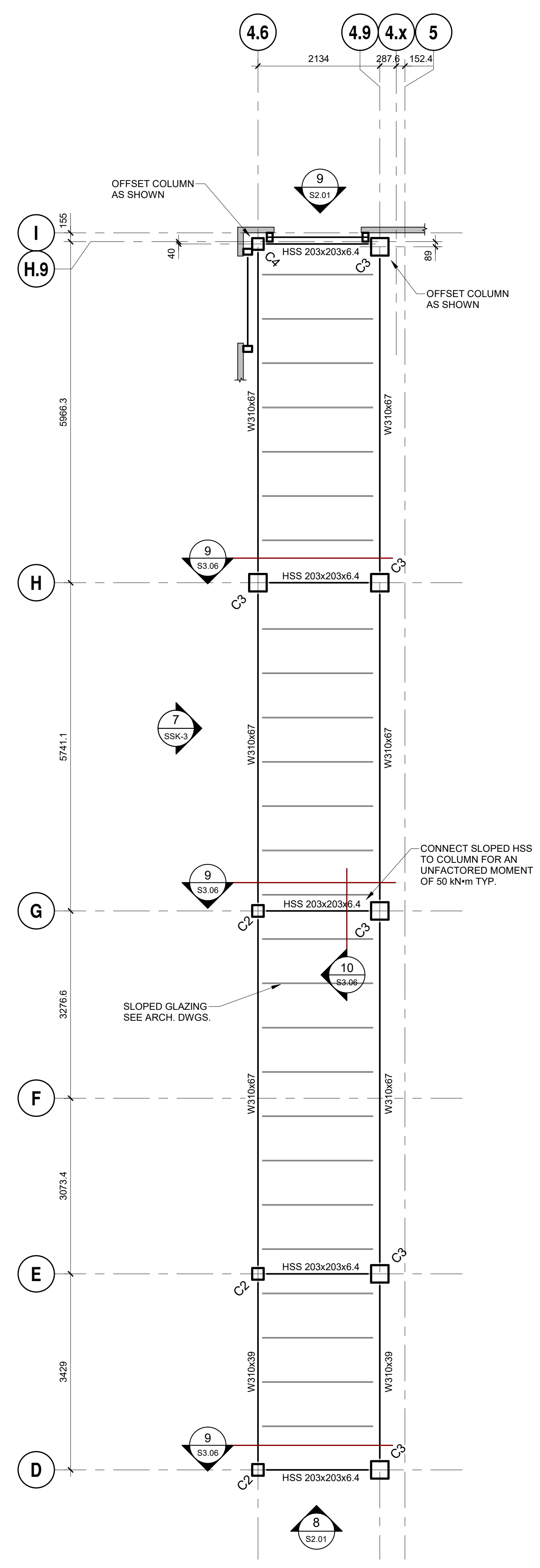
TYPICAL ROOF DECK:
 38mm DEEP x 0.76mm THICK STEEL ROOF DECK, LIGHT ZINC COATING, INCREASE THICKNESS AS REQ'D IN AREAS WITH SNOW DRIFTS

TYPICAL FLOOR CONSTRUCTION:
 87 CONCRETE TOPPING REIN. w/ 150x150 MAX. 18" TYP. @ 150mm DEEP x 0.76mm THICK COMPOSITE STEEL DECK, LIGHT ZINC COATING (125mm TOTAL THICKNESS)

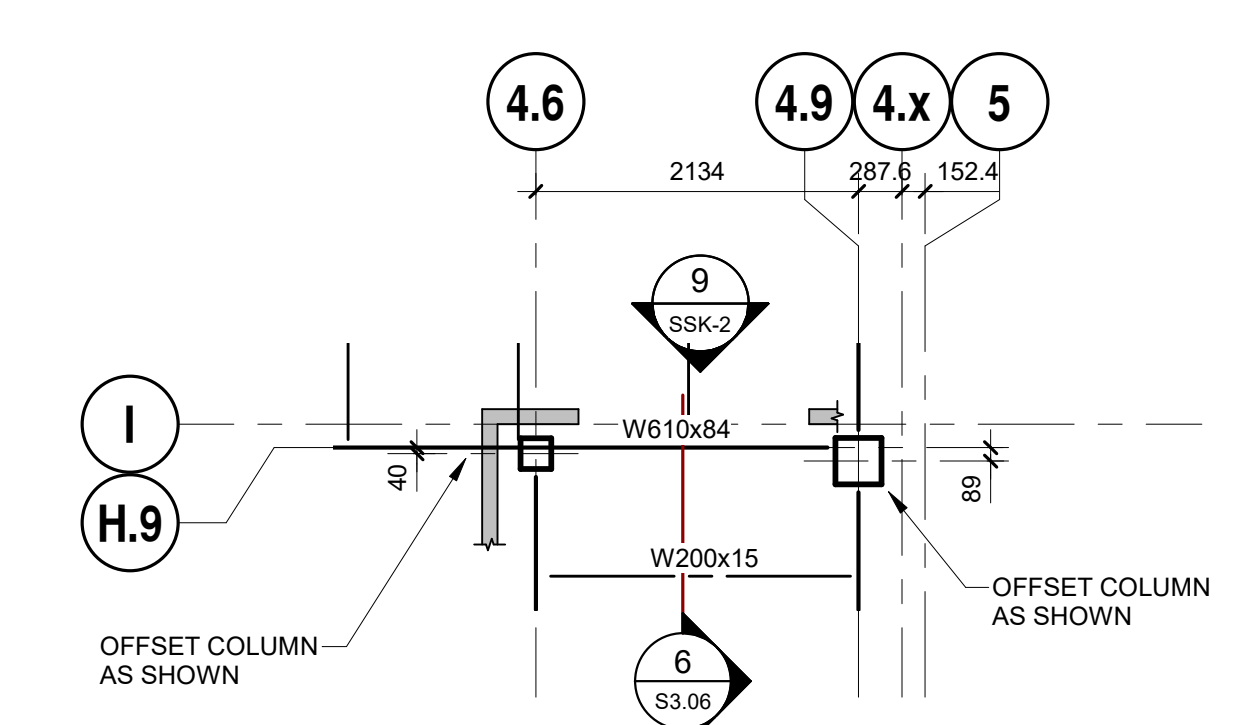


STEEL COLUMN SCHEDULE			
MARK	SIZE	B. PLATE	A. BOLTS
C1	HSS 152x152x6.4	200 x 300 x 20	4-20mm DIA.
C2	HSS 203x203x6.4	250 x 400 x 20	4-20mm DIA.
C3	HSS 303x303x6.4	350 x 500 x 20	4-20mm DIA.
C4	HSS 203x203x7.9		

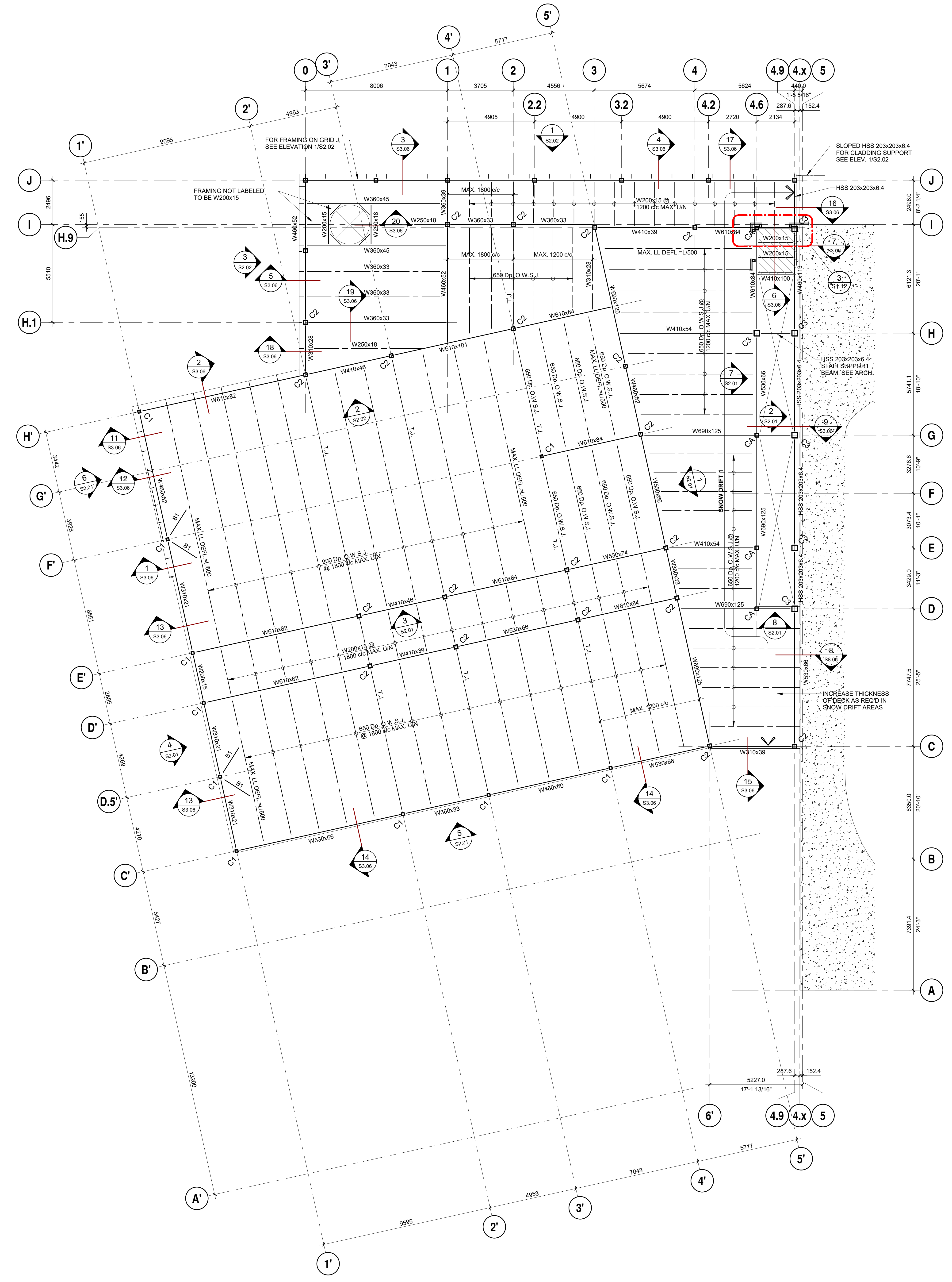
NOTE:
 INCREASE BASE PLATE SIZE AS REQUIRED AT BRACE BAY LOCATIONS



2 T.O. STEEL STAIR
 S2.01 1:50



3 COLUMN OFFSET PLAN
 S1.12 1:50



1 U/S DECK LOW ROOF - FRONT ENTRANCE / POOL
 S1.02 1:100

NO.	REVISION	DATE
1	TP6 IFT	2023.04.10

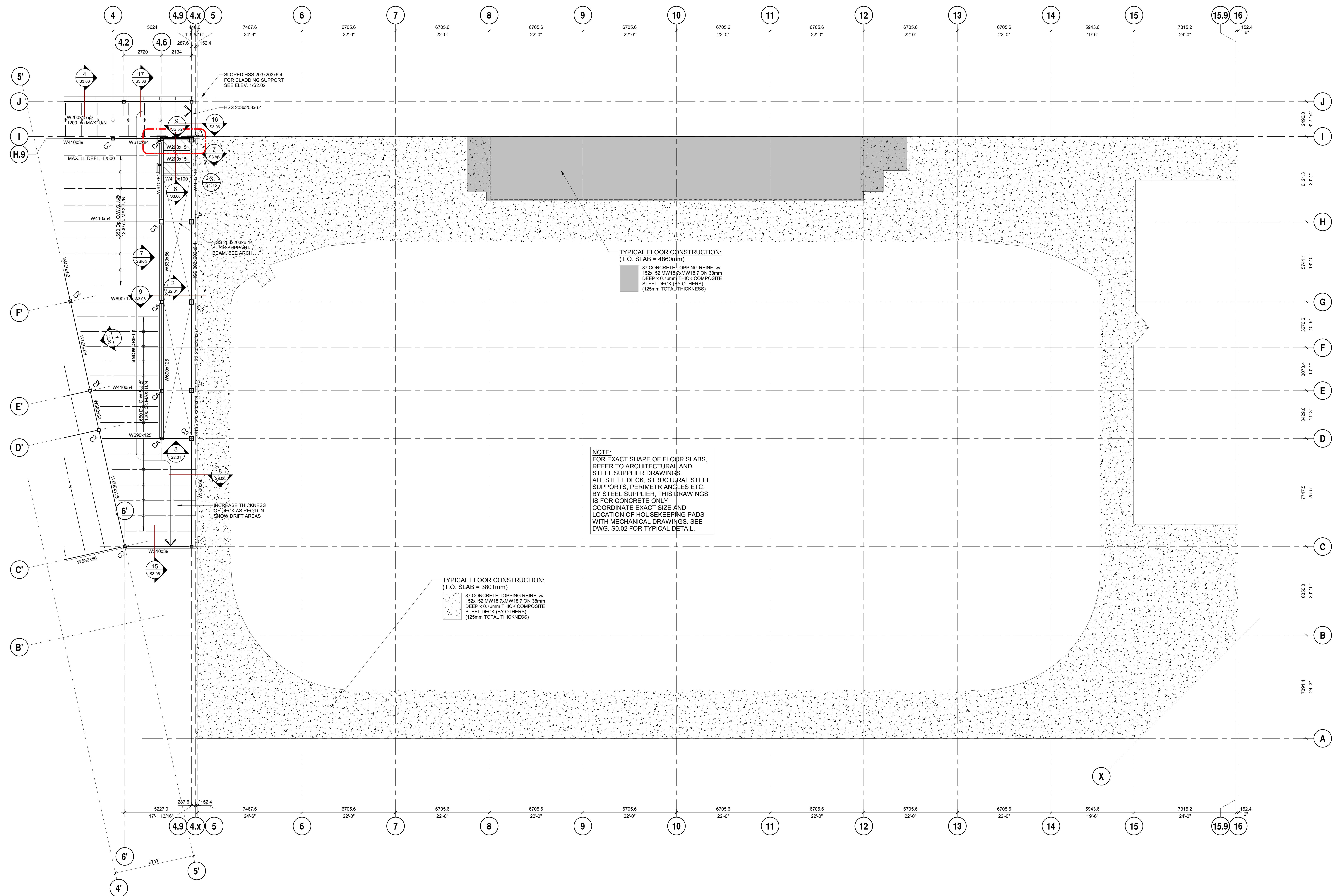
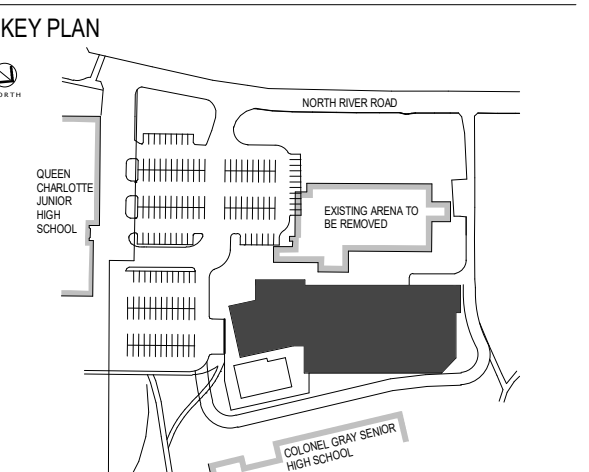
STAMP
 Professional Engineer
 No. 1927
 DATE: 2023.03.24
 PROFESSIONAL ENGINEER
 PRINCE EDWARD ISLAND

PROJECT NAME:
 SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

SIMMONS SPORTS CENTRE

PROJECT NO.: 2111
 DRAWN BY: P.R.
 CHECKED BY: S.U.
 SCALE: As indicated

LOW ROOF FRAMING - FRONT ENTRANCE / POOL AND STAIR ROOF PLAN



1 SECOND FLOOR PLAN - ARENA
S1.02 1:100

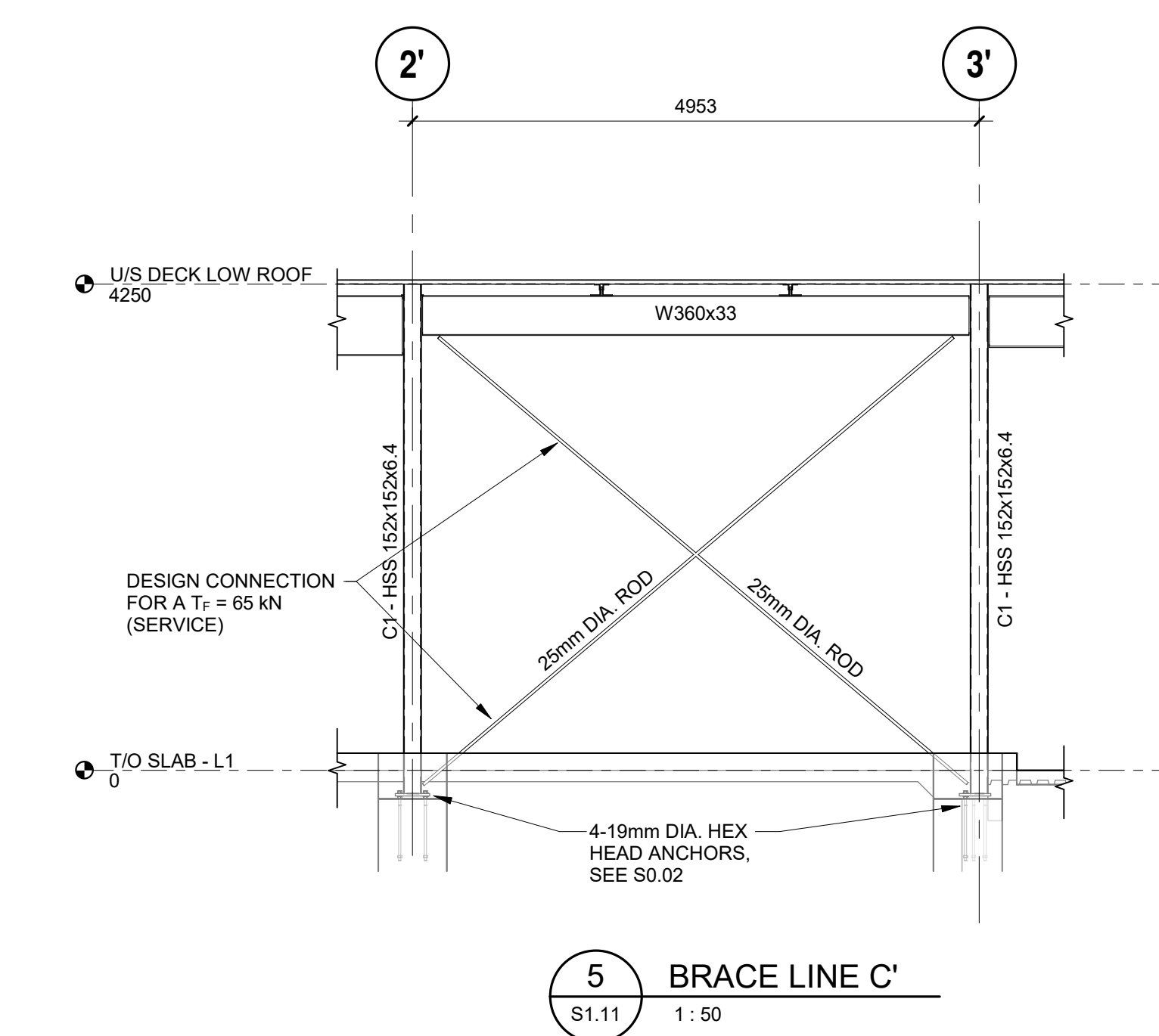
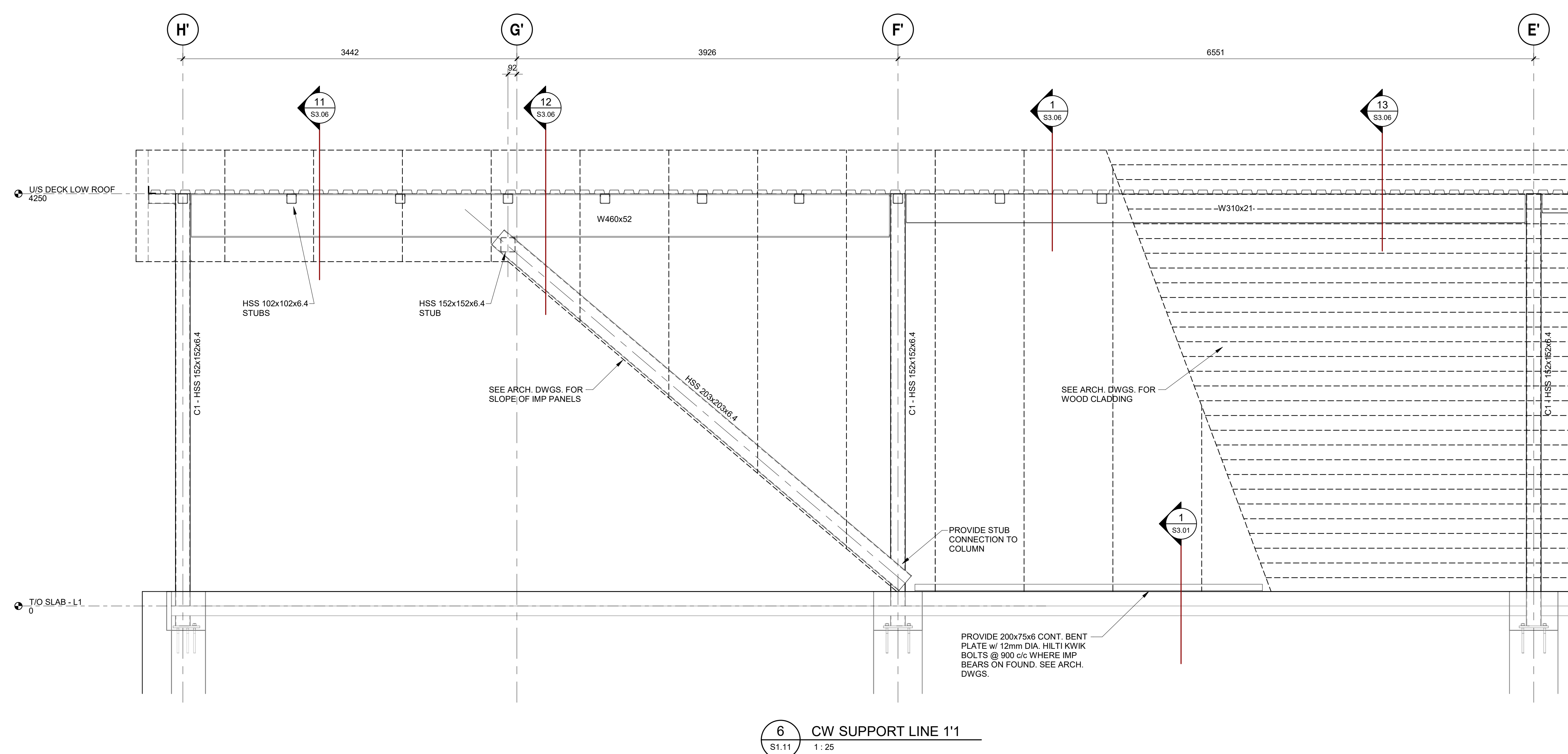
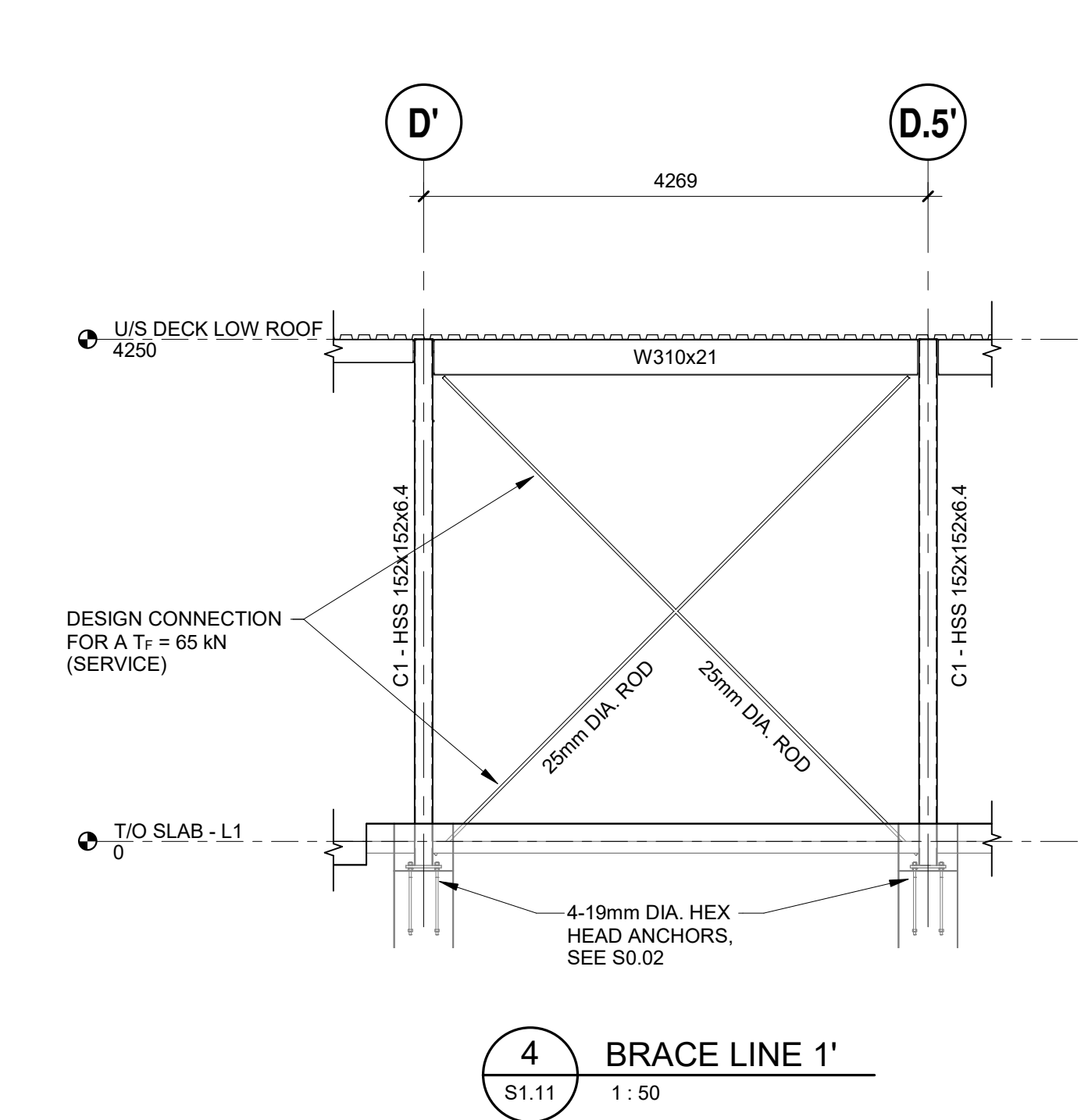
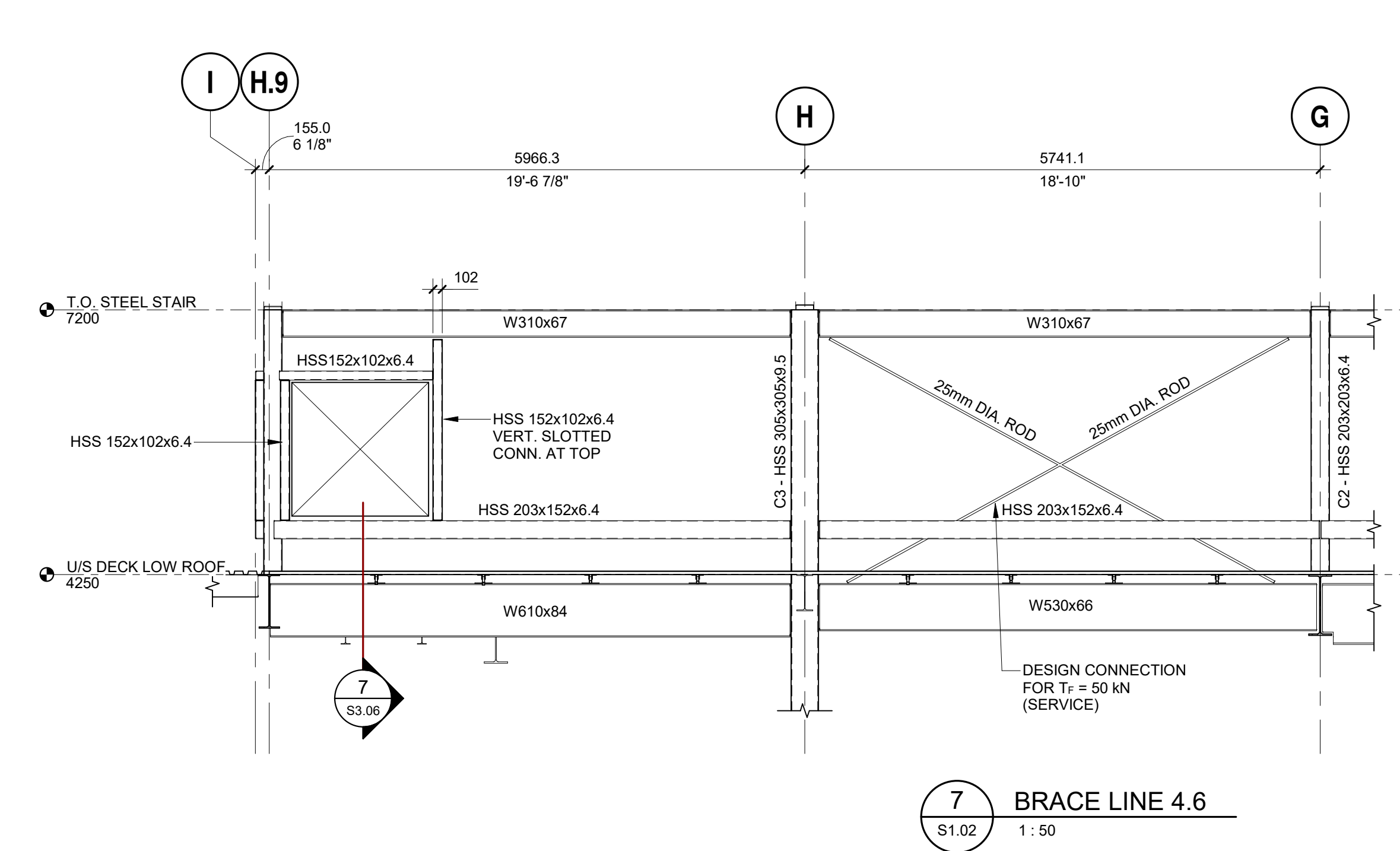
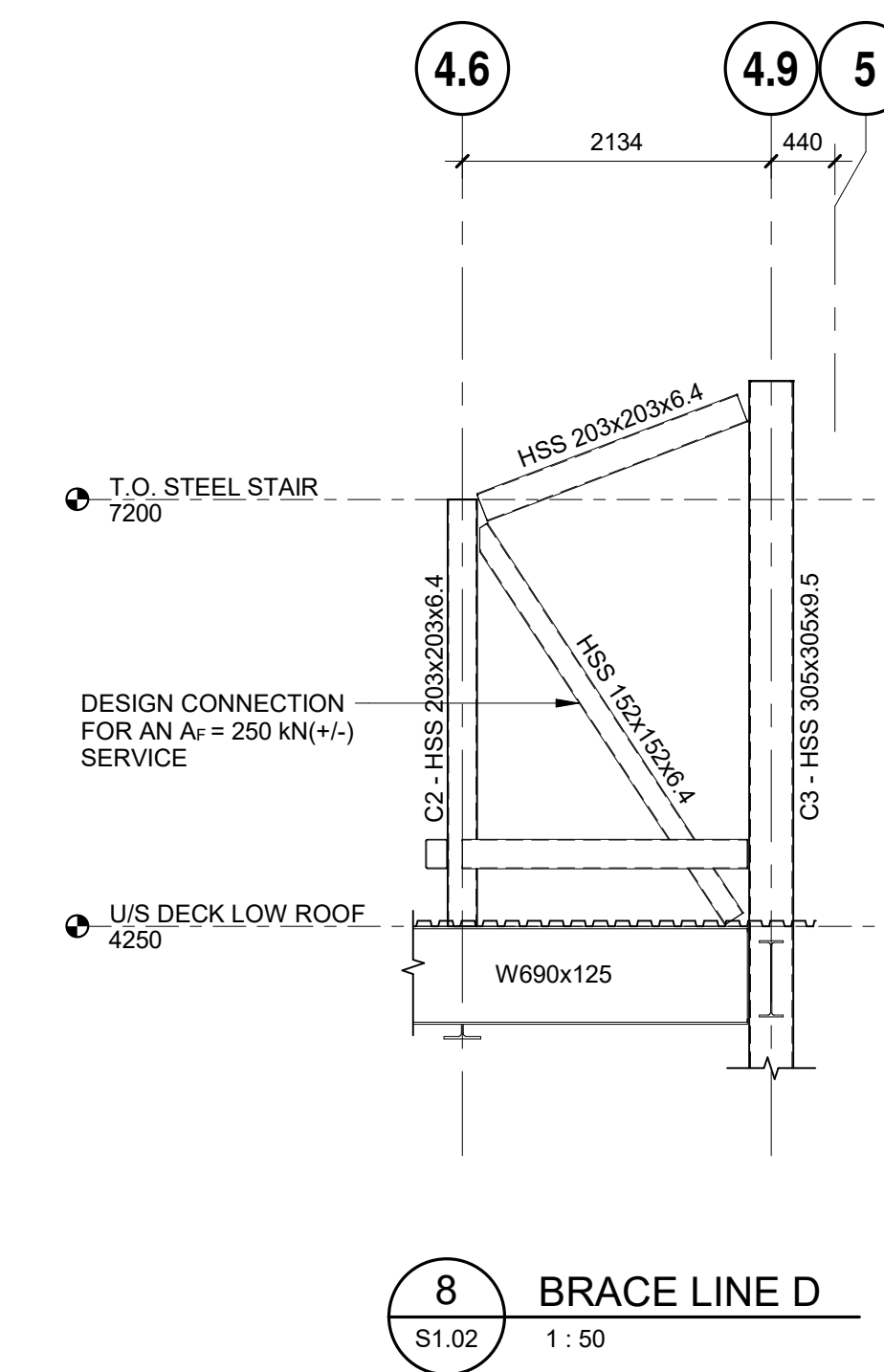
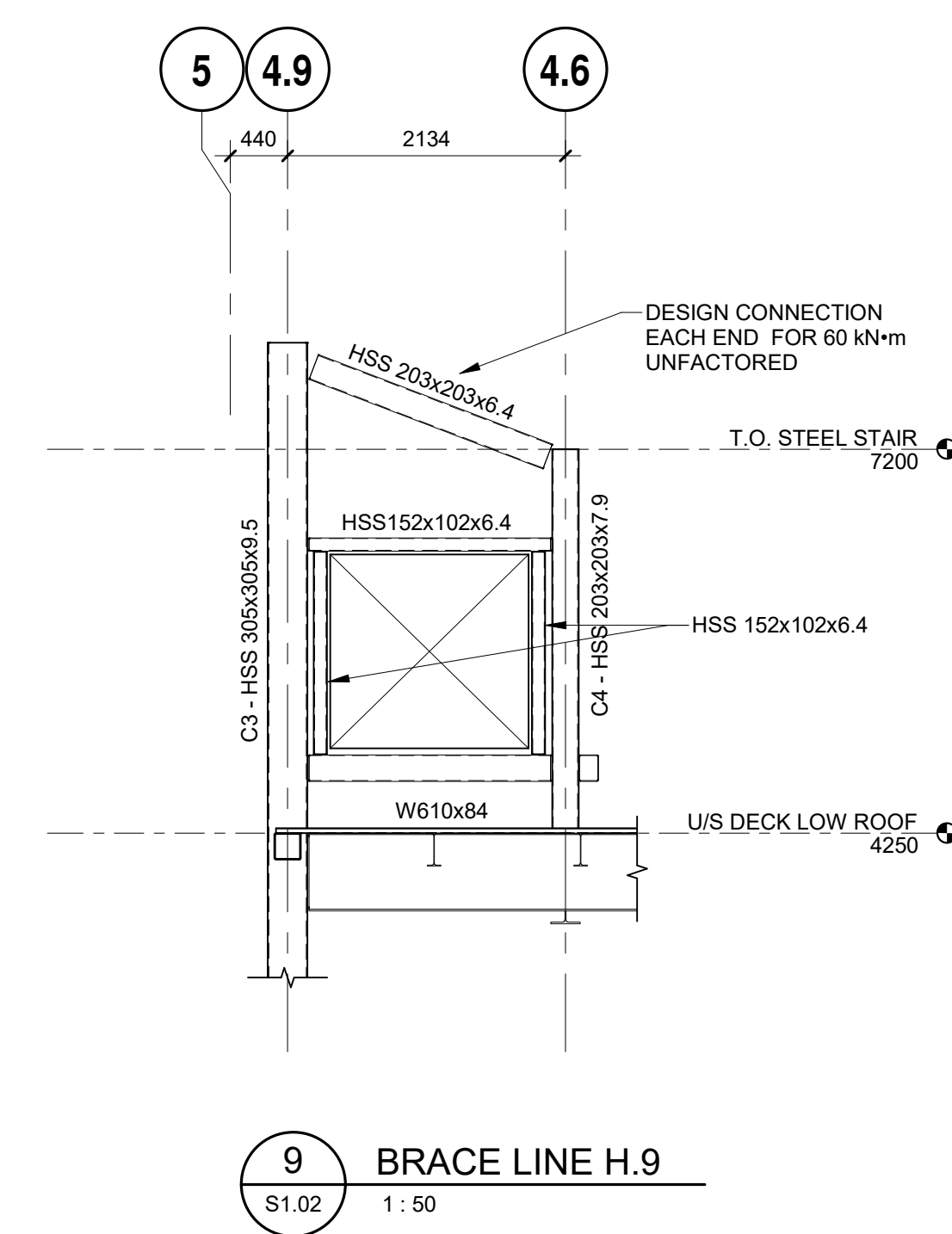
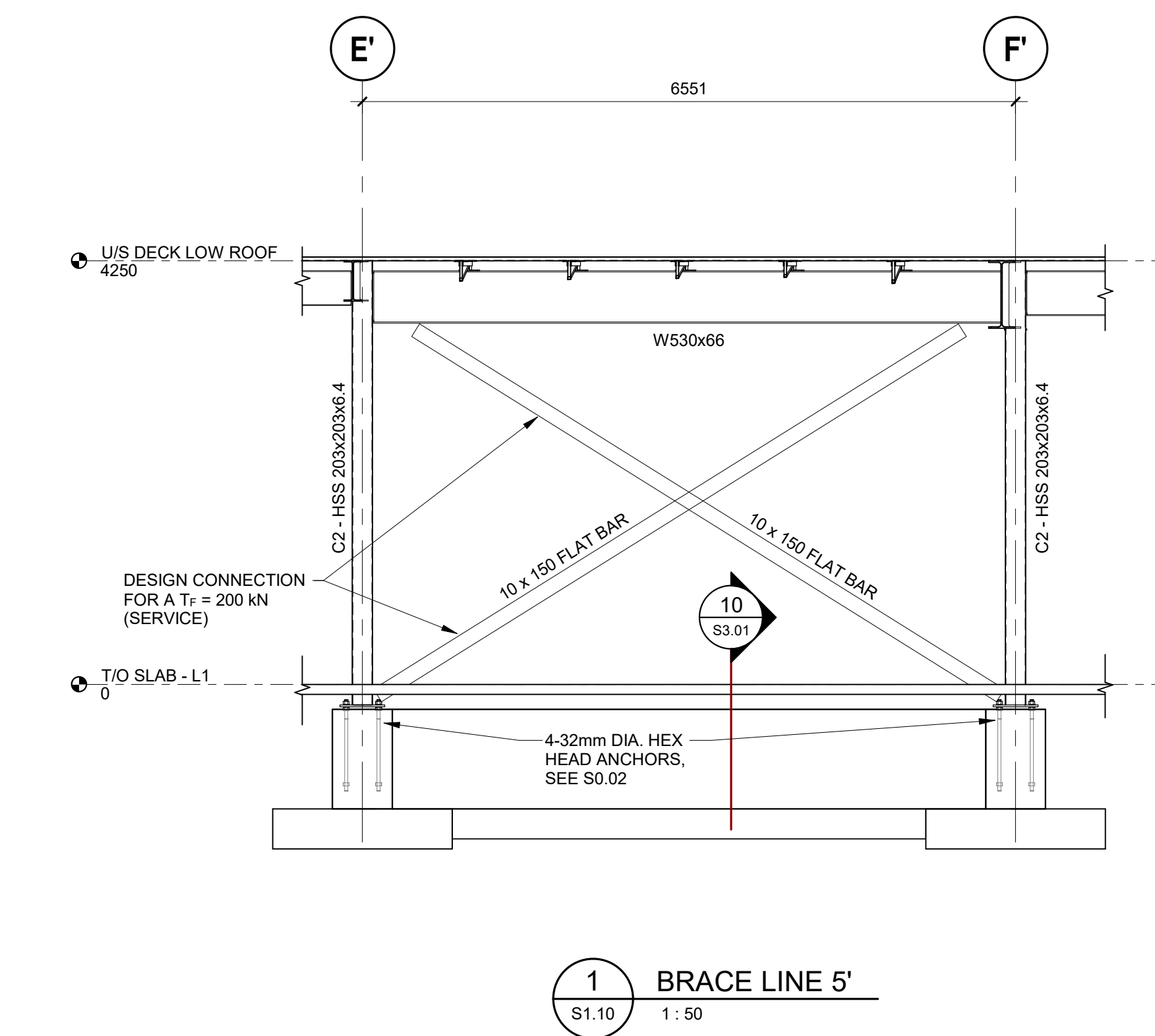
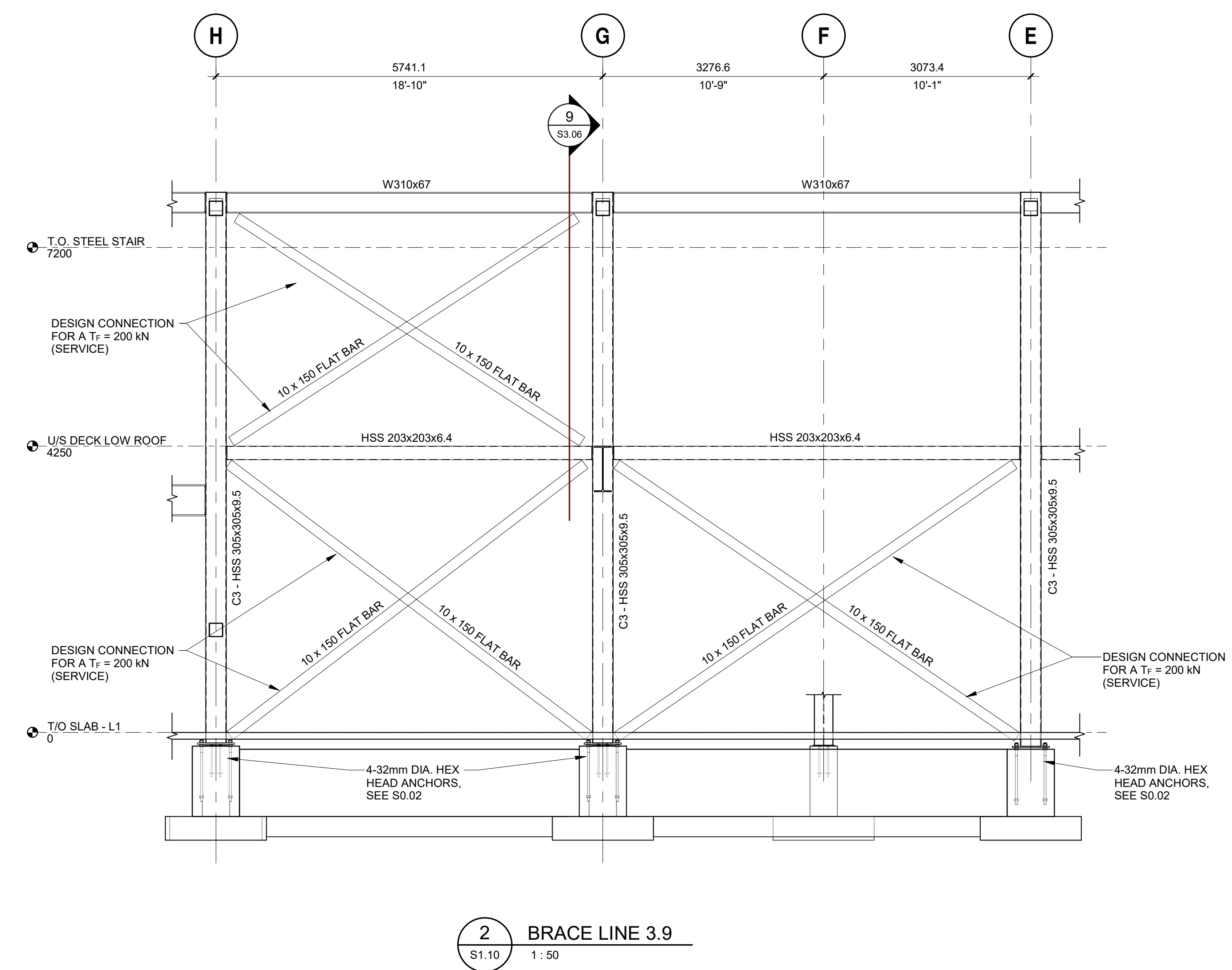
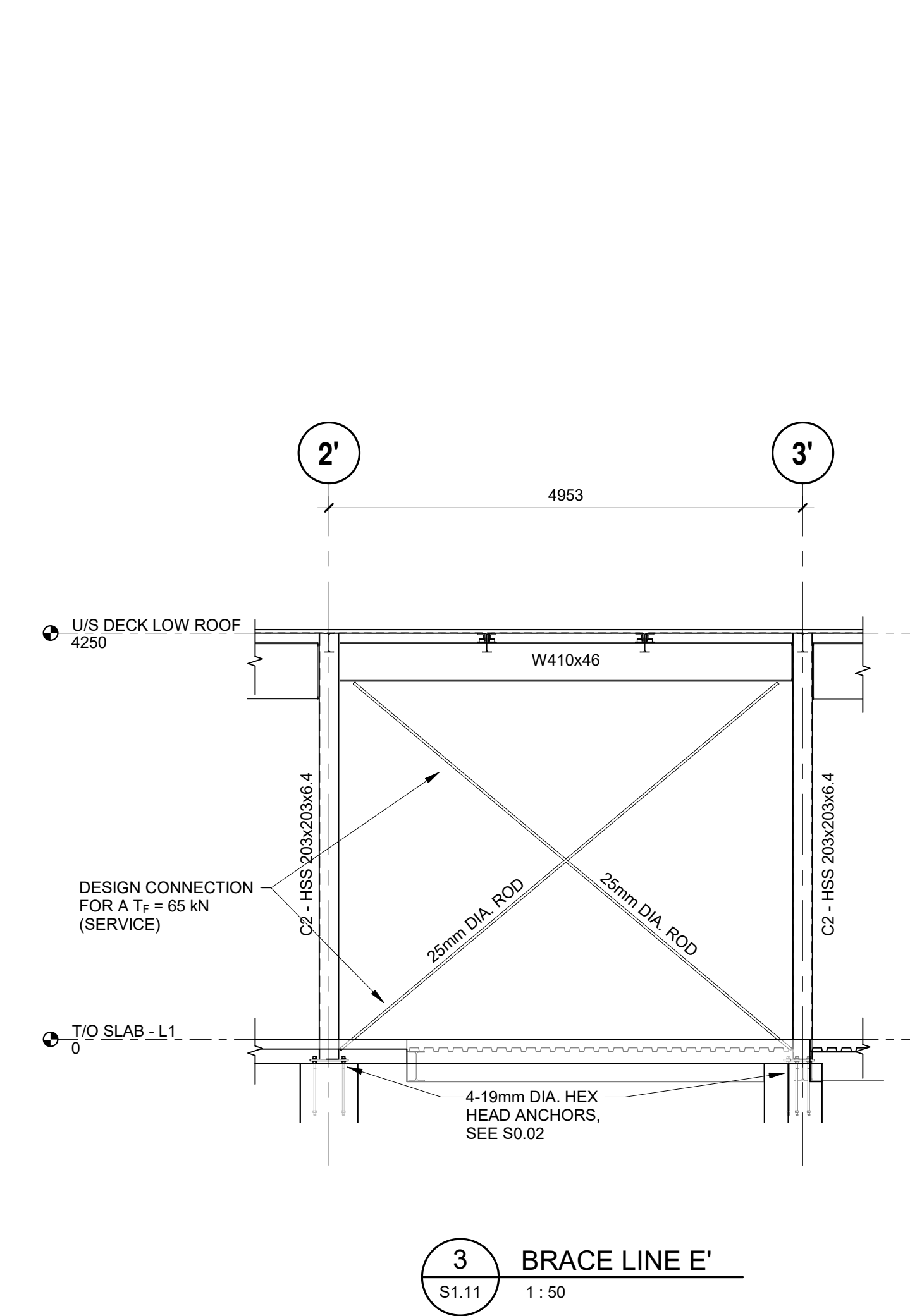
NO.	REVISION	DATE
1	TPG IFT	2023.04.10

STAMP
Professional Engineer
No. 1927
Date: 2023.03.24
Professional Engineer
Prasad, Eshwar Reddy

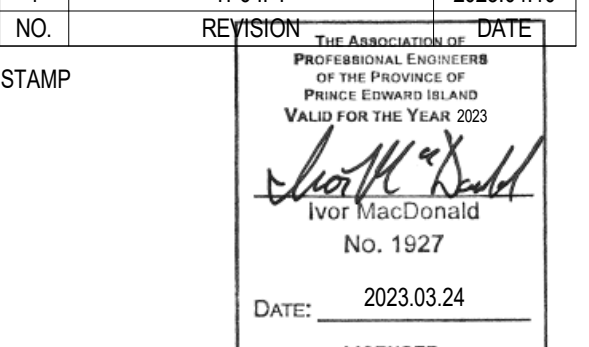
PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL
REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

SIMMONS SPORTS CENTRE
PROJECT NO.: 21111
DRAWN BY: P.R.
CHECKED BY: S.U.
SCALE: 1:100

SECOND FLOOR PLAN -
ARENA



NO.	REVISION	DATE
1	TPG IFT	2023.04.10

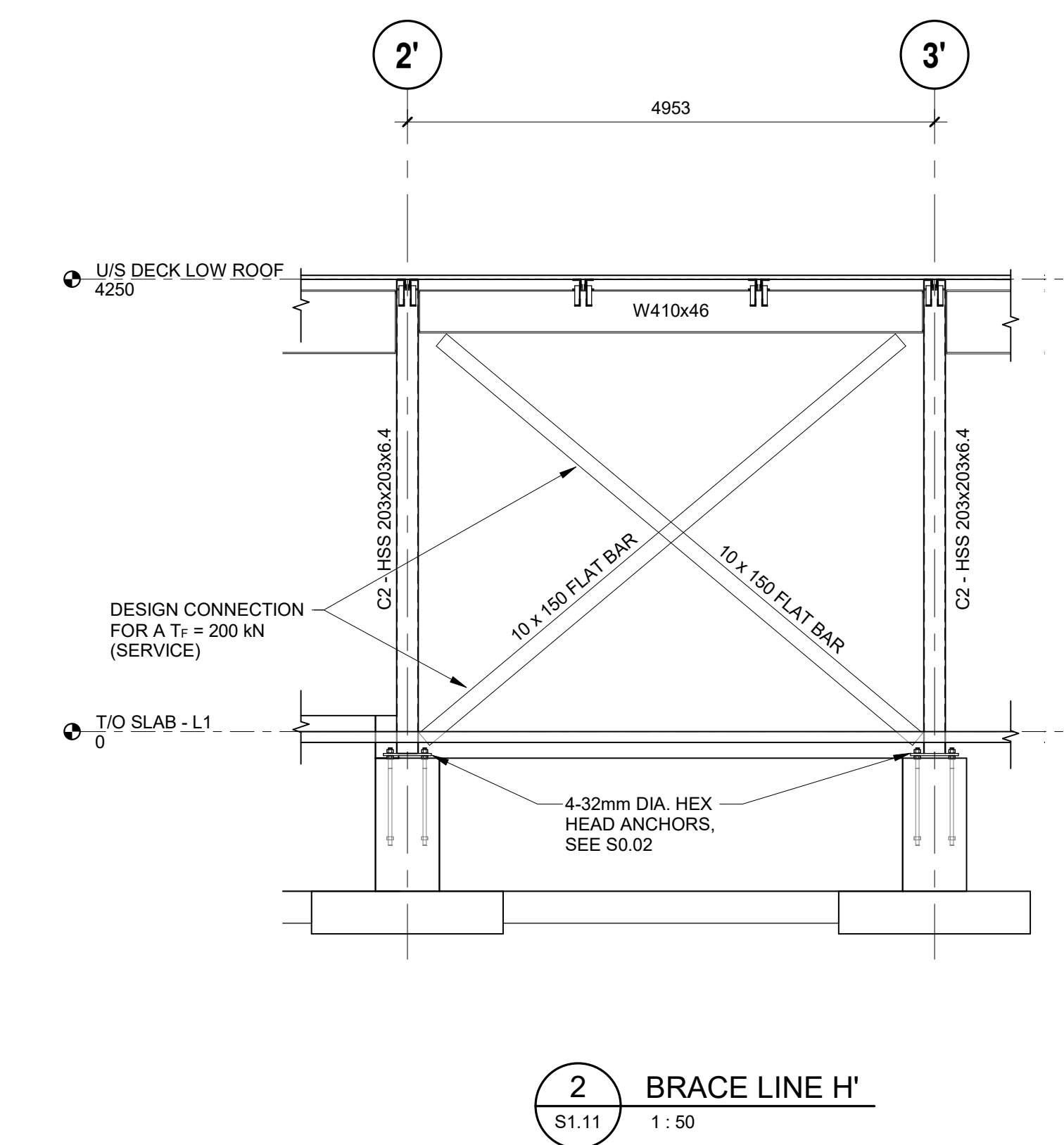
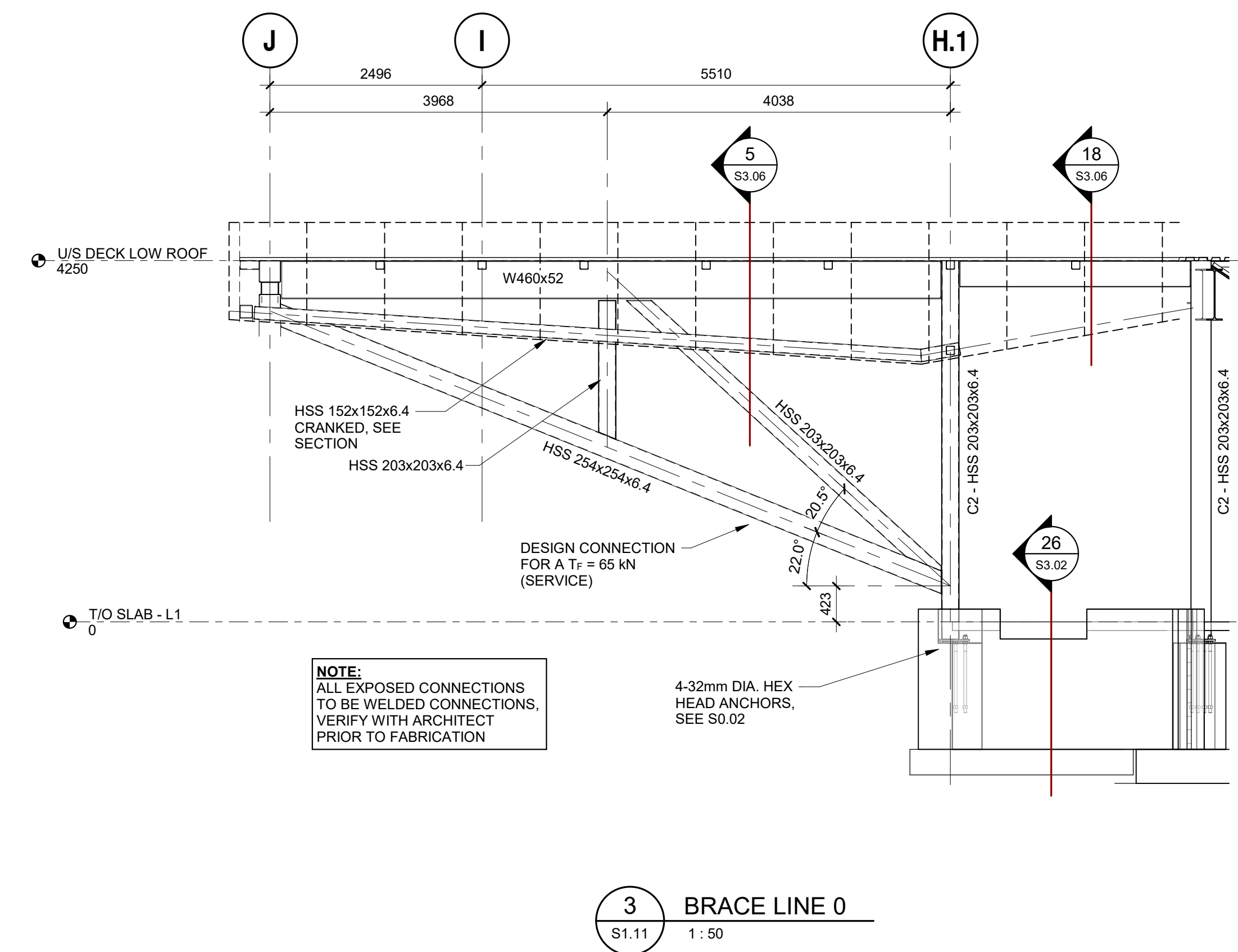
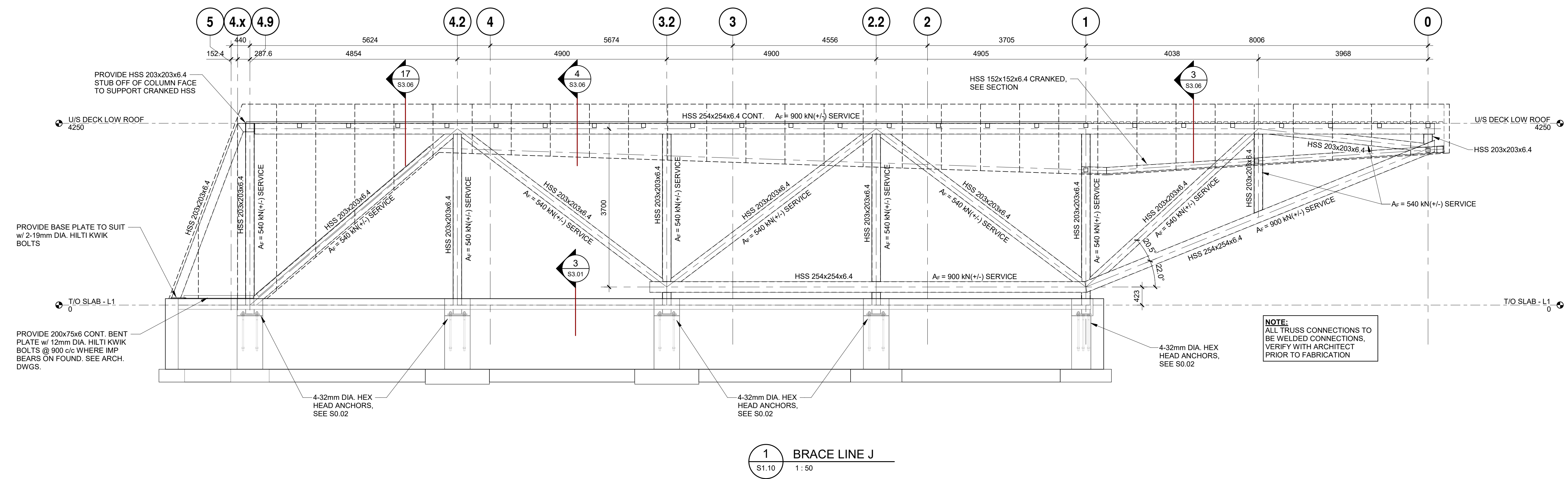
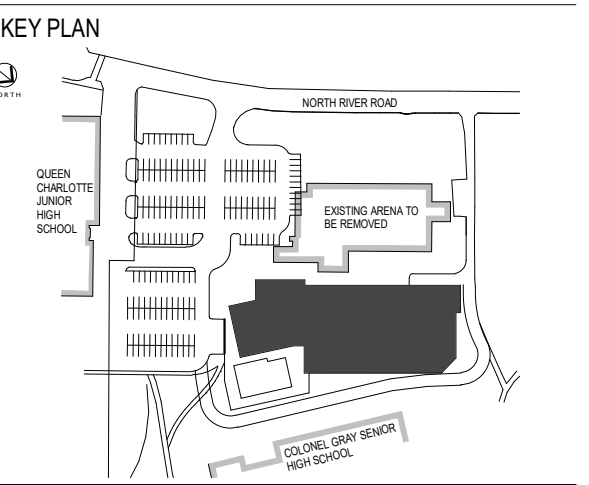
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PROJECT NAME
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 110 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

SIMMONS SPORTS CENTRE

PROJECT NO.: 21111
 DRAWN BY: P.R.
 CHECKED BY: S.U.
 SCALE: As indicated

BRACING ELEVATIONS



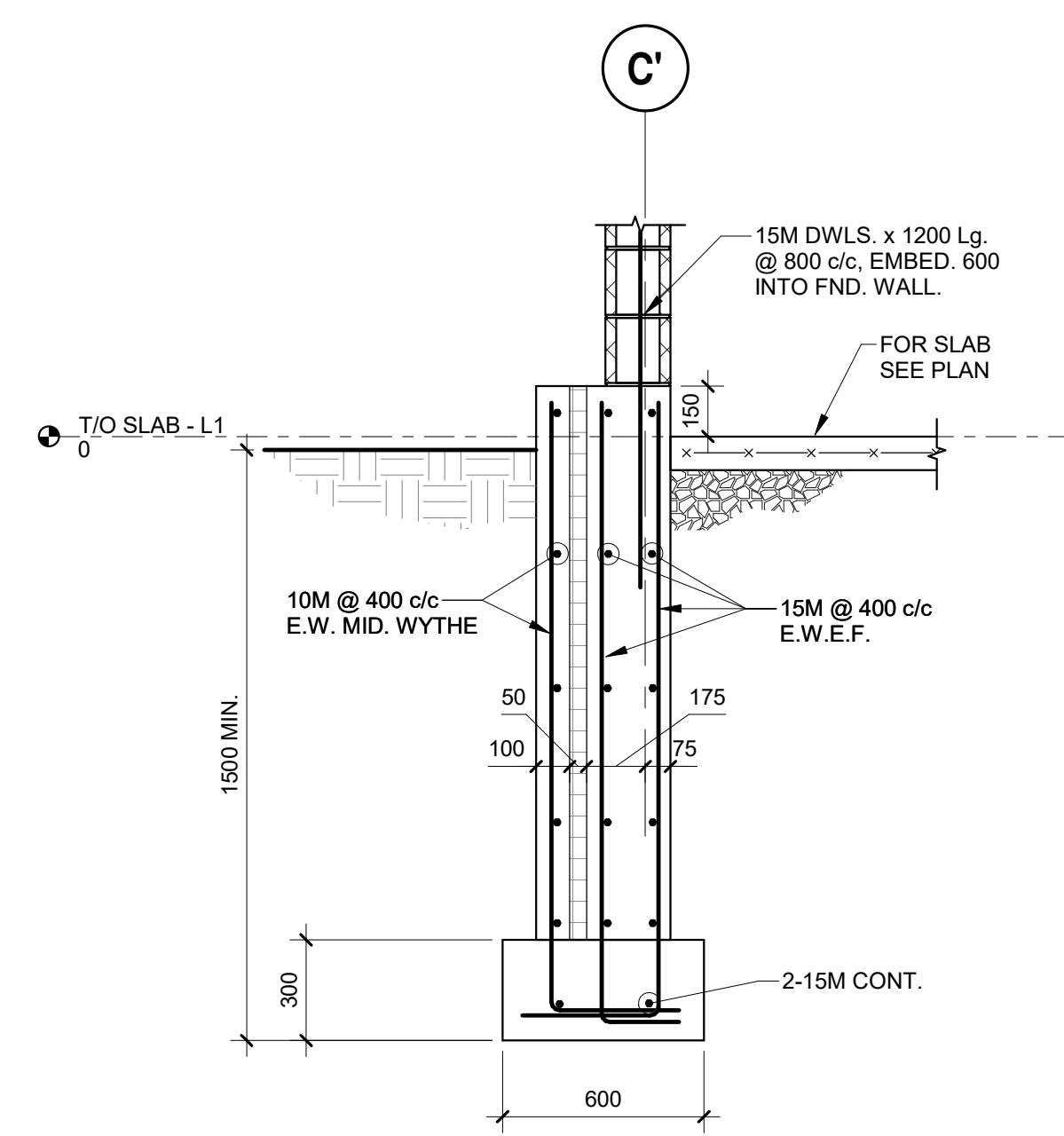
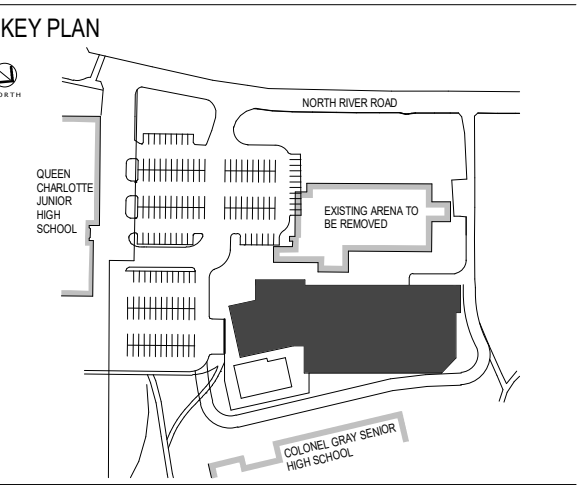
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1	TP6 IFT	2023.04.10

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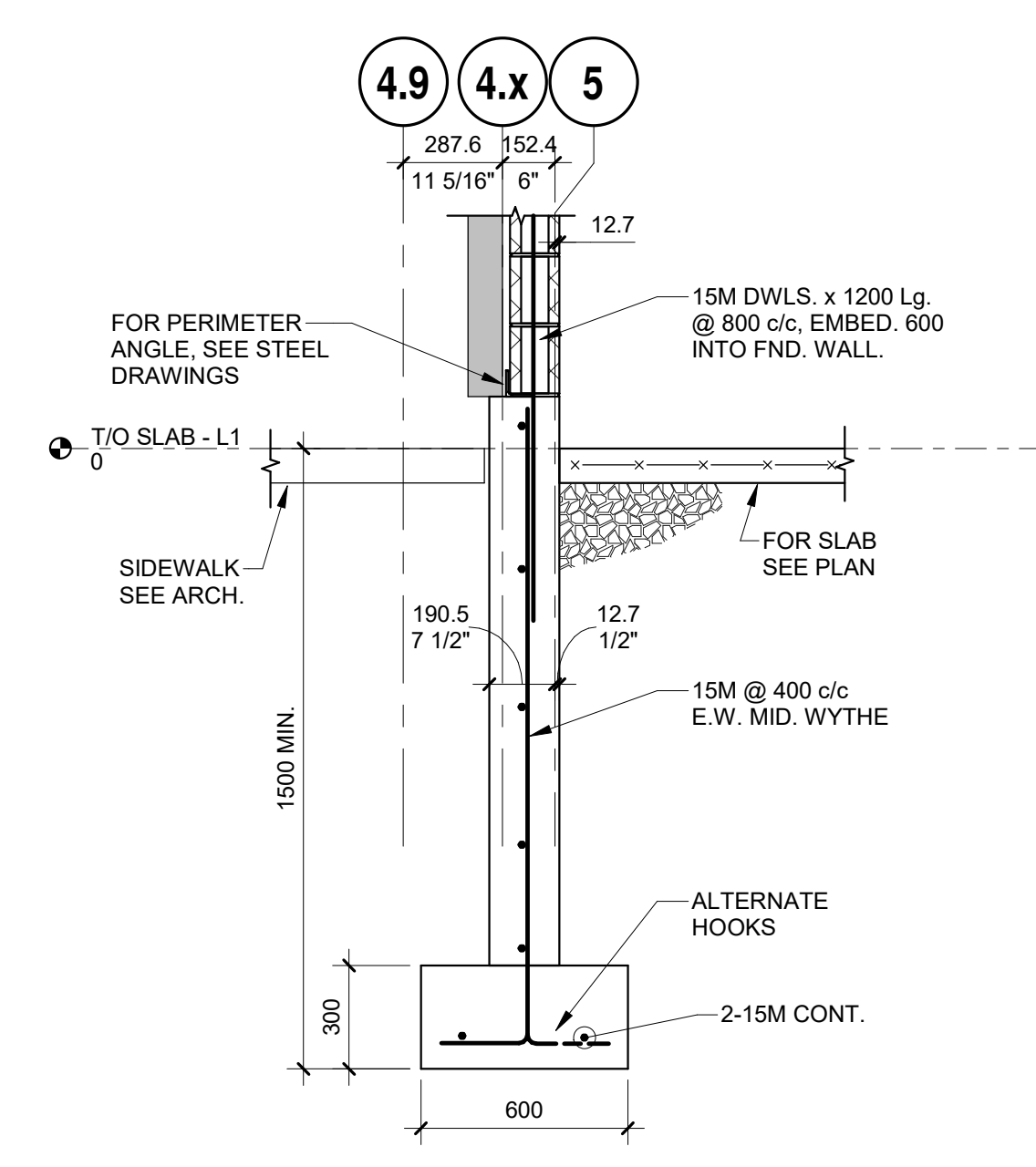
PROJECT NAME:
 SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

PROJECT NO.: 21111
 DRAWN BY: P.R.
 CHECKED BY: S.U.
 SCALE: 1:50

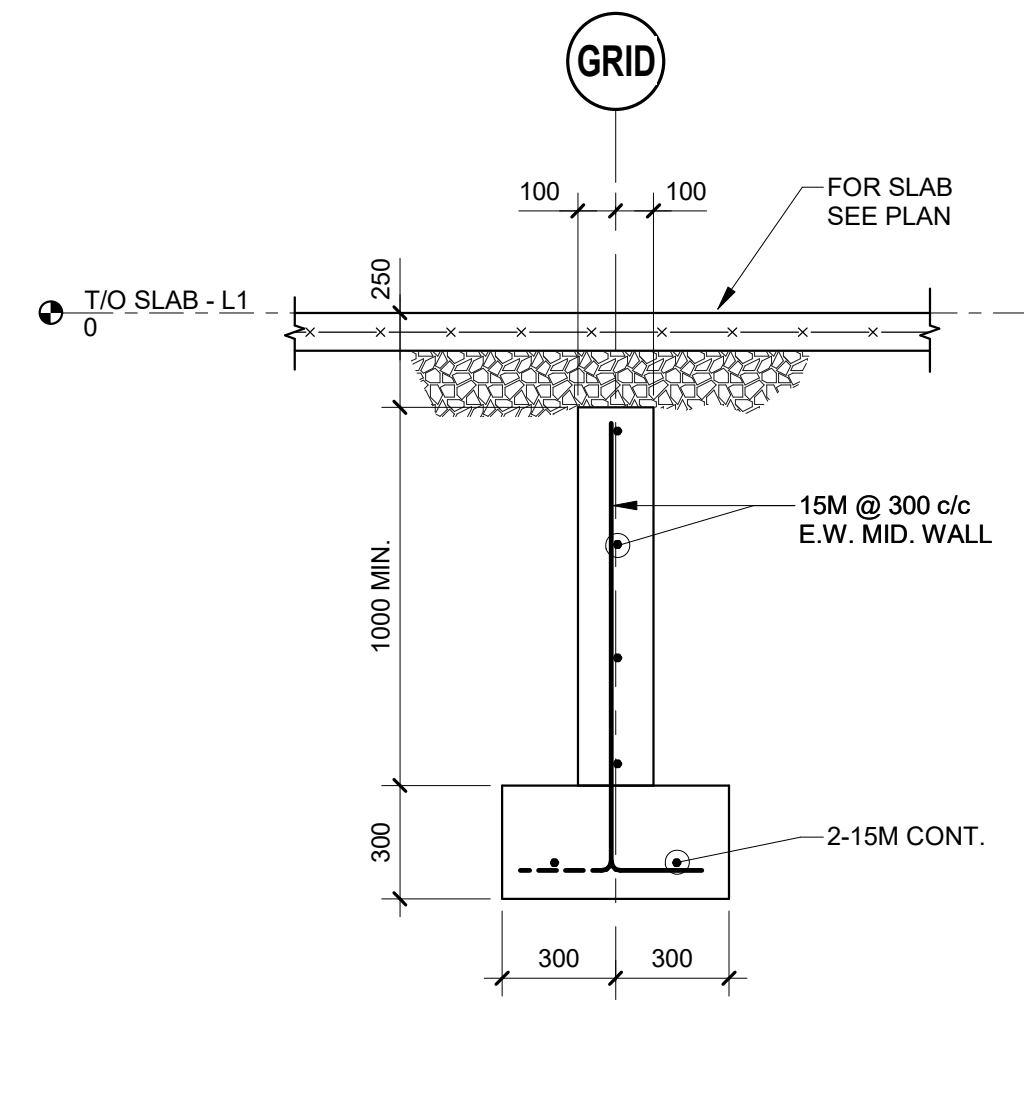
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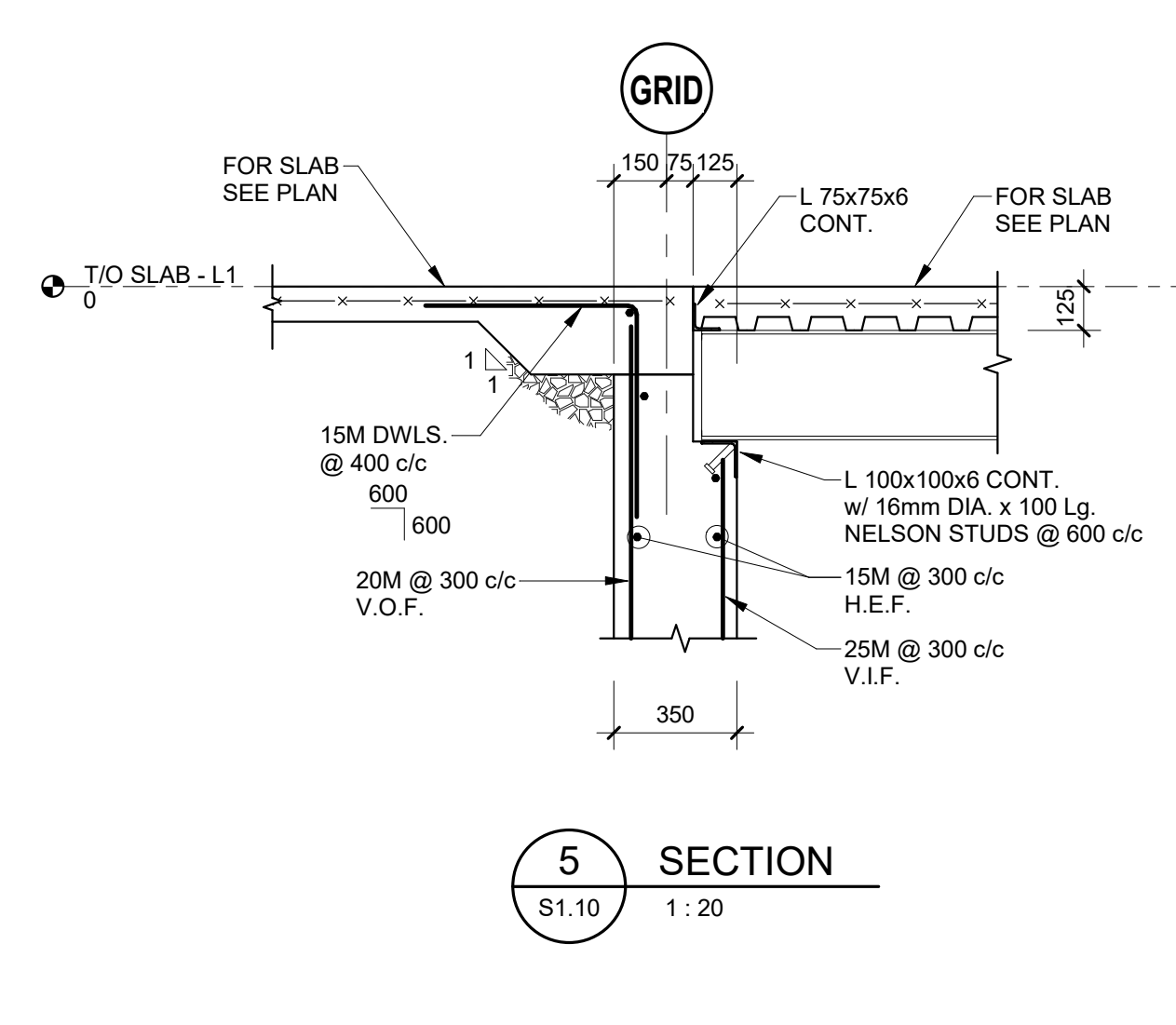
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S1.10 1:20



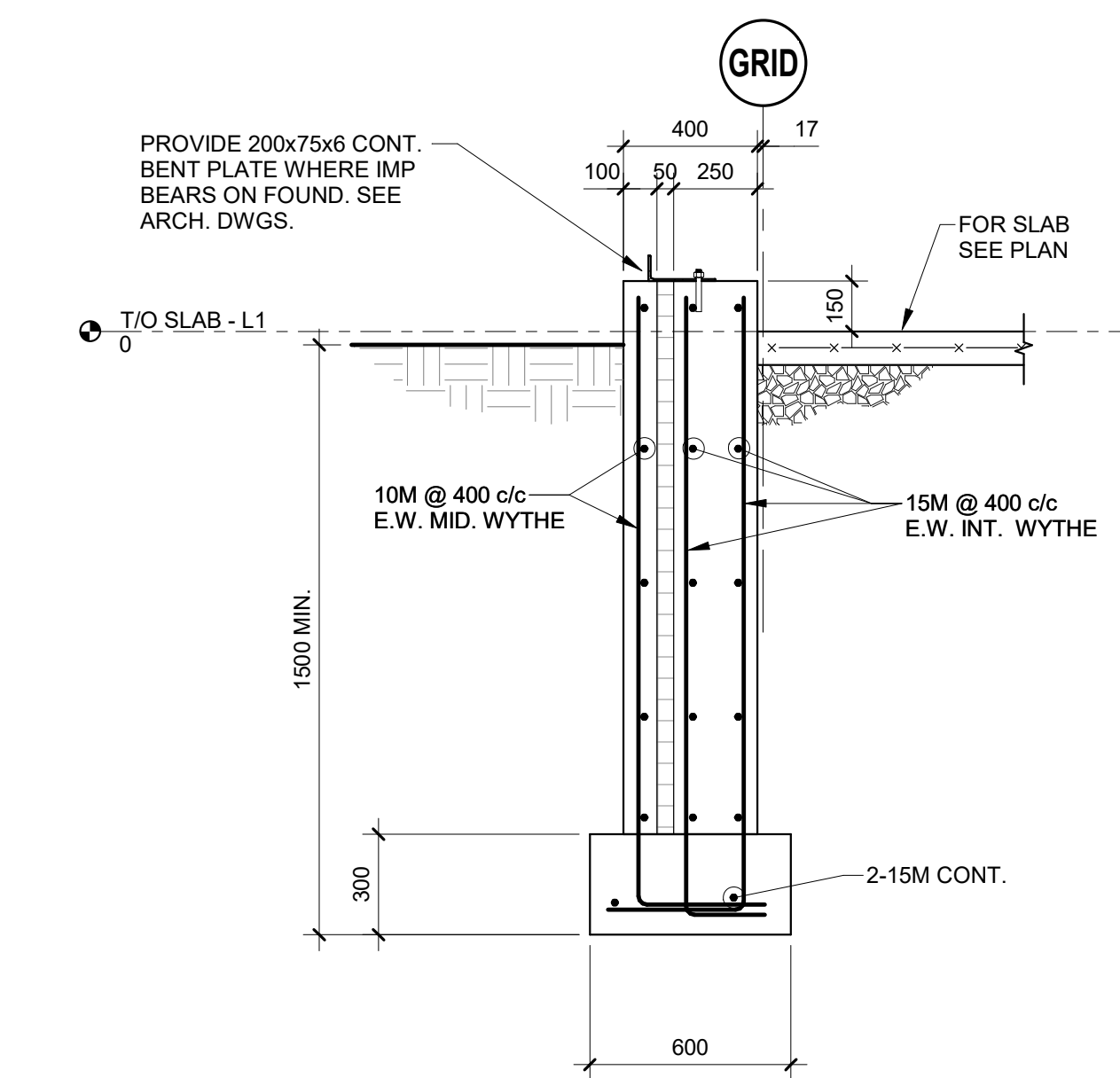
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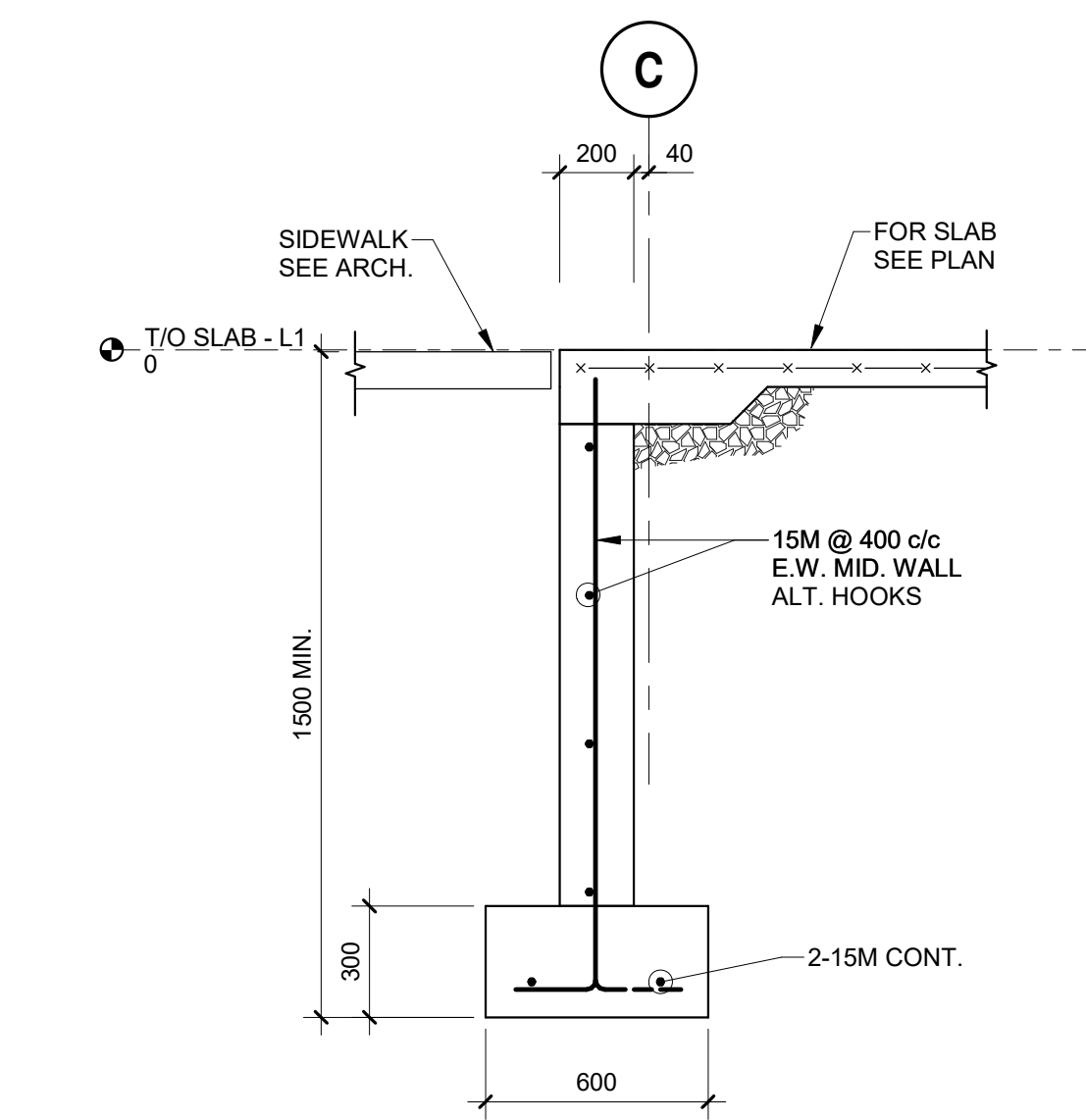
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S1.10 1:20



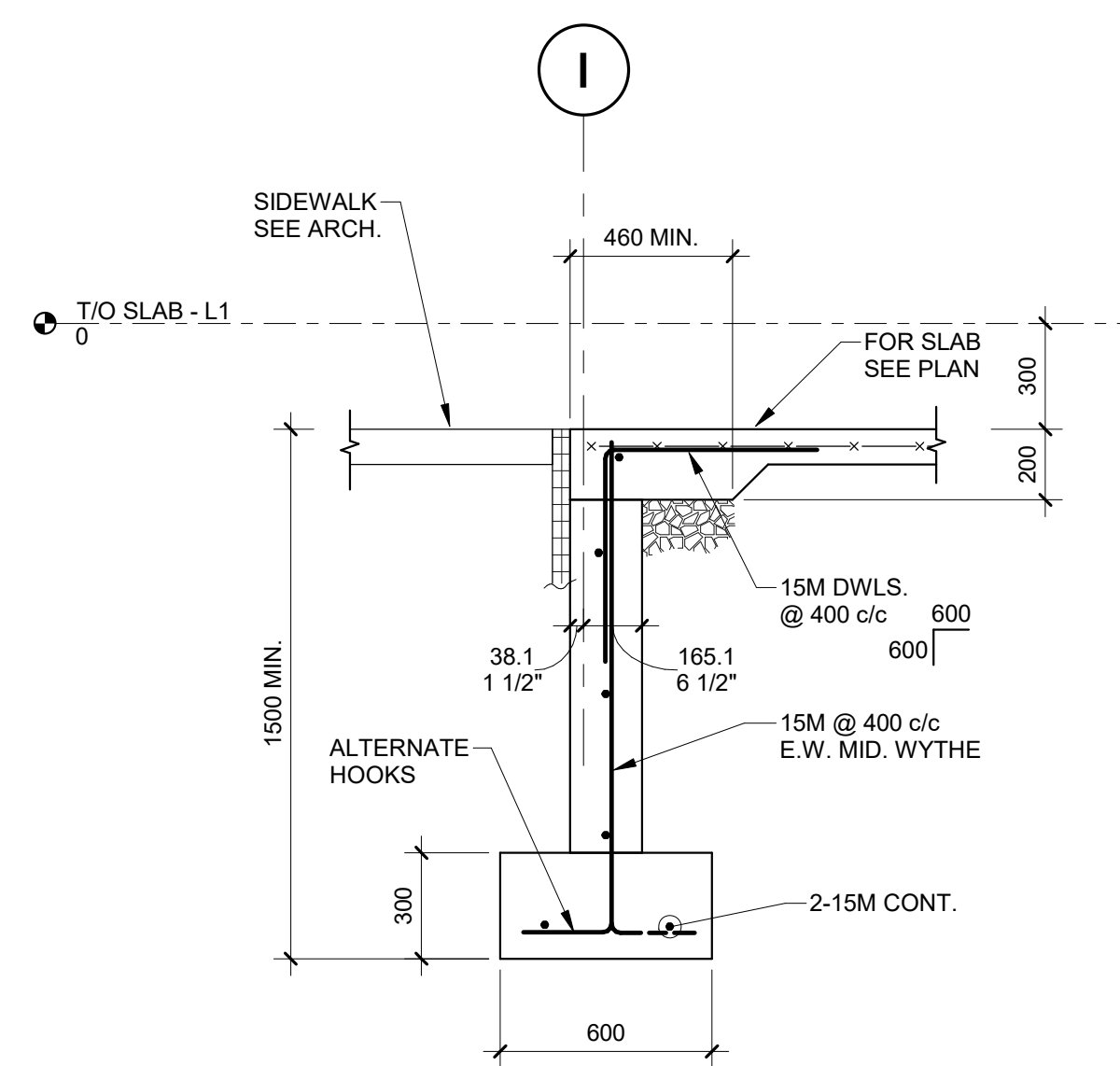
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S1.10 1:20



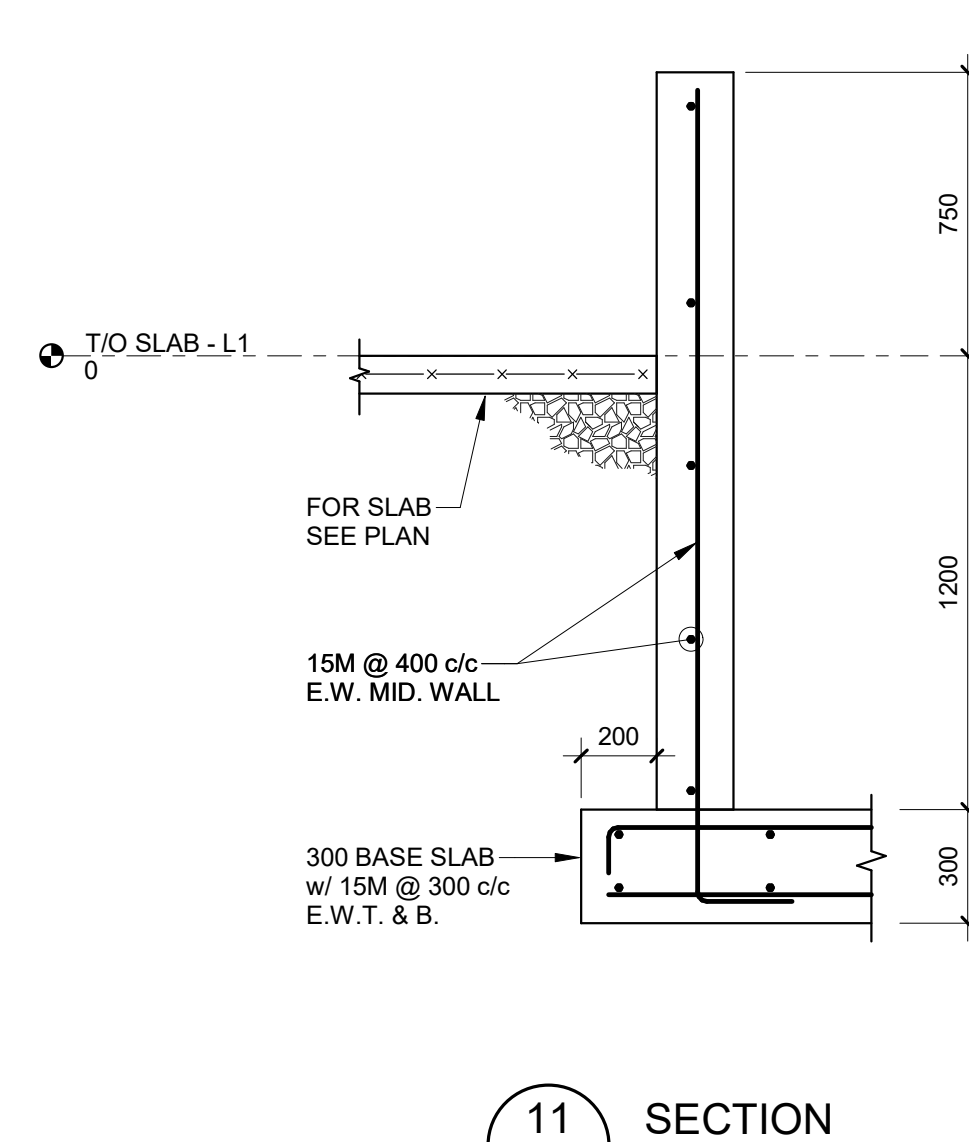
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S1.11 1:20



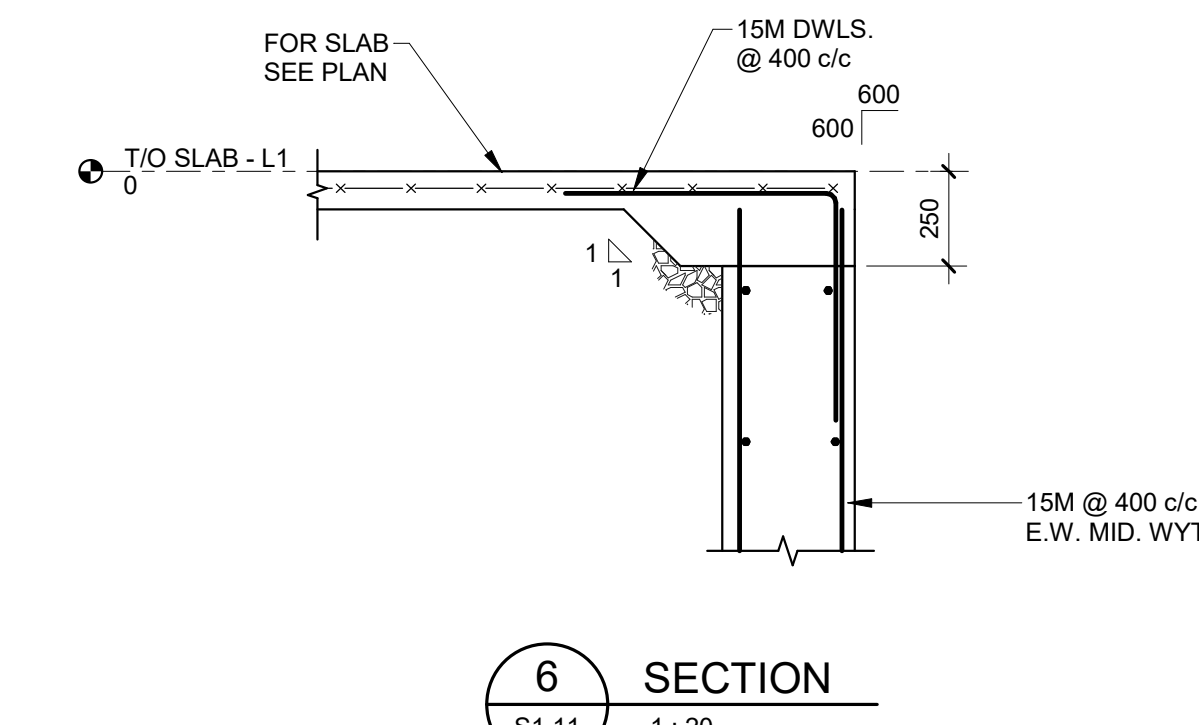
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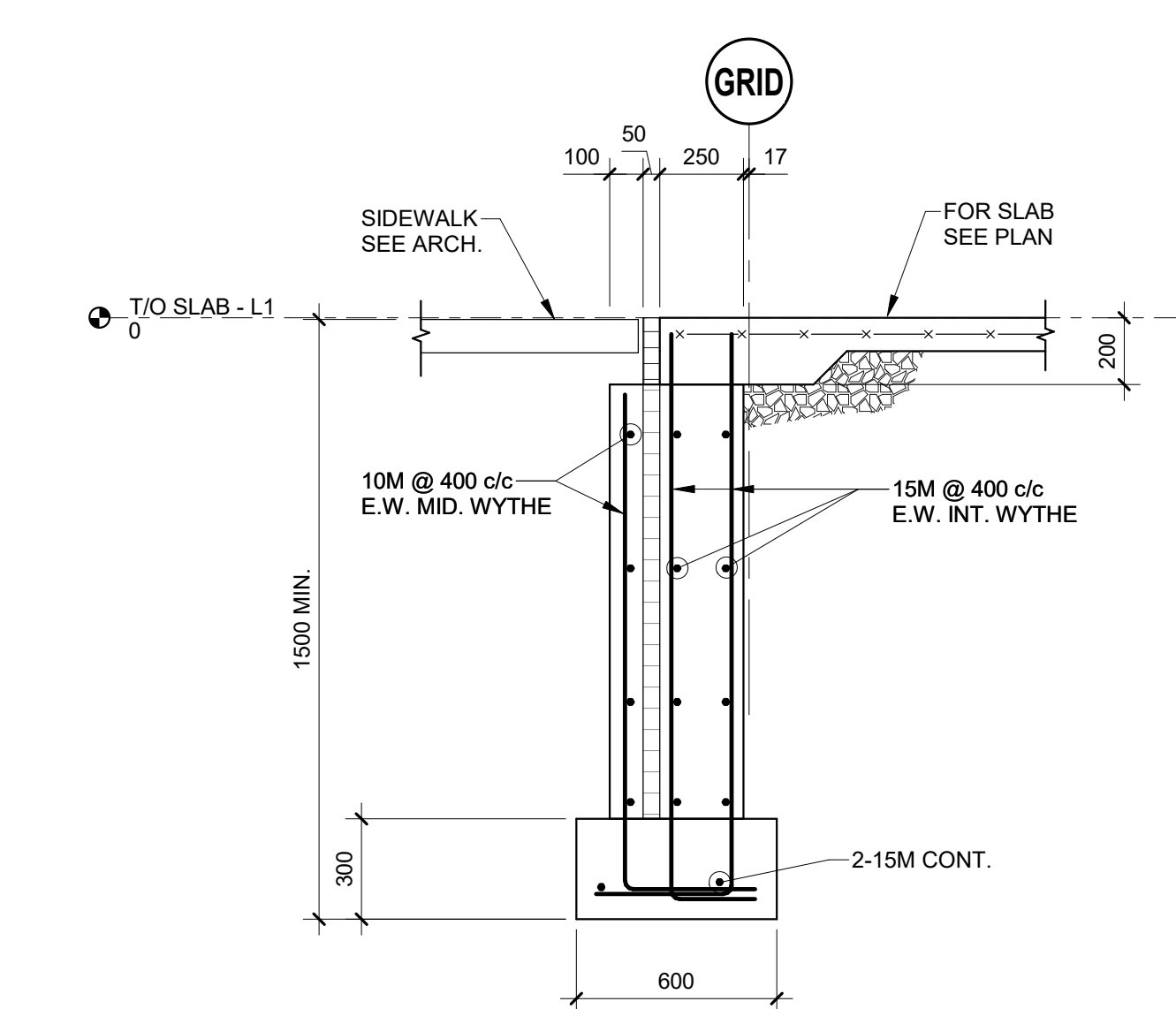
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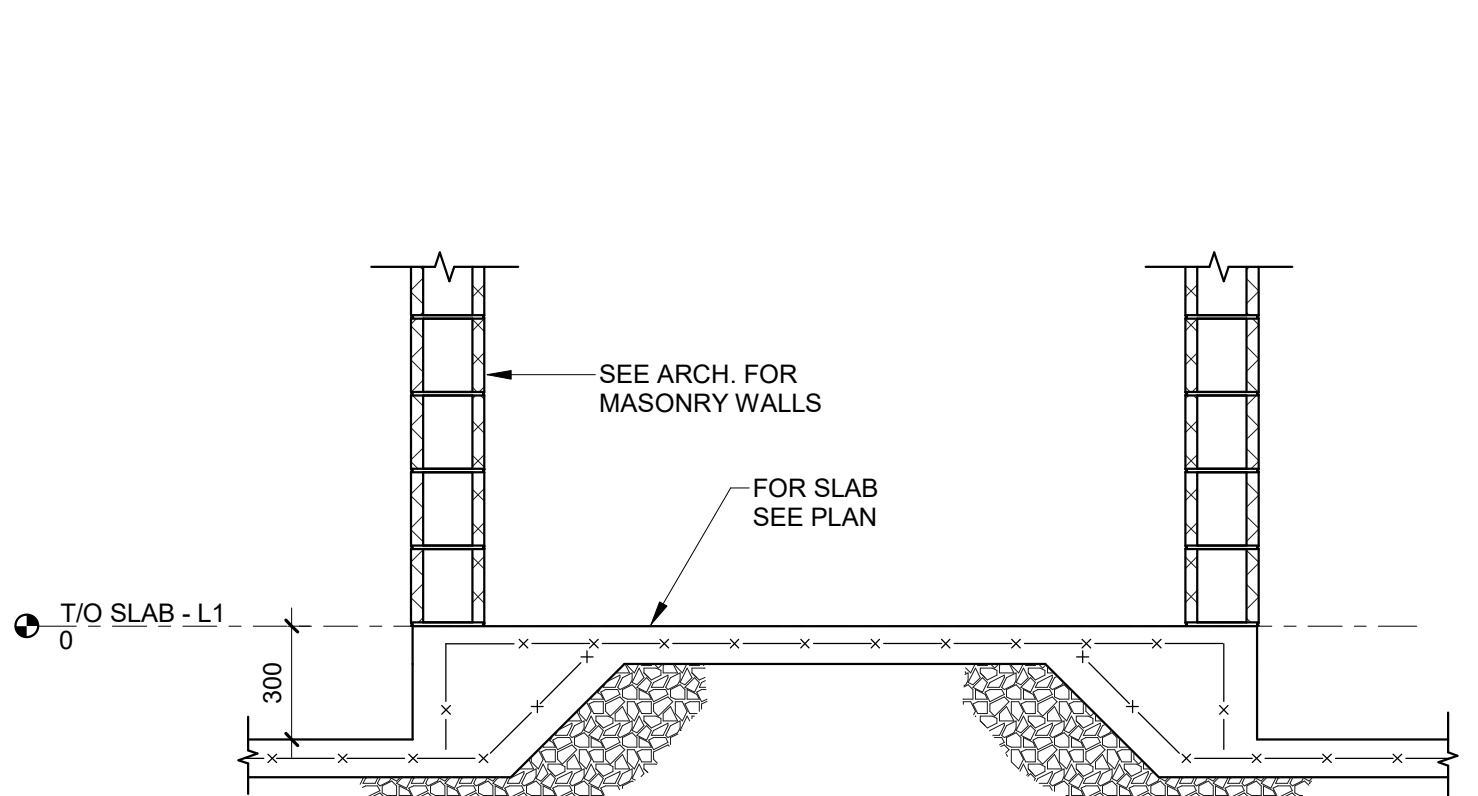
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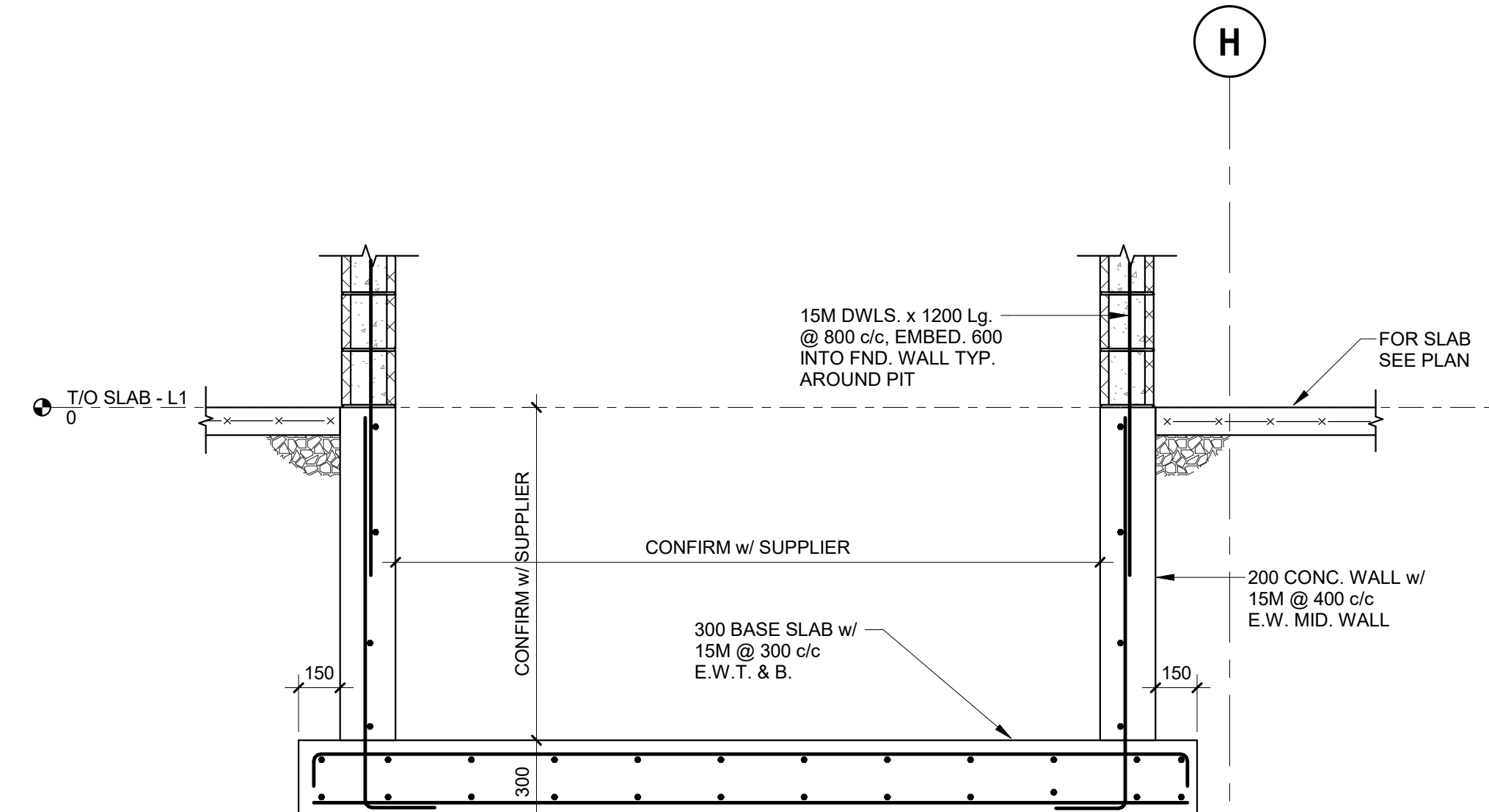
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S1.11 1:20



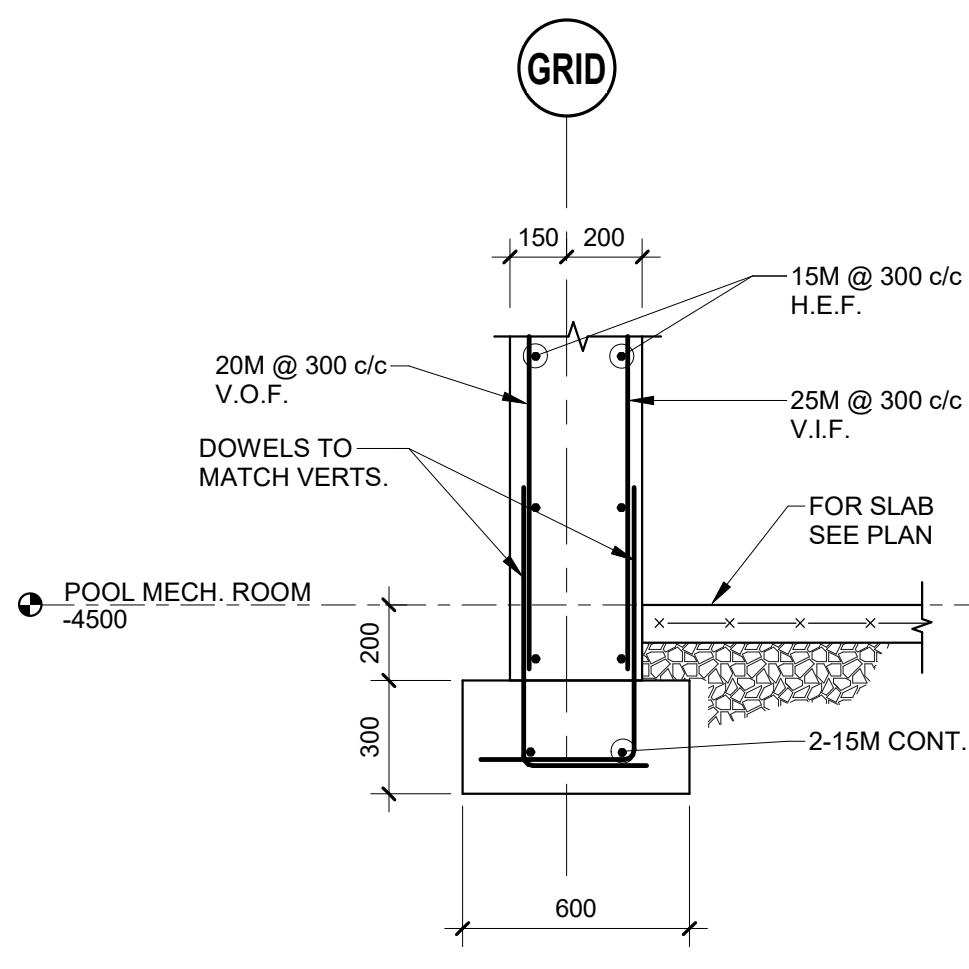
2 SECTION
S1.11 1:20



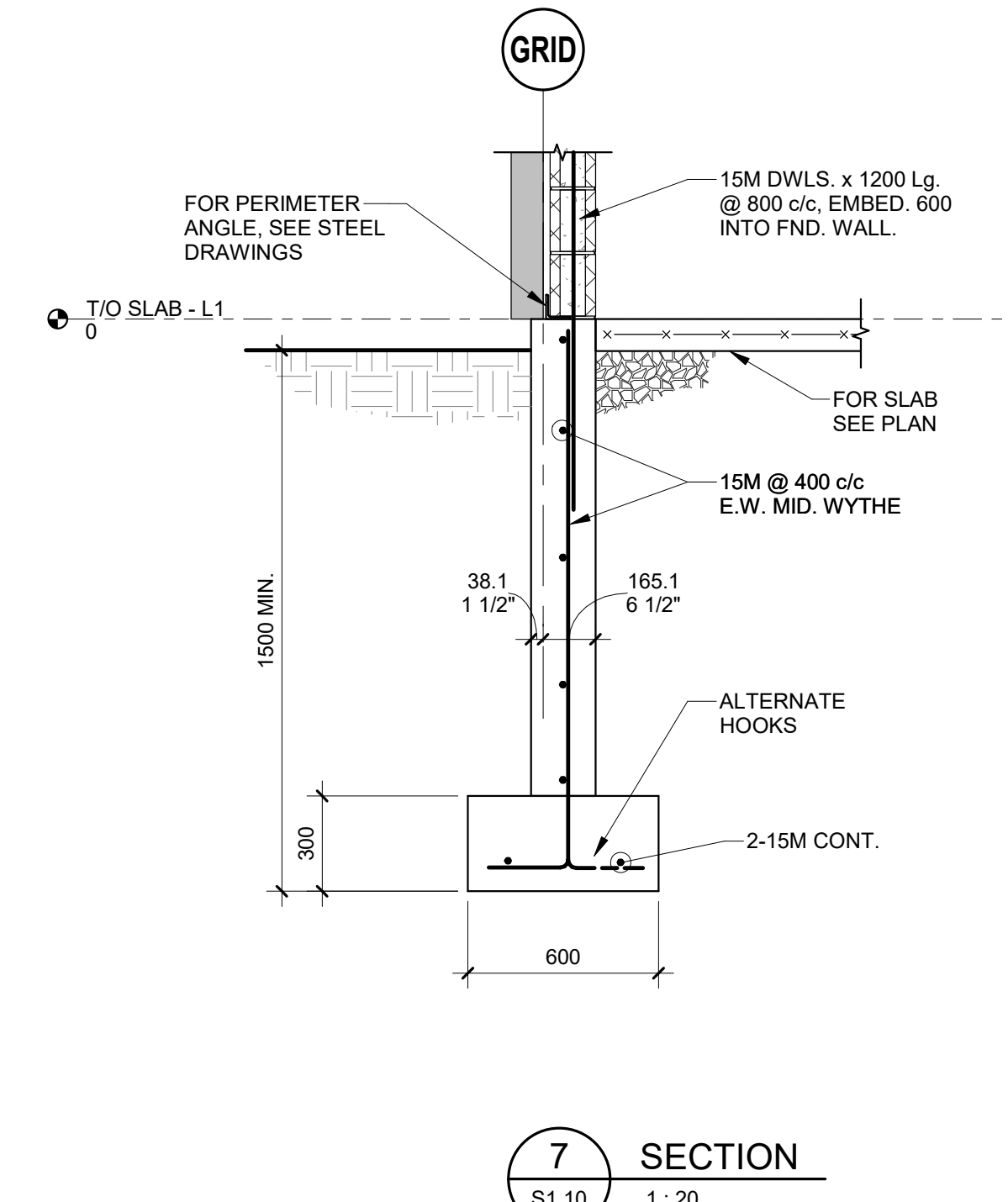
20 SECTION
S1.10 1:20



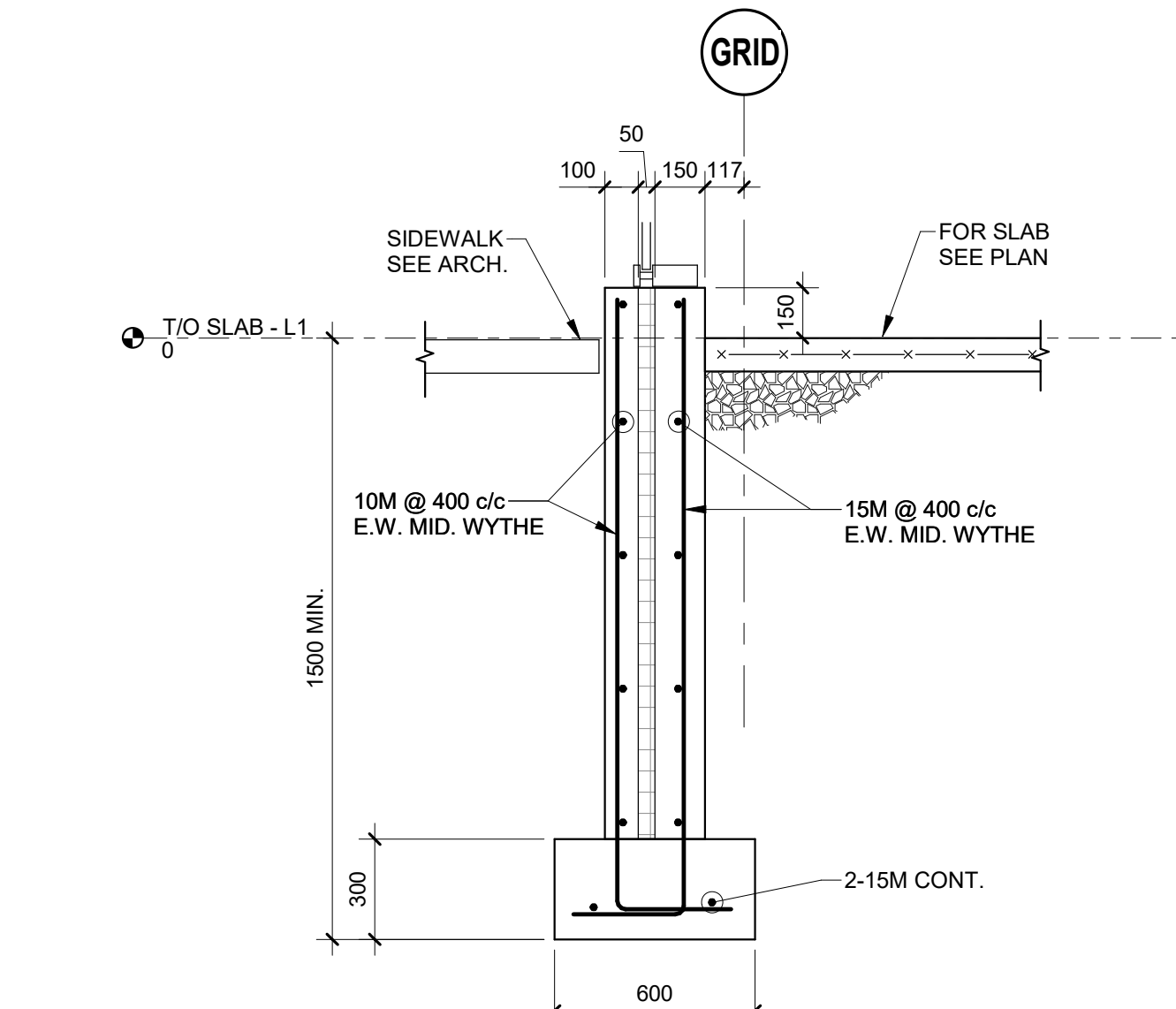
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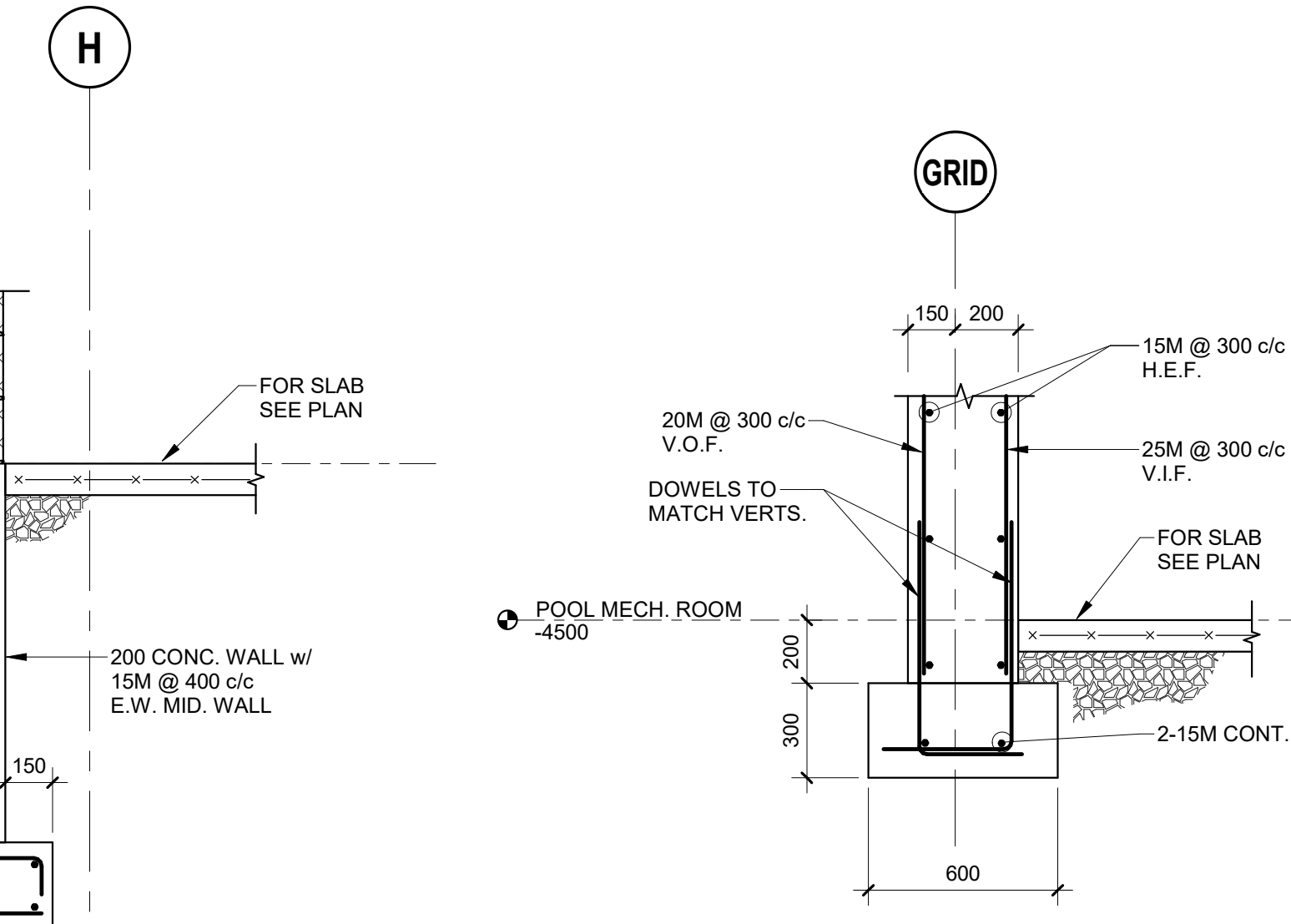
12 SECTION
S1.11 1:20



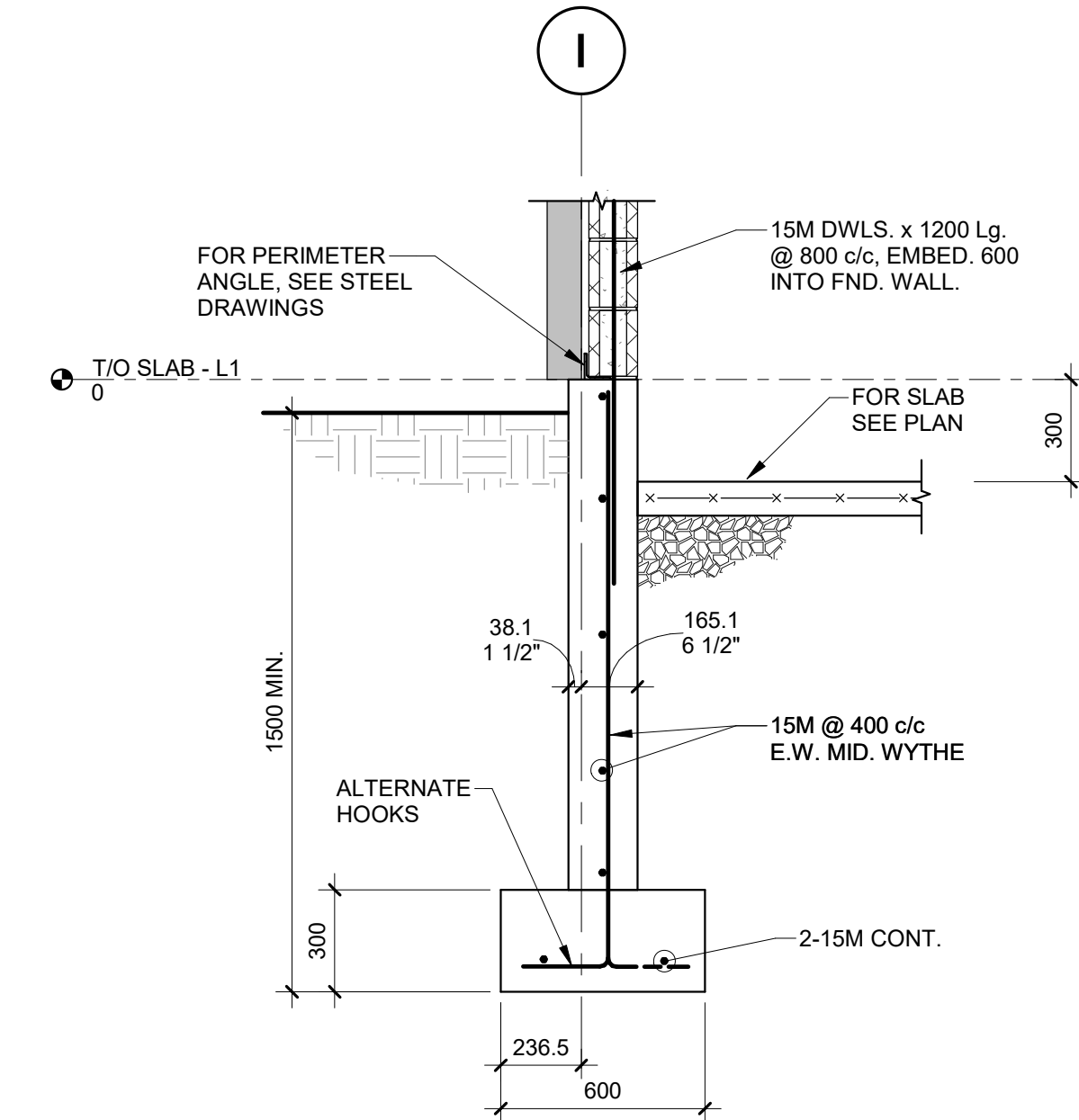
7 SECTION
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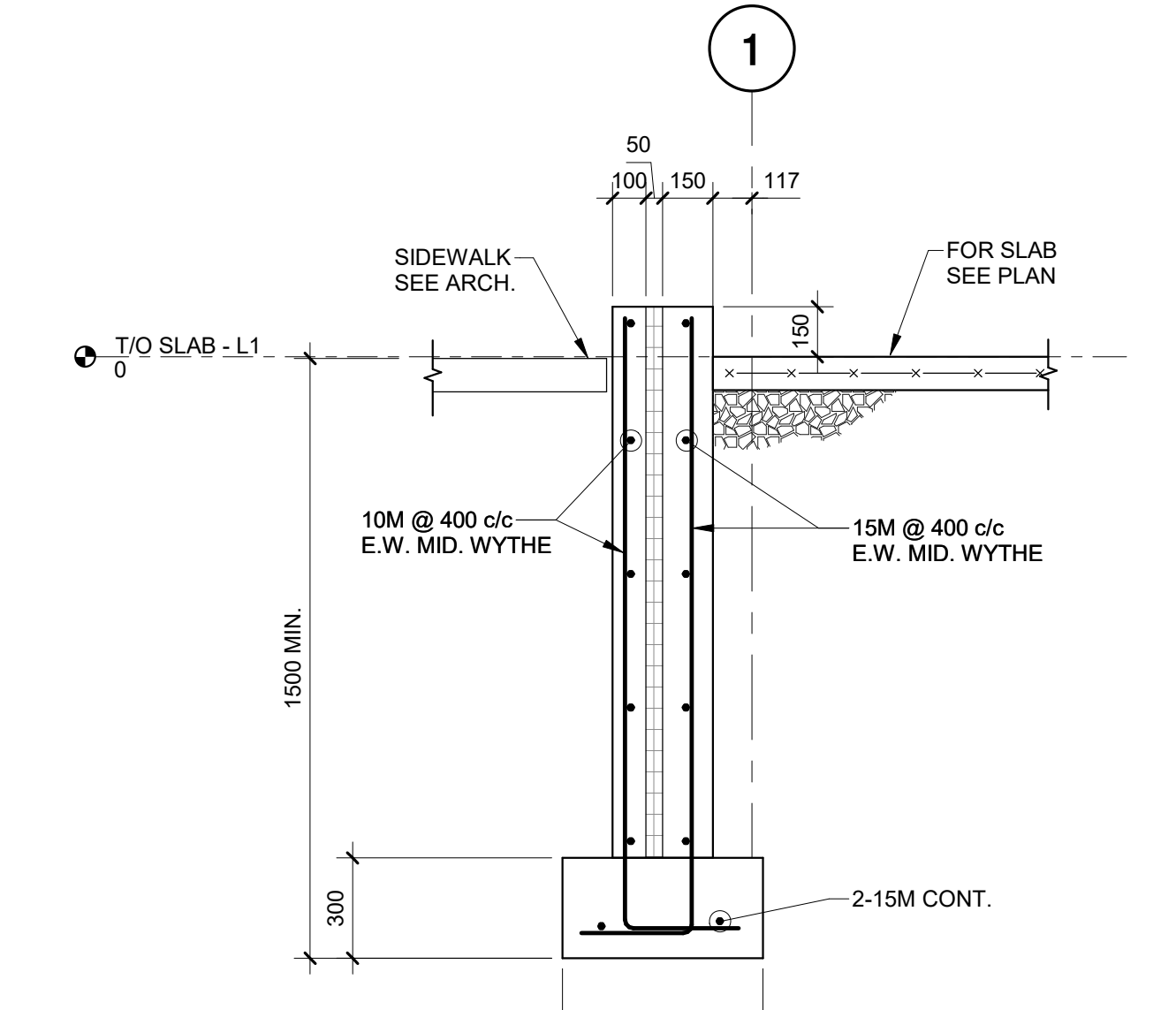
3 SECTION
S1.10 1:20



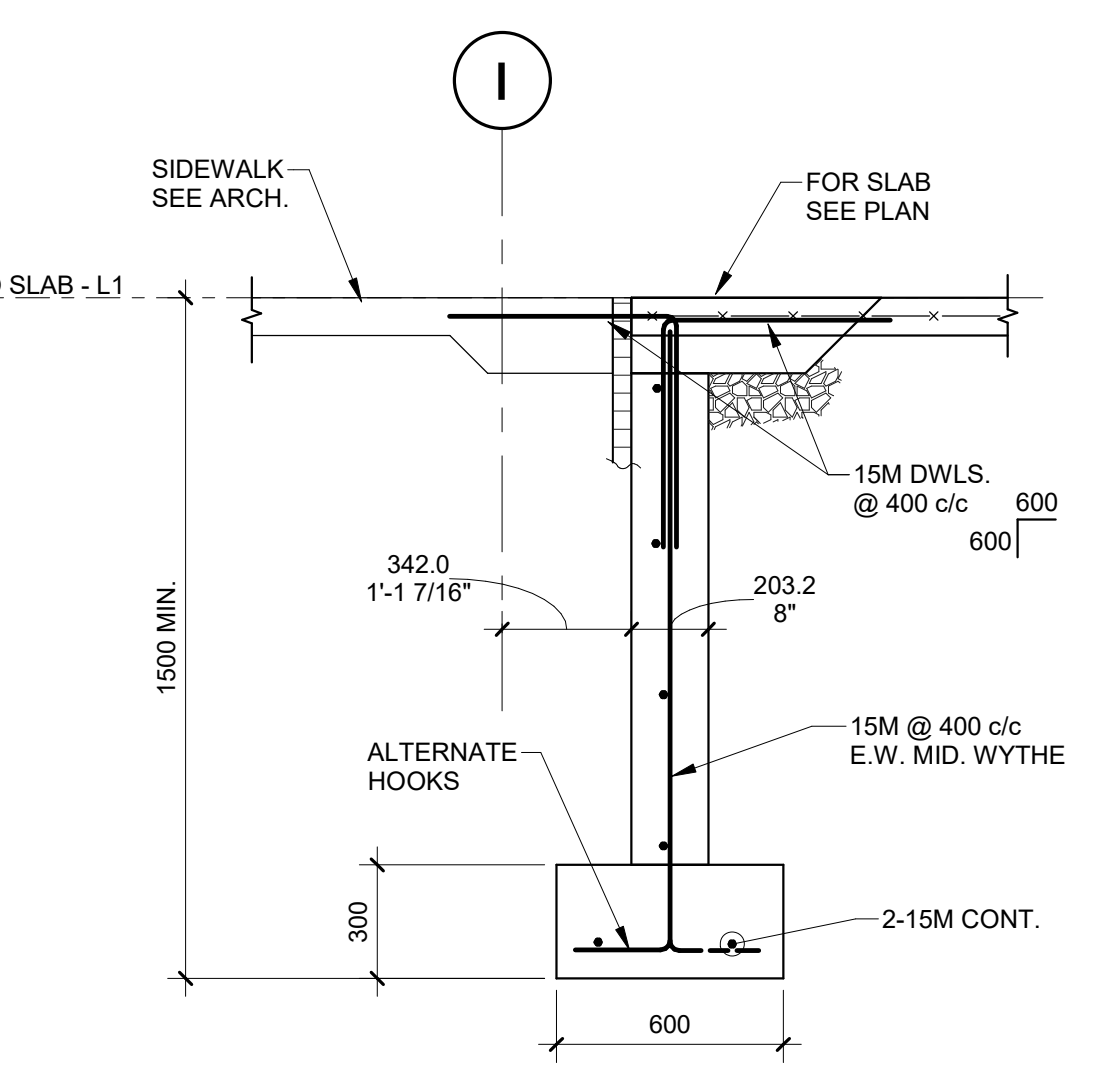
13 SECTION
S1.10 1:20



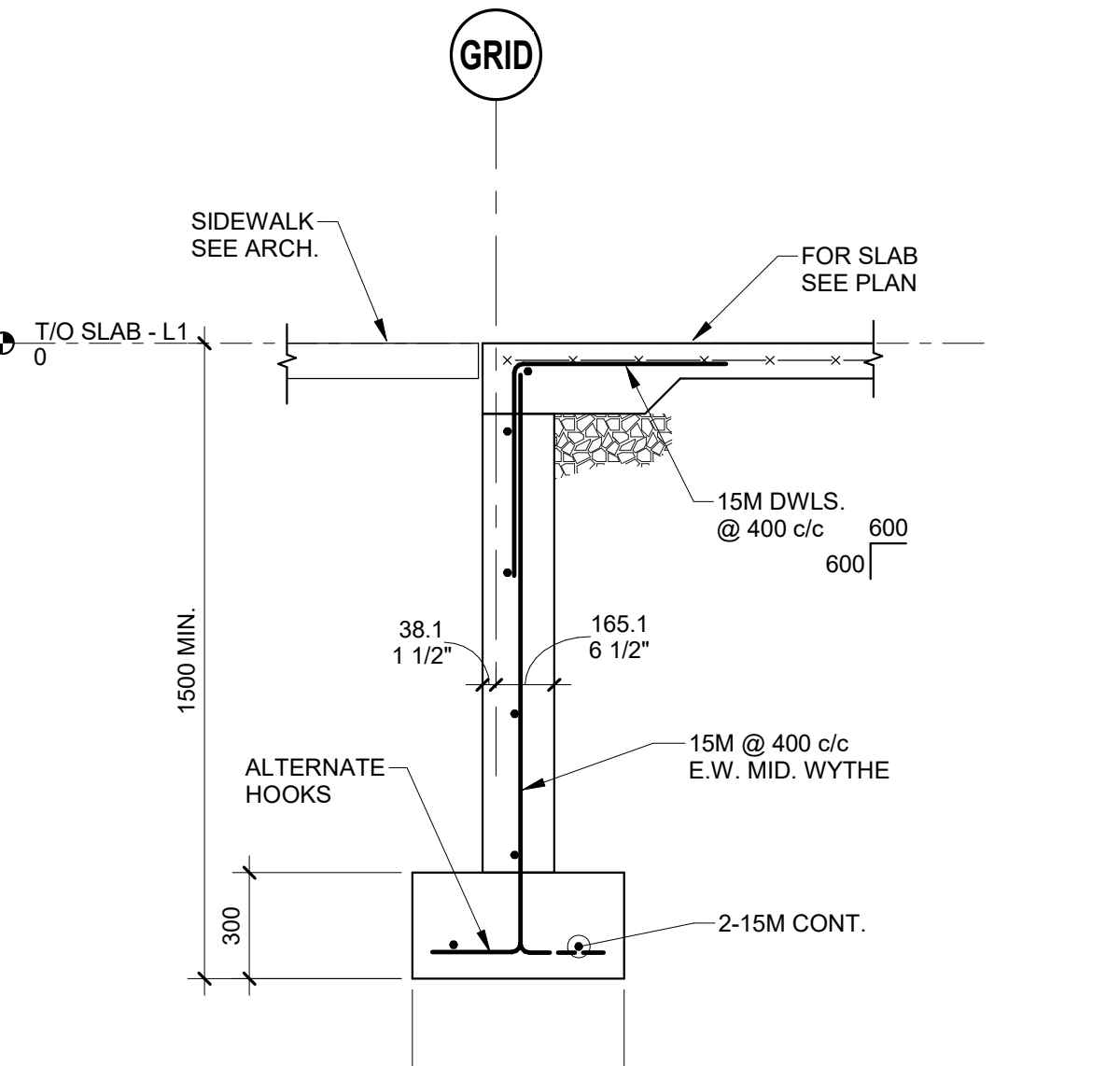
8 SECTION
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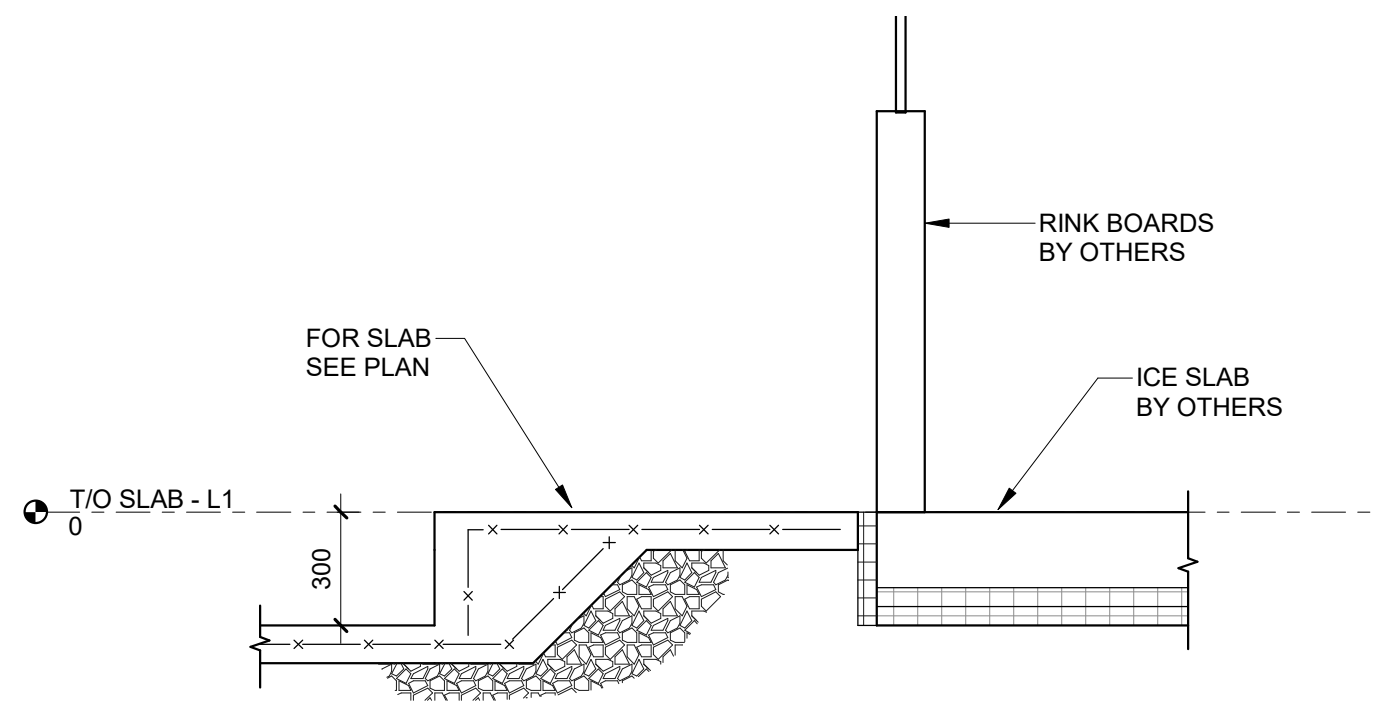
4 SECTION
S1.11 1:20



21 SECTION
S1.10 1:20



17 SECTION
S1.10 1:20



9 SECTION
S1.10 1:20

NO.	REVISION	DATE
9	TRF IFT	2023.04.10
8	RE-ISSUED FOR BUILDING PERMIT	2023.01.26
7	TRF REVISIONS	2023.01.09
6	ISSUED FOR BUILDING PERMIT	2022.11.01
5	TRF IFT	2022.11.01
4	ISSUED FOR 99% CD REVIEW	2022.10.21
3	ISSUED FOR 90% CD REVIEW	2022.08.22
2	TRF IFT	2022.04.22
1	ISSUED FOR DESIGN DEVELOPMENT	2022.03.04

PROJECT NAME
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PE

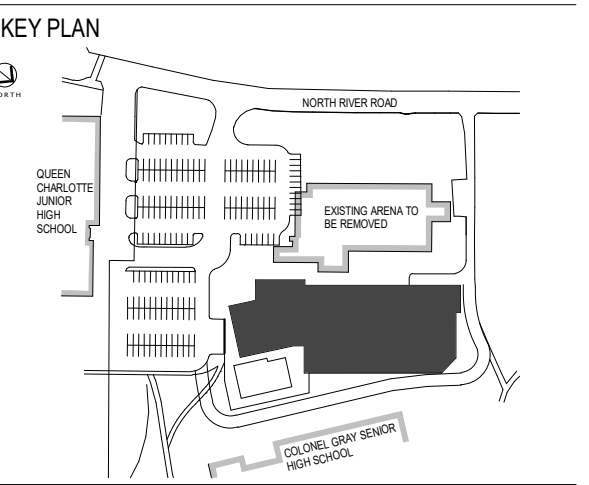
PROJECT NO.: 21111

DRAWN BY: P.R.

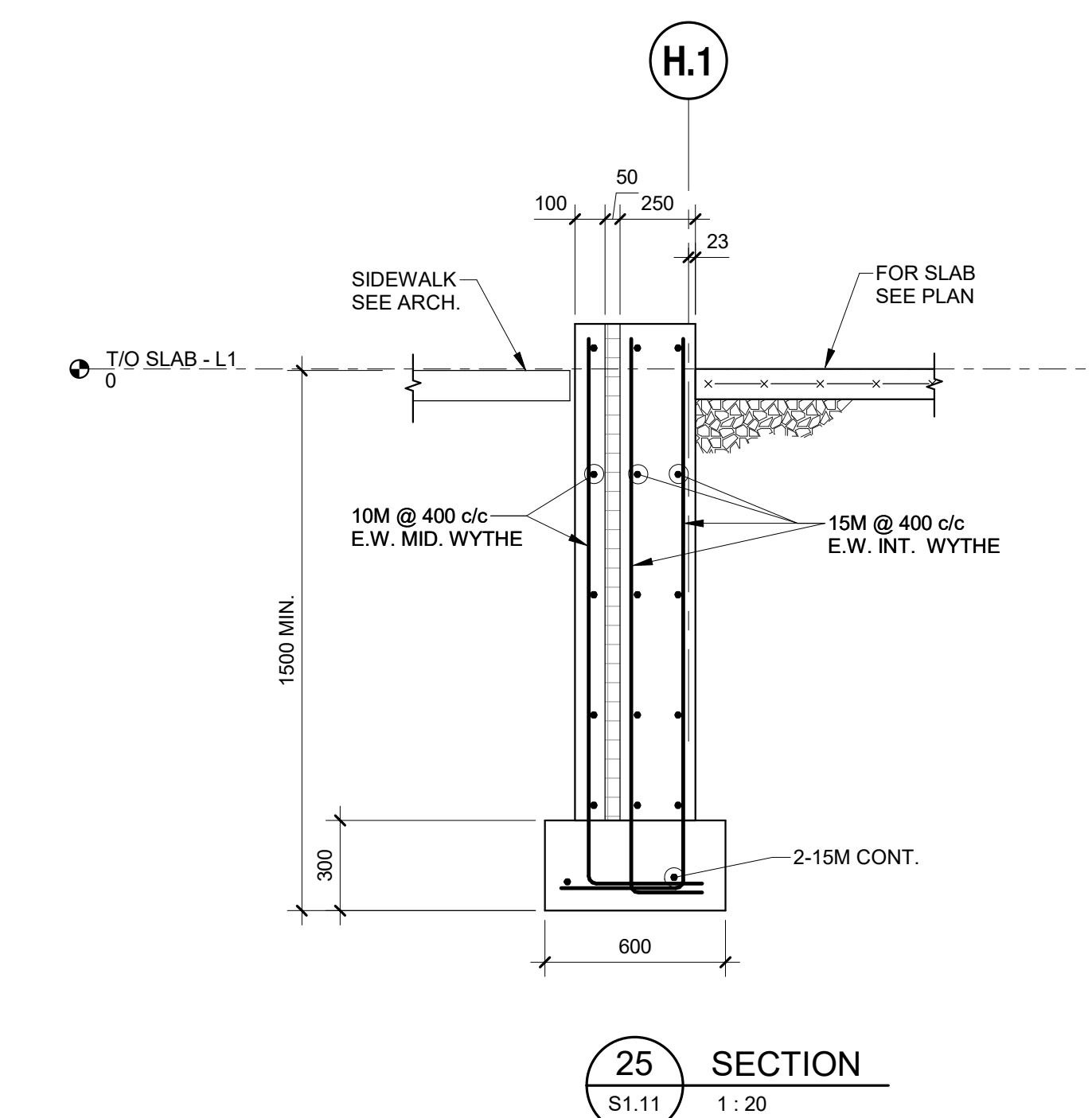
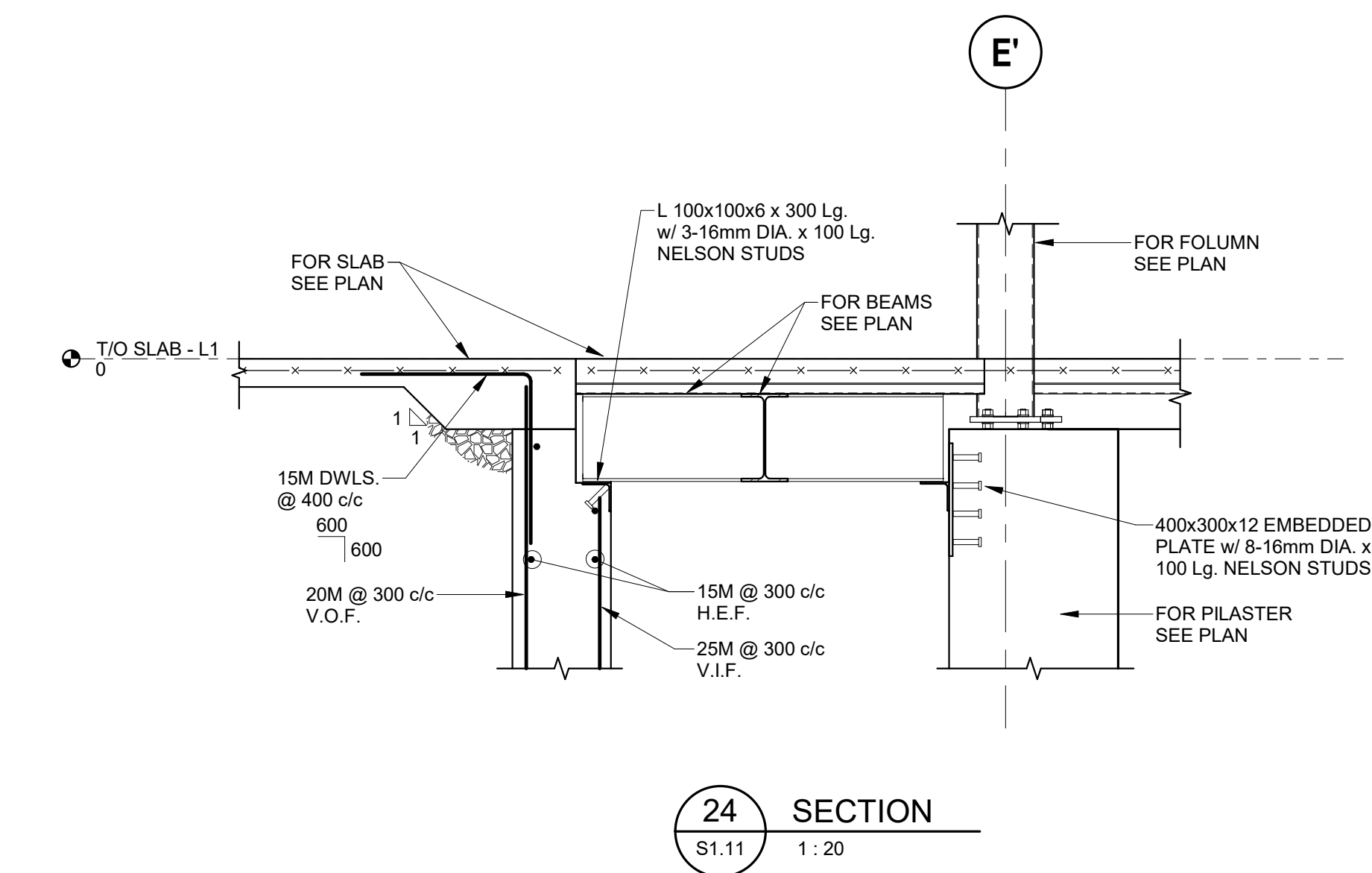
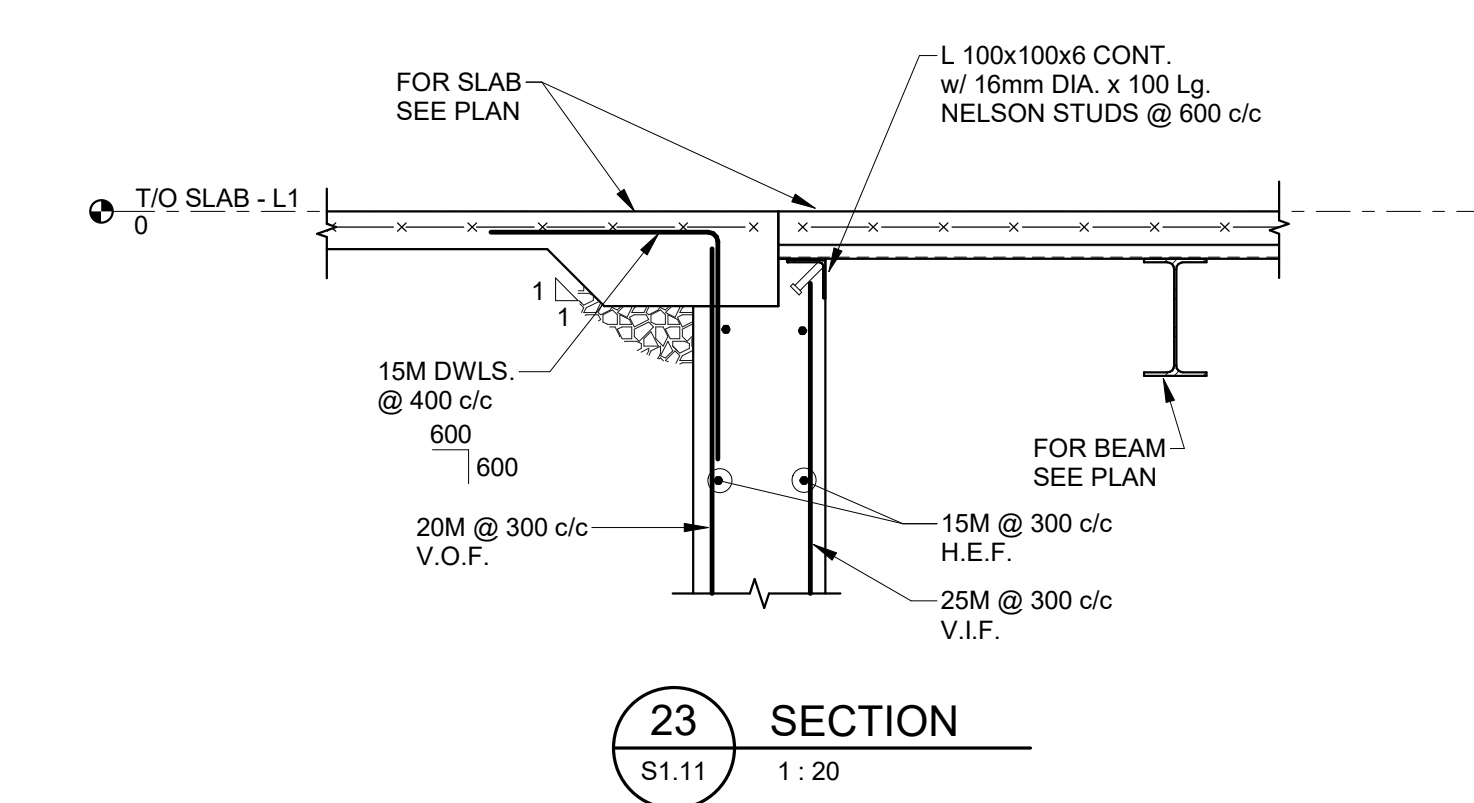
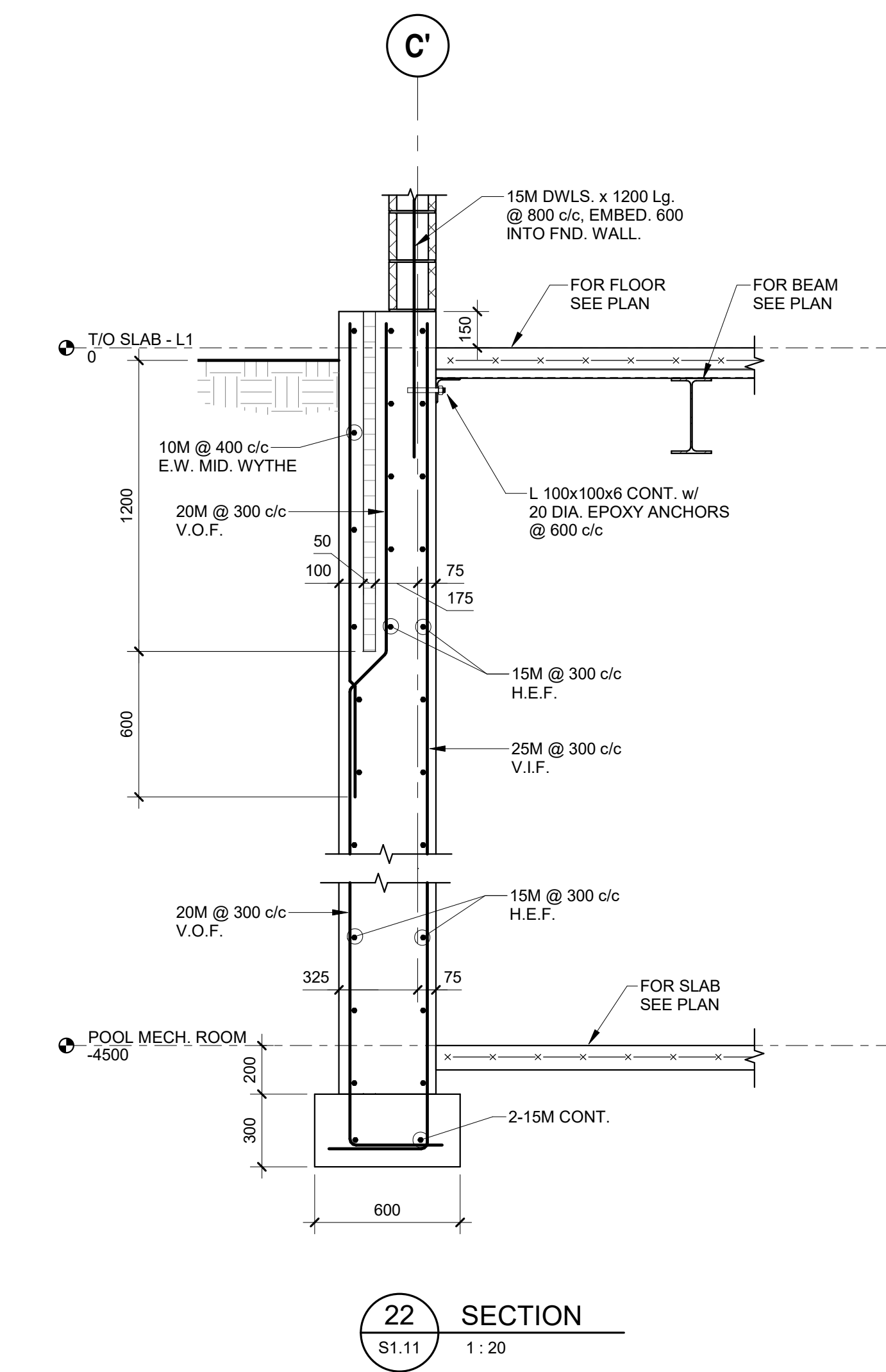
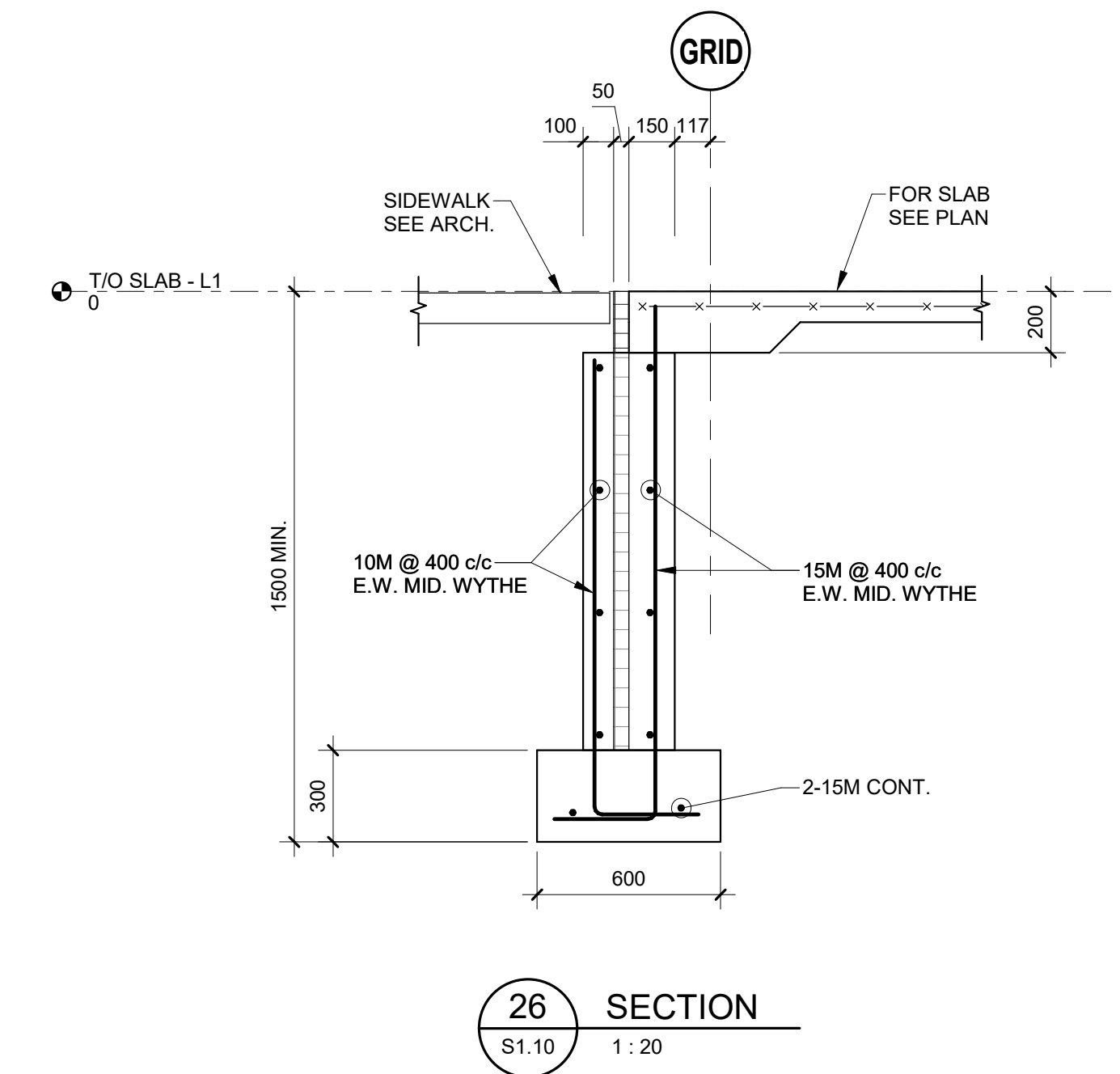
CHECKED BY: S.U.

SCALE: 1:20

FOUNDATION SECTIONS



CONSULTANT

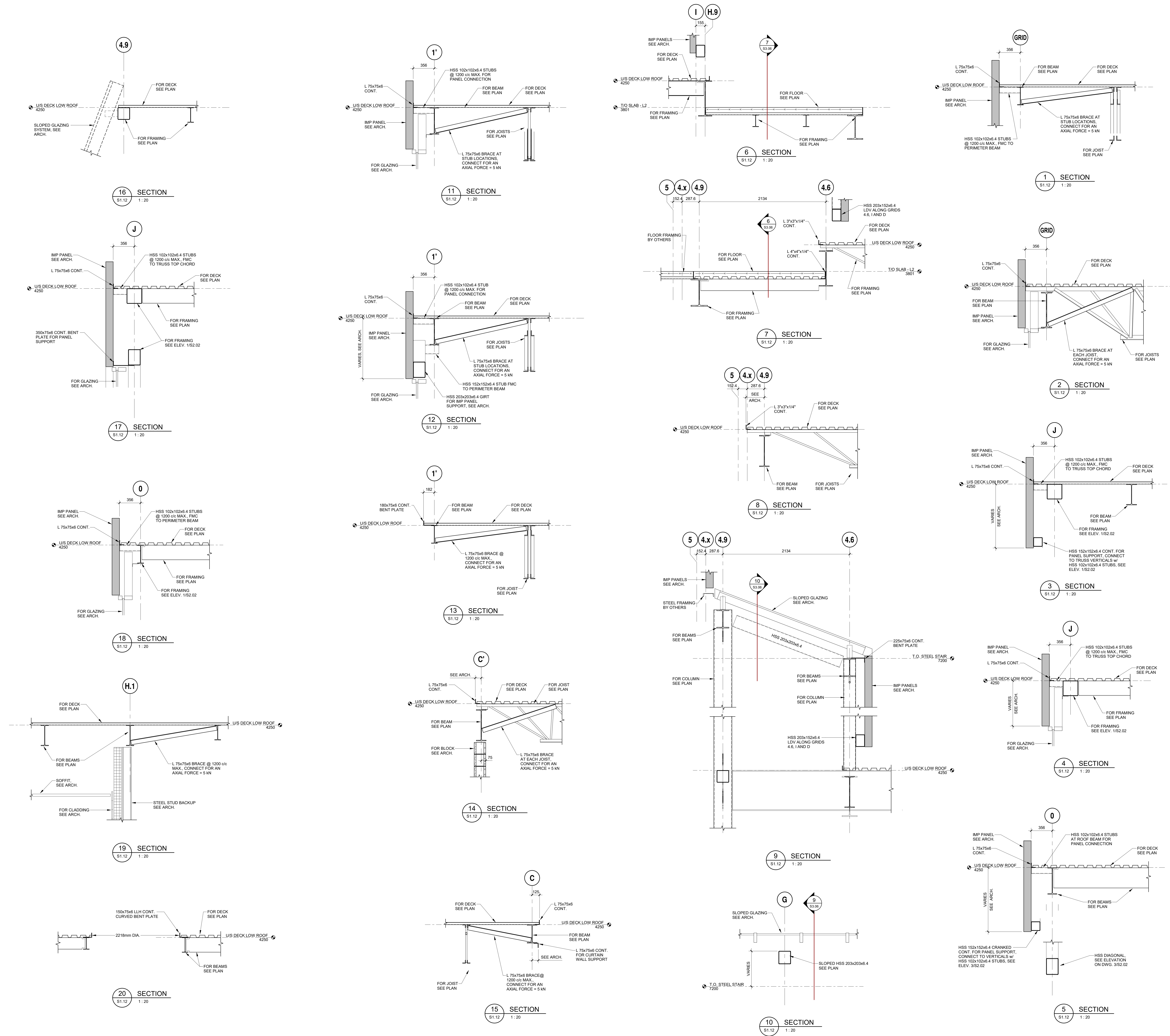


NO.	REVISION	DATE
6	TPM IFT	2023.04.10
5	RE-ISSUED FOR BUILDING PERMIT	2023.01.26
4	TPM REVISIONS	2023.01.09
3	ISSUED FOR BUILDING PERMIT	2022.11.01
2	TPM IFT	2022.11.01
1	ISSUED FOR 99% CD REVIEW	2022.10.21

PROJECT NAME:
 SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

PROJECT NO.: 21111
 DRAWN BY: P.R.
 CHECKED BY: S.U.
 SCALE: 1:20

FOUNDATION SECTIONS



NO.	REVISION	DATE
1	TPG IFT	2023.04.10

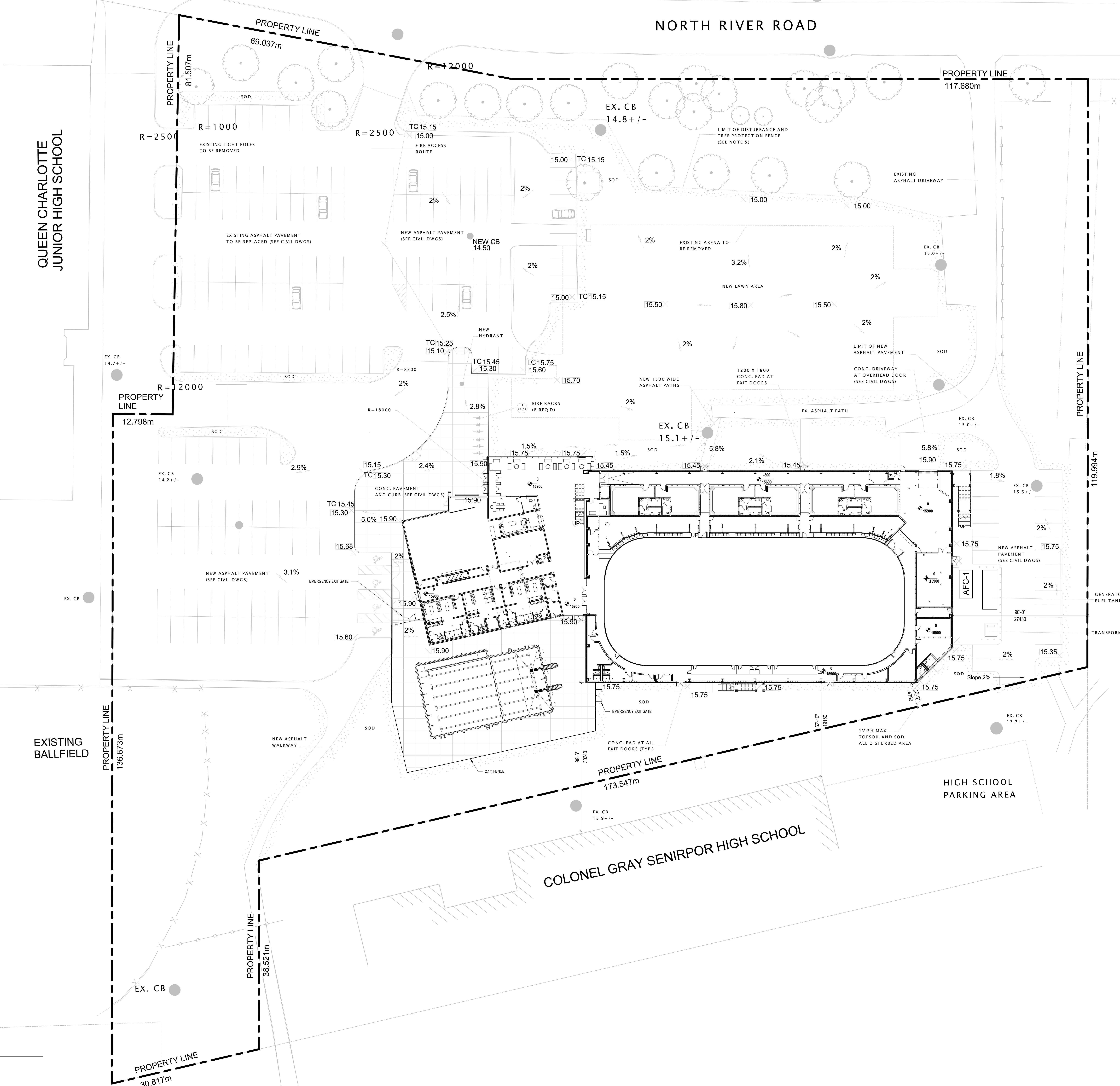
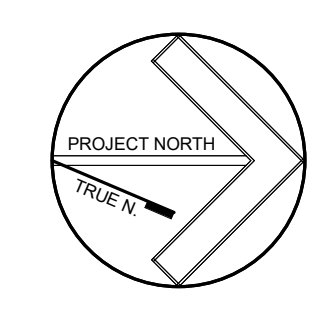
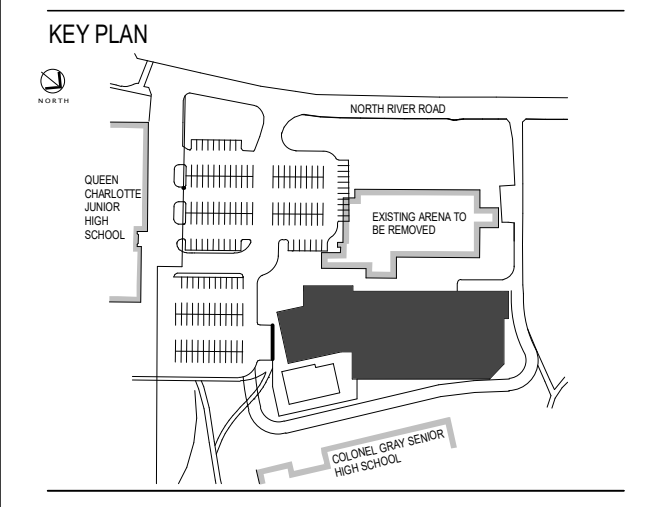
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PROJECT NAME: SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
110 NORTH RIVER ROAD CHARLOTTETOWN, PE

PROJECT NO.: 21111
DRAWN BY: P.R.
CHECKED BY: S.U.
SCALE: 1:20

STEEL SECTIONS

S3.06



QUEEN CHARLOTTE JUNIOR HIGH SCHOOL

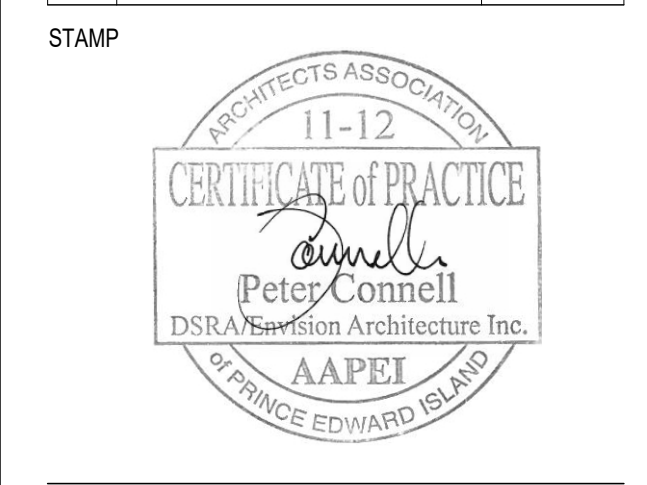
NORTH RIVER ROAD

COLONEL GRAY SENIOR HIGH SCHOOL

HIGH SCHOOL PARKING AREA

EXISTING BALLFIELD

3	TPI - ISSUED FOR TENDER	2023-04-10
2	TPI - ISSUED FOR TENDER	2022-11-01
1	TPI - ADDENDUM 1	2022-06-01
0	TPI - ISSUED FOR TENDER	2022-03-24
NO.	REVISION	DATE



PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

PROJECT NO.: 21111
DRAWN BY: OM / MM / DE
CHECKED BY: MMG / PC
SCALE: 1:250

GENERAL NOTES

1. POOL IS NOT PART OF THIS PACKAGE.
2. LOOSE FURNITURE SHOWN IS NOT PART OF THIS PACKAGE.
3. CONSTRUCTION DRAWINGS TO BE READ IN CONJUNCTION WITH ALL WORKING DRAWINGS.
4. DRAWINGS AND SPECIFICATIONS ARE TO BE READ IN CONJUNCTION WITH EACH OTHER AND THEREFORE THEY ARE DEEMED AS ONE DOCUMENT. WHERE A DISCREPANCY OR CONFLICT MAY EXIST, NOTIFY OWNER'S REPRESENTATIVE AND ARCHITECT IMMEDIATELY.
5. DRAWINGS ARE NOT TO BE SCALED. DIMENSIONS OF EXISTING CONDITIONS ARE APPROXIMATE AND ARE PROVIDED FOR ESTIMATION PURPOSES ONLY. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS WITHIN THE CONTRACT LIMITS AND NOTIFY THE ARCHITECT IMMEDIATELY IN WRITING OF ANY DEVIATION FROM CONTRACT DOCUMENTS NECESSITATED BY FIELD CONDITIONS OR ITEMS NOT REFERENCED IN THE CONTRACT DOCUMENTS AND SPECIFICATIONS
6. THE GENERAL CONTRACTOR IS ADVISED THAT NO VARIATIONS OR MODIFICATIONS WILL BE ALLOWED WITHOUT PRIOR APPROVAL OF THE OWNER'S REPRESENTATIVE AND ARCHITECT, AND WRITTEN PERMISSION OF THE OWNER'S REPRESENTATIVE AND ARCHITECT.
7. MAINTAIN THE INTEGRITY OF ALL LIFE SAFETY SYSTEMS AND REQUIRED EXISTS AT ALL TIMES THROUGHOUT THE DURATION OF THE PROJECT.
8. ALL CONSTRUCTION SHALL BE PERFORMED IN A SAFE AND ACCEPTABLE MANNER TO ALL AUTHORITIES HAVING JURISDICTION AND THE OWNER. A FIRE WATCH SHALL BE PROVIDED IF ANY HAZARDOUS SITUATIONS ARE THOUGHT TO BE POSSIBLE. COMPLY WITH GOVERNING REGULATIONS PERTAINING TO ENVIRONMENTAL PROTECTION FOR POLLUTION CONTROL.
9. TO ENSURE LOCATION AND CONTINUITY OF AIR AND VAPOUR BARRIER CLEARLY DEPICTED, DETAILS MAY SHOW COMPONENTS AND ASSEMBLIES AS DISCONTINUOUS OR PULLED APART.
10. ALL NEW CONSTRUCTION IS TO BE IN ACCORDANCE WITH THE CURRENT EDITION OF THE NATIONAL BUILDING CODE OF CANADA, FIRE, PLUMBING, ELECTRICAL CODES OF CANADA, AND THE OCCUPATIONAL HEALTH AND SAFETY ACT OF THE PROVINCE, TO THE APPROVAL OF THE AUTHORITY HAVING JURISDICTION.
11. REFER TO THE ROOM SCHEDULE FOR WALL FINISHES.
12. FOR PRE-ENGINEERED STEEL AND ENVELOPE AT MAIN ARENA REFER TO TP1
13. FOR DEMOLITION OF EXISTING POOL AND ARENA REFER TO TP2
14. FOR ELEVATOR REFER TO TP3
15. FOR UNDERGROUND SERVICES, SITE PREPARATION, FOUNDATION AND CONCRETE REFER TO TP4
16. FOR POOL PACKAGE REFER TO TP5
17. FOR ICE SLAB, NETTING, HOCKEY DASHER BOARDS AND GLAZING REFER TO TP7
18. FOR HVAC AND REFRIGERATION REFER TO TP7
19. EPOXY PAINT FINISH ON ALL EXPOSED GYPSUM BOARD IN ARENA AND SERVICE AREAS

INTERIOR WALL / PARTITION ASSEMBLIES

	P1- CONC. BLOCK WALL	P2- CONC. BLOCK WALL	P3- CONC. BLOCK WALL	P4- CONC. BLOCK WALL	P6- 152 STL. STUD. INTERIOR PARTITION W/ INSULATION	P6a- 152 STL. STUD. INTERIOR PARTITION W/ INSULATION	P6b- 152 STL. STUD. CLADDING SUPPORT WALL	P6c- 152 STL. STUD. CLADDING SUPPORT WALL	P6d- 152 STL. STUD. W/ TORRIERED WOOD FINISH	P7- 152 STL. STUD. INTERIOR PARTITION	P8- 92 STL. STUD. INTERIOR PARTITION	P8a- 92 STL. STUD. INTERIOR PARTITION	P8b- 92 STL. STUD. INTERIOR WALL
PARTITION WALL ASSEMBLY													
	190mm CONCRETE BLOCK WALL TO US DECK UNLESS NOTED OTHERWISE 1HR FIRE RESISTANT RATING WHERE NOTED *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) SEE ELEVATIONS FOR EXTENTS TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	100mm SEM SOLID CONCRETE BLOCK WALL TO US DECK UNLESS NOTED OTHERWISE TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	140mm CONCRETE BLOCK WALL TO US DECK UNLESS NOTED OTHERWISE *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) SEE ELEVATIONS FOR EXTENTS TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	90mm CONCRETE BLOCK WALL TO US DECK UNLESS NOTED OTHERWISE *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) SEE ELEVATIONS FOR EXTENTS TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	150mm TYPE X ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X ABUSE RESISTANT GYP. BD. TOP AND BOTTOM OF PARTITION CONTINUOUS MASTIC ACOUSTIC SEAL, EACH SIDE, TYPICAL. *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	150mm TYPE X ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X ABUSE RESISTANT GYP. BD. TOP AND BOTTOM OF PARTITION CONTINUOUS MASTIC ACOUSTIC SEAL, TYPICAL. *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	150mm ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + 150mm LET. GRADE GYP. BD. TO US DECK UNLESS NOTED OTHERWISE	150mm ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. TO US DECK UNLESS NOTED OTHERWISE	150mm x 100mm TORRIERED TAG WOOD BEARING BOARD. 150mm METAL STUDS @ 400 C.C. 150mm TYPE X ABUSE RESISTANT GYP. BD. WHEN NOTED ONLY 150mm ABUSE RESISTANT GYP. BD. ACOUSTIC COMPOUND BETWEEN CW TO US DECK UNLESS NOTED OTHERWISE TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY SEE INT. ELEVATIONS FOR EXTENTS	11.4K/80 150mm TYPE X GYP. BD. WITH ACOUSTICAL COMPOUND BETWEEN CW TO US DECK UNLESS NOTED OTHERWISE 150mm METAL STUDS @ 400 C.C. 150mm TYPE X ABUSE RESISTANT GYP. BD. WHEN NOTED ONLY 150mm ABUSE RESISTANT GYP. BD. ACOUSTIC COMPOUND BETWEEN CW TO US DECK UNLESS NOTED OTHERWISE TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY SEE INT. ELEVATIONS FOR EXTENTS	150mm TYPE X GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X GYP. BD. (SEE ELEVATIONS FOR EXTENTS) *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	150mm TYPE X GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X GYP. BD. (SEE ELEVATIONS FOR EXTENTS) *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	150mm ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE
FIRE RATING	1.5 HR	3 HR	1 HR	0.5 HR	-	2 HR WHERE NOTED	-	-	-	2 HR	1 HR	45 MIN	-
ETC RATING	0	-2	0	0	-	45 MIN. TO 2 HR	-	-	-	0 (1.00-1.02)	45 MIN. 100/99	0	0
REFERENCE	NBCC 2015 TABLE 9.13.1.4. 8/9	NBCC 2015 TABLE 9.13.1.4. 8/9	NBCC 2015 TABLE 9.13.1.4. 8/9	NBCC 2015 TABLE 9.13.1.4. 8/9	-	45 MIN. TO 2 HR	-	-	-	0 (1.00-1.02)	45 MIN. 100/99	0	NBCC 2015 TABLE 9.13.1.4. 8/9

INTERIOR WALL / PARTITION ASSEMBLIES

	P9- 6" STL. STUD. INTERIOR PARTITION W/ INSULATION AND WOOD BOARD	P9a- 6" STL. STUD. INTERIOR PARTITION AND WOOD BOARD	P9b- 6" STL. STUD. INTERIOR PARTITION AND WOOD BOARD	P10- CONC. BLOCK WALL	P11- CONC. BLOCK WALL INTERIOR PARTITION W/ GYP. BD.	P12- CONC. BLOCK WALL INTERIOR PARTITION W/ WOOD BOARD	P12a- CONC. BLOCK WALL INTERIOR PARTITION W/ WOOD BOARD	P13- 92 STL. STUD. INTERIOR PARTITION W/ WOOD BOARD	P13a- 102 STL. STUD. INTERIOR PARTITION W/ WOOD BOARD	P14- CONC. BLOCK WALL	P14a- BOARDS	F1- 41 STL. STUD. INTERIOR FLOORING	F2- 64 STL. STUD. INTERIOR PARTITION W/ GYP. BOARD
PARTITION WALL ASSEMBLY													
	25mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + 150mm METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm ABUSE RESISTANT GYP. BD. TOP AND BOTTOM OF PARTITION CONTINUOUS MASTIC ACOUSTIC SEAL, TYPICAL. TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	25mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + 150mm METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm ABUSE RESISTANT GYP. BD. TOP AND BOTTOM OF PARTITION CONTINUOUS MASTIC ACOUSTIC SEAL, TYPICAL. TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	25mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + 150mm METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm ABUSE RESISTANT GYP. BD. TOP AND BOTTOM OF PARTITION CONTINUOUS MASTIC ACOUSTIC SEAL, TYPICAL. TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	6" CONCRETE BLOCK WALL TO US DECK UNLESS NOTED OTHERWISE *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) SEE ELEVATIONS FOR EXTENTS TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	150mm ABUSE RESISTANT GYP. BD. + 25mm FLOORING CHANNEL @ 400 C.C. + 150mm CONCRETE BLOCK TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	150mm ABUSE RESISTANT GYP. BOARD + 25mm FLOORING CHANNEL @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm CONCRETE BLOCK TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	150mm ABUSE RESISTANT GYP. BOARD + 25mm METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm SEMI-SOLID CONCRETE BLOCK TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	150mm HOR. CLEAR FINE BOARDS BLACK BUILDING WRAP + 150mm METAL STUDS @ 400 C.C. TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	25mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + 150mm METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	17' (54 mm) CONCRETE BLOCK WALL TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) SEE ELEVATIONS FOR EXTENTS	HOCKEY DASHER BOARDS TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	150mm ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm ABUSE RESISTANT GYP. BD. (SEE ELEVATIONS FOR EXTENTS) *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE	150mm ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm ABUSE RESISTANT GYP. BD. (SEE ELEVATIONS FOR EXTENTS) *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY TO 150mm ABOVE CEILING UNLESS INDICATED OTHERWISE
FIRE RATING	-	-	-	1.5 HR	2 HR	1.5 HR	3 HR	-	-	2 HR	-	-	-
ETC RATING	0	0	0	0	0	0	0	-	-	0	-	-	0
REFERENCE	-	-	-	NBCC 2015 TABLE D.2.1.1 TYPE 9 w/ N CONCRETE	NBCC 2015 TABLE D.2.1.1 TYPE 9 w/ N CONCRETE	NBCC 2015 TABLE D.2.1.1 TYPE 9 w/ N CONCRETE	NBCC 2015 TABLE D.2.1.1 TYPE 9 w/ N CONCRETE	-	-	NBCC 2015 TABLE D.2.1.1 TYPE 9 w/ N CONCRETE	-	-	-

FOUNDATION WALL ASSEMBLIES

	FDN 1- ELEVATOR AND SUMP FOUNDATION	FDN 2- PERIMETER FOUNDATION	FDN 3- PERIMETER FOUNDATION	FDN 4- PERIMETER FOUNDATION
FOUNDATION				
	200mm C.I.P. CONCRETE WALL (SEE STRUCT.) 200mm ASPHALT IMPREGATED FIBRE BOARD 150mm CONCRETE FACED INSULATED WALL PANEL - BOUND GRADE	200mm C.I.P. CONCRETE WALL (SEE STRUCT.) 200mm ASPHALT IMPREGATED FIBRE BOARD 150mm CONCRETE FACED INSULATED WALL PANEL - BOUND GRADE	200mm C.I.P. CONCRETE WALL (SEE STRUCT.) 200mm ASPHALT IMPREGATED FIBRE BOARD 150mm CONCRETE FACED INSULATED WALL PANEL - BOUND GRADE	150mm C.I.P. CONCRETE WALL (SEE STRUCT.) 200mm ASPHALT IMPREGATED FIBRE BOARD 150mm CONCRETE FACED INSULATED WALL PANEL - BOUND GRADE
FIRE RATING	-	-	-	-
ETC RATING	-	-	-	-
REFERENCE	-	-	-	-

EXTERIOR WALL ASSEMBLIES

	EW1- EXTERIOR ARENA WALL	EW2- EXTERIOR WALL
EXTERIOR WALL ASSEMBLY		
	127 INSULATED METAL PANEL, WHITE BARRIER, STEEL TRITTS SEE STRUCTURAL	150mm x 140mm TORRIERED TAG WOOD BEARING BOARD + 150mm METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X GYP. BD. + 150mm METAL STUDS @ 400 C.C. + 150mm LET. GRADE GYP. BD. *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY - REFER TO PLAN
FIRE RATING	-	-
ETC RATING	-	-
REFERENCE	-	-

FLOOR ASSEMBLIES

	F51- SLAB ON GRADE	F52- SUSPENDED CONCRETE SLAB ON STEEL DECK AT LEVEL 2 & POOL MECHANICAL
FLOOR ASSEMBLY		
	150mm TYPE X GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X GYP. BD. (SEE ELEVATIONS FOR EXTENTS) *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY - REFER TO PLAN	150mm TYPE X GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X GYP. BD. (SEE ELEVATIONS FOR EXTENTS) *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY - REFER TO PLAN
FIRE RATING	-	1 HR
ETC RATING	-	-2
REFERENCE	-	-

CEILING ASSEMBLIES

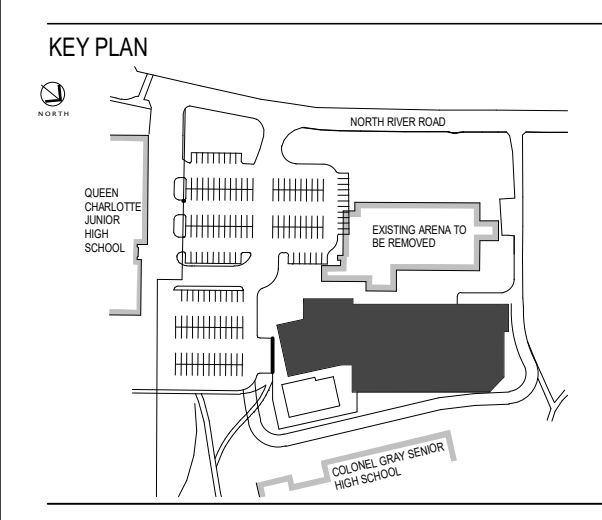
	ACT1- 24" x 48" RESISTANT ACOUSTIC CEILING TILE	ACT2- 24" x 48" ACOUSTIC CEILING TILE	ACT3- 24" x 48" ACOUSTIC CEILING TILE W/ BATT INSUL.	ACT4- 24" x 48" TECTUM CEILING PANEL	LMP- LINEAR METAL PANEL	GB- GYPSUM BOARD	GB1- GYPSUM BOARD @ ELEVATOR SHAFT	BAF- BAFFLE CEILING
CEILING ASSEMBLY								
	150mm TYPE X ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X ABUSE RESISTANT GYP. BD. (SEE ELEVATIONS FOR EXTENTS) *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY - REFER TO PLAN	150mm TYPE X ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X ABUSE RESISTANT GYP. BD. (SEE ELEVATIONS FOR EXTENTS) *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY - REFER TO PLAN	150mm TYPE X ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X ABUSE RESISTANT GYP. BD. (SEE ELEVATIONS FOR EXTENTS) *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY - REFER TO PLAN	150mm TYPE X ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X ABUSE RESISTANT GYP. BD. (SEE ELEVATIONS FOR EXTENTS) *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY - REFER TO PLAN	150mm TYPE X ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X ABUSE RESISTANT GYP. BD. (SEE ELEVATIONS FOR EXTENTS) *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY - REFER TO PLAN	150mm TYPE X ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X ABUSE RESISTANT GYP. BD. (SEE ELEVATIONS FOR EXTENTS) *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY - REFER TO PLAN	150mm TYPE X ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X ABUSE RESISTANT GYP. BD. (SEE ELEVATIONS FOR EXTENTS) *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY - REFER TO PLAN	150mm TYPE X ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X ABUSE RESISTANT GYP. BD. (SEE ELEVATIONS FOR EXTENTS) *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY - REFER TO PLAN
FIRE RATING	-	-	-	-	-	-	2 HR	-
ETC RATING	-	-	-	-	-	-	0	-
REFERENCE	-	-	-	-	-	-	SYSTEM #F52X, ULC M104	-

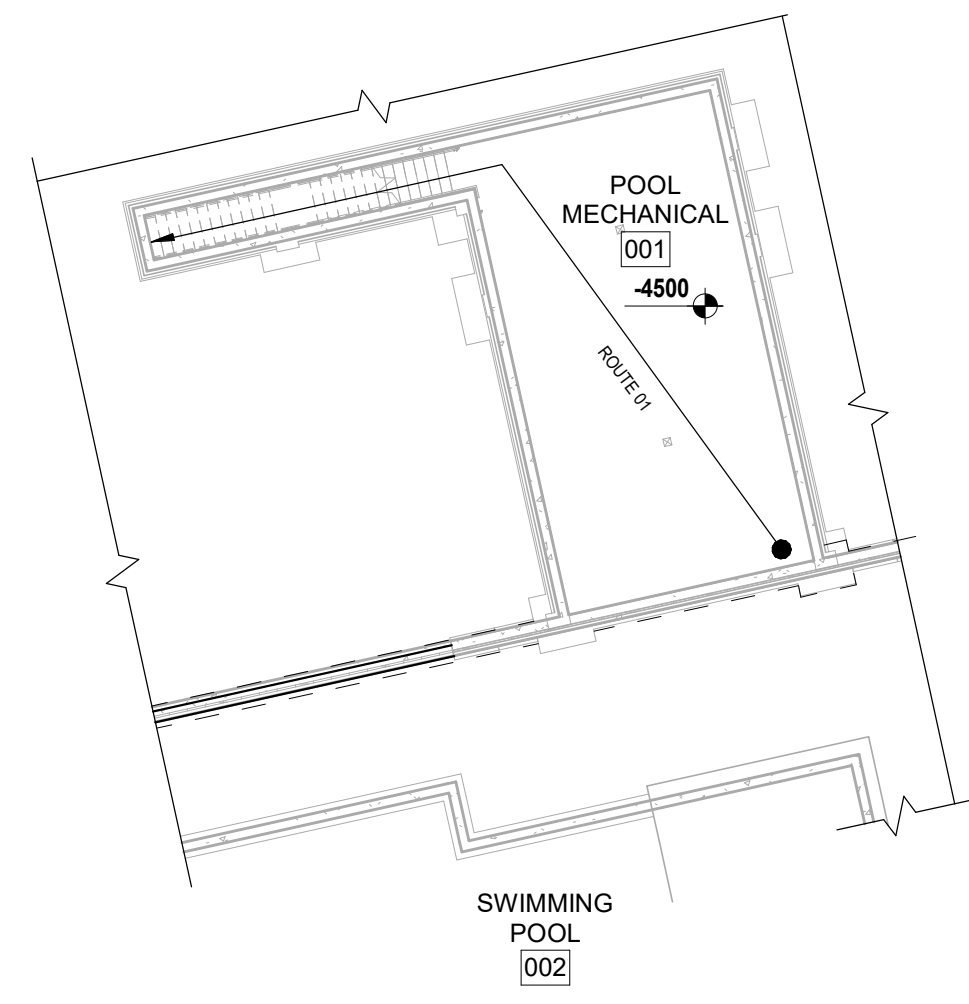
ROOF ASSEMBLIES

	R1- STANDING SEAM ROOF	R2- ROOF
ROOF ASSEMBLY		
	150mm TYPE X ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X ABUSE RESISTANT GYP. BD. (SEE ELEVATIONS FOR EXTENTS) *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY - REFER TO PLAN	150mm TYPE X ABUSE RESISTANT GYP. BD. + 12.5MM METAL STUDS @ 400 C.C. + BATT ACOUSTIC INSULATION TO FULL CAVITY 150mm TYPE X ABUSE RESISTANT GYP. BD. (SEE ELEVATIONS FOR EXTENTS) *200mm x 100mm STUDS @ 400 C.C. (SEE ELEVATIONS FOR EXTENTS) 200mm HOR. WHITEWASHED BARN BOARDS BLACK BUILDING WRAP + TPY P7 WALL ASSEMBLY - REFER TO PLAN
FIRE RATING	-	-
ETC RATING	-	-
REFERENCE	-	-

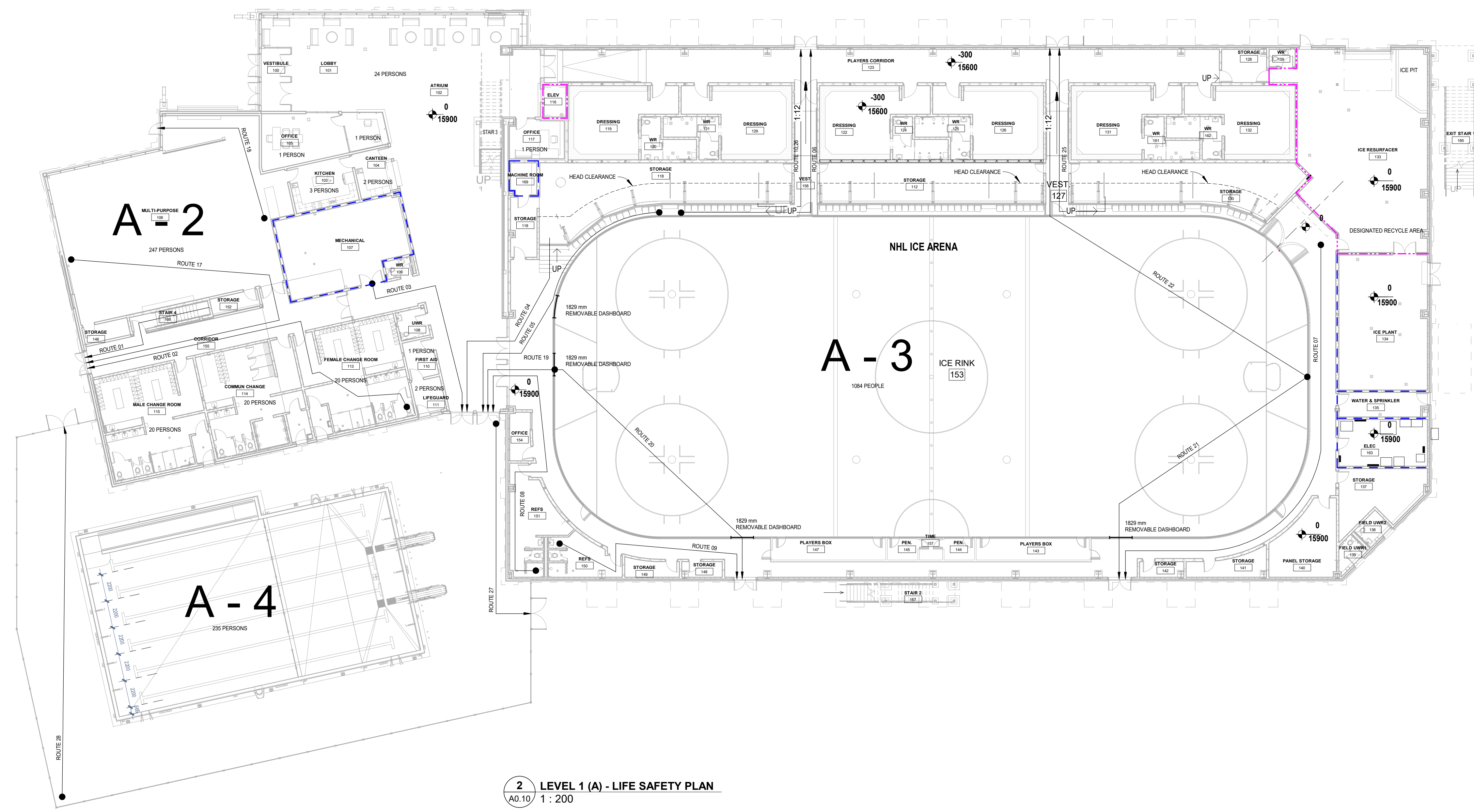
SYMBOLS/ ABBREVIATION LEGEND

- WALL TAG
- PARTITION TAG
- CURTAIN WALL TAG
- FIXED WINDOW TAG
- GUARDRAIL TAG
- ROOF TAG
- FLOOR TAG
- DOOR TAG: REFER TO DOOR SCHEDULE
- ROOM NAME & NUMBER TAG
- DETAIL REFERENCE
- CEILING TYPE & HEIGHT
- BUILDING ELEVATION REFERENCE
- BUILDING SECTION REFERENCE
- INTERIOR ELEVATION REFERENCE
- DRAWING TITLE REFERENCE
- MAIN ENTRANCE
- BUILDING ACCESS
- FLDR-FLOOR DRAIN
- DOOR SYMBOL
- 1 HOUR FIRE SEPARATION
- 45 min. FIRE SEPARATION
- PROPERTY LINE
- CONCRETE
- CONCRETE BLOCK
- SUBGRADE
- GRANULAR
- RIGID INSULATION
- BATT INSULATION



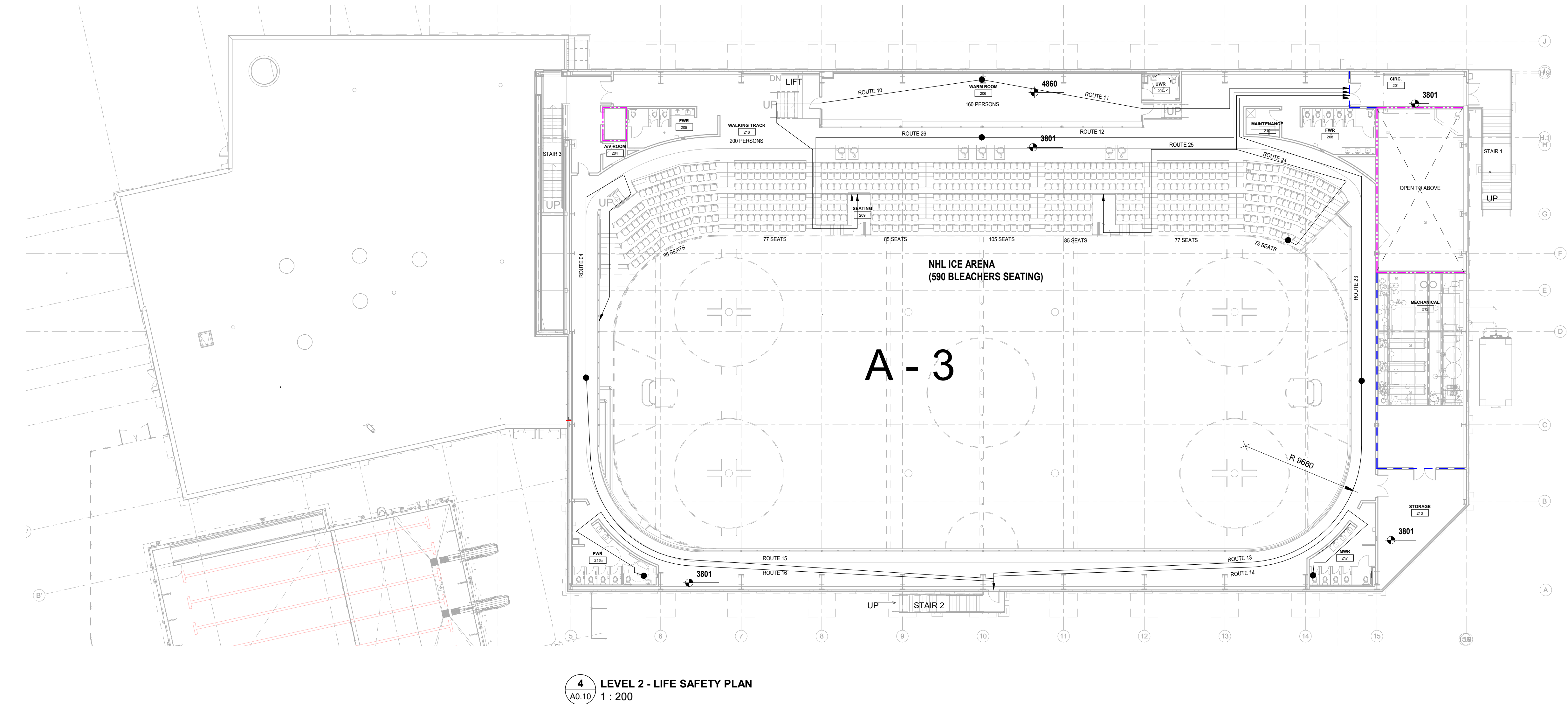


3 BASEMENT LEVEL - LIFE SAFETY PLAN
 A0.10 1:200



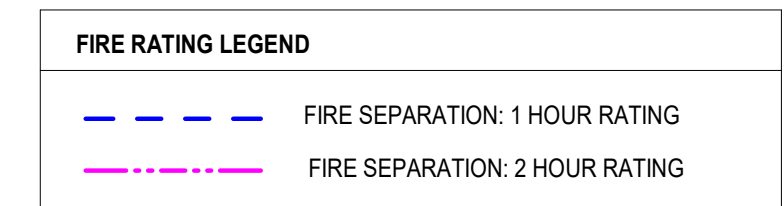
System	Existing	New	Total	%
Occupancy	NA	141,000	141,000	100%
Area	NA	141,000	141,000	100%
Volume	NA	141,000	141,000	100%
Weight	NA	141,000	141,000	100%
Energy	NA	141,000	141,000	100%
Water	NA	141,000	141,000	100%
Gas	NA	141,000	141,000	100%
Electricity	NA	141,000	141,000	100%
Other	NA	141,000	141,000	100%

Item	Value	Units
Area of Building	141,000	m ²
Volume of Building	141,000	m ³
Weight of Building	141,000	kN
Energy of Building	141,000	kWh
Water of Building	141,000	L
Gas of Building	141,000	m ³
Electricity of Building	141,000	kWh
Other of Building	141,000	kg



EXITING ROUTES

ROUTE NUMBER	TRAVEL DISTANCE
ROUTE 01	30.6 m
ROUTE 02	32.0 m
ROUTE 03	157.7 m
ROUTE 04	45.0 m
ROUTE 05	24.9 m
ROUTE 06	23.3 m
ROUTE 07	38.2 m
ROUTE 08	27.2 m
ROUTE 09	19.0 m
ROUTE 10	46.8 m
ROUTE 11	32.5 m
ROUTE 12	34.4 m
ROUTE 13	42.7 m
ROUTE 14	40.9 m
ROUTE 15	45.9 m
ROUTE 16	44.8 m
ROUTE 17	35.7 m
ROUTE 18	12.9 m
ROUTE 19	9.2 m
ROUTE 20	24.1 m
ROUTE 21	24.5 m
ROUTE 22	37.8 m
ROUTE 23	40.3 m
ROUTE 24	30.95 m
ROUTE 25	41.2 m
ROUTE 26	36.8 m
ROUTE 27	18.2 m
ROUTE 28	29.9 m



NOTE:
 PERMANENT SIGNS INDICATING MAXIMUM OCCUPANCY TO BE POSTED IN:
 - EACH CHANGE ROOMS: 20 PEOPLE
 - ATRIUM LOBBY: 24 PEOPLE
 - WALKING TRACK 216: 200 PEOPLE STANDING

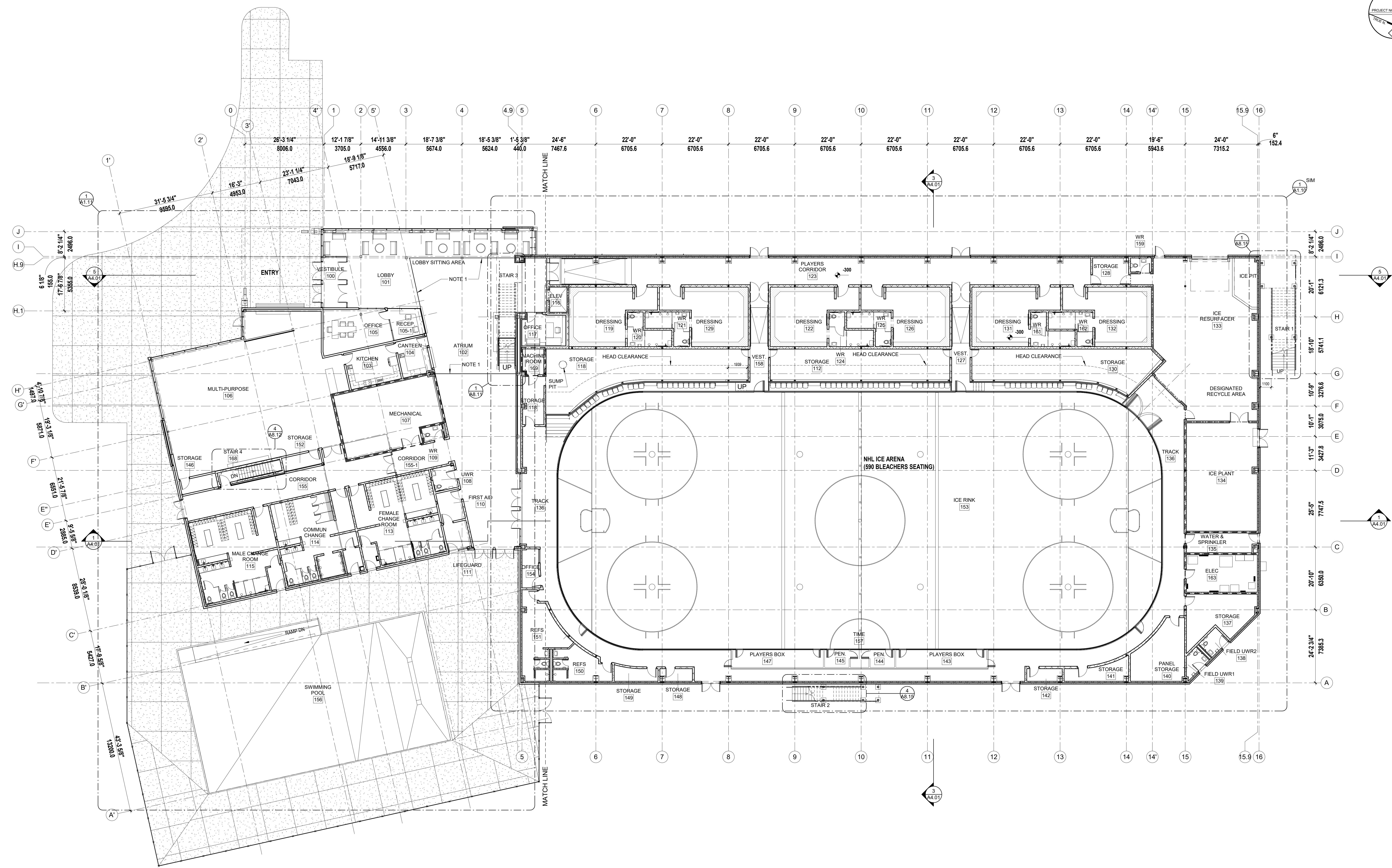
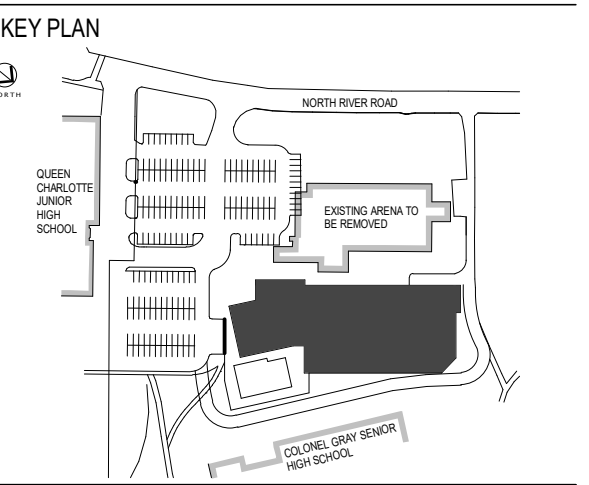
NO.	REVISION	DATE
0	TPS - ISSUED FOR TENDER	2023-04-10

PROJECT NAME:
 SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

PROJECT NO.: 21111
 DRAWN BY: MMG / JDE
 CHECKED BY: MMG / PC
 SCALE: As indicated

LIFE SAFETY PLANS & CODE MATRIX

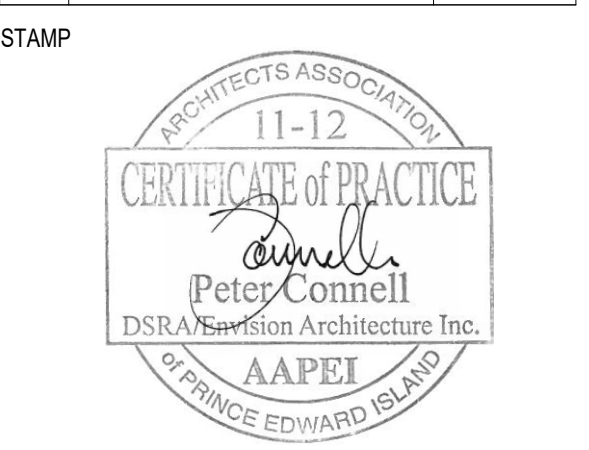
A0.10



1 FLOOR PLAN-LEVEL 1
A1.01 / 1 : 150

NOTES:
1. RECESSED CONCRETE SLAB IN THIS AREA FOR RUBBER FLOOR FINISH

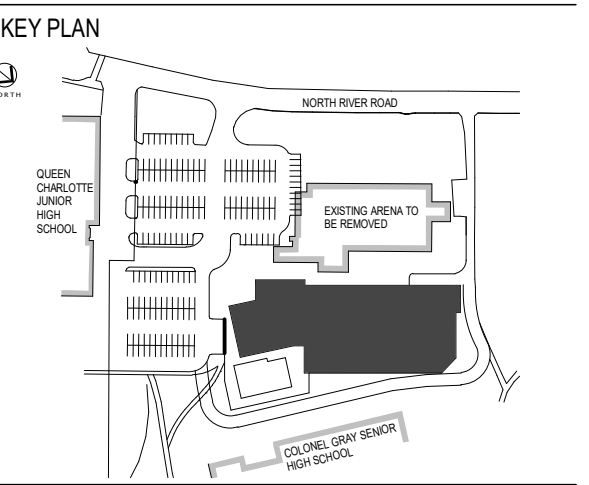
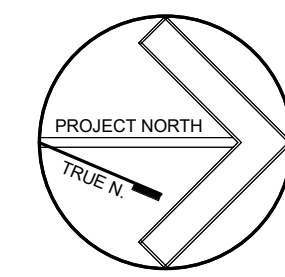
NO.	REVISION	DATE
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2	TR3 - ISSUED FOR TENDER	2022-11-04
1	TR4 - ISSUED FOR TENDER	2022-11-01
0	TR1 - ISSUED FOR TENDER	2022-03-24



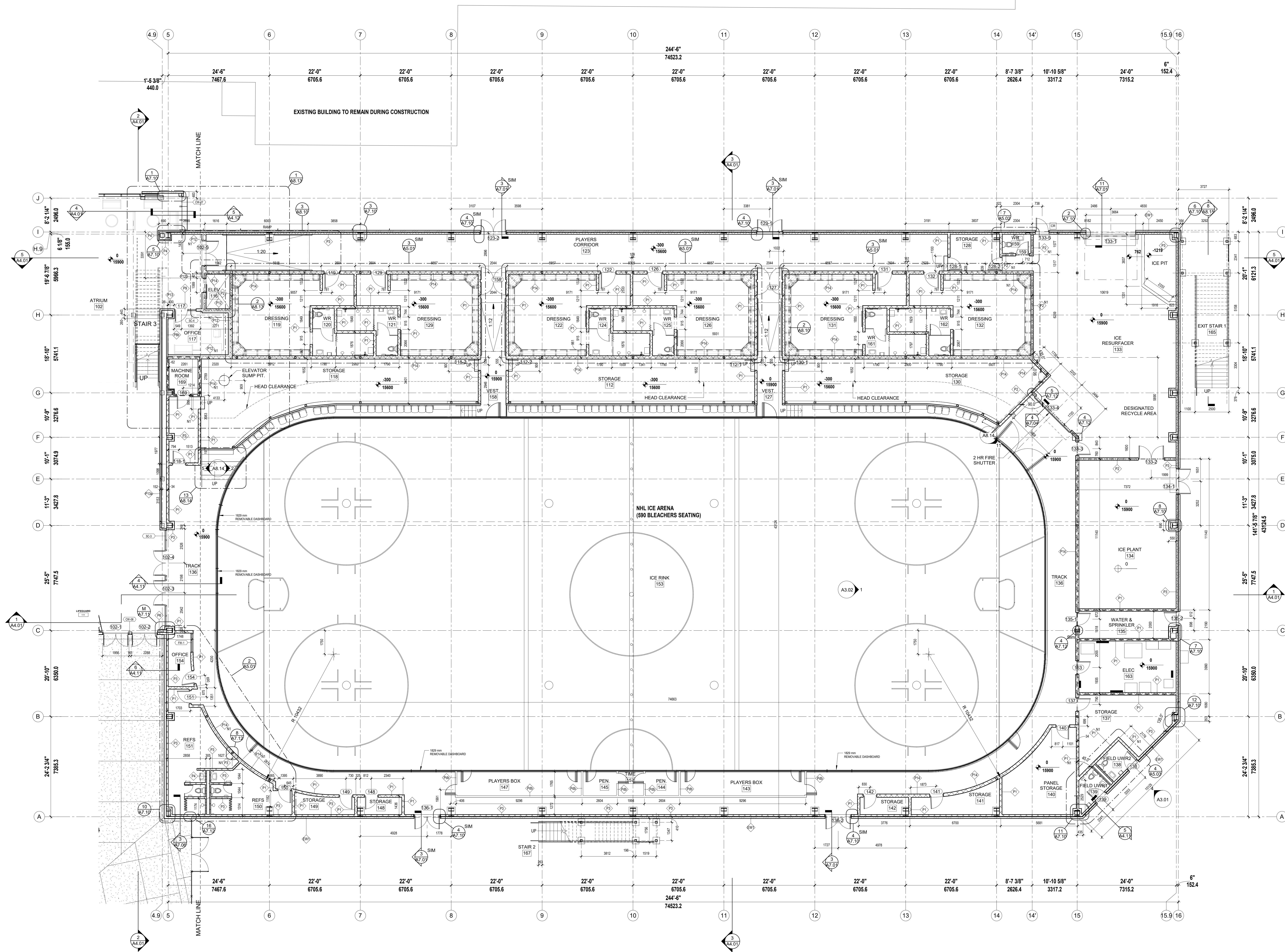
PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL
REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

PROJECT NO.: 21111
DRAWN BY: OM / MM / DE
CHECKED BY: MMG / PC
SCALE: 1 : 150

GENERAL NOTES:
 ALL DIMENSIONS TO OUTSIDE FACE OF STUD. TO CENTRE OF CML
 UNLESS NOTED OTHERWISE
 N1: WALL HEIGHT TO UNDERSIDE OF FLOOR/ROOF DECK



CONSULTANT



1 FLOOR PLAN - LEVEL 1 (A)
 AT.10 1 : 100

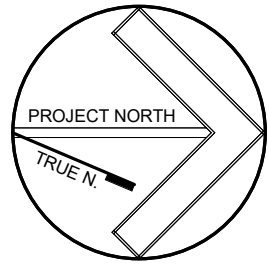
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4	TP1 - ISSUED FOR TENDER	2023-04-10
3	TP3 - ISSUED FOR TENDER	2022-11-04
2	TP4 - ISSUED FOR TENDER	2022-11-01
1	TP1 - ASSEMBLY	2022-08-01
0	TP1 - ISSUED FOR TENDER	2022-03-24



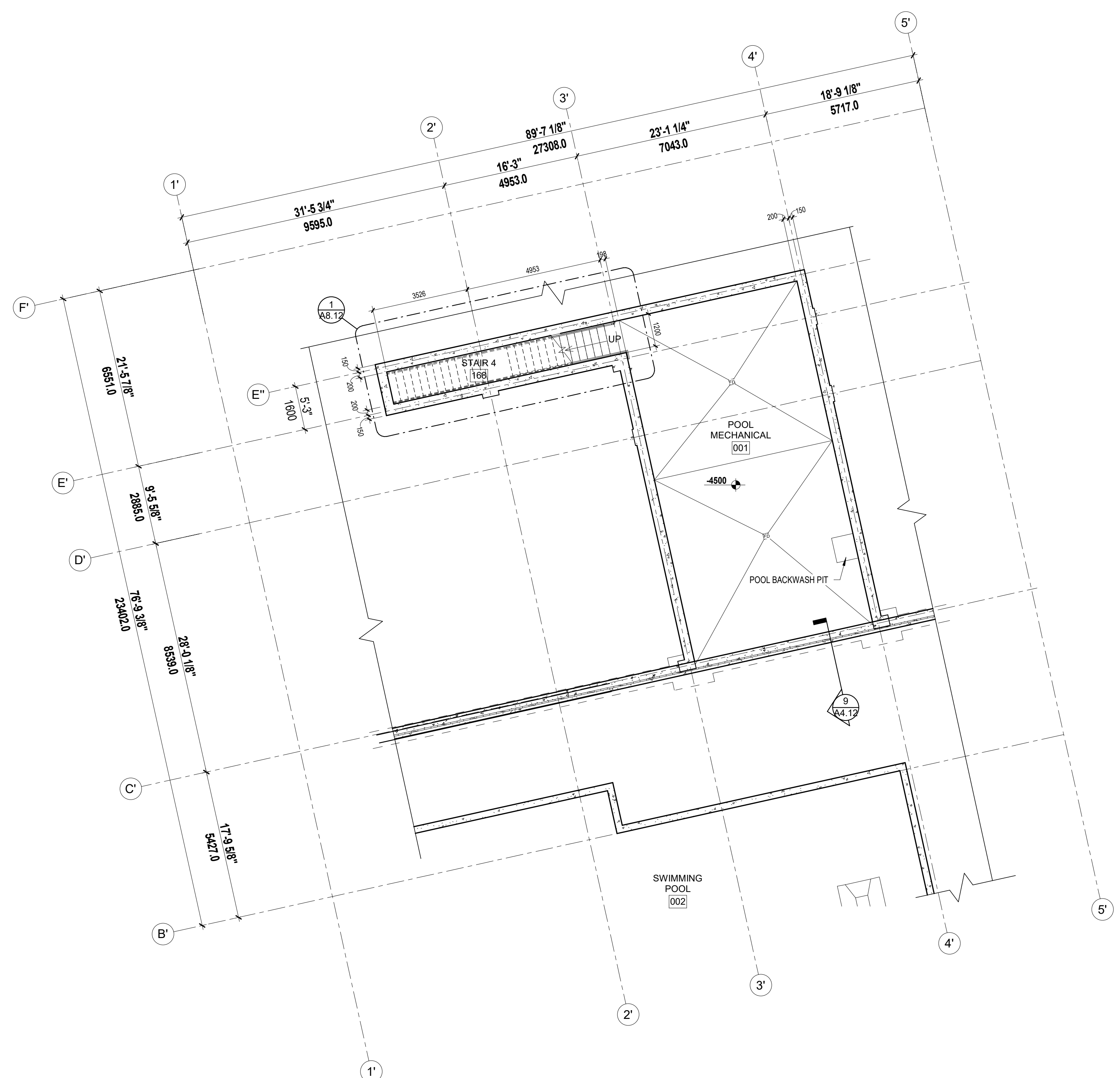
PROJECT NAME:
 SIMMONS SPORTS CENTRE ARENA & POOL
 REPLACEMENT
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

PROJECT NO.: 21111
 DRAWN BY: OM / MV / DE
 CHECKED BY: MMG / PC
 SCALE: 1 : 100

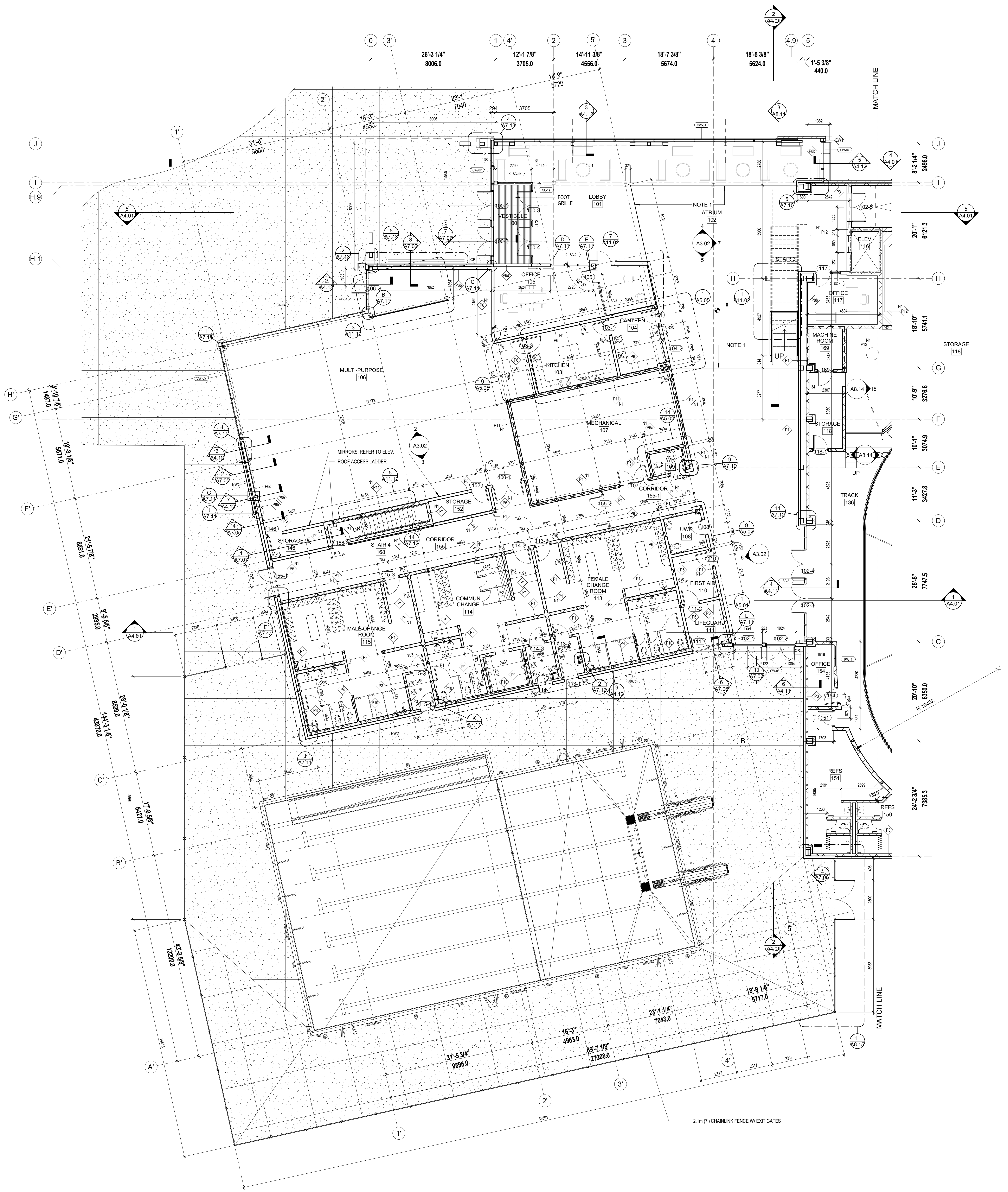
FLOOR PLAN - LEVEL 1 (A)



GENERAL NOTES:
 ALL DIMENSIONS TO OUTSIDE FACE OF STUD, TO CENTRE OF CHAL, UNLESS NOTED OTHERWISE.
 N1: WALL HEIGHT TO UNDERSIDE OF FLOORROOF DECK

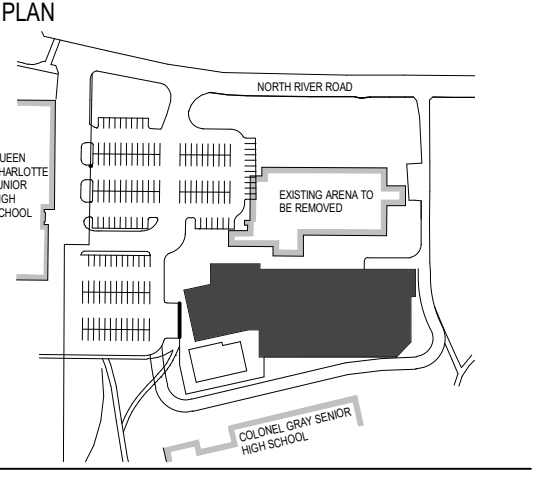


2 FLOOR PLAN - BASEMENT LEVEL
 A1.11 1:100



1 FLOOR PLAN - LEVEL 1(A)
 A1.11 1:100

NOTES:
 1. RECESSED CONCRETE SLAB IN THIS AREA FOR RUBBER FLOOR FINISH



CONSULTANT

NO.	REVISION	DATE
2	TPI - ISSUED FOR TENDER	2022-04-10
1	TPI - ISSUED FOR TENDER	2022-11-01
0	TPI - ISSUED FOR TENDER	2022-03-24

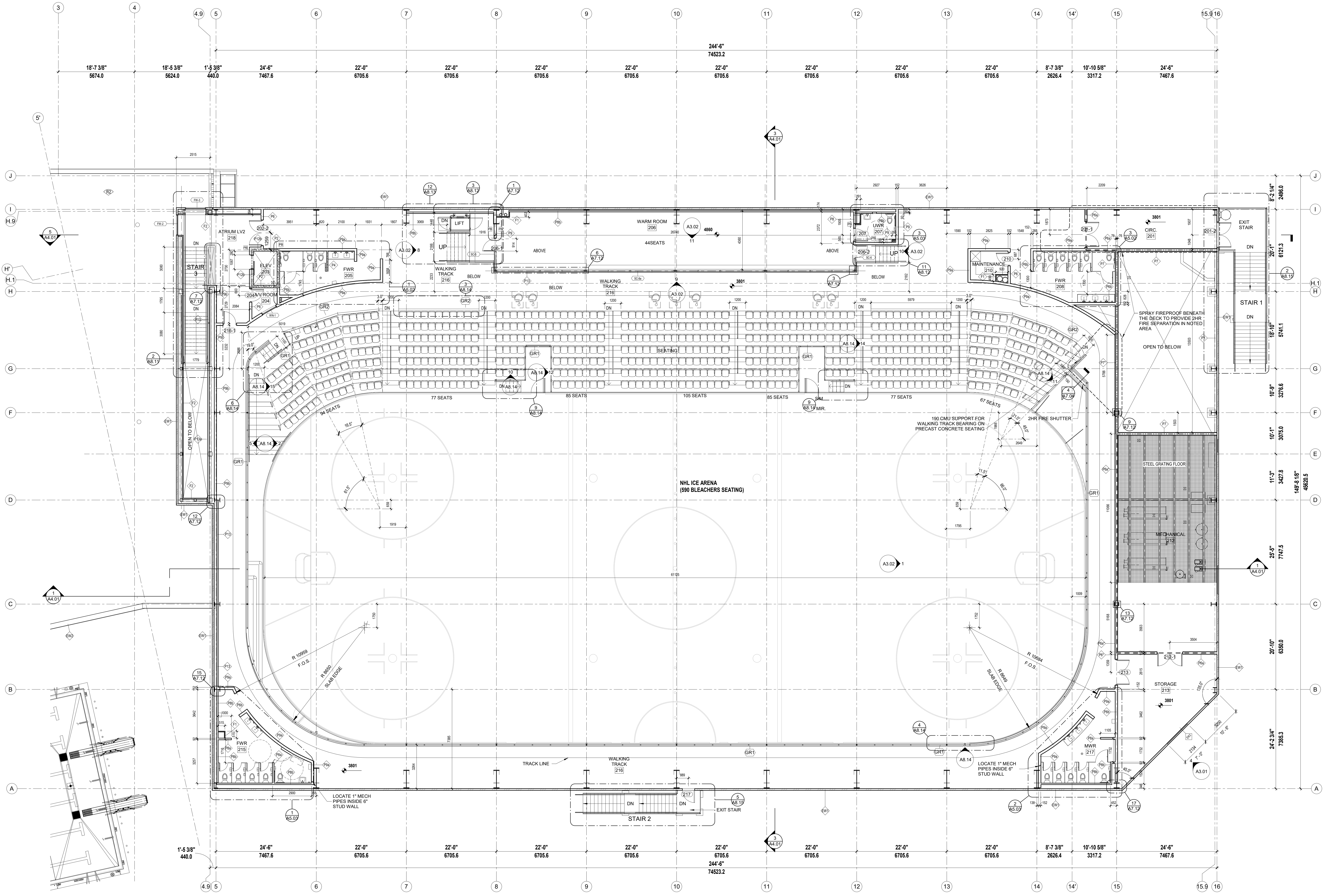
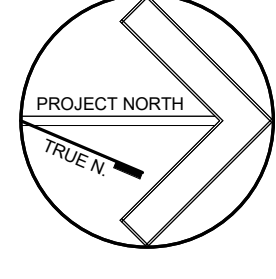


PROJECT NAME:
 SIMMONS SPORTS CENTRE ARENA & POOL
 REPLACEMENT
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

PROJECT NO.: 21111
 DRAWN BY: OM / MM / DE
 CHECKED BY: MMG / PC
 SCALE: 1:100

FLOOR PLAN - LEVELS 1 (B)
 & BASEMENT

GENERAL NOTES
 ALL DIMENSIONS TO OUTSIDE FACE OF STUD, TO CENTRE OF CMU,
 UNLESS NOTED OTHERWISE
 N1: WALL HEIGHT TO UNDERSIDE OF FLOOR/ROOF DECK



1 LARGE SCALE PLAN-ARENA-LEVEL 2
 A1.12 1:100

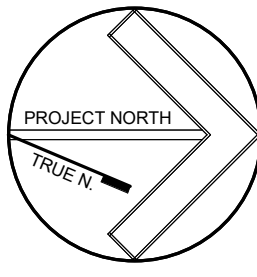
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3	TPI - ISSUED FOR TENDER	2023-04-10
2	TPI - ISSUED FOR TENDER	2022-11-04
1	TPI - ISSUED FOR TENDER	2022-11-01
	TPI - ISSUED FOR TENDER	2022-03-24

STAMP

PROJECT NAME
 SIMMONS SPORTS CENTRE ARENA & POOL
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 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

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 CHECKED BY: MGG / PC
 SCALE: 1:100

FLOOR PLAN - LEVEL 2 (A)



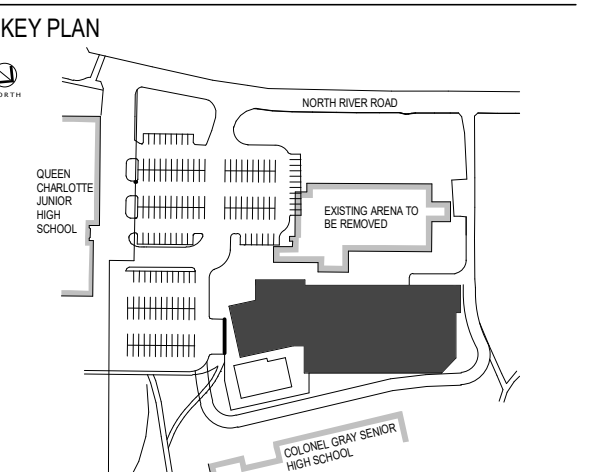
NOTE:

▭ - PV1 PANELS IN CONTRACT

▭ - PV2 PANELS FOR FUTURE WORK

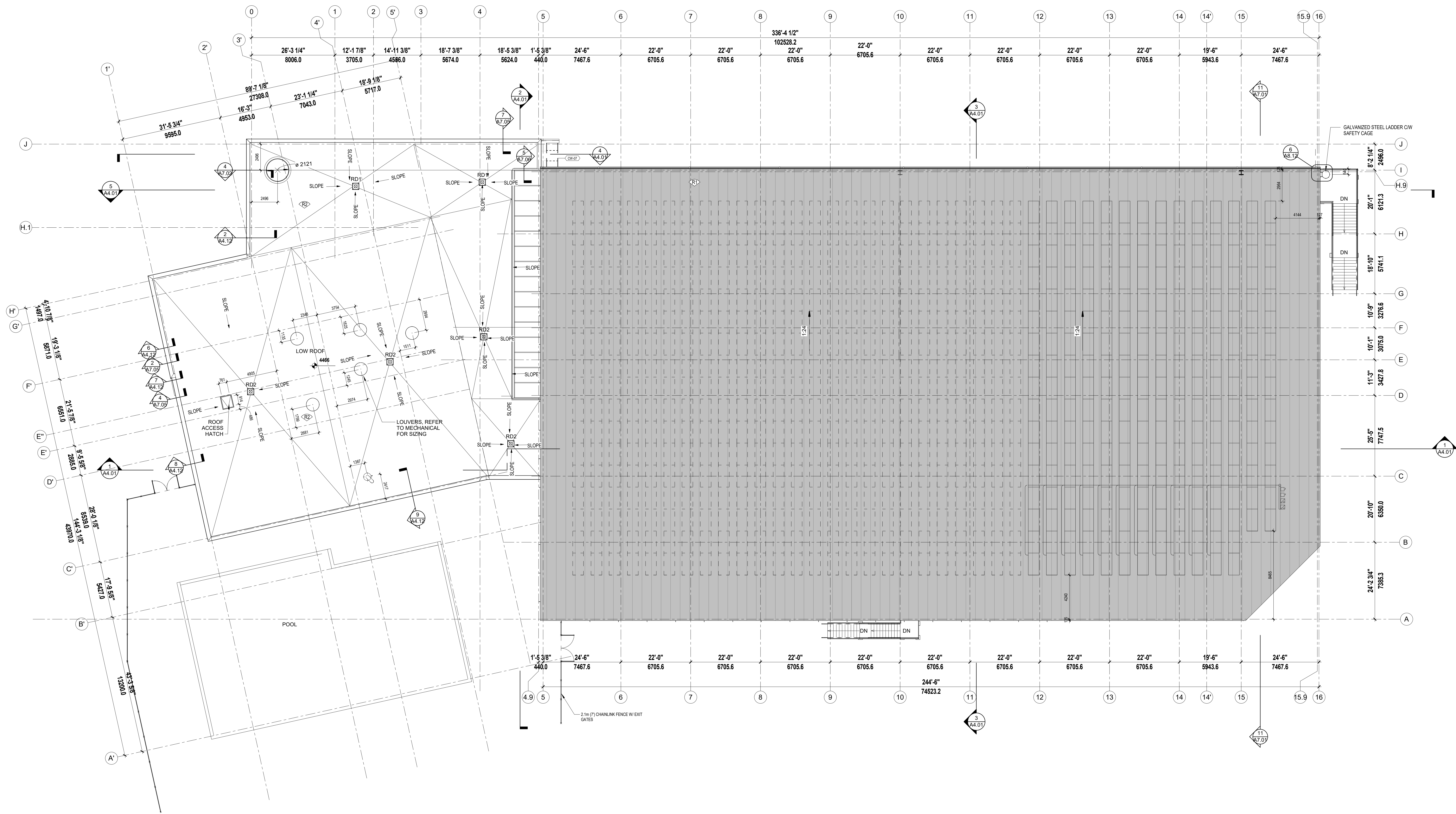
CLIENT

CHARLOTTETOWN
1902-966-5548 199 QUEEN STREET, 3RD FLOOR,
CHARLOTTETOWN, PE, C1A 4B7



CONSULTANT

DSRA
1302-420-9990 1080 Spring Garden Road, 8th Floor,
1302-420-9450 Halifax, Nova Scotia, CAN. B3J 1J2



1 ROOF PLAN
A2.01 1:150
ENVELOPE AREA 4 387.66 m²
GLAZING AREA 62.99 m²
DOOR OPENINGS 0.69 m²

1	TPI - ISSUED FOR TENDER	2023-04-10
0	TPI - ISSUED FOR TENDER	2022-03-24
NO.	REVISION	DATE

STAMP

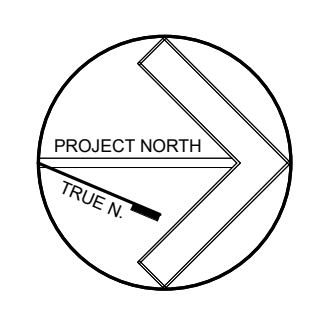
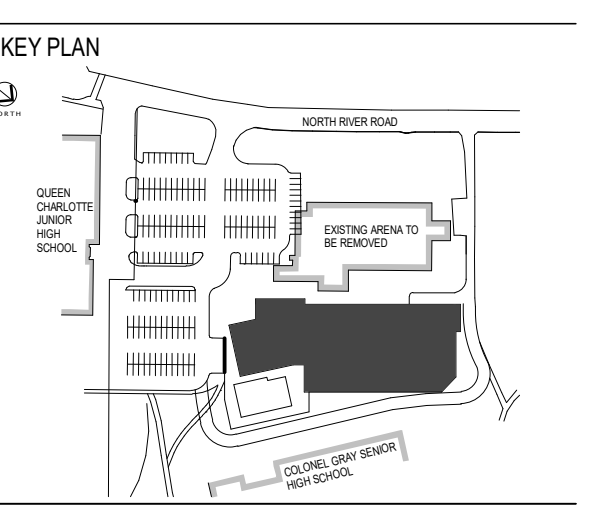


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SIMMONS SPORTS CENTRE ARENA & POOL
REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

PROJECT NO.: 21111
DRAWN BY: OM / MM / DE
CHECKED BY: MMG / PC
SCALE: 1:150

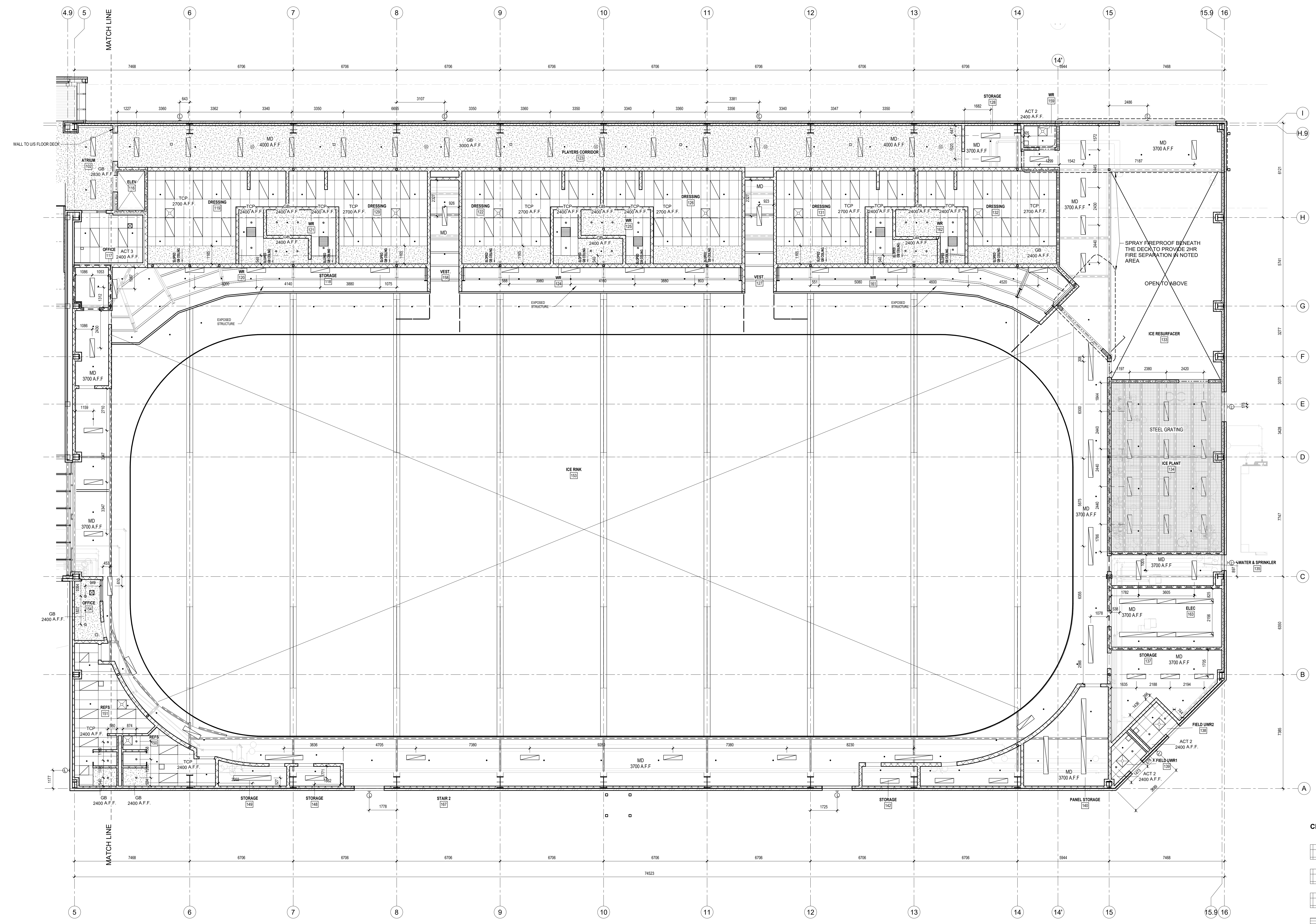
ROOF PLAN

A2.01



- GENERAL NOTES - RCP**
1. PAINT OUT ALL EXPOSED SURFACES, INCLUDING BUT NOT LIMITED TO METAL SURFACES AND DECKS EQUIPMENT, CONDUIT, DUCTWORK AND STRUCTURE AT US OF ROOF AND FLOOR ABOVE, UNLESS OTHERWISE NOTED.
 2. LEVEL 2 FLOOR TO BE 2 HR F.R.R.; SEE AREA NOTED

--- AREA TO RECEIVE 2 HR FIRE RESISTANCE RATING (IF A.R.) SPRAY FIREPROOFING ON US FLOOR & BLEACHERS



1 LEVEL 1 - ARENA CEILING PLAN
A2.11 1:100

CEILING LEGEND

ACT2 ACOUSTIC CEILING TILE 24" x 48" SAC/ HUMIDITY RESISTANT REFER TO SPECIFICATION.	610 X 810 LIGHT FIXTURE - SEE ELECTRICAL
ACT1 ACOUSTIC CEILING TILE 24" x 48" REFER TO SPECIFICATION.	610 X 1200 LIGHT FIXTURE - SEE ELECTRICAL
TCP TECTUM CEILING PANEL 24" x 48" REFER TO SPECIFICATION.	8' LIGHT FIXTURE - SEE ELECTRICAL
LMP LINEAR METAL PANEL	4' LIGHT FIXTURE - SEE ELECTRICAL
BAF ALUMINUM BAFFLE CEILING 96" x 4" x 11" SUSPENDED ALUM. BLADES REFER TO A8.20	POT LIGHT FIXTURE - SEE ELECTRICAL
GB GYPSUM BOARD	11" DIA. LIGHT FIXTURE - SEE ELECTRICAL
GB2 2HR RATED GYPSUM BOARD CEILING	48" DIA. LIGHT FIXTURE - SEE ELECTRICAL
MD METAL DECK/ UNDERSIDE OF FLOOR ABOVE	WALL SCENE LIGHT FIXTURE - SEE ELECTRICAL
MG METAL GRATING ABOVE	SPRINKLER - SEE MECHANICAL
SLP STEEL LINER PANEL/ UNDERSIDE OF FLOOR ABOVE	DEFUSERS - SEE MECHANICAL
EXP EXPOSED STRUCTURE AND US ROOF/DECK	SQUARE
SKL SKYLIGHT; REFER TO GLAZING	ROUND
	LINEAR
	GRILLS - SEE MECHANICAL

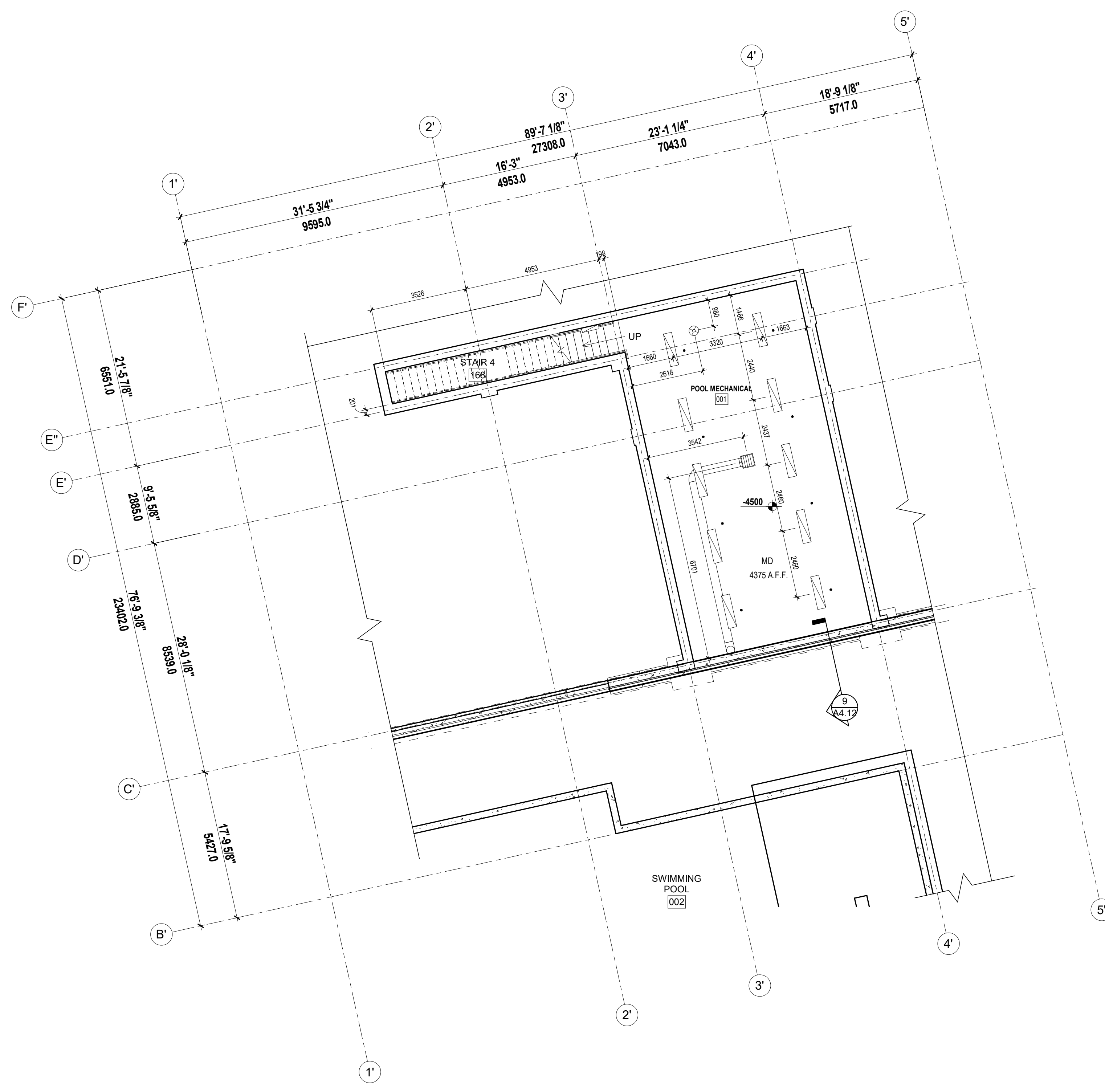
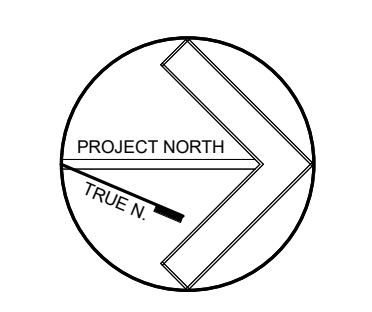
0	TPS - ISSUED FOR TENDER	2023-04-10
NO.	REVISION	DATE



PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

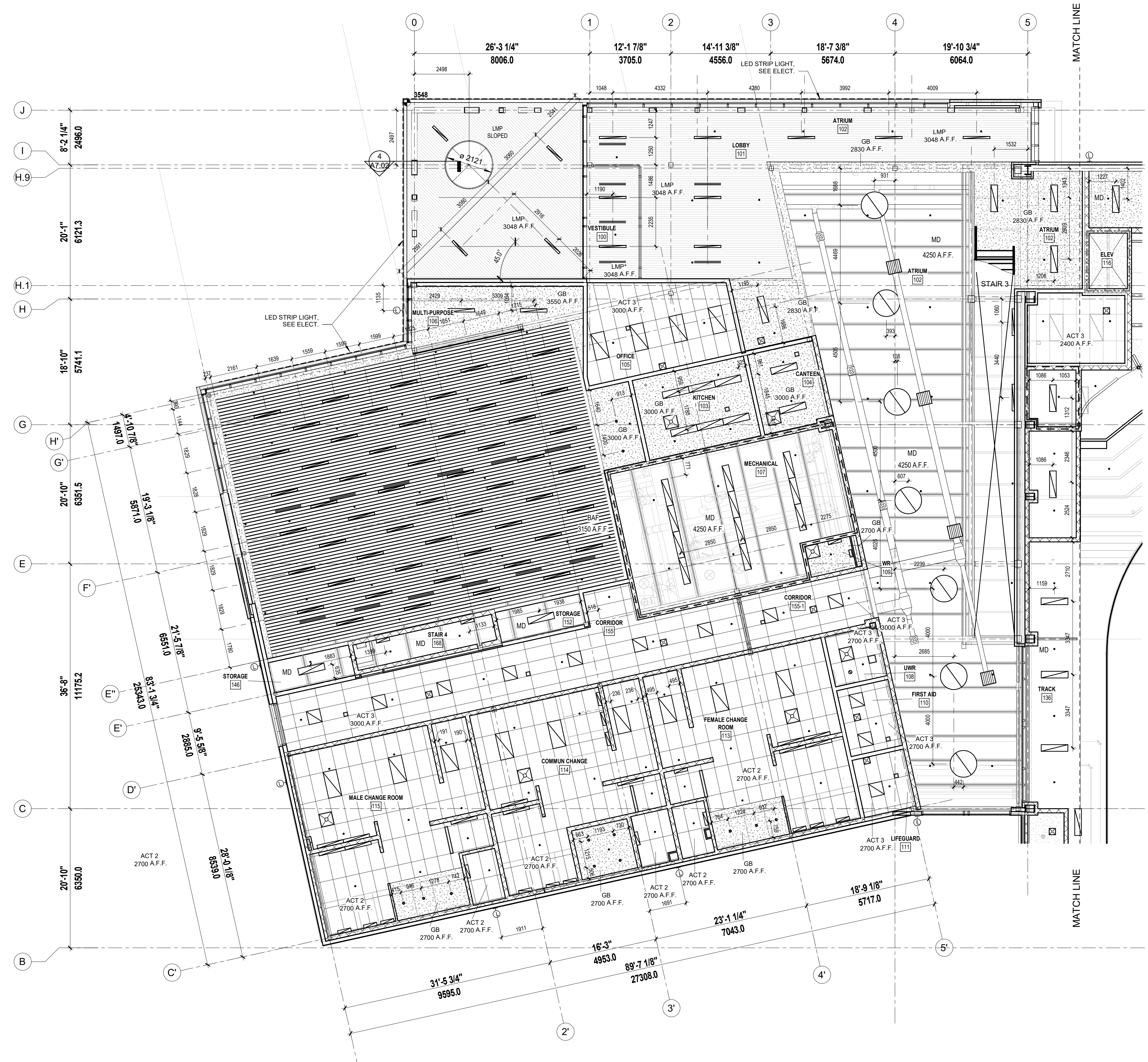
PROJECT NO.: 21111
DRAWN BY: OM / MV / DE
CHECKED BY: MMG / PC
SCALE: As indicated

REFLECTED CEILING PLAN - LEVEL 1 ARENA



2 BASEMENT LEVEL - CEILING PLAN
A2.12 / 1 : 100

- GENERAL NOTES - RCP**
- PAINT OUT ALL EXPOSED SURFACES, INCLUDING BUT NOT LIMITED TO METAL SURFACES AND DECKS EQUIPMENT, CONDUIT, DUCTWORK AND STRUCTURE AT US OF ROOF AND FLOOR ABOVE, UNLESS OTHERWISE NOTED.
 - LEVEL 2 FLOOR TO BE 2 HR F.R.R., SEE AREA NOTED
- AREA TO RECEIVE 2 HR FIRE RESISTANCE RATING (F.R.R.) SPRAY FIREPROOFING ON US FLOOR & BLEACHERS



1 LEVEL 1 - FRONT ADDITION CEILING PLAN
A2.12 / 1 : 100

CEILING LEGEND

- | | | |
|------|---|--|
| ACT2 | ACOUSTIC CEILING TILE 24" x 48" SAGI HUMIDITY RESISTANT REFER TO SPECIFICATION. | 610 X 610 LIGHT FIXTURE -SEE ELECTRICAL |
| ACT3 | ACOUSTIC CEILING TILE 24" x 48" REFER TO SPECIFICATION. | 610 X 1220 LIGHT FIXTURE -SEE ELECTRICAL |
| TCP | TECTUM CEILING PANEL 24" x 48" REFER TO SPECIFICATION. | 8" LIGHT FIXTURE -SEE ELECTRICAL |
| LMP | LINEAR METAL PANEL | 4" LIGHT FIXTURE -SEE ELECTRICAL |
| BAF | ALUMINUM BAFFLE CEILING 96" x 4" x 1" SUSPENDED ALUM. BLADES REFER TO A&O | POT LIGHT FIXTURE -SEE ELECTRICAL |
| GB | GYPSUM BOARD | 11" DIA. LIGHT FIXTURE -SEE ELECTRICAL |
| GB2 | 2HR RATED GYPSUM BOARD CEILING | 48" DIA. LIGHT FIXTURE -SEE ELECTRICAL |
| MD | METAL DECK/ UNDERSIDE OF FLOOR ABOVE | WALL SCENE LIGHT FIXTURE -SEE ELECTRICAL |
| MG | METAL GRATING ABOVE | SPRINKLER - SEE MECHANICAL |
| SLP | STEEL LINER PANEL/ UNDERSIDE OF FLOOR ABOVE | DIFFUSERS - SEE MECHANICAL |
| EXP | EXPOSED STRUCTURE AND US ROOF/DECK | SQUARE |
| SKL | SKYLIGHT, REFER TO GLAZING | ROUND |
| | | LINEAR |
| | | GRILLS - SEE MECHANICAL |

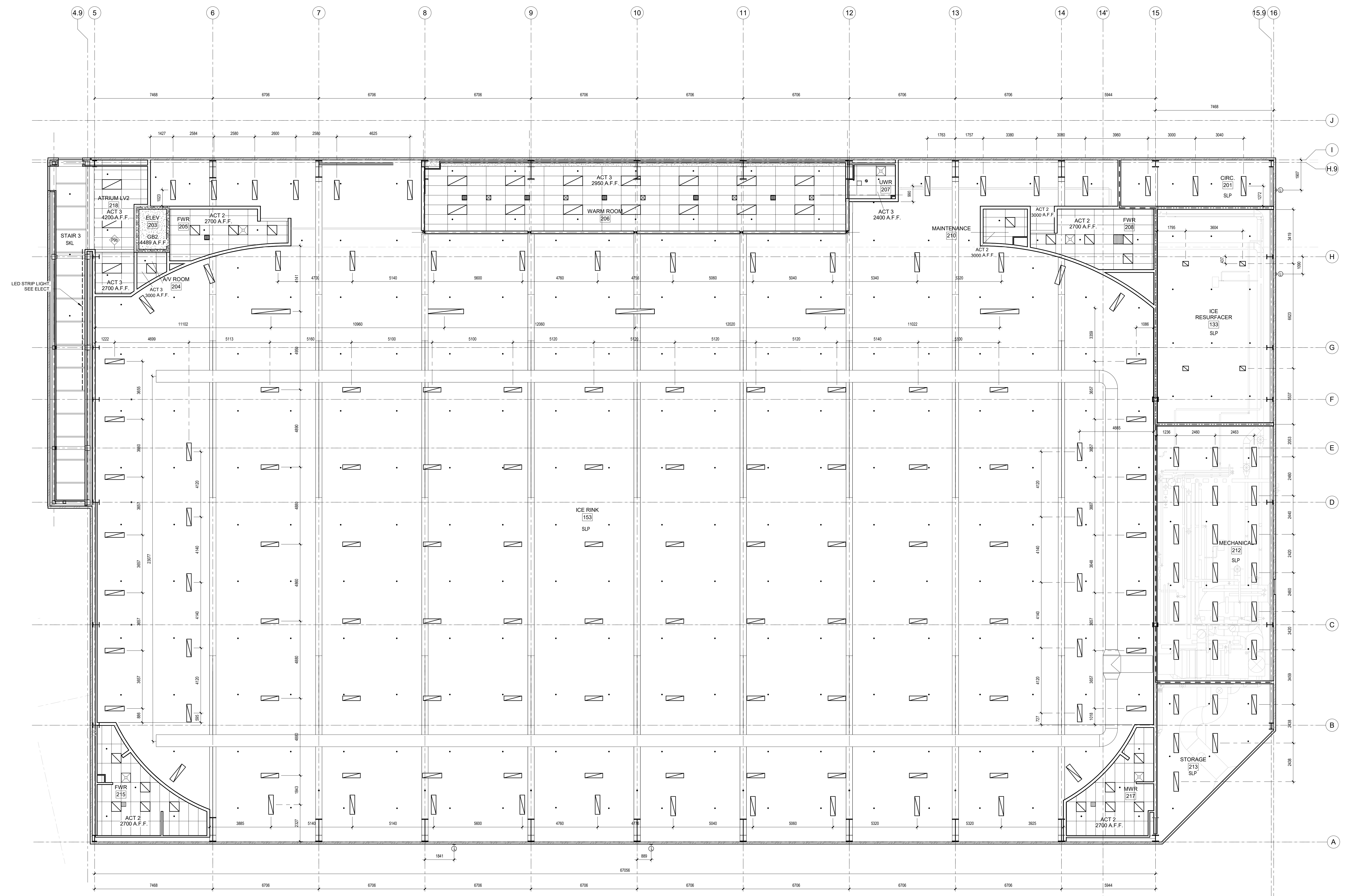
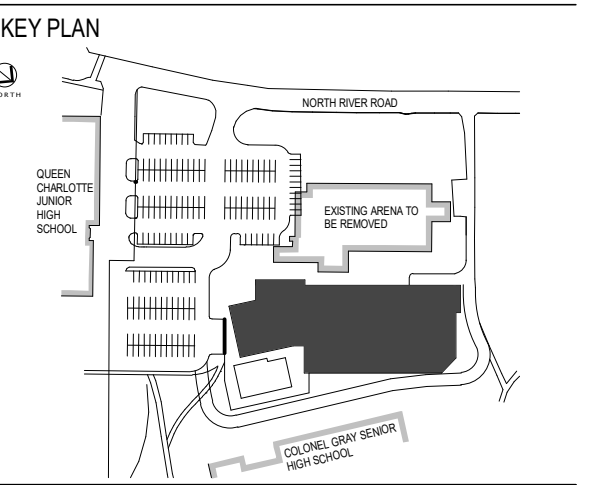
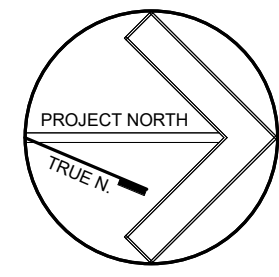
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	REVISION	DATE



PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PE

PROJECT NO.: 21111
DRAWN BY: OM / MV / DE
CHECKED BY: MGG / PC
SCALE: As indicated

REFLECTED CEILING PLAN - FRONT ADDITION



1 LEVEL 2 - ARENA CEILING PLAN
A2.13 1 : 100

CEILING LEGEND

- ACT2 ACOUSTIC CEILING TILE 24" x 48" SAGI HUMIDITY RESISTANT REFER TO SPECIFICATION
- ACT3 ACOUSTIC CEILING TILE 24" x 48" REFER TO SPECIFICATION
- TCP TECTUM CEILING PANEL 24" x 48" REFER TO SPECIFICATION
- LMP LINEAR METAL PANEL
- BAF ALUMINUM BAFFLE CEILING 96" x 4" x 1" SUSPENDED ALUM. BLADES REFER TO A8.20
- GB GYPSUM BOARD
- GB2 2HR RATED GYPSUM BOARD CEILING
- MD METAL DECK UNDERSIDE OF FLOOR ABOVE
- MG METAL GRATING ABOVE
- SLP STEEL LINER PANEL UNDERSIDE OF FLOOR ABOVE
- EXP EXPOSED STRUCTURE AND US ROOF/DECK
- SKL SKYLIGHT, REFER TO GLAZING
- 610 X 610 LIGHT FIXTURE - SEE ELECTRICAL
- 610 X 1200 LIGHT FIXTURE - SEE ELECTRICAL
- 8" LIGHT FIXTURE - SEE ELECTRICAL
- 4" LIGHT FIXTURE - SEE ELECTRICAL
- POT LIGHT FIXTURE - SEE ELECTRICAL
- 11" DIA LIGHT FIXTURE - SEE ELECTRICAL
- 48" DIA LIGHT FIXTURE - SEE ELECTRICAL
- WALL SCONCE LIGHT FIXTURE - SEE ELECTRICAL
- SPRINKLER - SEE MECHANICAL
- DEFUSERS - SEE MECHANICAL
- SQUARE
- ROUND
- LINEAR
- GRILLS - SEE MECHANICAL

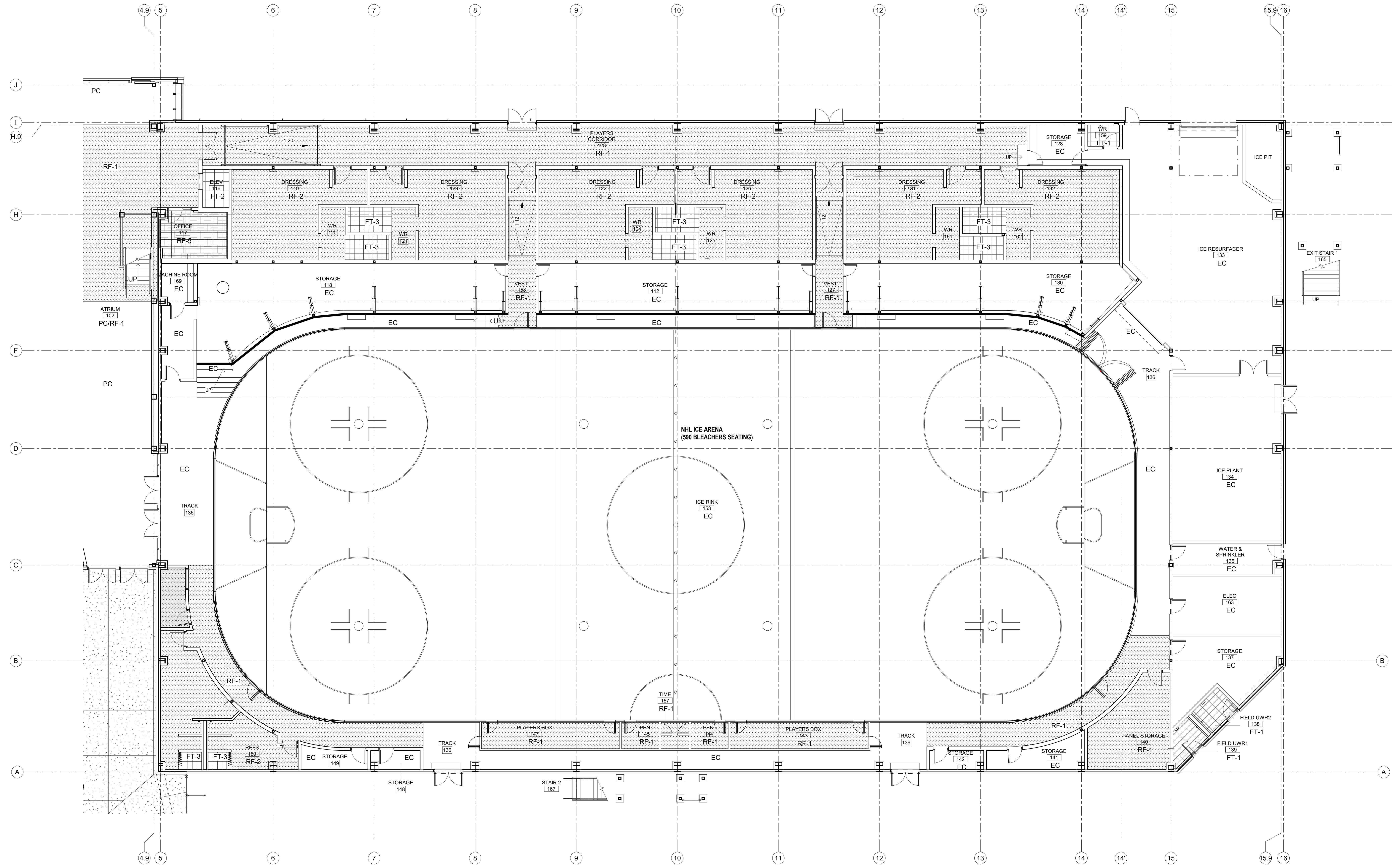
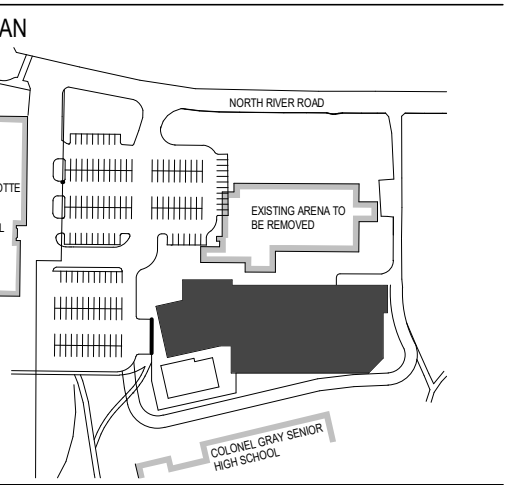
0	TPS - ISSUED FOR TENDER	2023-04-10
NO.	REVISION	DATE



PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

PROJECT NO.: 21111
DRAWN BY: OM / MV / DE
CHECKED BY: MGG / PC
SCALE: As indicated

REFLECTED CEILING PLANS
- LEVEL 2



1 FLOOR FINISHES PLAN-ARENA-LEVEL 1
A2.20 1 : 100

FLOOR FINISHES	
	EXPOSED CONCRETE EC - EXPOSED CONCRETE SEALED PC - POLISHED CONCRETE
	RUBBER FLOOR RF-6 - REFER TO SPECS
	CERAMIC TILE FT-1 12" x 24" TILE
	CERAMIC TILE FT-2 24" x 24" TILE
	CERAMIC TILE FT-3 12" x 12" TILE
	RESILIENT FLOORING RF-1 10mm RUBBER FLOOR, COLOR TBD RF-2 10mm RUBBER FLOOR, COLOR TBD
	RESILIENT FLOORING RF-3 VINYL SHEET FLOORING W/ WOOD LOOK FINISH
	RESILIENT FLOORING RF-4 SLIP-RESIST. KITCHEN SHEET FLOORING
	RESILIENT FLOORING RF-5 VINYL TILE
	MG - METAL GRATING
	FG - RECESSED FOOT GRILLE (EC-2 BELOW)

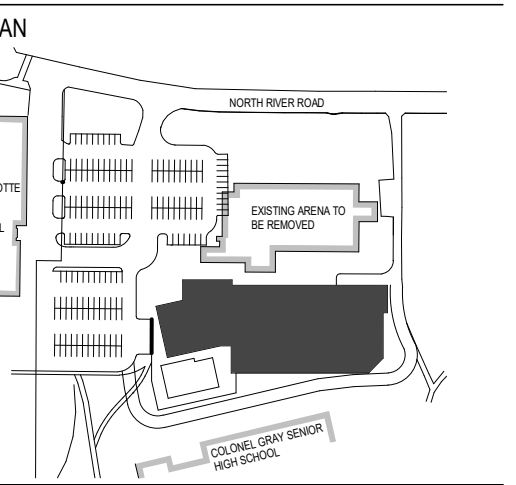
0	TPS - ISSUED FOR TENDER	2023-04-10
NO.	REVISION	DATE



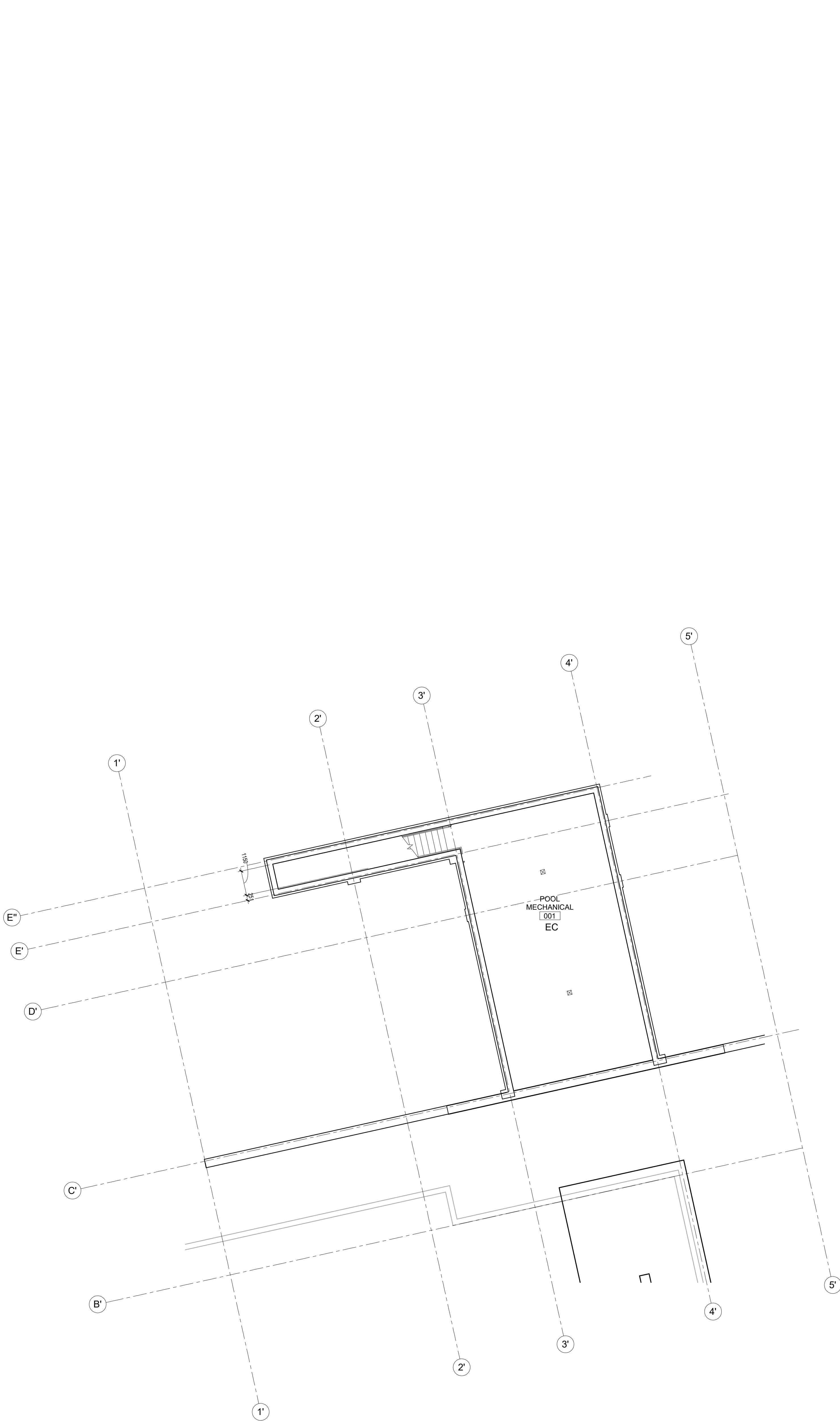
PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

PROJECT NO.: 21111
DRAWN BY: OM / MV / DE
CHECKED BY: MMG / PC
SCALE: As indicated

FLOOR FINISHES
PLAN-ARENA-LEVEL 1



CONSULTANT



2 FLOOR FINISHES PLAN-LEVEL -1 FRONT ADDITION
A2.21 1: 100



1 FLOOR FINISHES PLAN-LEVEL 1-FRONT ADDITION
A2.21 1: 100

FLOOR FINISHES			
	EXPOSED CONCRETE EC - EXPOSED CONCRETE SEALED PC - POLISHED CONCRETE		RESILIENT FLOORING RF-3 VINYL SHEET FLOORING W/ WOOD LOOK FINISH
	RUBBER FLOOR RF-6 - REFER TO SPECS		RESILIENT FLOORING RF-4 SLIP RESIST. KITCHEN SHEET FLOORING
	CERAMIC TILE FT-1 12" x 24" TILE		RESILIENT FLOORING RF-5 VINYL TILE
	CERAMIC TILE FT-2 24" x 24" TILE		MG - METAL GRATING
	CERAMIC TILE FT-3 12" x 12" TILE		RESILIENT FLOORING RF-1 10mm RUBBER FLOOR, COLOR TBD RF-2 10mm RUBBER FLOOR, COLOR TBD
	RESILIENT FLOORING RF-1 10mm RUBBER FLOOR, COLOR TBD RF-2 10mm RUBBER FLOOR, COLOR TBD		FG - RECESSED FOOT GRILLE (EC-2 BELOW)

0	TRP - ISSUED FOR TENDER	2023-04-10
NO.	REVISION	DATE

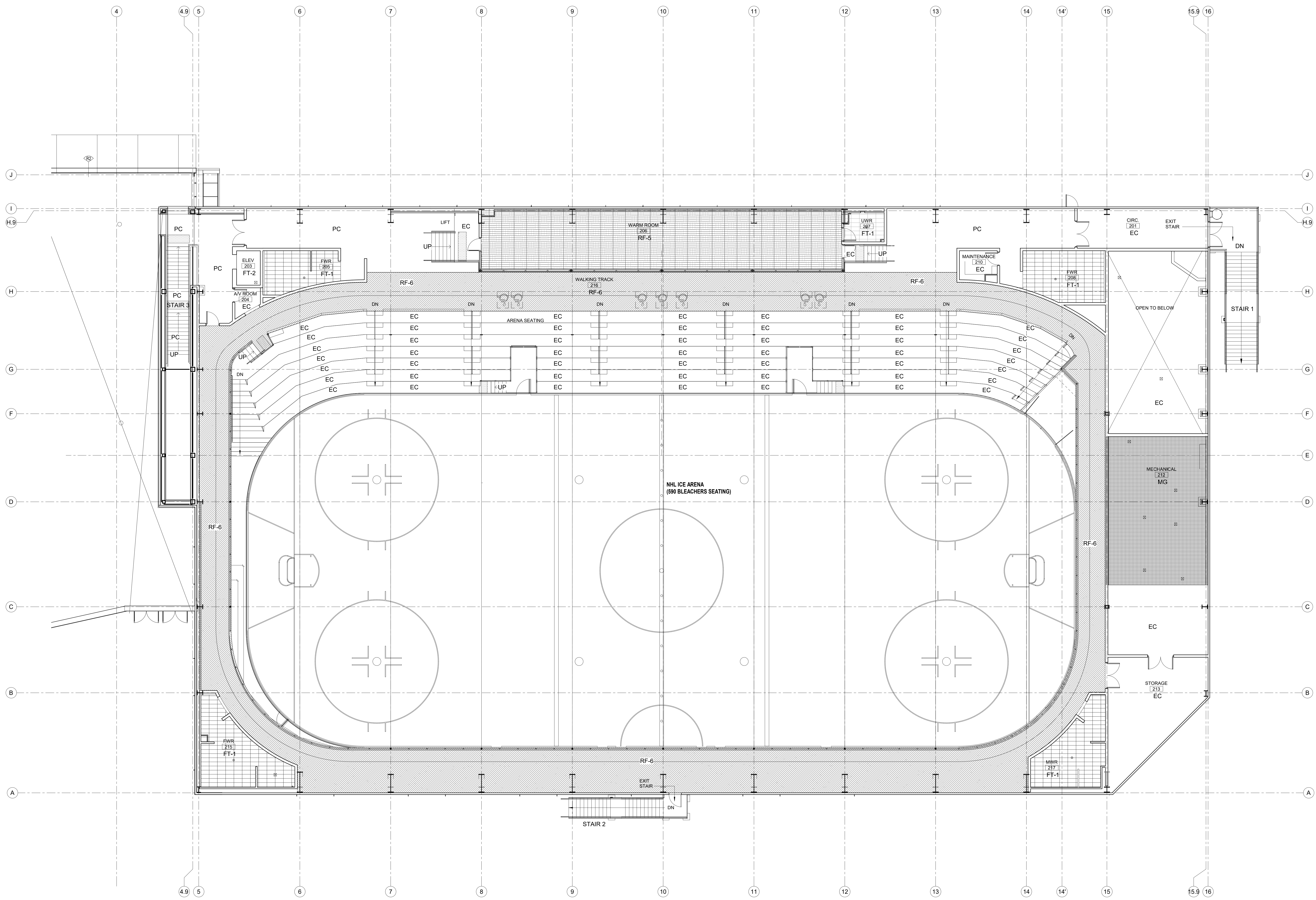
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PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PE

PROJECT NO.: 21111
DRAWN BY: OM / MV / DE
CHECKED BY: MGG / PC
SCALE: As indicated

FLOOR FINISHES PLAN-
LEVEL 1 & -1-FRONT
ADDITION



1 FLOOR FINISHES PLAN-ARENA-LEVEL 2
 A2.22 1:100

FLOOR FINISHES

	EXPOSED CONCRETE EC - EXPOSED CONCRETE SEALED PC - POLISHED CONCRETE		RESILIENT FLOORING RF-3 VINYL SHEET FLOORING W/ WOOD LOOK FINISH
	RUBBER FLOOR RF-6 - REFER TO SPECS		RESILIENT FLOORING RF-4 SLIP-RESIST. KITCHEN SHEET FLOORING
	CERAMIC TILE FT-1 12" x 24" TILE		RESILIENT FLOORING RF-5 VINYL TILE
	CERAMIC TILE FT-2 24" x 24" TILE FT-3 12" x 12" TILE		MG - METAL GRATING
	RESILIENT FLOORING RF-1 10mm RUBBER FLOOR, COLOR TBD RF-2 10mm RUBBER FLOOR, COLOR TBD		FG - RECESSED FOOT GRILLE (EC-2 BELOW)

0	TRF - ISSUED FOR TENDER	2023-04-10
NO.	REVISION	DATE

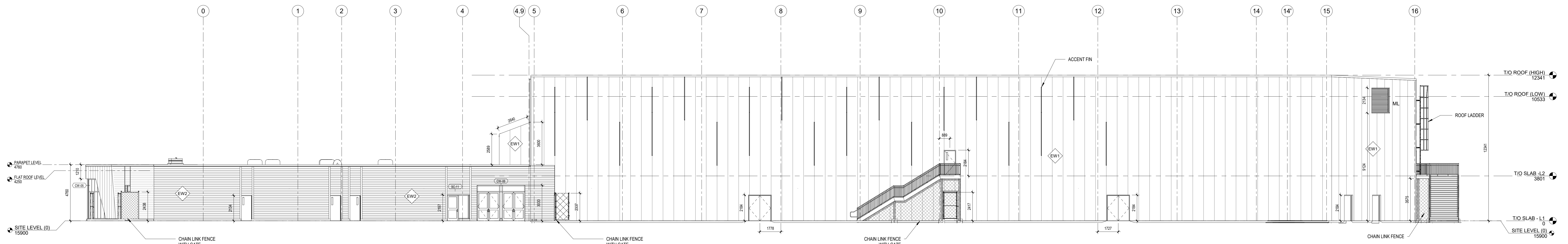


PROJECT NAME:
 SIMMONS SPORTS CENTRE ARENA & POOL
 REPLACEMENT
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

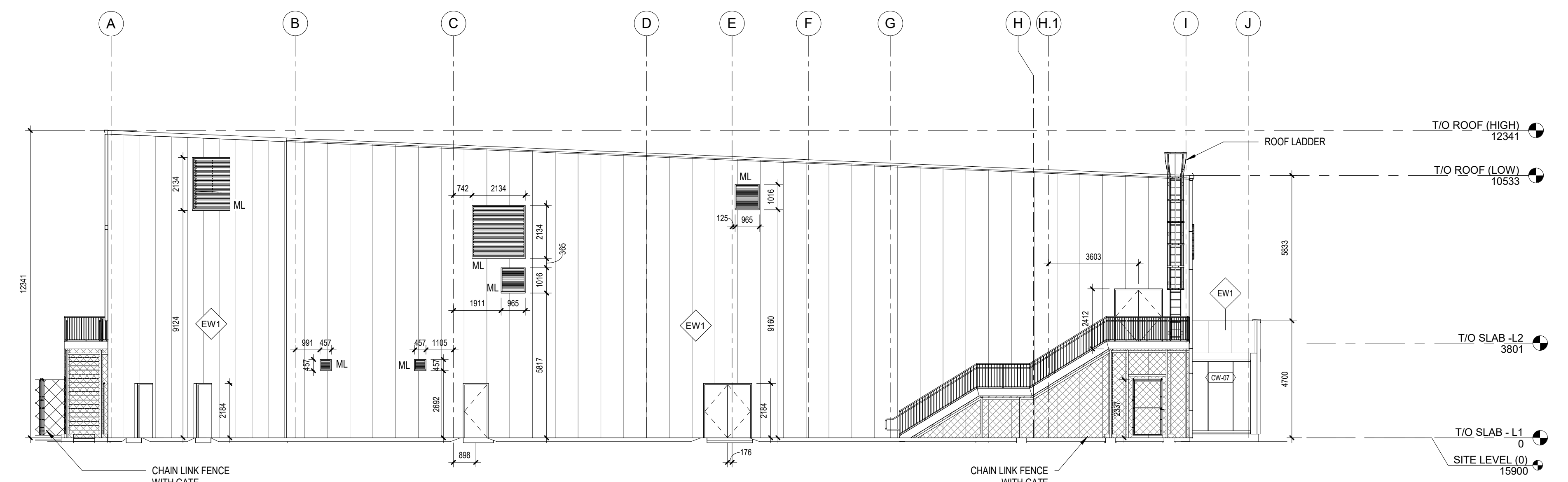
PROJECT NO.: 21111
 DRAWN BY: OM / MV / DE
 CHECKED BY: MGG / PC
 SCALE: As indicated

**FLOOR FINISHES PLAN -
 LEVEL - 2 - ARENA**

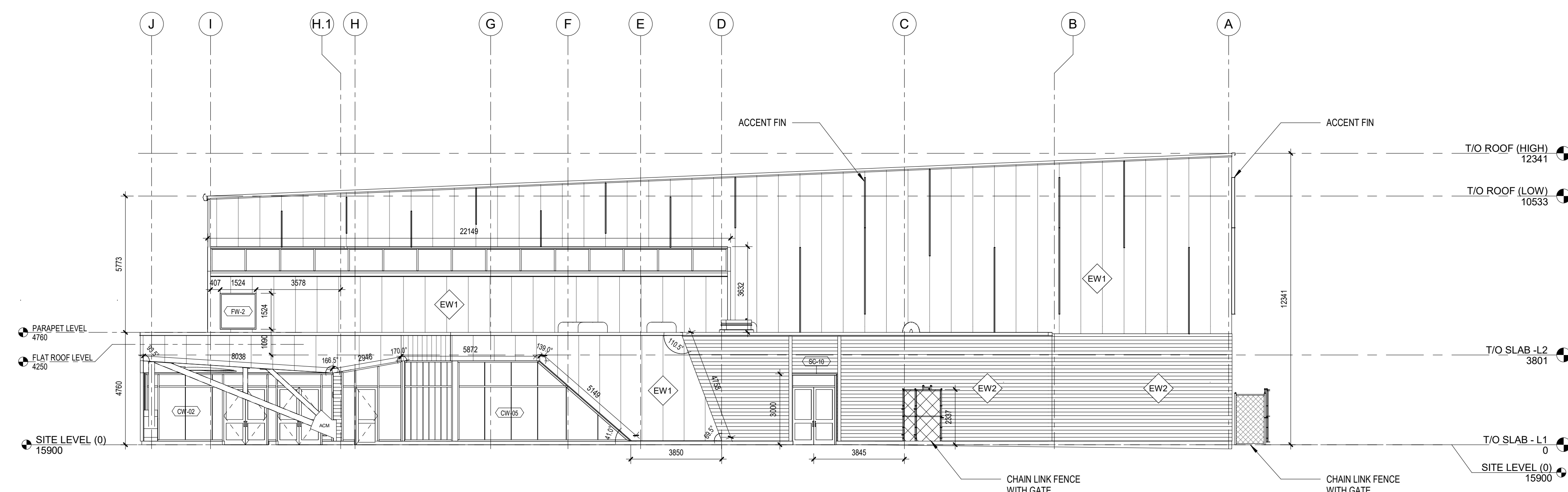
GENERAL NOTE: IMP PANELS, ROOF AND ACCENT FINIS AT MAIN AREA BETWEEN GRID LINES 5-16 AND A-1 ARE NOT PART OF TP6 PACKAGE, REFER TO TP1 FOR INFORMATION.



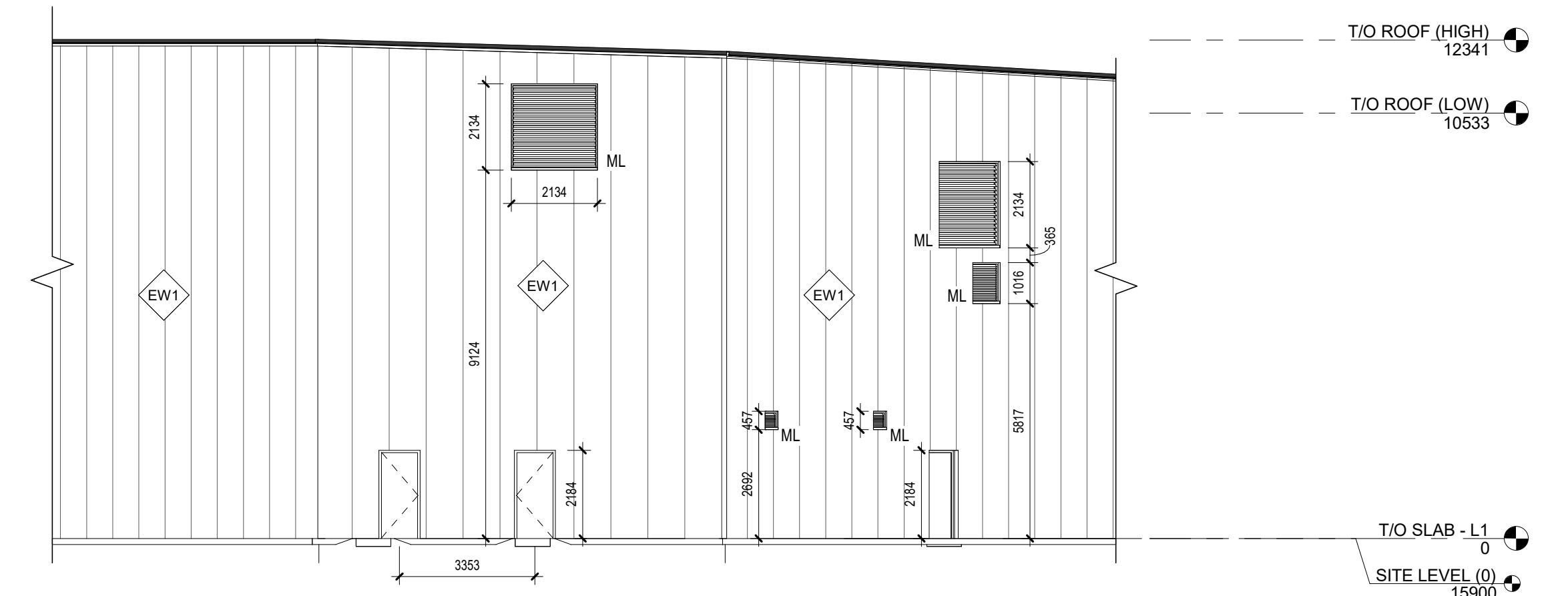
1 EAST ELEVATION
A3.01 1: 125



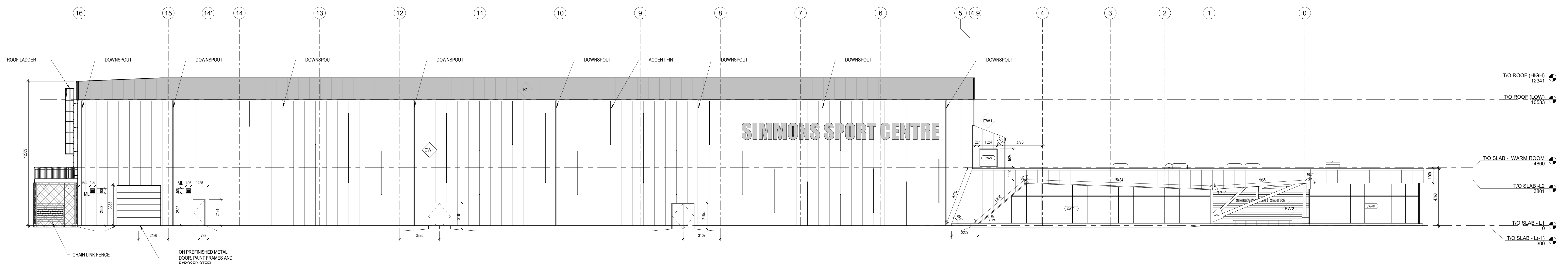
2 NORTH ELEVATION
A3.01 1: 125



3 SOUTH ELEVATION
A3.01 1: 125



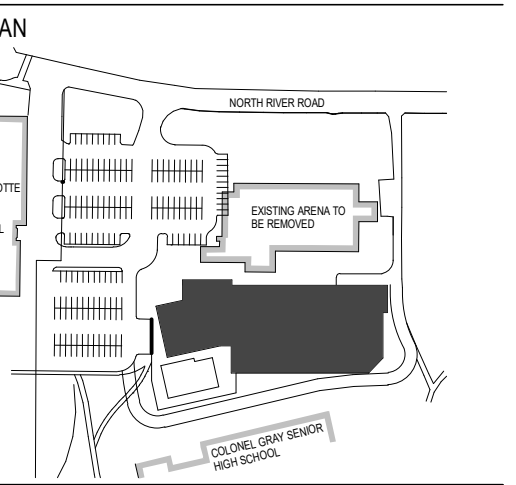
4 NORTH-EAST ELEVATION
A3.01 1: 125



5 WEST ELEVATION
A3.01 1: 125

CLIENT

CHARLOTTETOWN
1 902-666-5548 189 QUEEN STREET, 3RD FLOOR,
CHARLOTTETOWN, PE, C1A 4B7



CONSULTANT

DSRA
1 902-420-9990 1045 Spring Garden Road, 8th Floor
1 902-420-9450 Halifax, Nova Scotia, CAN B3J 1J2

NOTE:
DOOR AND LOWER DIMENSIONS ARE TO EDGE OF FRAMES, NOT TO ROUGH OPENING, UNLESS NOTED OTHERWISE.
ALLOW FOR 6mm (1/4") SHIM SPACE AROUND DOORS & LOUVERS

3	TP6 - ISSUED FOR TENDER	2022-04-10
2	SI 01	2022-01-10
1	TP1 - APPENDIXUM 1	2022-04-19
0	TP1 - ISSUED FOR TENDER	2022-03-24
NO.	REVISION	DATE

STAMP

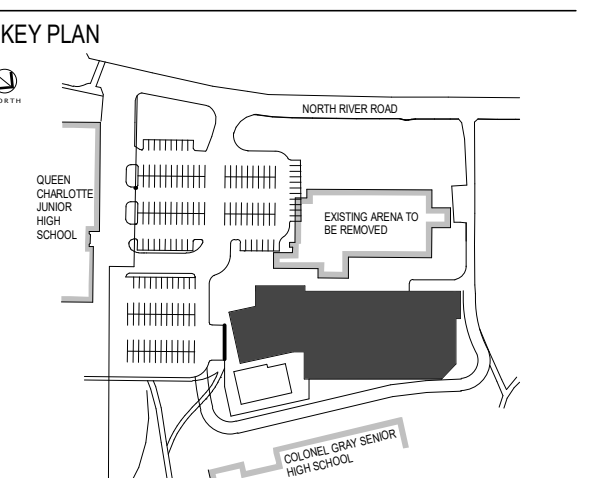


PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
110 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

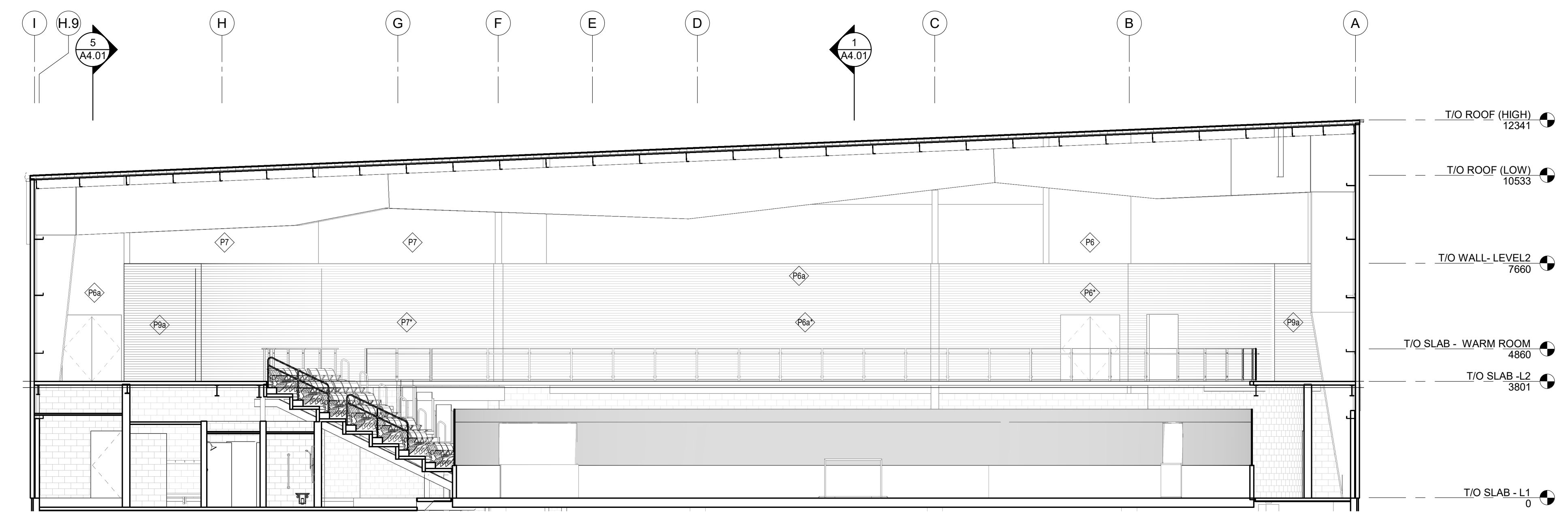
PROJECT NO.: 21111
DRAWN BY: OM / MV / DE
CHECKED BY: MMG / PC
SCALE: 1: 125

BUILDING ELEVATIONS

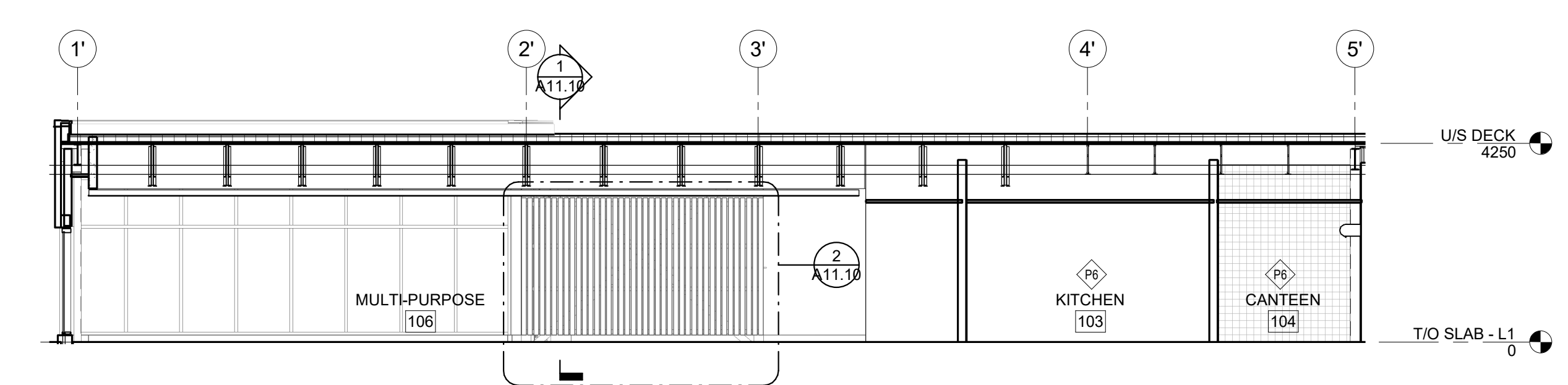
A3.01



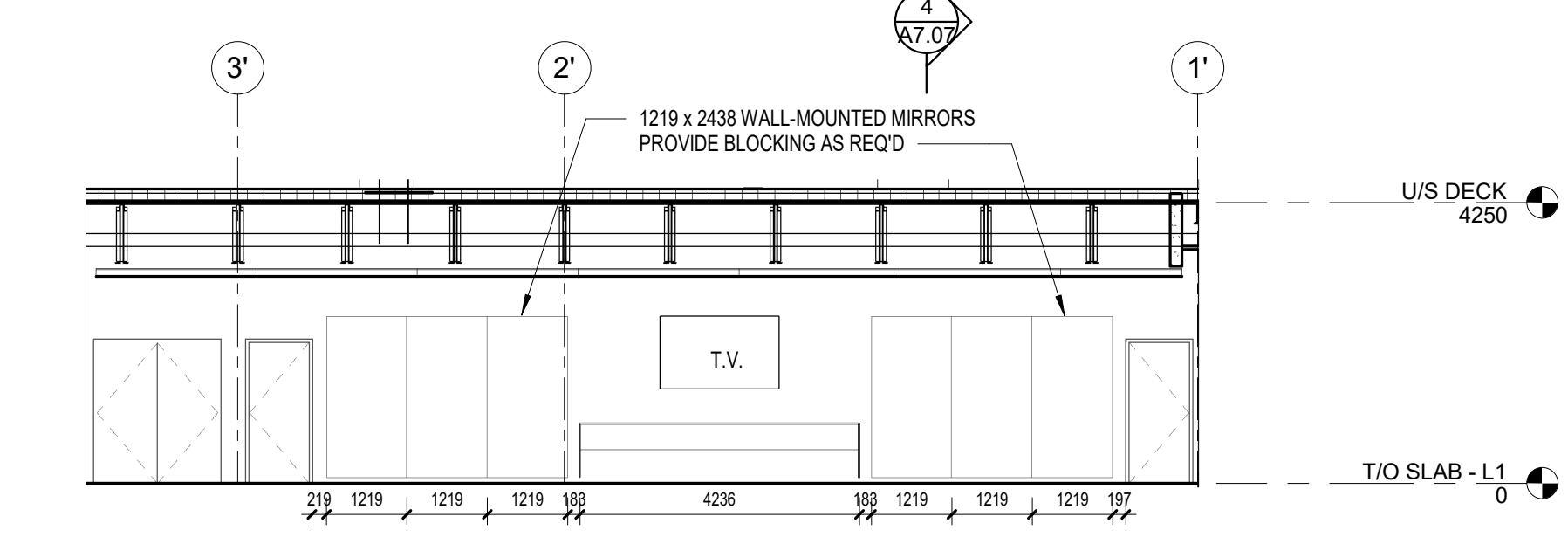
CONSULTANT



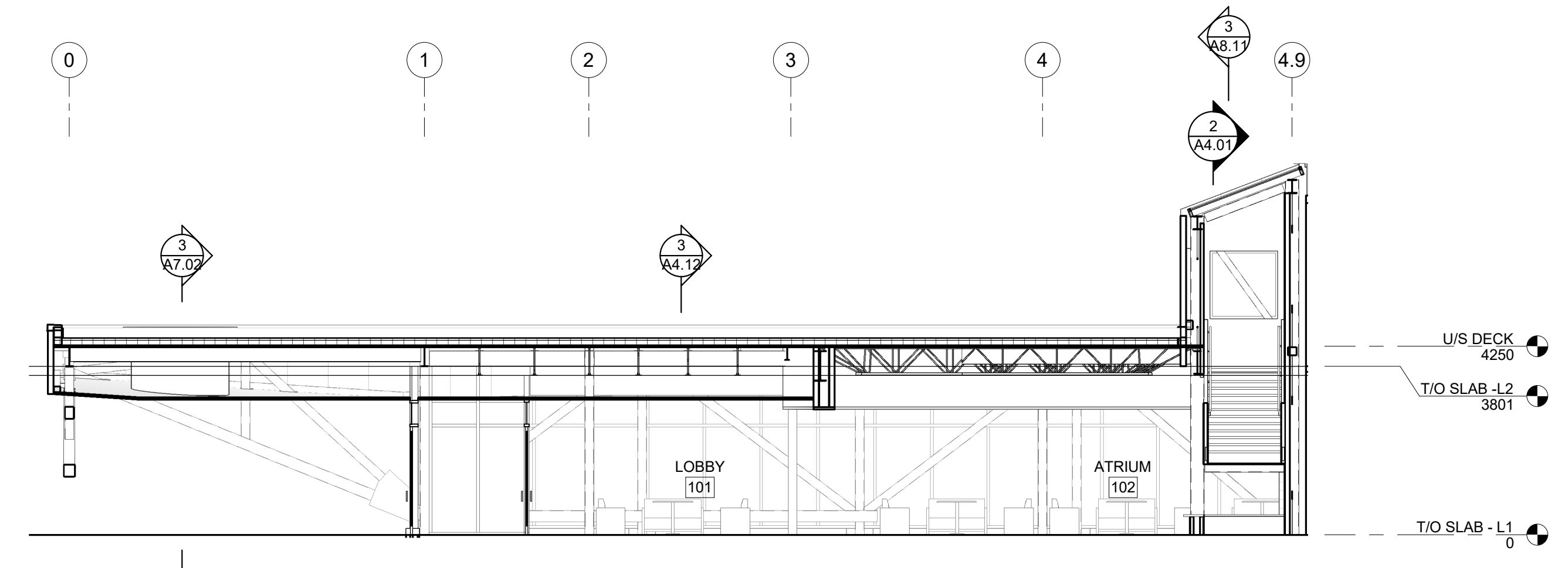
1 INTERIOR ELEVATION - ICE RINK NORTH
A3.02 / 1 : 100



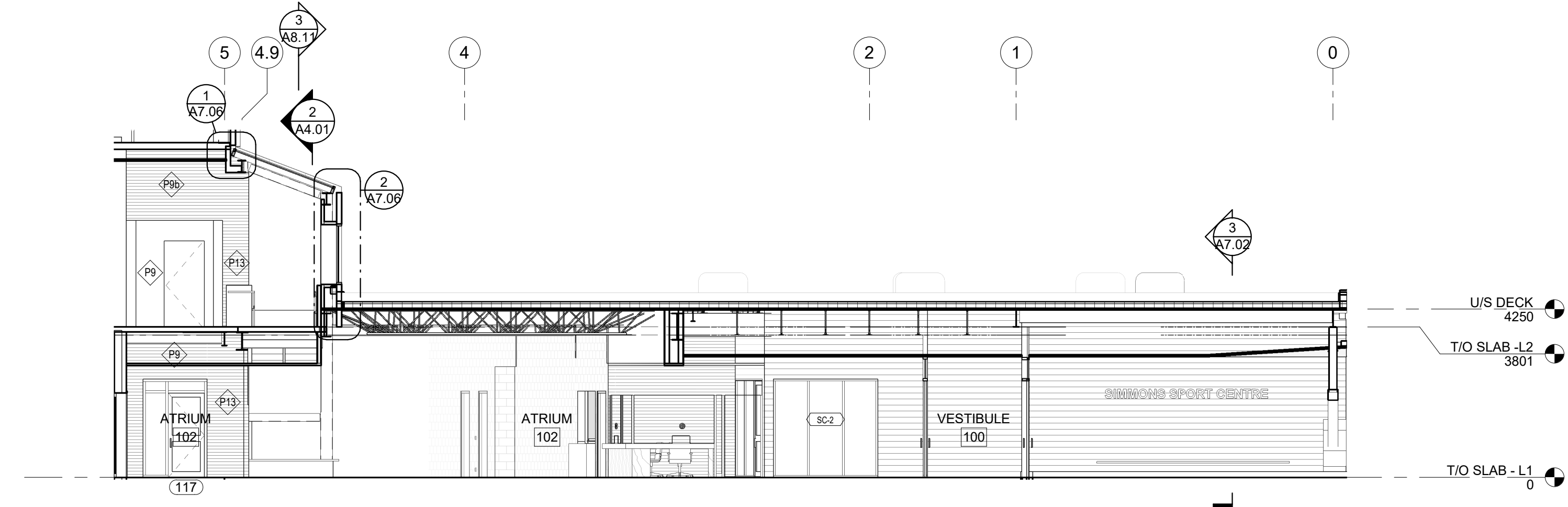
2 INTERIOR ELEVATION - MULTI-PURPOSE ROOM 1
A3.02 / 1 : 100



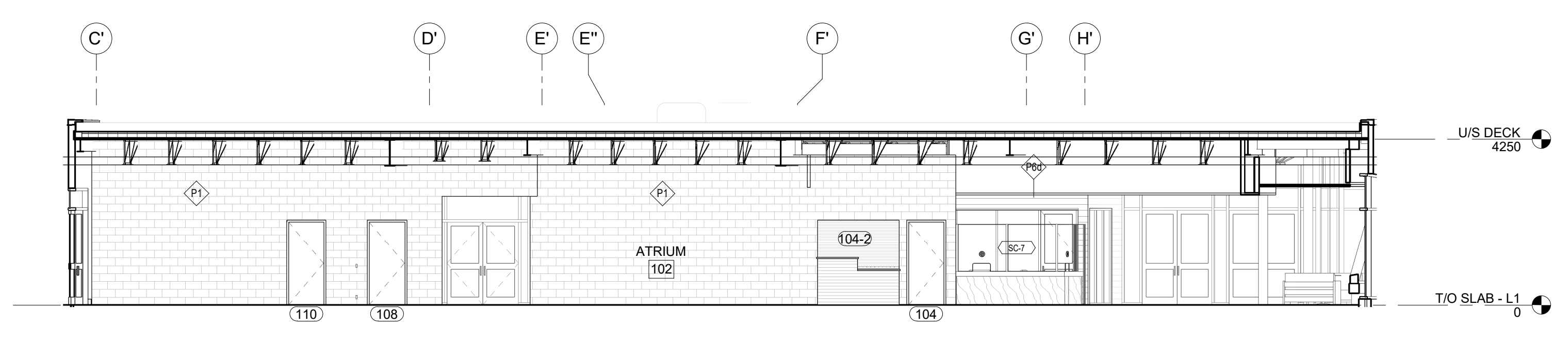
3 INTERIOR ELEVATION - MULTI-PURPOSE ROOM 2
A3.02 / 1 : 100



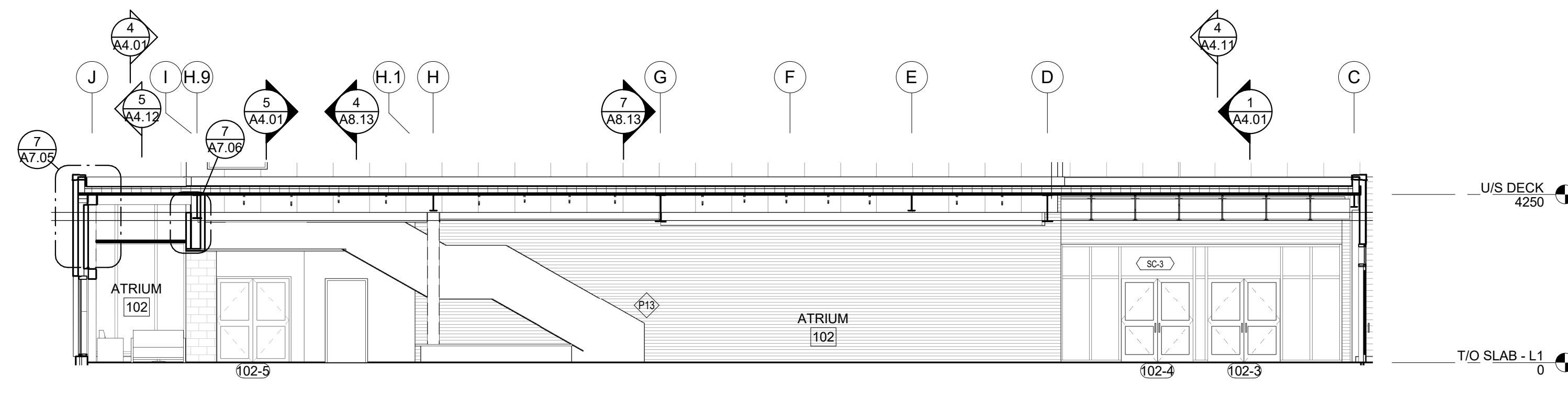
4 INTERIOR ELEVATION - ATRIUM WEST
A3.02 / 1 : 100



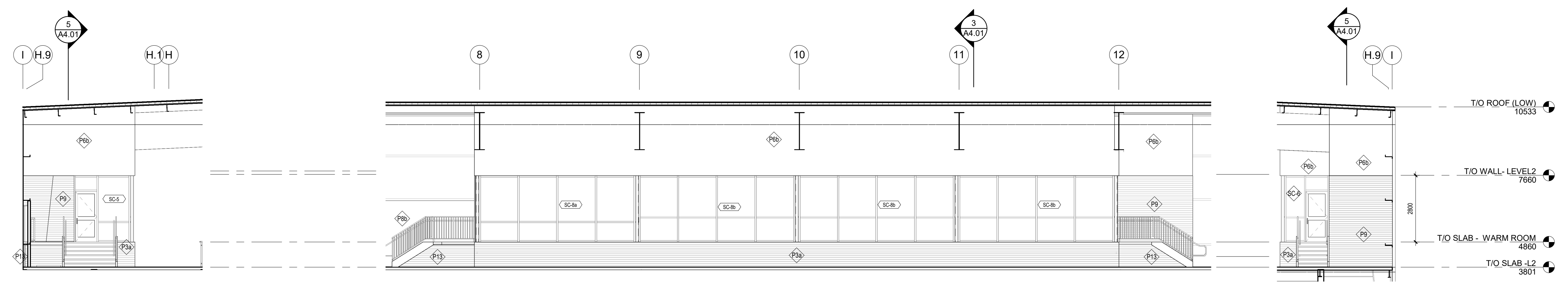
5 INTERIOR ELEVATION - ATRIUM EAST
A3.02 / 1 : 100



6 INTERIOR ELEVATION - ATRIUM
A3.02 / 1 : 100



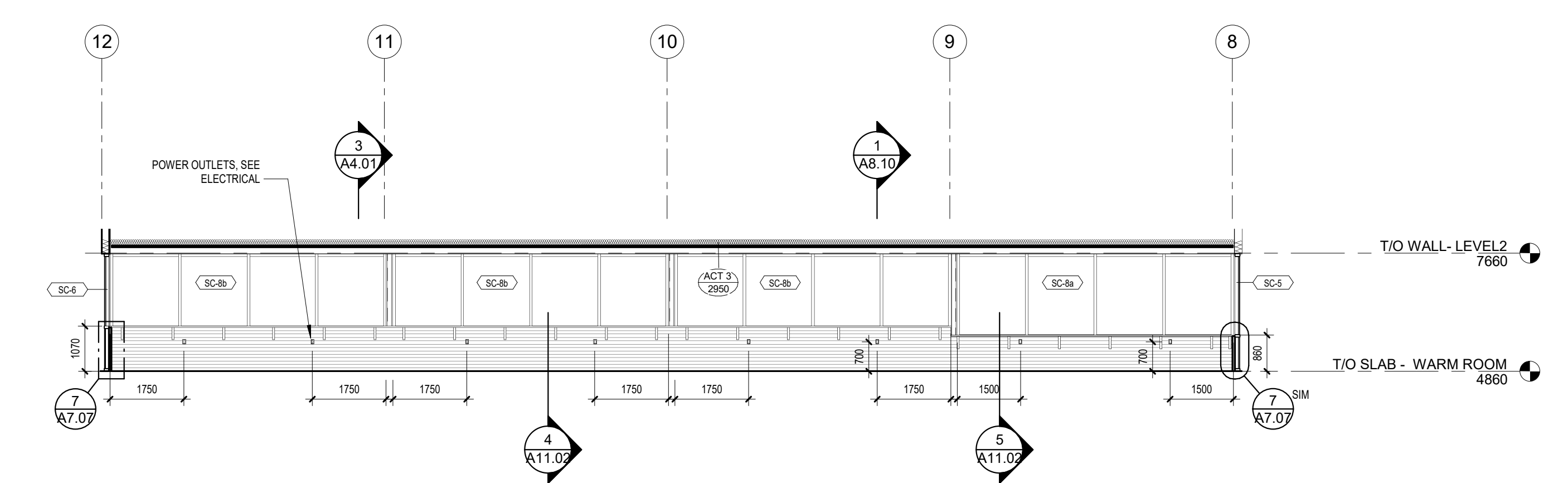
7 INTERIOR ELEVATION - ATRIUM WALL
A3.02 / 1 : 100



8 INTERIOR ELEVATION - MULTI-PURPOSE ROOM (LEFT)
A3.02 / 1 : 100

9 INTERIOR ELEVATION - WARM ROOM (FRONT)
A3.02 / 1 : 100

10 INTERIOR ELEVATION - MULTI-PURPOSE ROOM (RIGHT)
A3.02 / 1 : 100



11 INTERIOR ELEVATION - WARM ROOM INTERIOR
A3.02 / 1 : 100

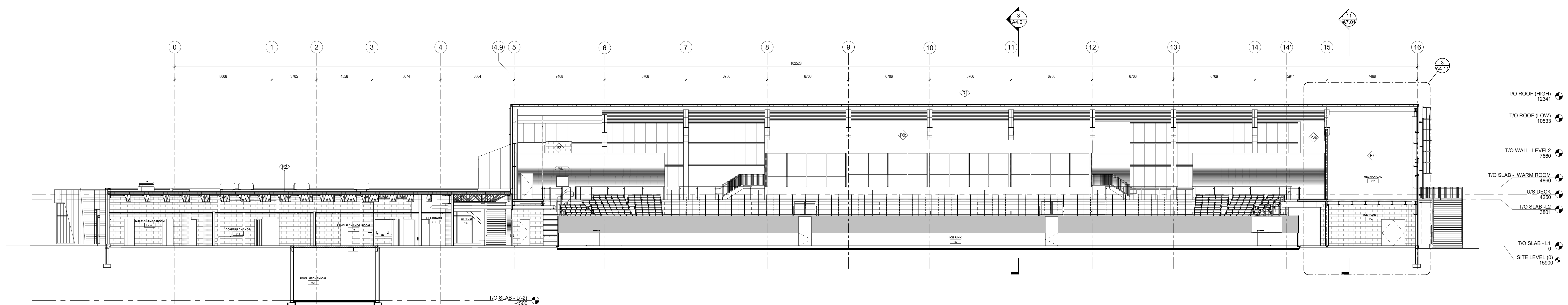
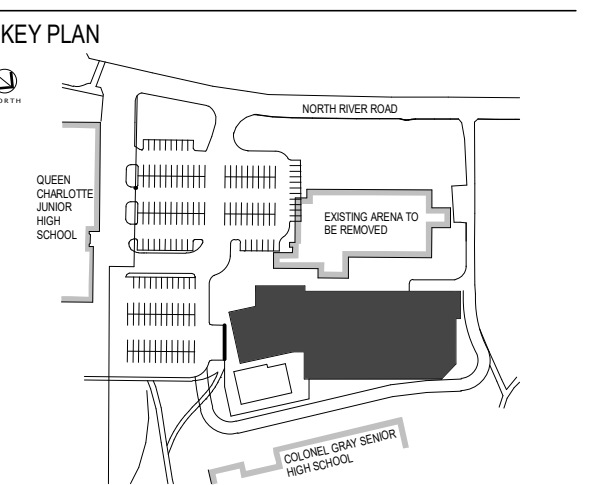
0 TRP - ISSUED FOR TENDER 2023-04-10
NO. REVISION DATE



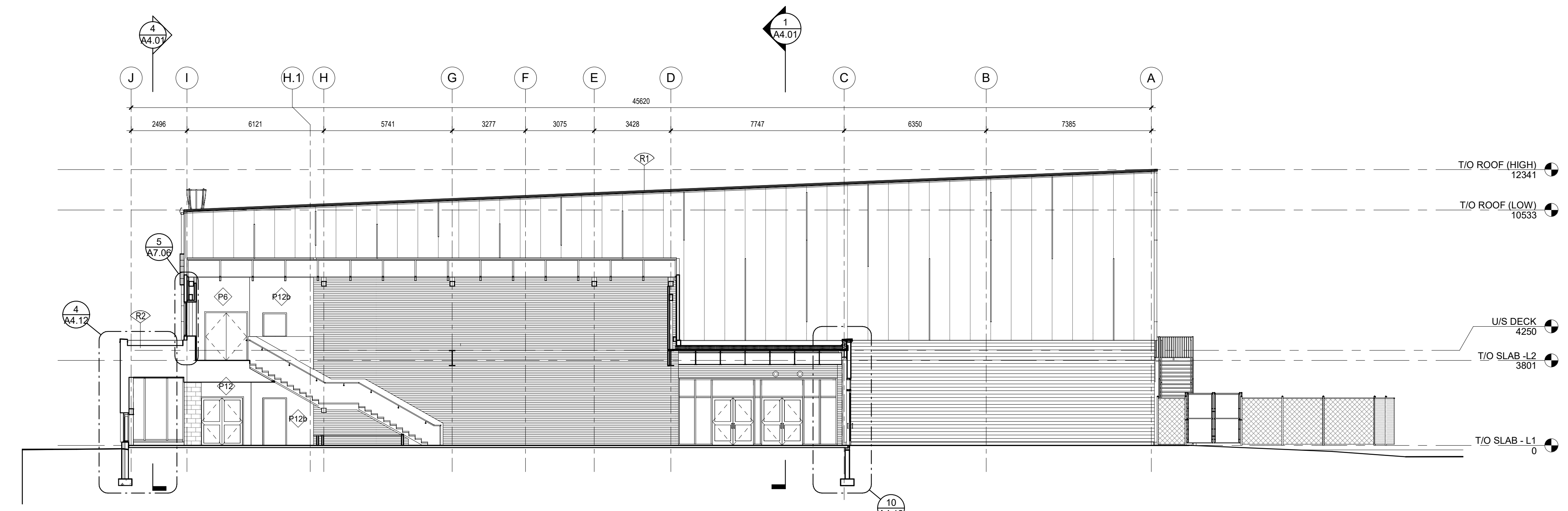
PROJECT NAME
SIMMONS SPORTS CENTRE ARENA & POOL
REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

PROJECT NO.: 21111
DRAWN BY: OM / MV / DE
CHECKED BY: MGG / PC
SCALE: 1 : 100

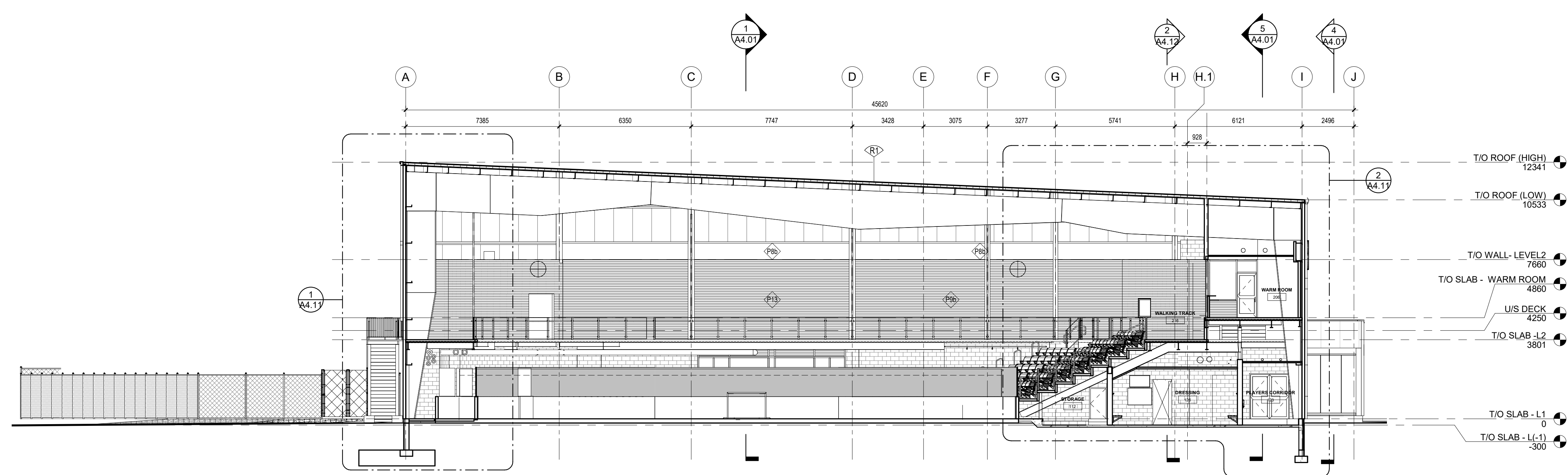
INTERIOR ELEVATIONS



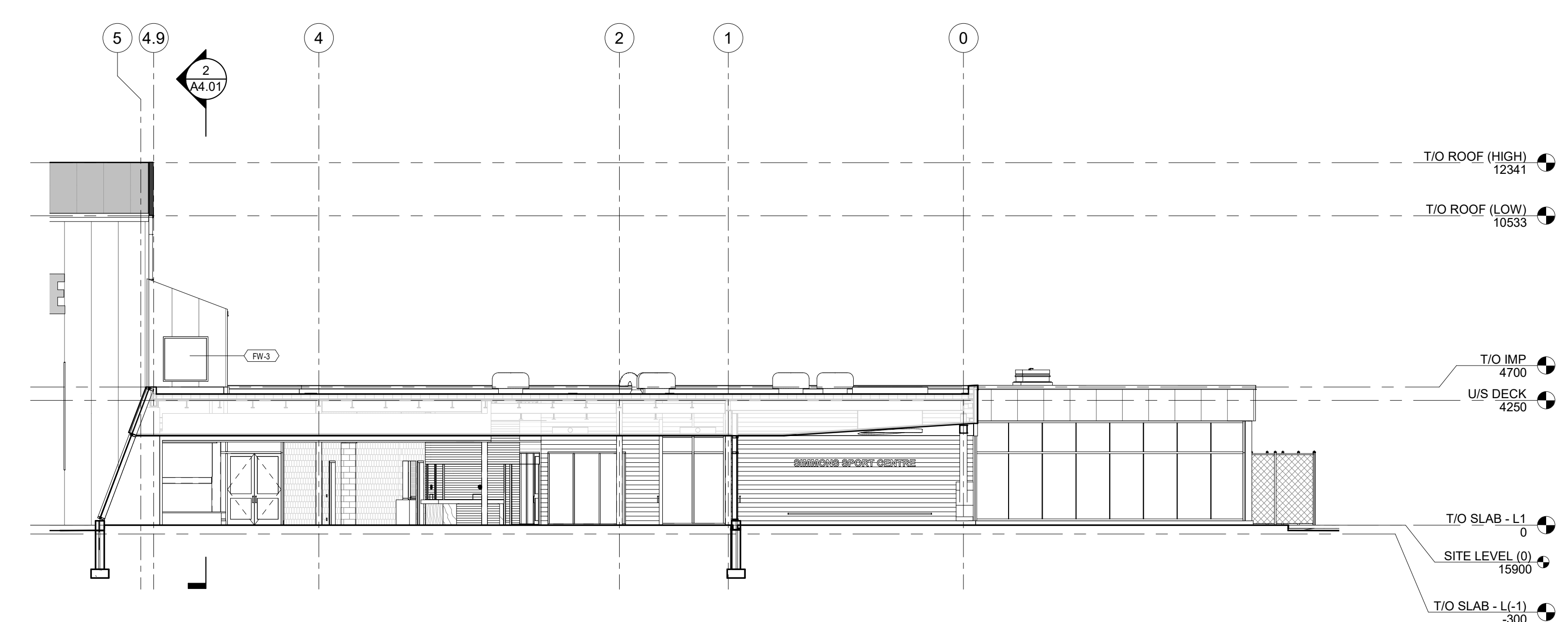
1 BUILDING SECTION 1
A4.01/1:125



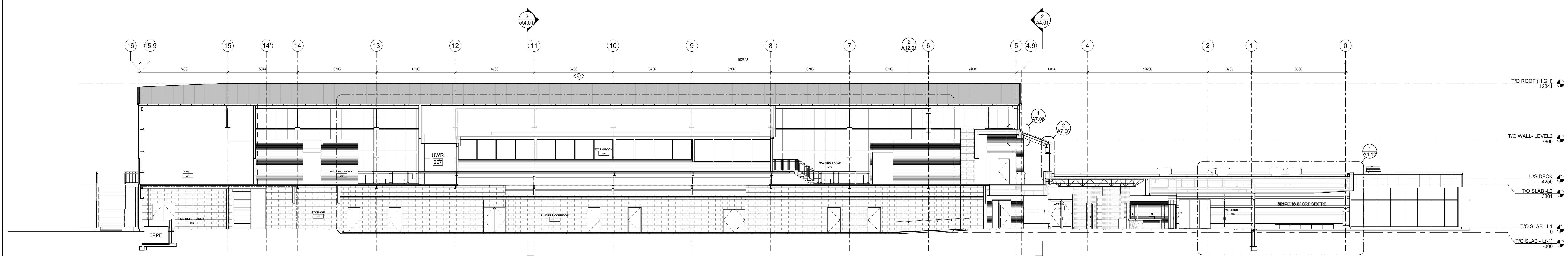
2 BUILDING SECTION 2
A4.01/1:125



3 BUILDING SECTION 3
A4.01/1:125



4 BUILDING SECTION 4
A4.01/1:125



5 BUILDING SECTION 5
A4.01/1:125

2	TR4 - ISSUED FOR TENDER	2023-04-10
1	TR4 - ISSUED FOR TENDER	2022-11-01
0	TR1 - ISSUED FOR TENDER	2022-03-24
NO.	REVISION	DATE

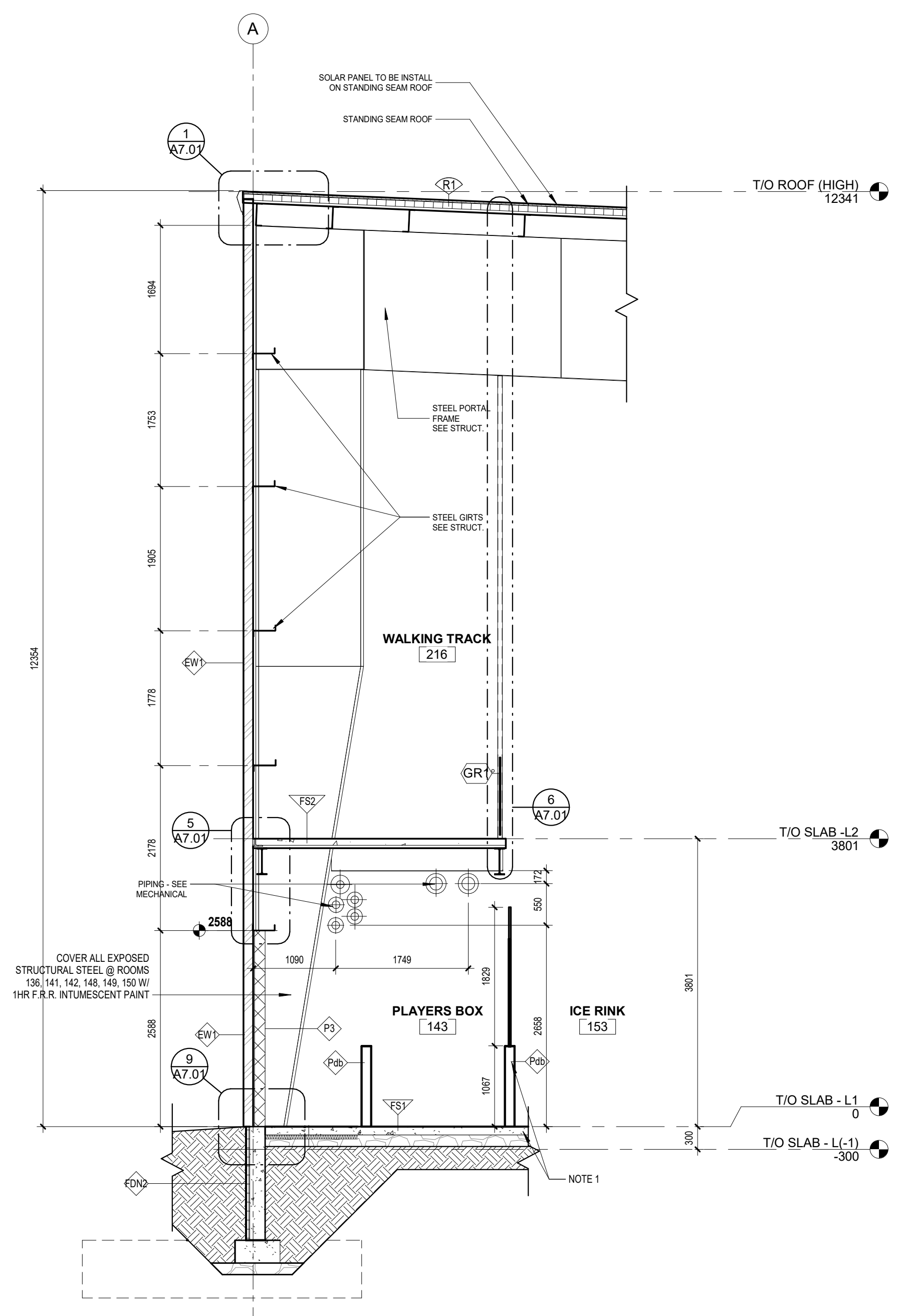
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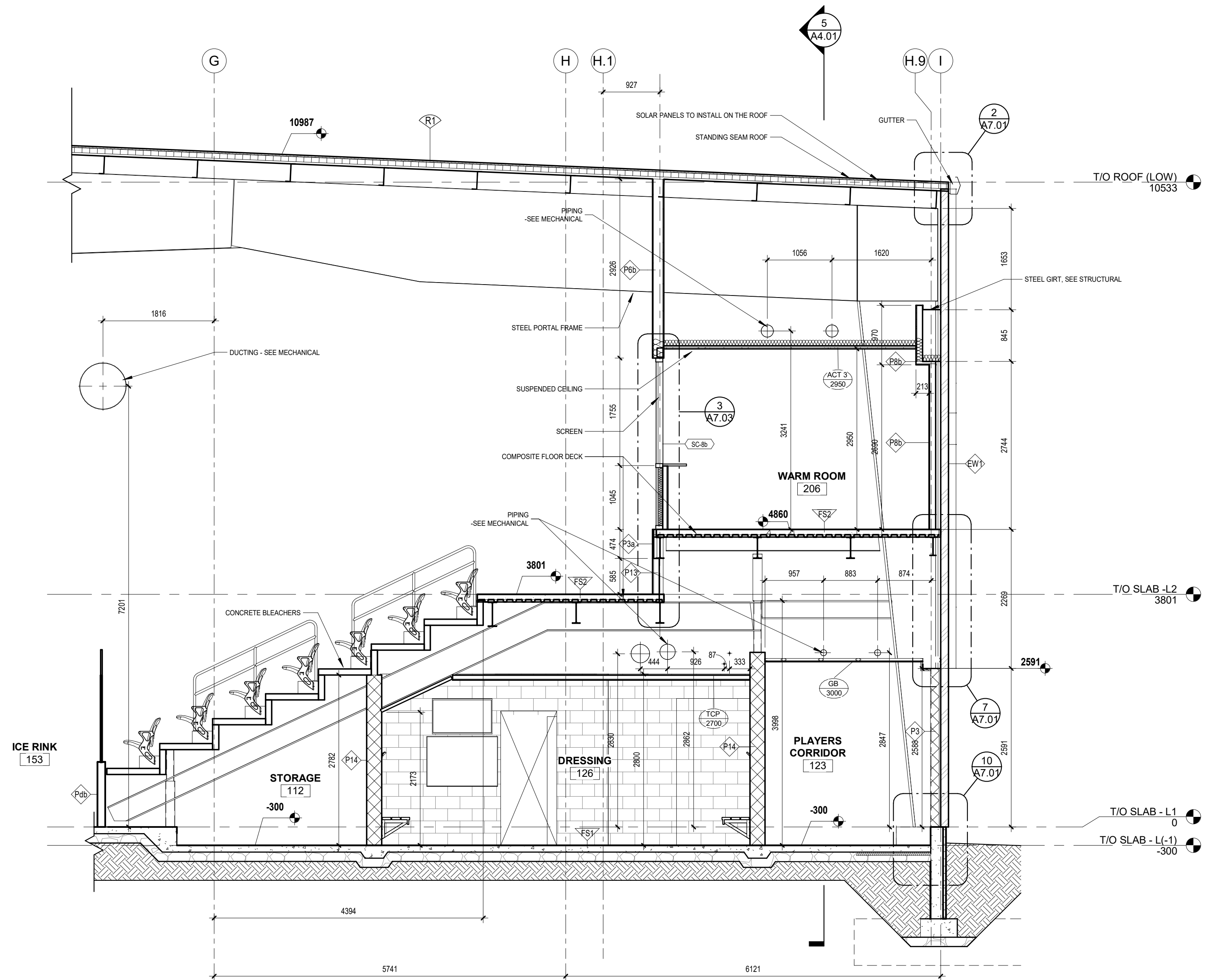
PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL
REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

PROJECT NO.: 21111
DRAWN BY: OM / MV / DE
CHECKED BY: MMG / PC
SCALE: 1:125

BUILDING SECTIONS

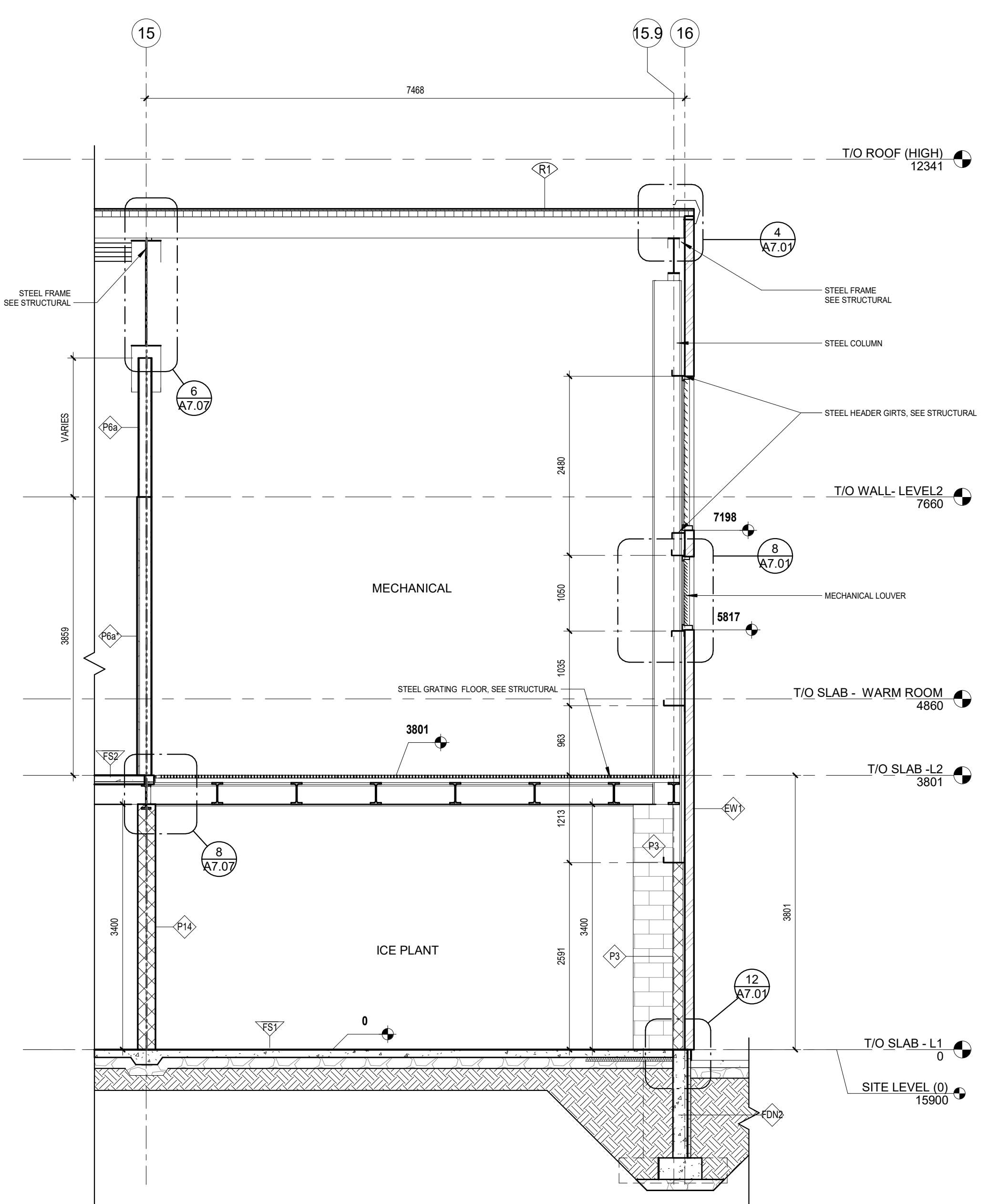


1 WALL SECTION @ WALKING TRACK
 A4.11 / A4.01 1:50

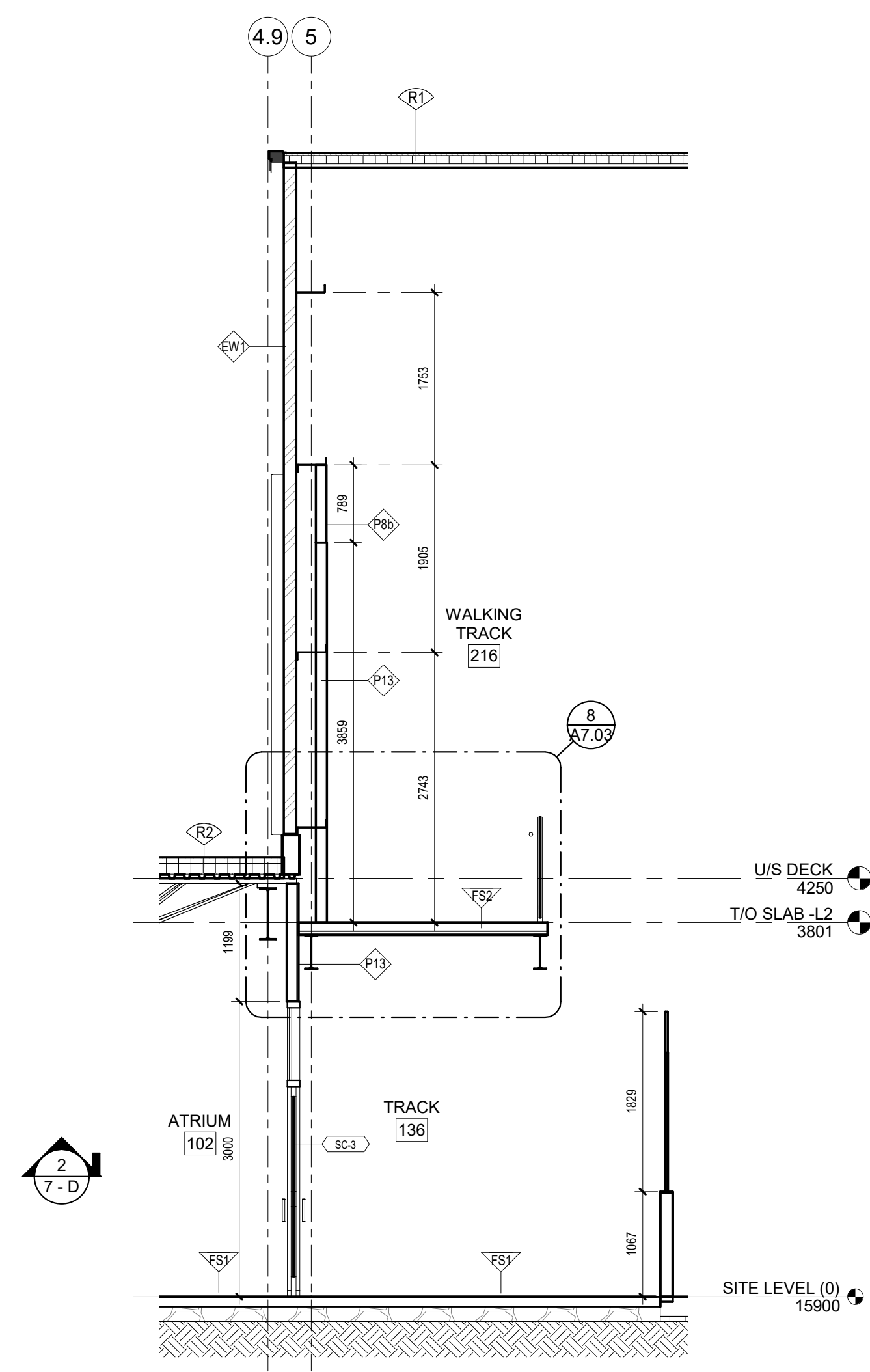


2 WALL SECTION @ WARM ROOM
 A4.11 / A4.01 1:50

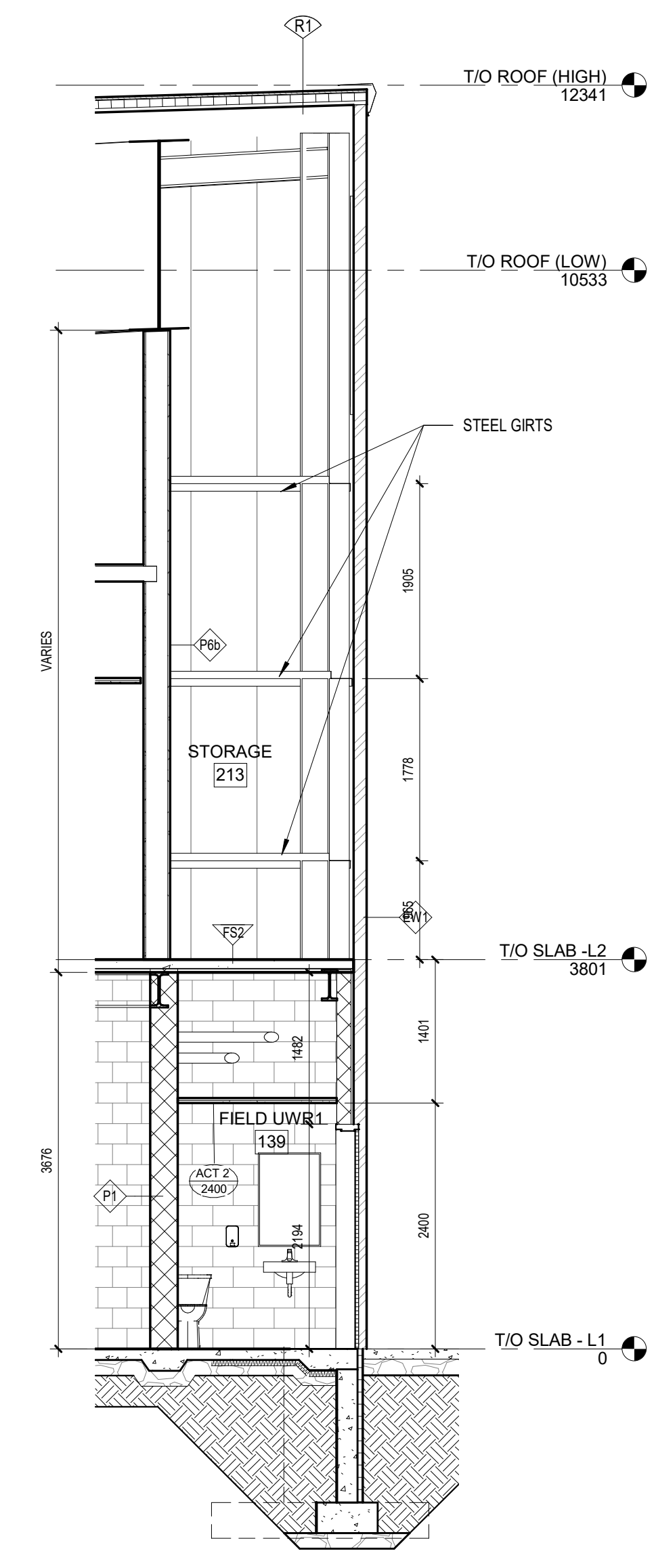
NOTE:
 1. DASHER BOARDS AND ICE SLAB NOT IN THE SCOPE



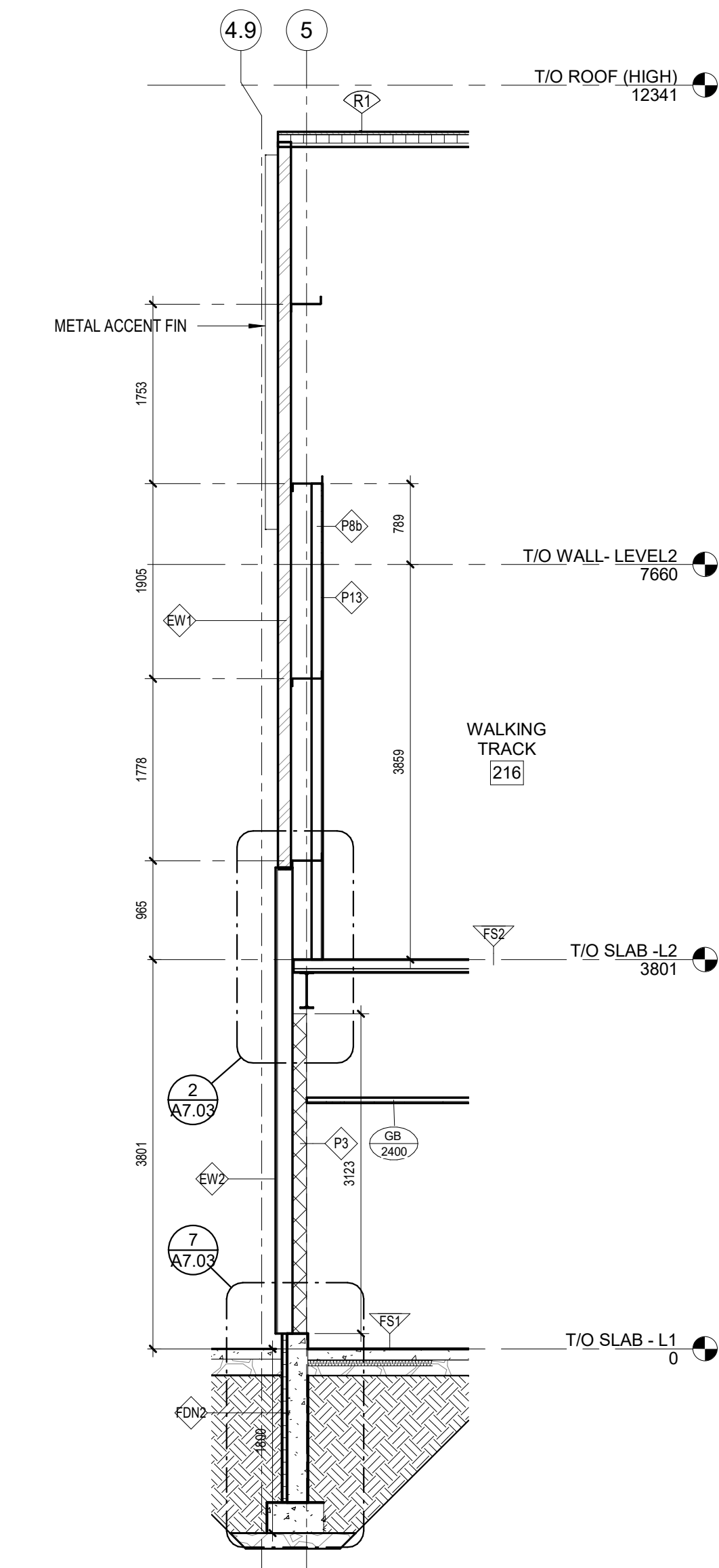
3 WALL SECTION @ ICE PLANT
 A4.11 / A4.01 1:50



4 WALL SECTION @ WALKING TRACK 2
 A4.11 / A4.10 1:50



5 WALL SECTION @ FIELD UWR1
 A4.11 / A4.10 1:50



6 WALL SECTION @ OFFICE 154
 A4.11 / A4.10 1:50

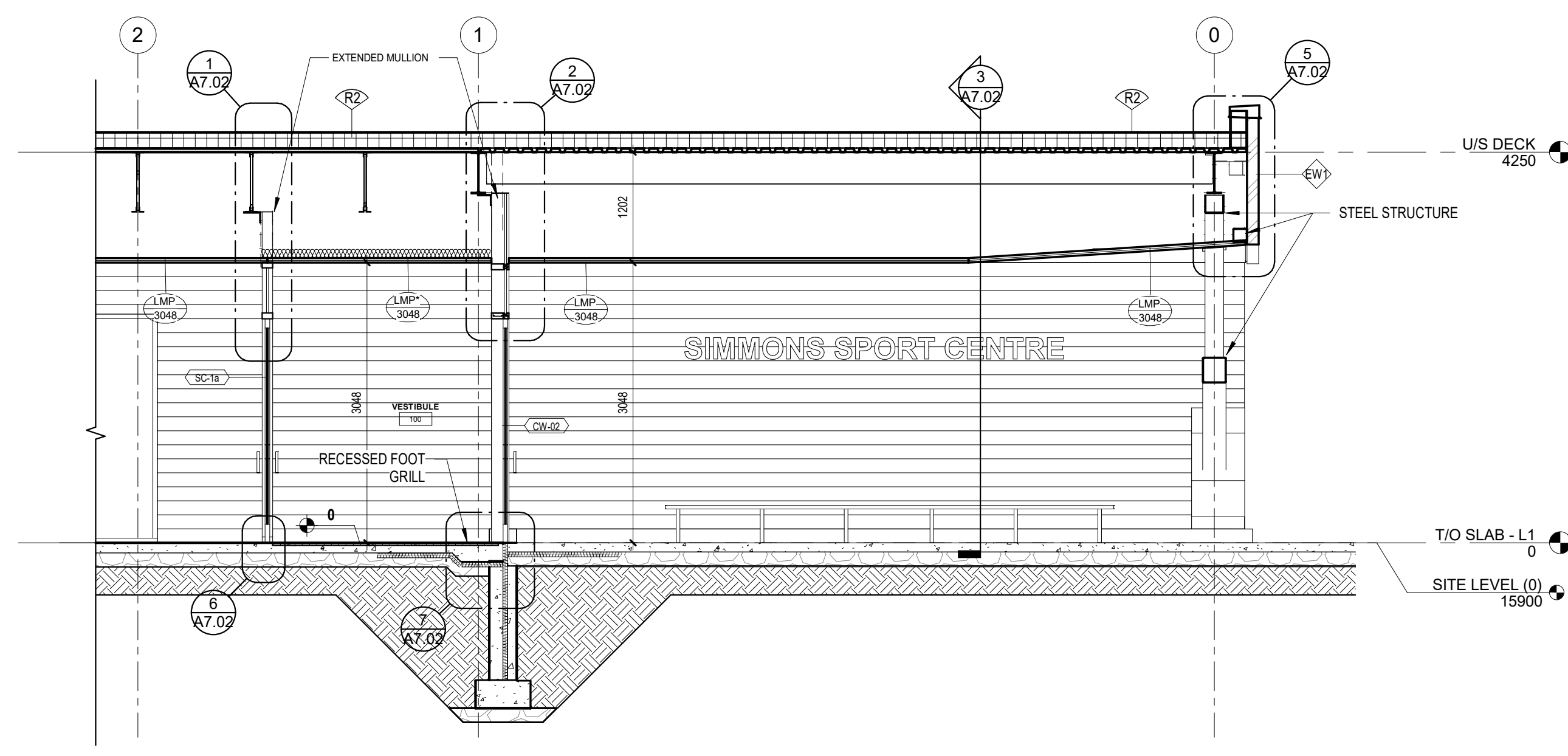
NO.	REVISION	DATE
1	TPI - ISSUED FOR TENDER	2022-04-10
0	TPI - ISSUED FOR TENDER	2022-03-24



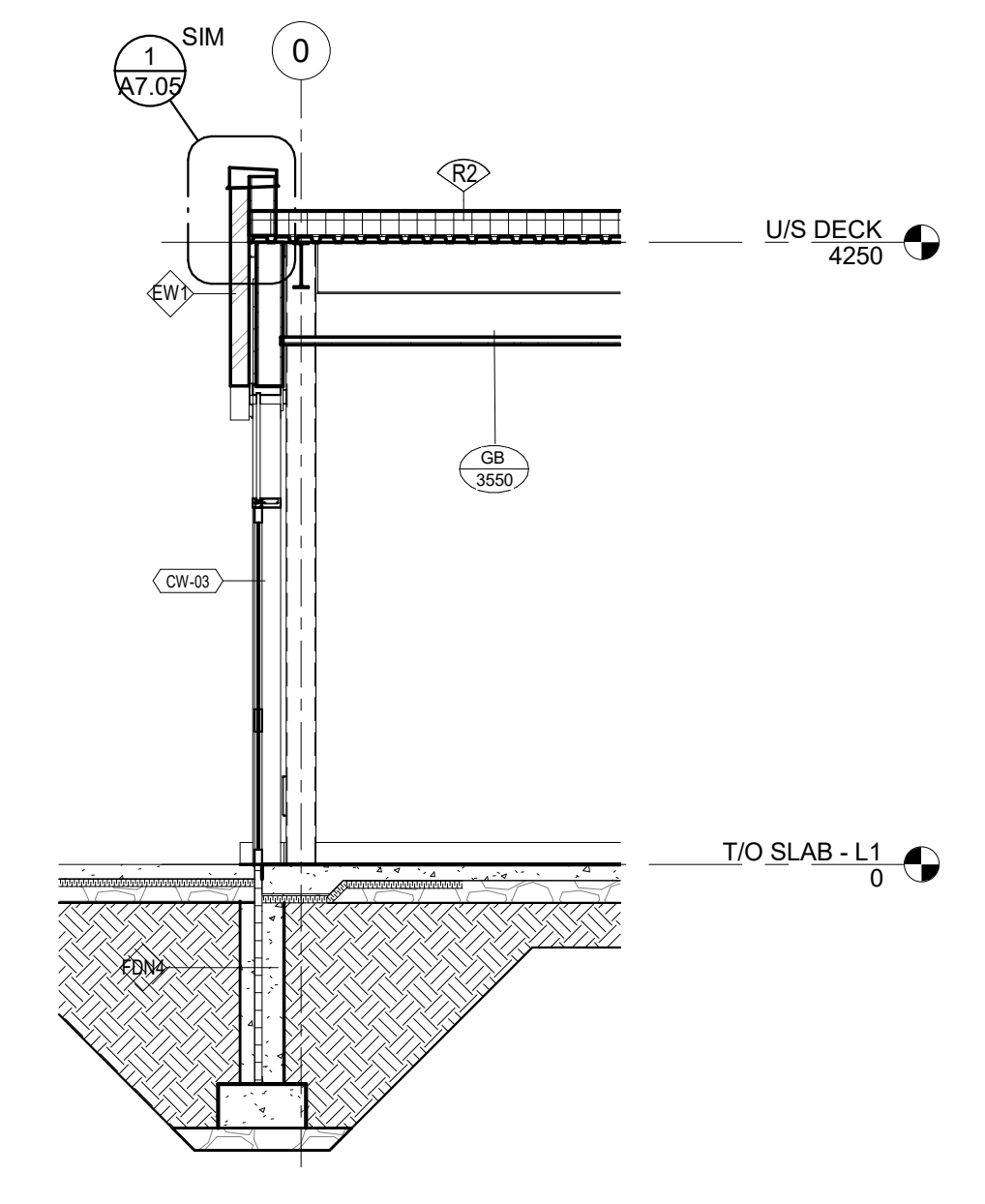
PROJECT NAME:
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 170 NORTH RIVER ROAD
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PROJECT NO.: 21111
 DRAWN BY: OM / MV / DE
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 SCALE: 1:50

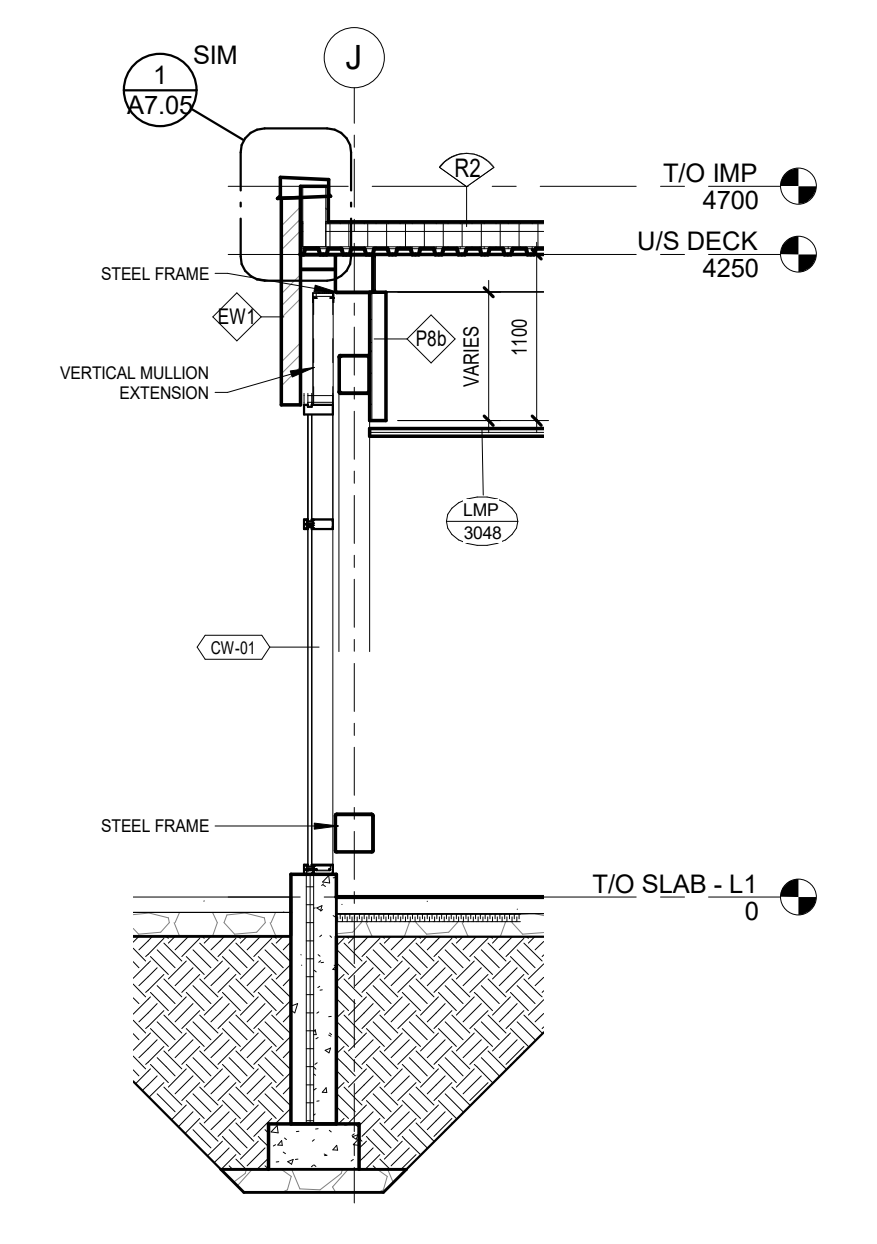
WALL SECTIONS



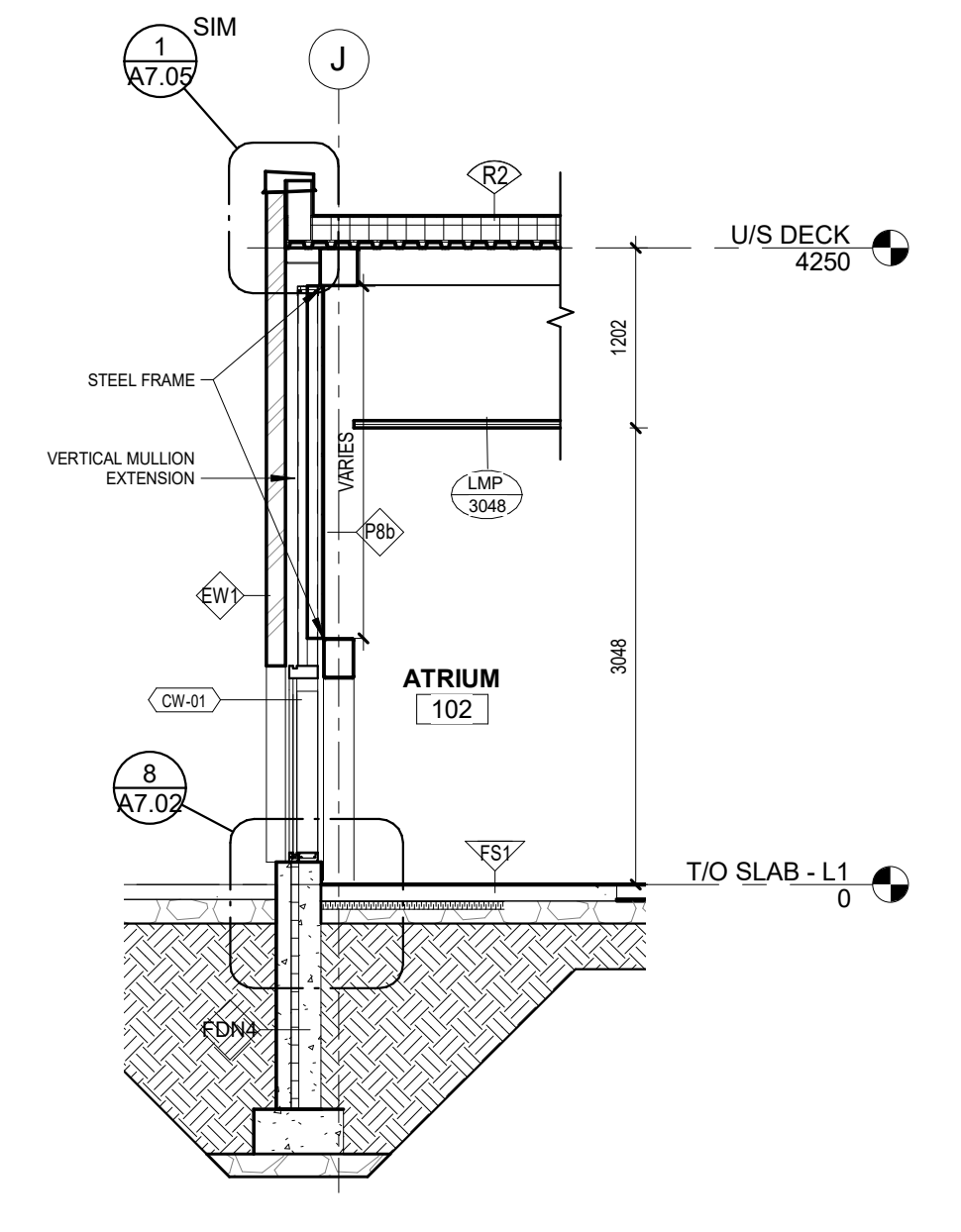
1 WALL SECTION @ VESTIBULE ENTRANCE
 A4.12 / A4.01 1:50



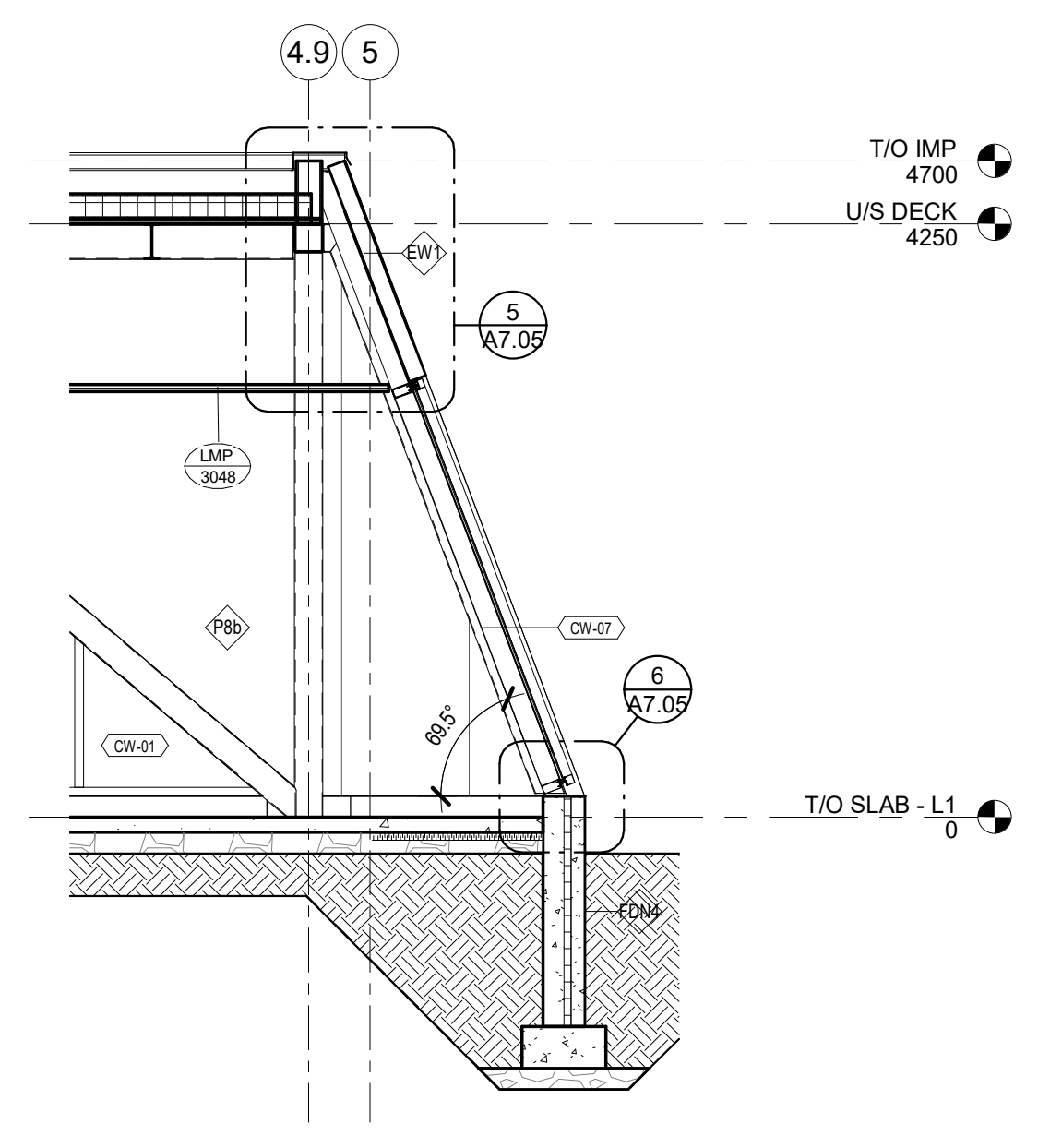
2 WALL SECTION @ FRONT ENTRY
 A4.12 / A1.11 1:50



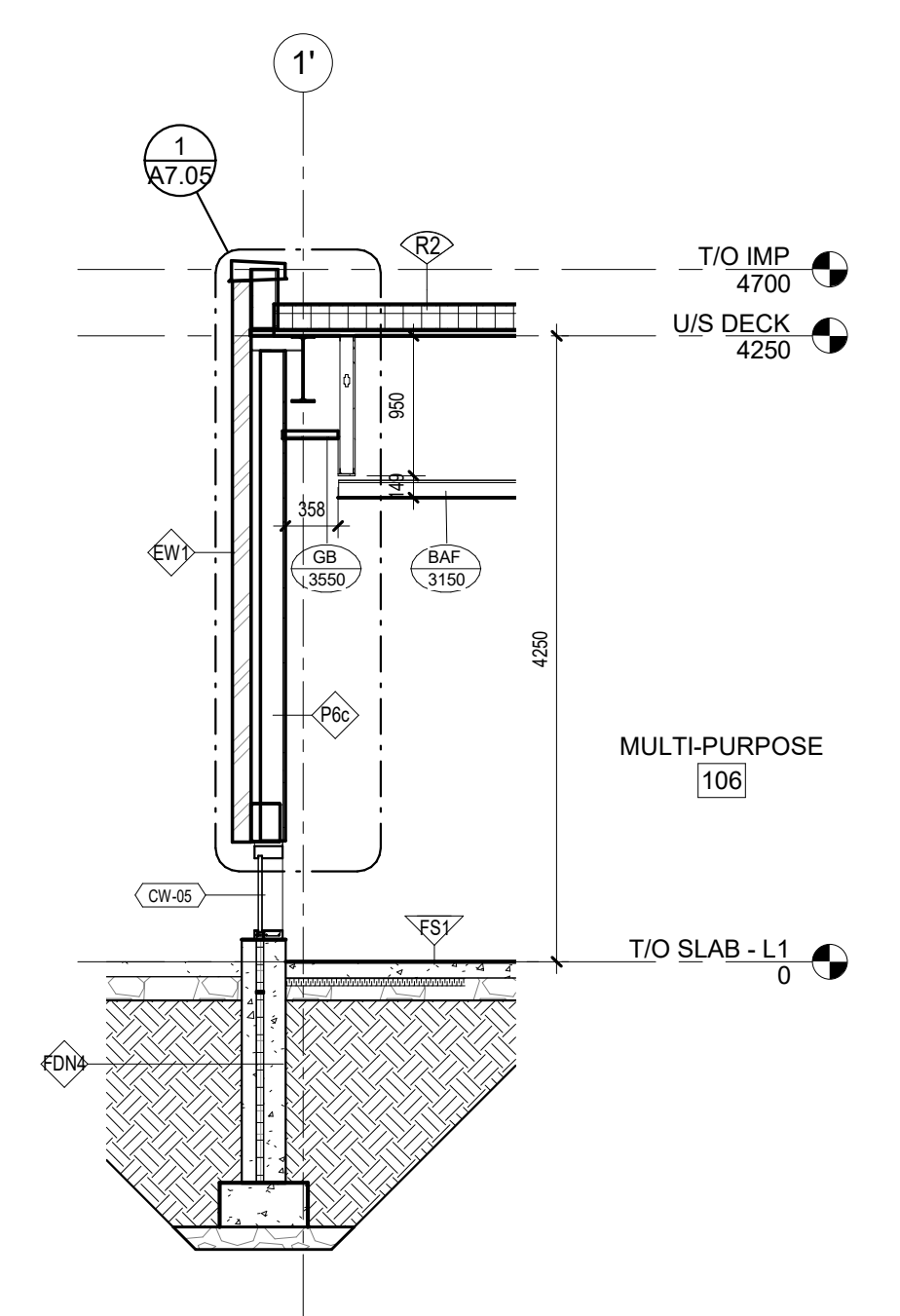
3 WALL SECTION @ ATRIUM 1
 A4.12 / A1.11 1:50



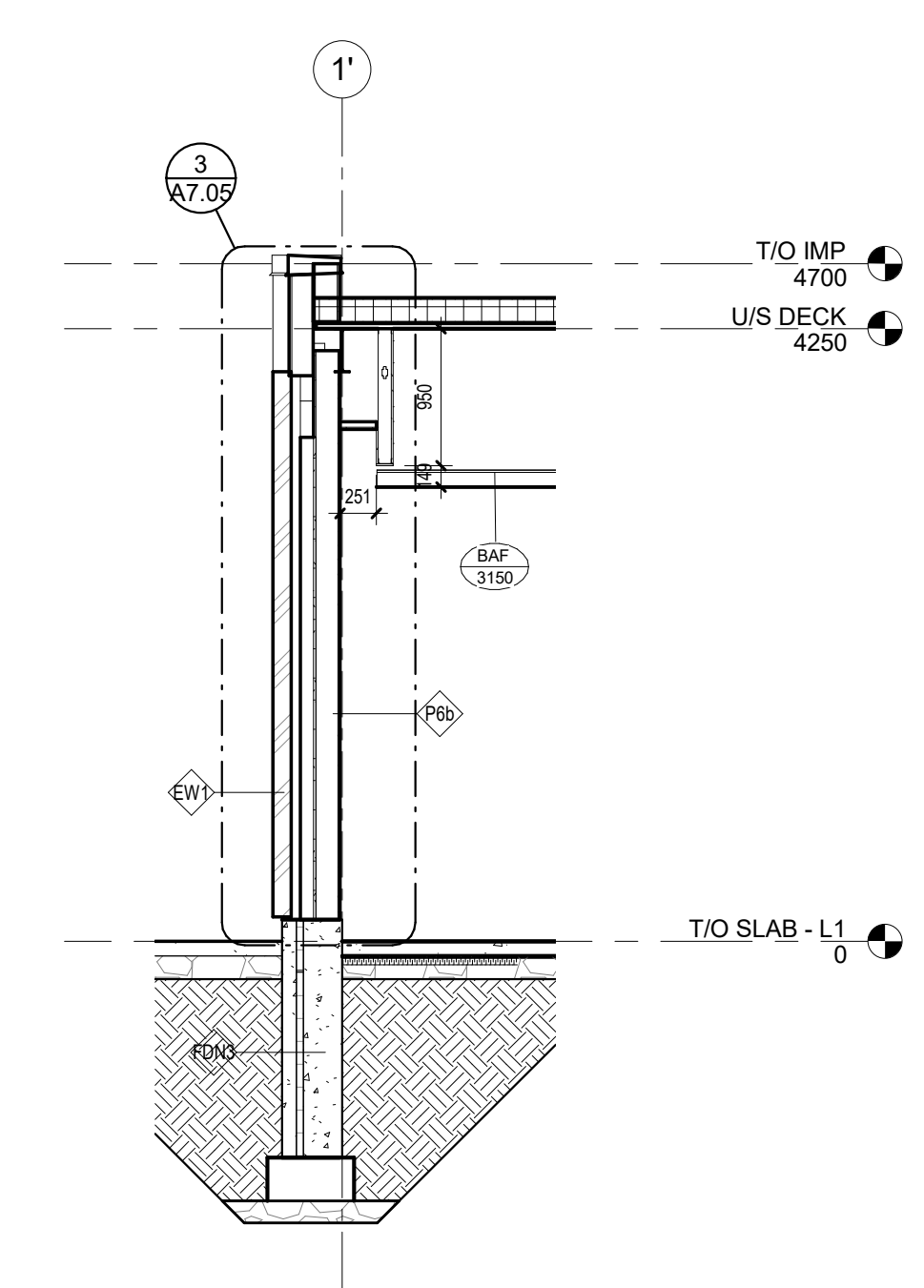
4 WALL SECTION @ ATRIUM 2
 A4.12 / A4.01 1:50



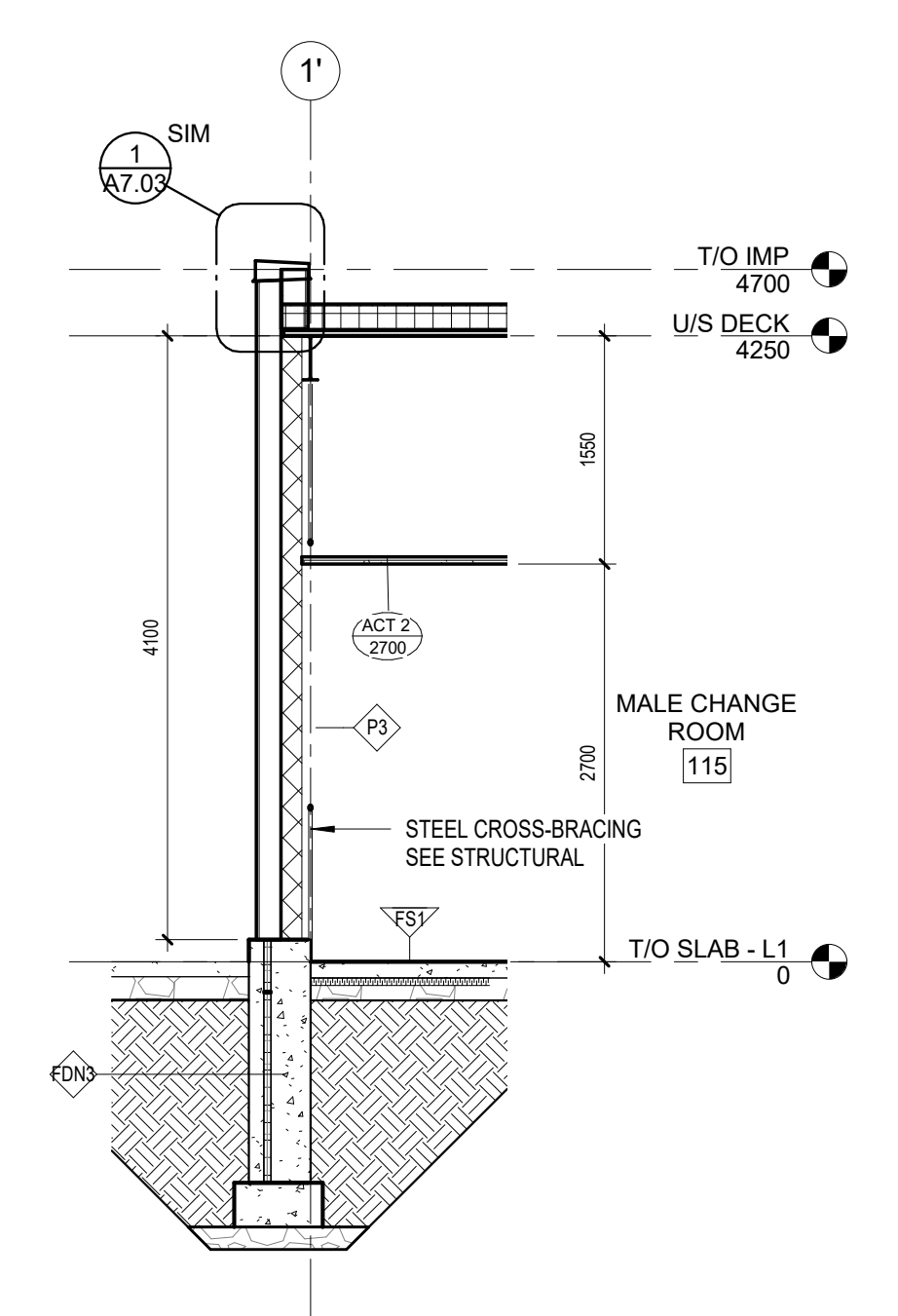
5 WALL SECTION @ LOBBY SLOPED GLAZING
 A4.12 / A1.10 1:50



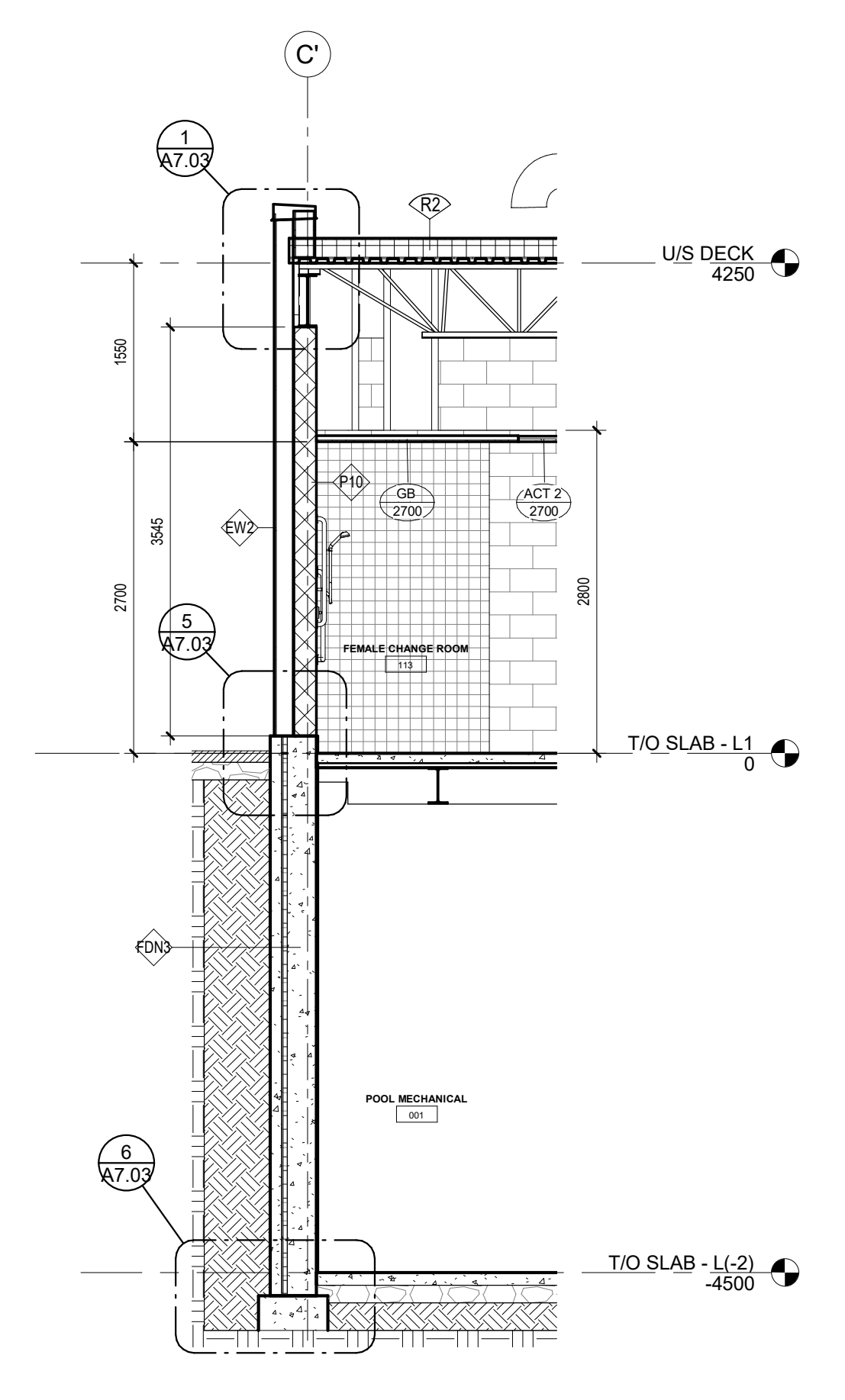
6 WALL SECTION - MULTI-PURPOSE RM @ GLAZING
 A4.12 / A1.11 1:50



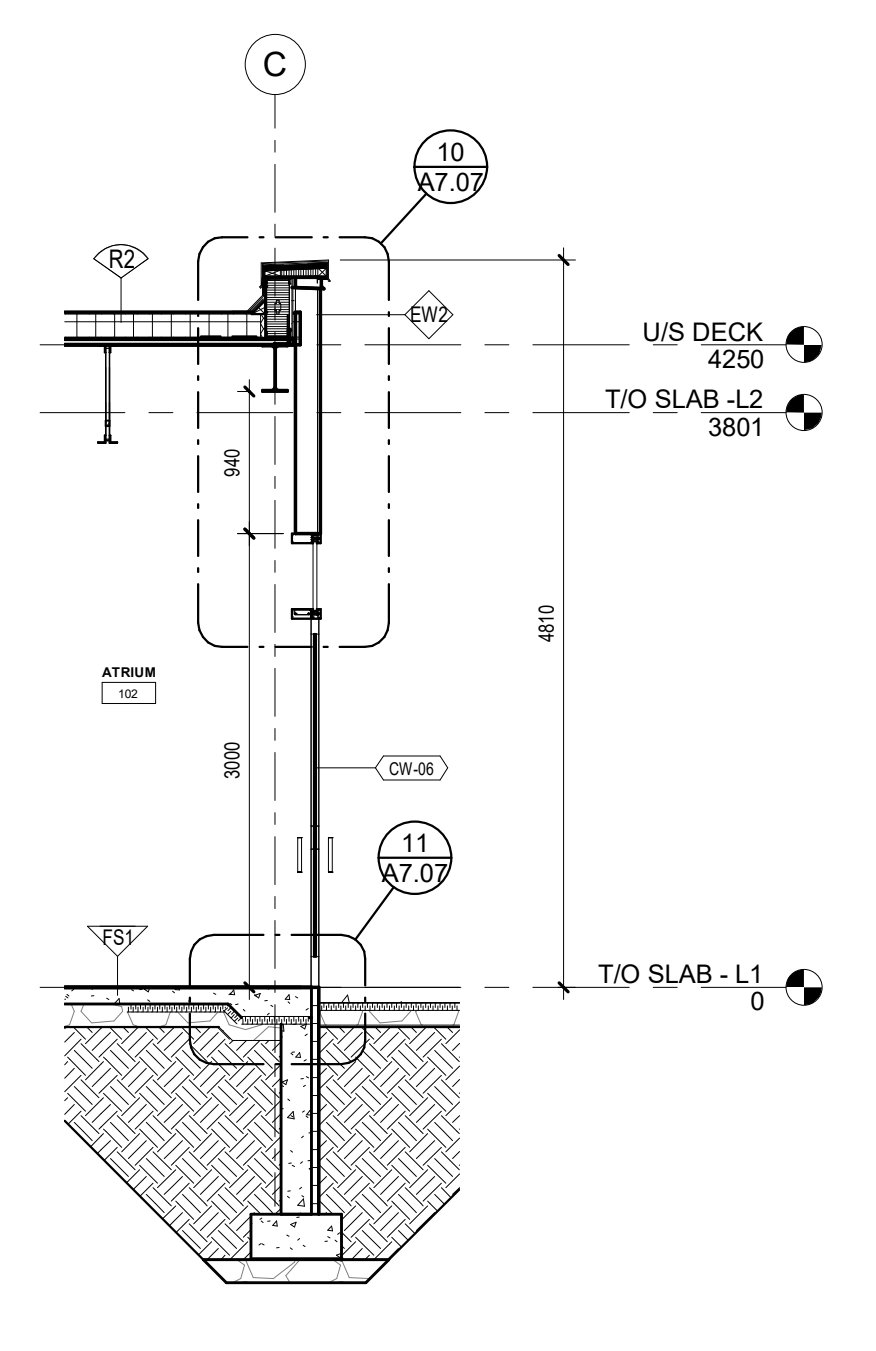
7 WALL SECTION - MULTI-PURPOSE RM @ CLADDING TRANSITION
 A4.12 / A1.11 1:50



8 WALL SECTION @ POOL CHANGE ROOM
 A4.12 / A2.01 1:50



9 WALL SECTION @ POOL MECHANICAL ROOM
 A4.12 / A1.11 1:50



10 WALL SECTION @ ATRIUM 3
 A4.12 / A4.01 1:50

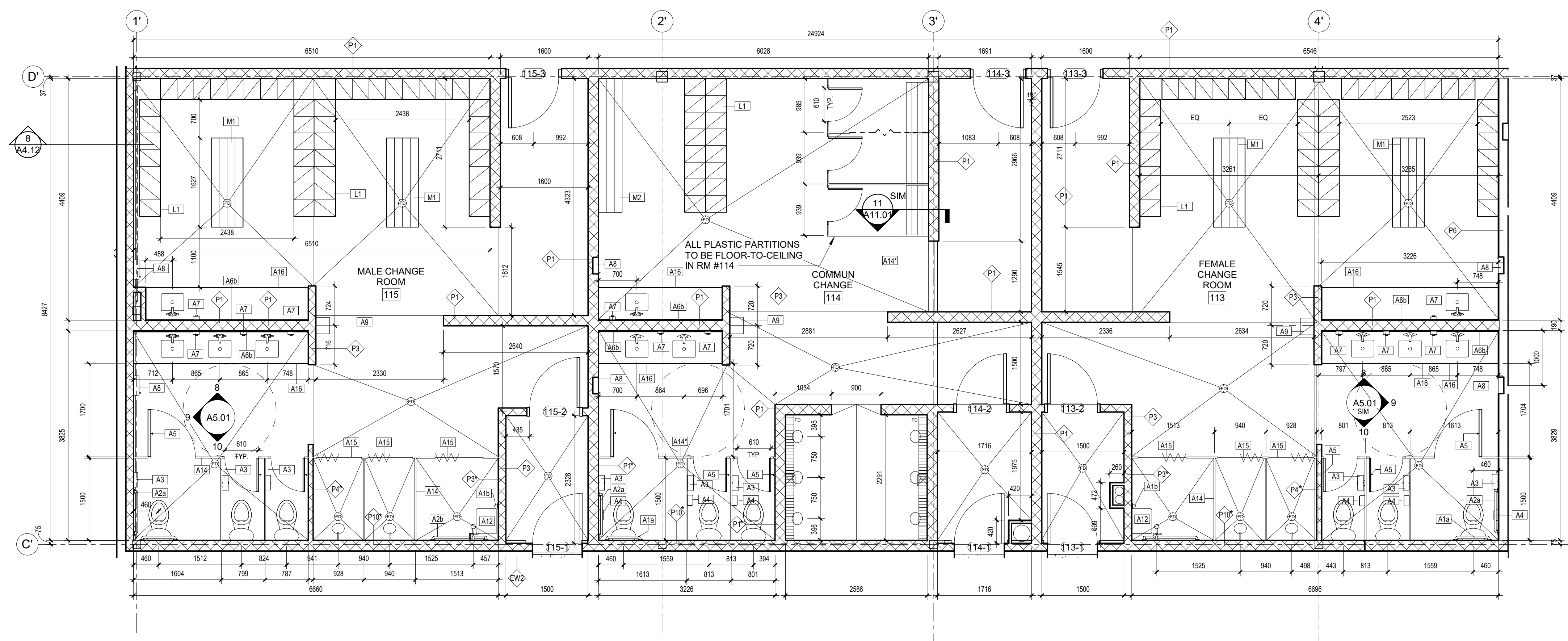
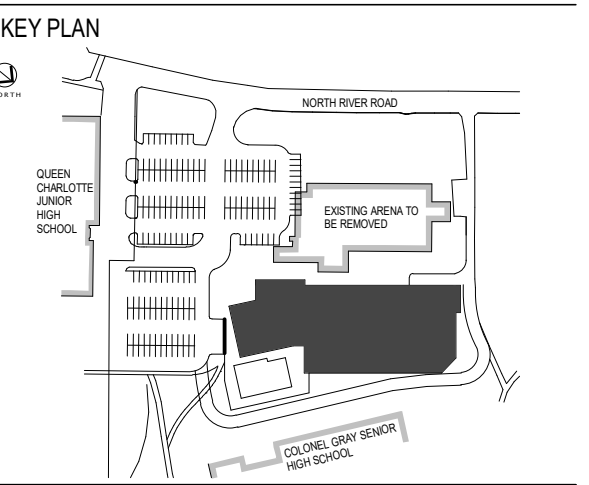
NO.	REVISION	DATE
2	TRN - ISSUED FOR TENDER	2023-04-10
0	TRN - ISSUED FOR TENDER	2022-11-01



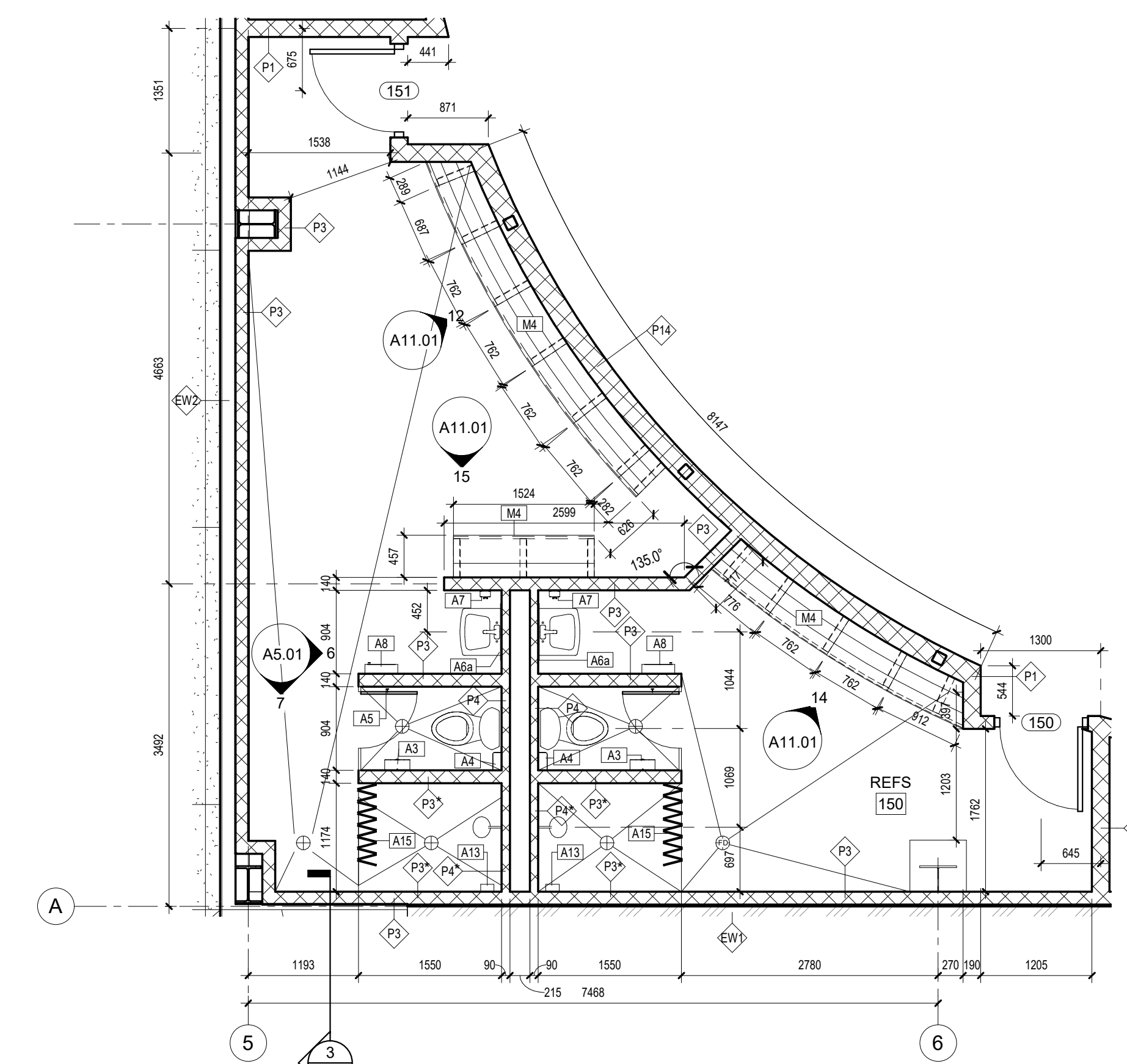
PROJECT NAME:
 SIMMONS SPORTS CENTRE ARENA & POOL
 REPLACEMENT
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

PROJECT NO.: 21111
 DRAWN BY: OM / MV / DE
 CHECKED BY: MMG / PC
 SCALE: 1:50

WALL SECTIONS



1 ENLARGED PLAN - CHANGE ROOMS
AS.01 1:50

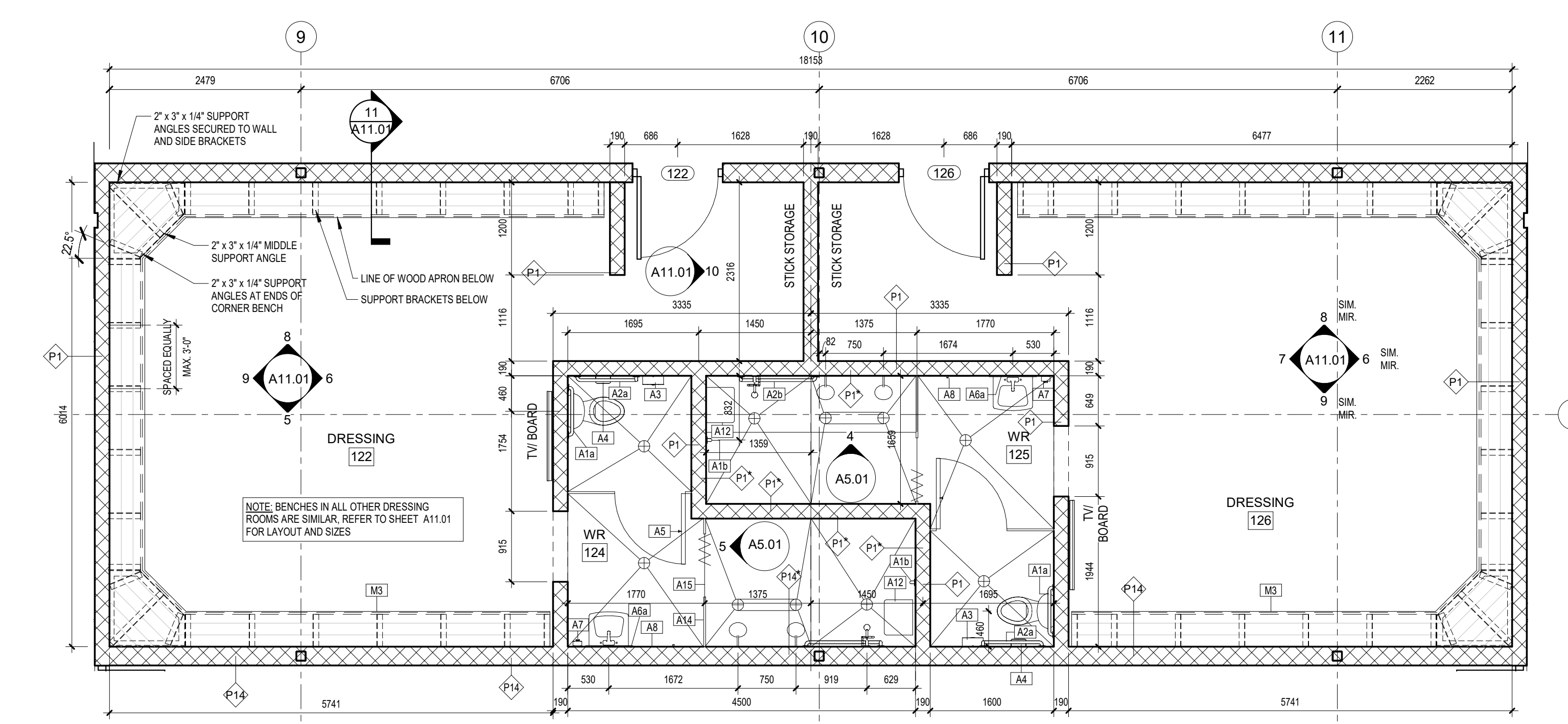


2 ENLARGED PLAN-REFS
AS.01 1:50

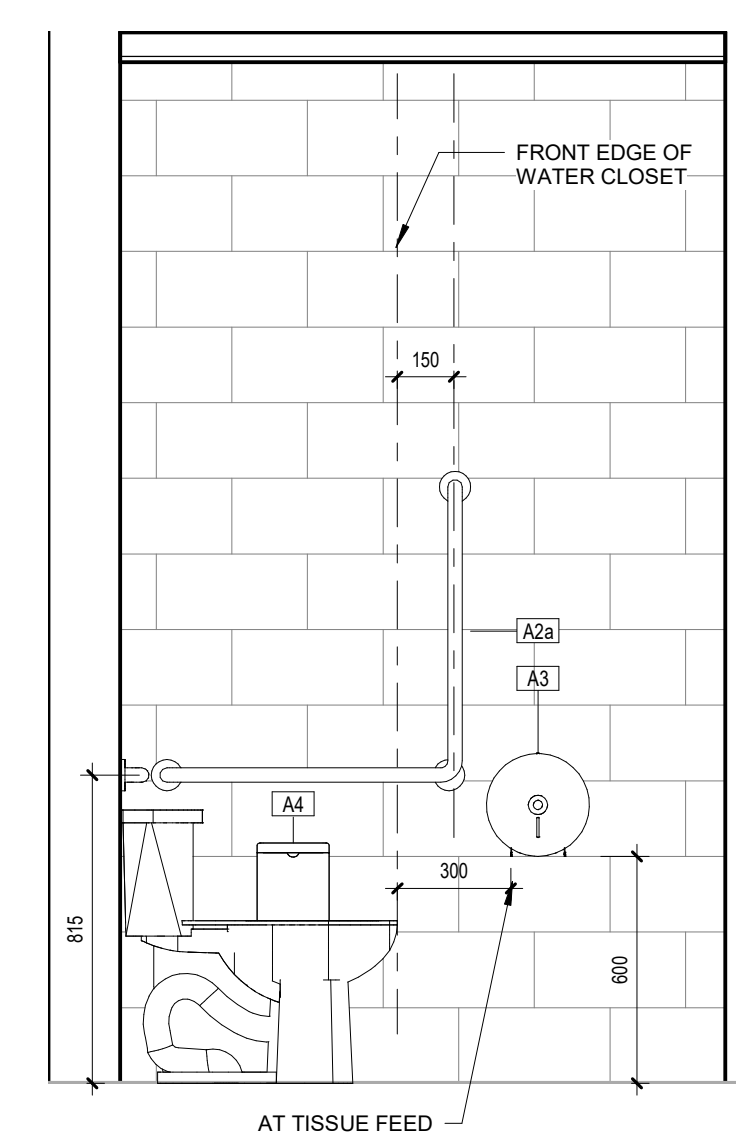
WASHROOM ACCESSORIES

- AS1 24" GRAB BAR
- AS2 42" GRAB BAR
- AS3 30" x 30" L-SHAPED GRAB BAR
- AS4 30" x 42" L-SHAPED GRAB BAR
- AS5 TOILET TISSUE DISPENSER
- AS6 SANITARY NAPKIN DISPOSAL
- AS7 ROBE HOOK
- AS8 610 x 214 FRAMELESS MIRROR
- AS9 FULL WIDTH x 1200 FRAMELESS MIRROR
- AS10 SOAP DISPENSER
- AS11 PAPER TOWEL DISPENSER / WASTE RECEPT
- AS12 HAIR DRYER
- AS13 BABY CHANGING TABLE
- AS14 400mm x 200mm SHELF
- AS15 FOLDING SHOWER SEAT
- AS16 SOAP DISH
- AS17 SOLID PLASTIC TOILET PARTITION FLOOR TO CEILING
- AS18 SOLID PLASTIC TOILET PARTITION FLOOR TO CEILING
- AS19 SHOWER CURTAIN & ROD
- AS20 SOLID SURFACE COUNTERTOP AND BACKSPASH (REFER TO DETAILS BATH AND TOILETS)
- AS21 LOCKER, SEE SPECIFICATIONS
- AS22 MILLWORK BENCH SEE MILLWORK
- AS23 MILLWORK BENCH SEE MILLWORK
- AS24 MILLWORK BENCH SEE MILLWORK
- AS25 MILLWORK BENCH SEE MILLWORK
- AS26 MILLWORK BENCH SEE MILLWORK
- AS27 FLOOR DRAIN - SEE MECHANICAL

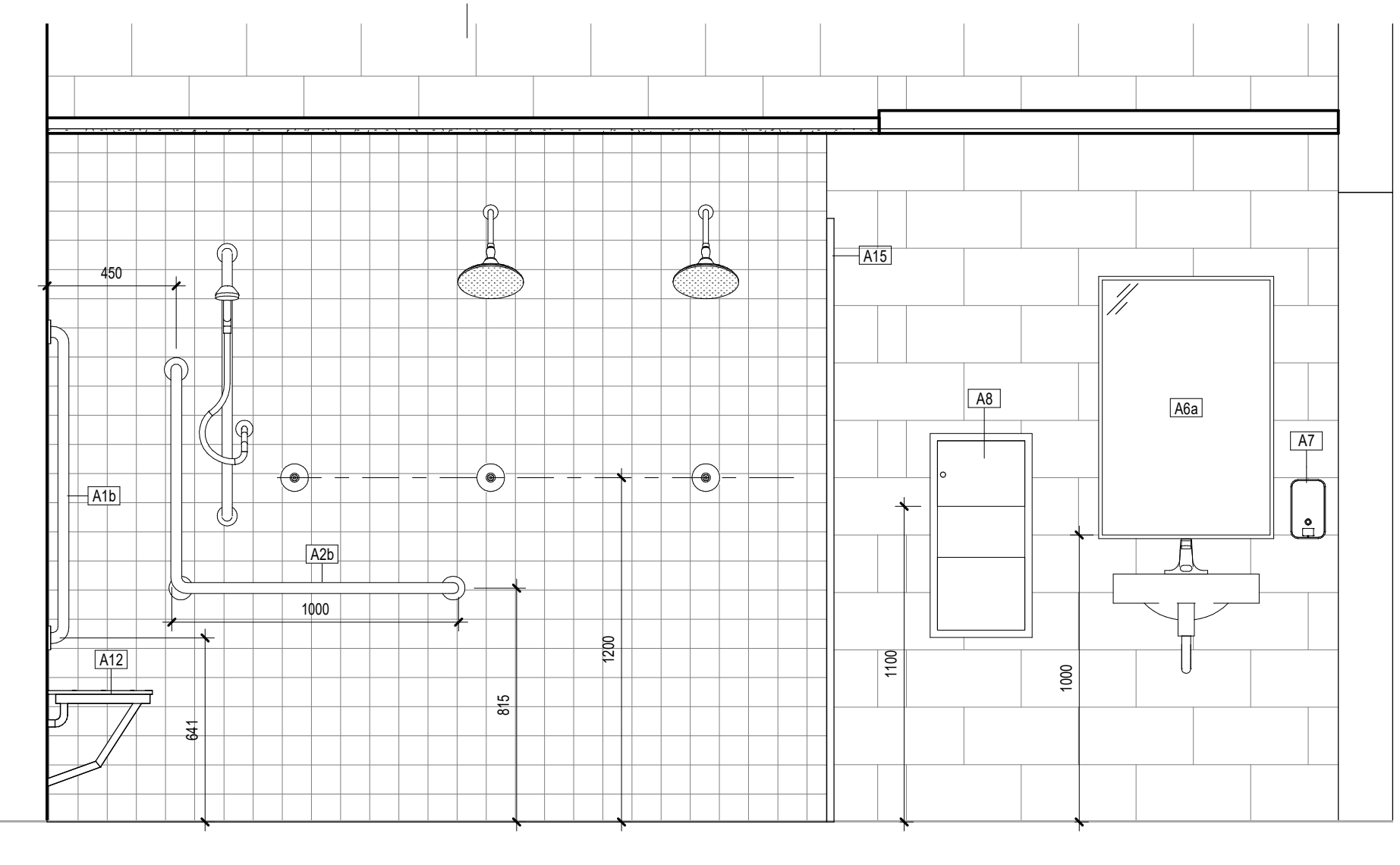
NOTE: PROVIDE WOOD BLOCKING WHERE REQUIRED FOR ALL WASHROOM ACCESSORIES.



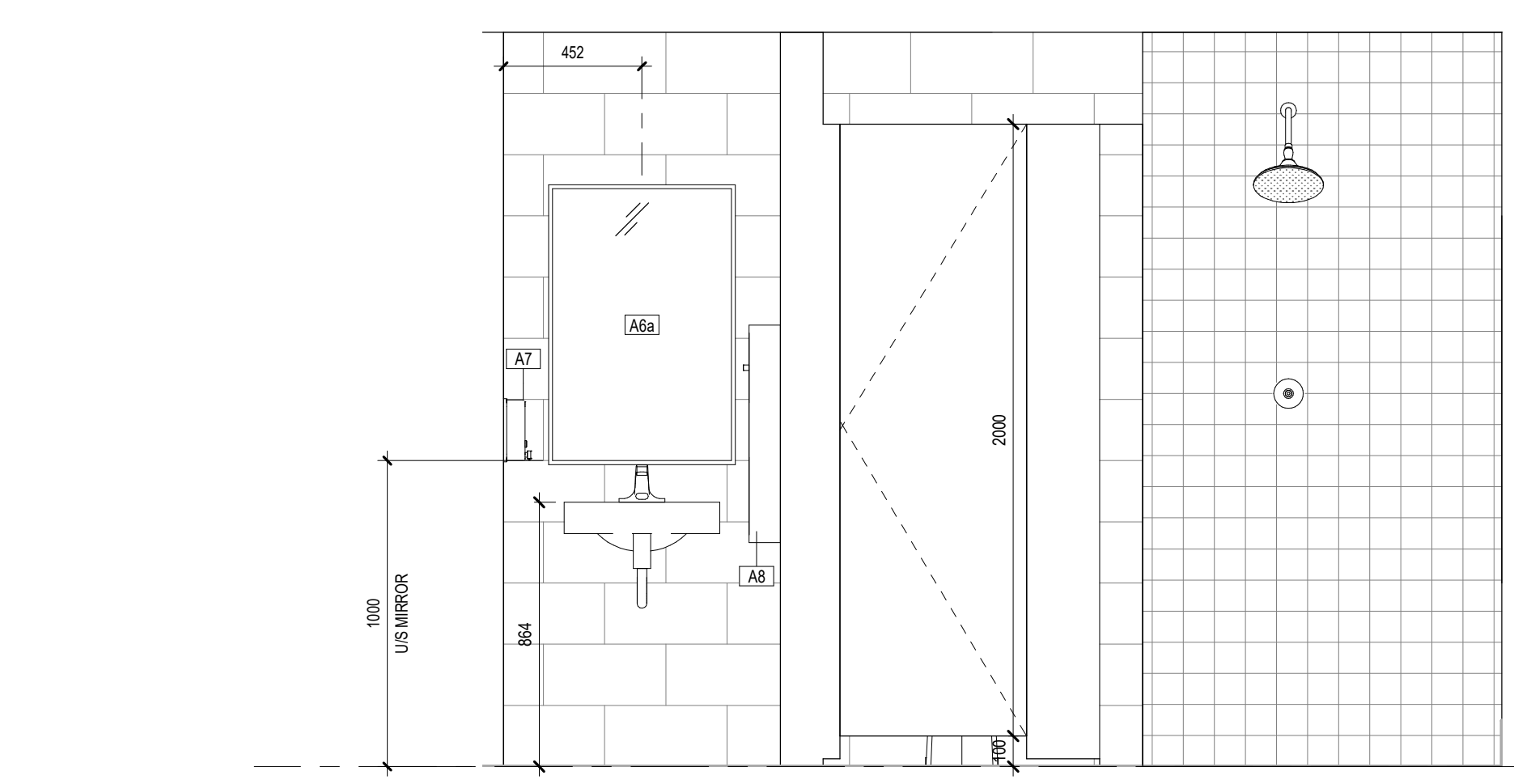
3 ENLARGED PLAN-DRESSING ROOM 119,122,126&129
AS.01 1:50



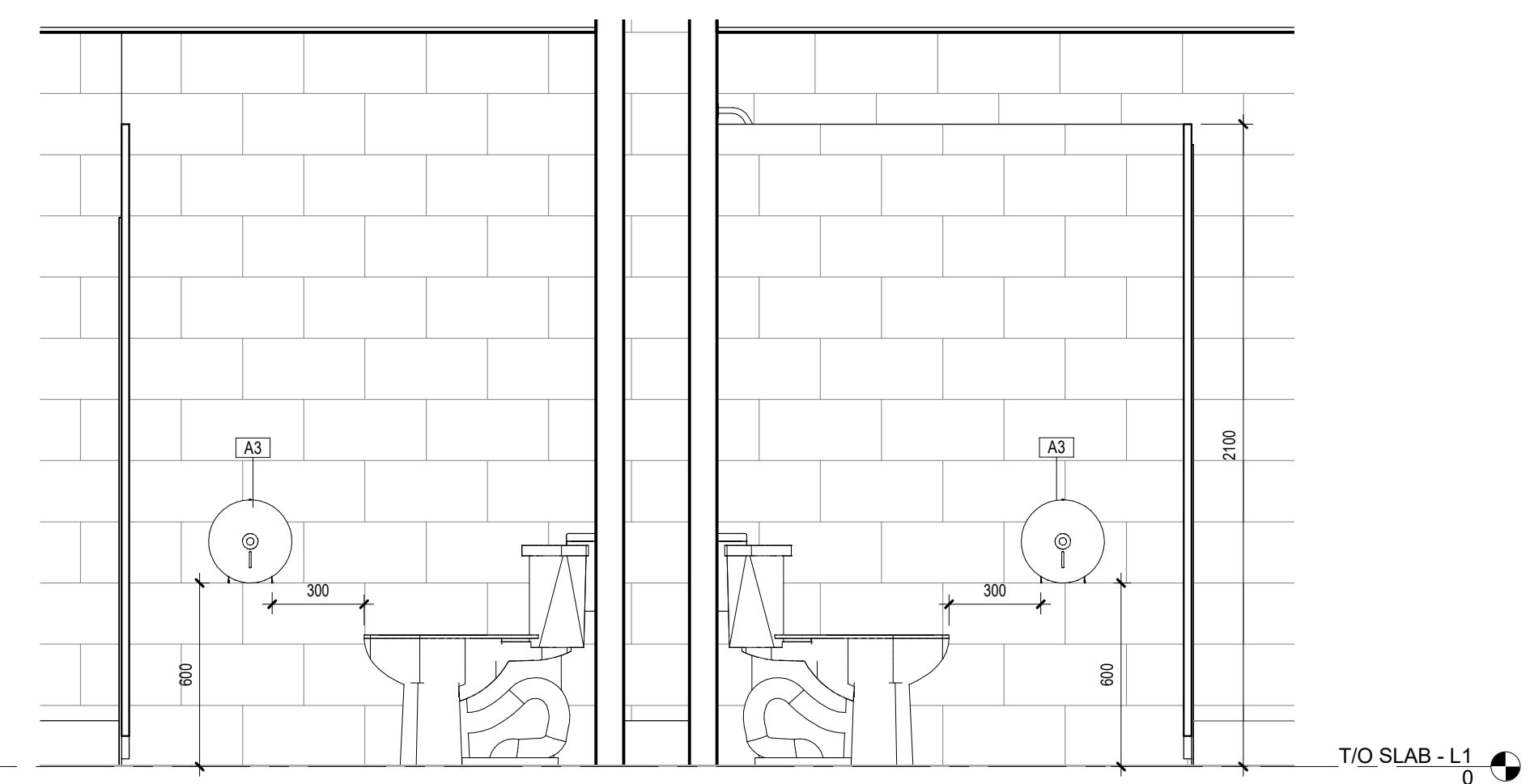
4 DRESSING ROOM ELEVATION 1
AS.01 1:20



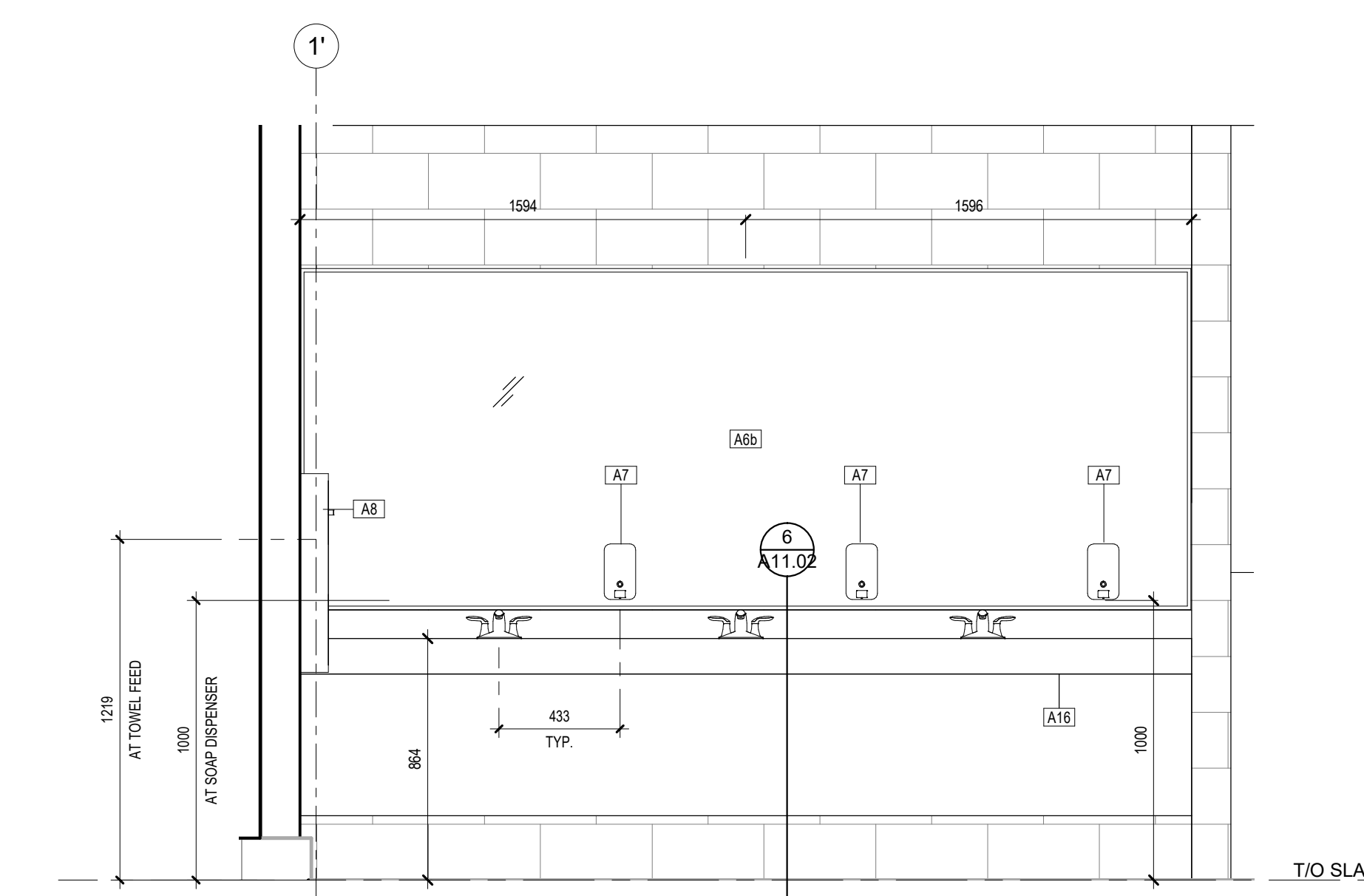
5 DRESSING ROOM ELEVATION 2
AS.01 1:20



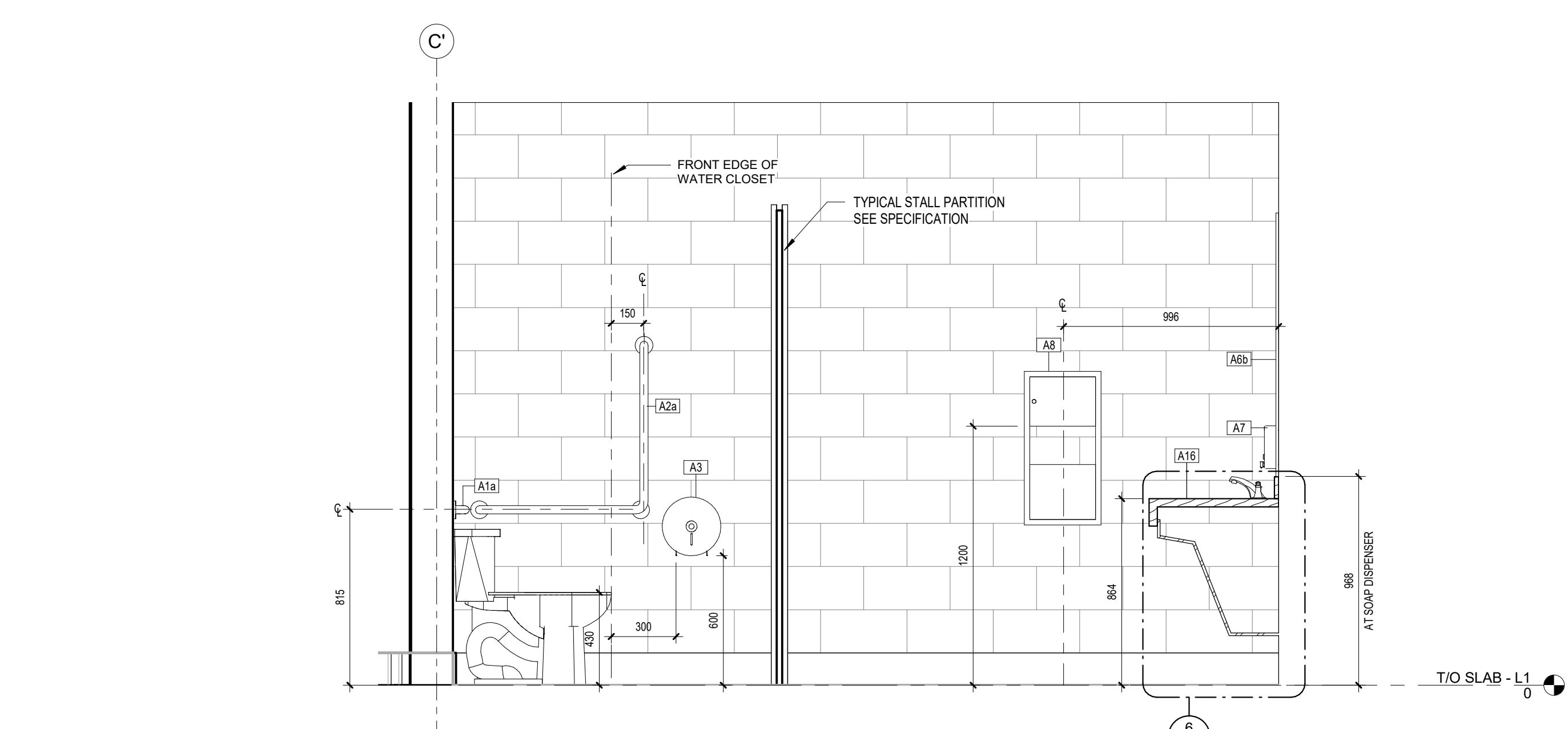
6 REF ROOM ELEVATION 1
AS.01 1:20



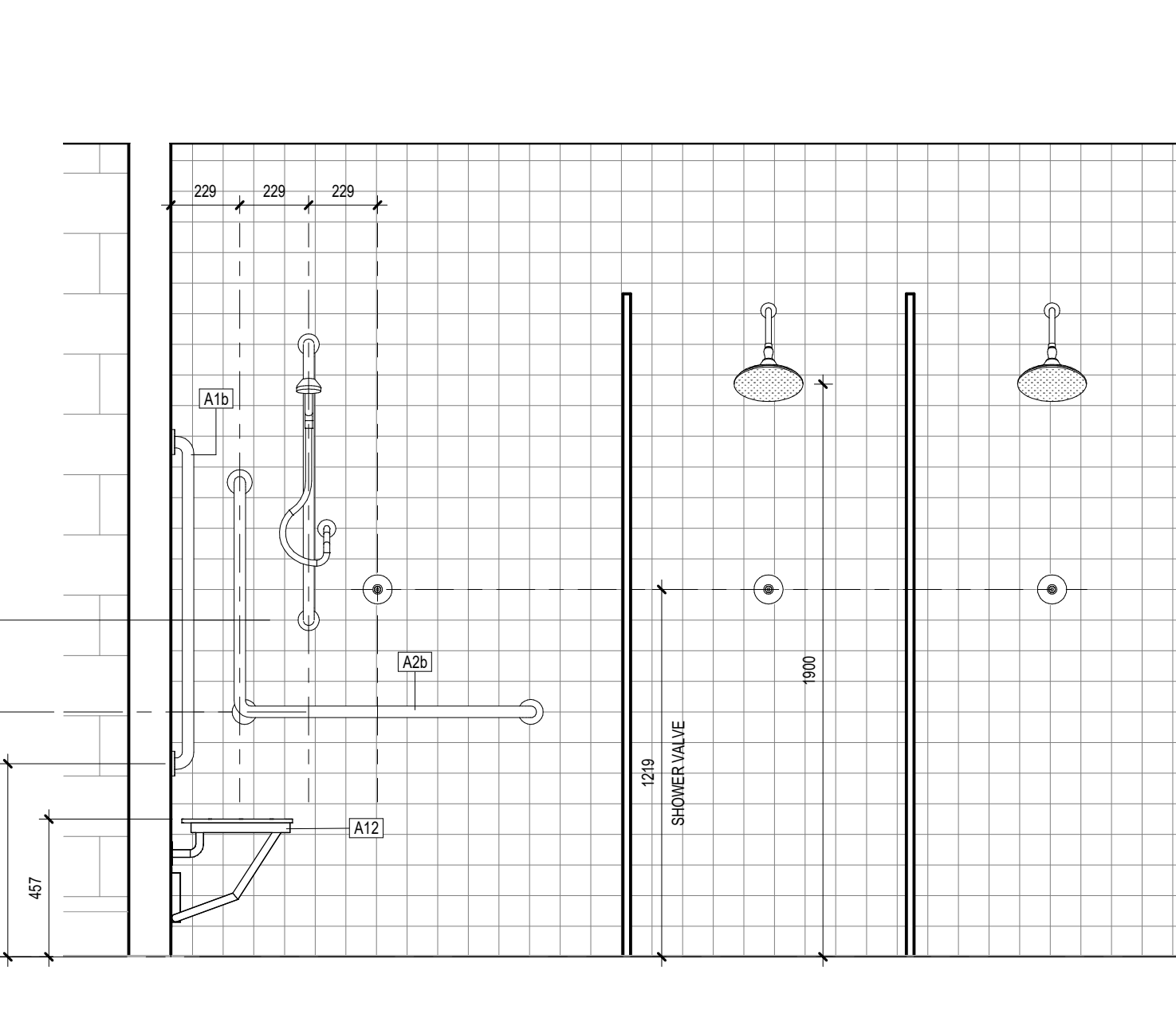
7 REF ROOM ELEVATION 2
AS.01 1:20



8 POOL CHANGE ROOM ELEVATION 1
AS.01 1:20



9 POOL CHANGE ROOM ELEVATION 2
AS.01 1:20



10 POOL CHANGE ROOM ELEVATION 3
AS.01 1:20

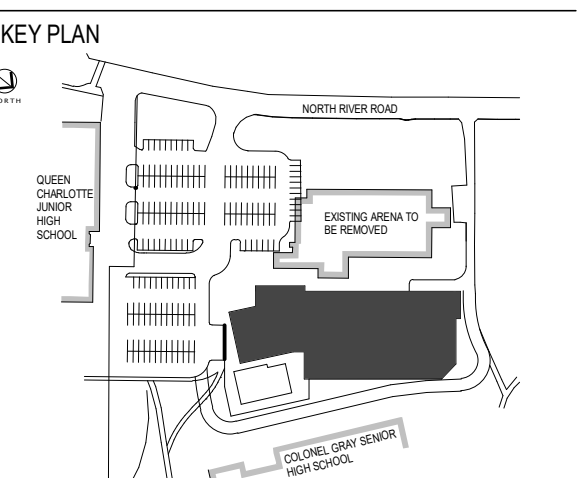
0	TPS - ISSUED FOR TENDER	2023-04-10
NO.	REVISION	DATE



PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL
REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

PROJECT NO.: 21111
DRAWN BY: OM / MV / DE
CHECKED BY: MMG / PC
SCALE: As indicated

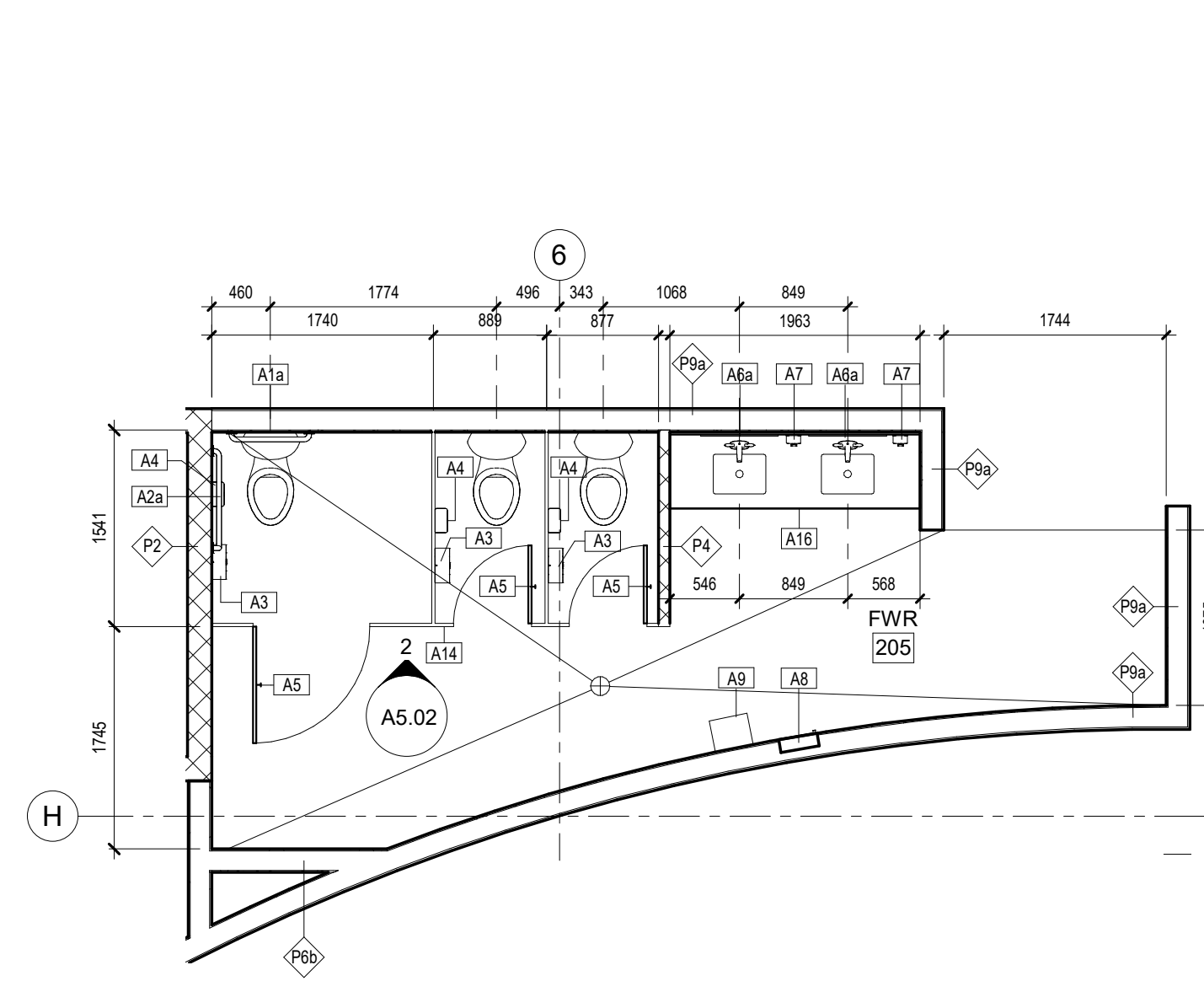
CHANGE ROOM, DRESSING
ROOM & REF PLANS &
ELEVATIONS



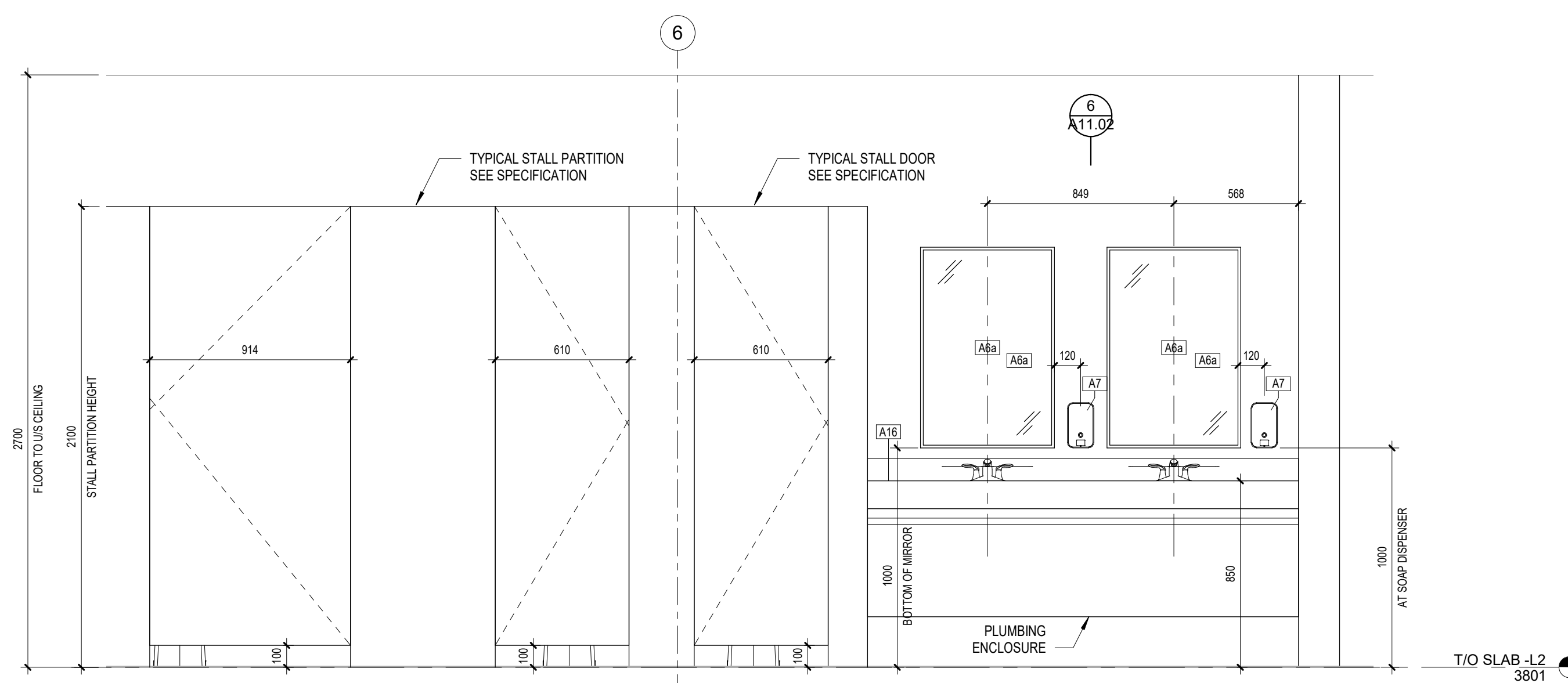
WASHROOM ACCESSORIES

- AS1 3" GRAB BAR
- AS2 4" GRAB BAR
- AS3 37" x 37" L-SHAPED GRAB BAR
- AS4 37" x 47" L-SHAPED GRAB BAR
- AS5 TOILET TISSUE DISPENSER
- AS6 SANITARY WIPER DISPOSAL
- AS7 ROBE HOOK
- AS8 615 x 914 FRAMELESS MIRROR
- AS9 FULL WIDTH 4 1/2" FRAMELESS MIRROR
- AS10 SOAP DISPENSER
- AS11 PAPER TOWEL DISPENSER / WASTE RECIPT
- AS12 HAIR DRYER
- AS13 BABY CHANGING TABLE
- AS14 400mm x 200mm SHELF
- AS15 FOLDING SHOWER SEAT
- AS16 SOAP DISH
- AS17 SOLID PLASTIC TOILET PARTITION FLOOR TO CEILING
- AS18 SOLID PLASTIC TOILET PARTITION FLOOR TO CEILING
- AS19 SHOWER CURTAIN & ROD
- AS20 SOLID SURFACE COUNTERTOP AND BACKSPASH-REFER TO DETAILS BATH102 AND BATH103
- AS21 LOCKER, SEE SPECIFICATIONS
- MS MILLWORK BENCH, SEE MILLWORK
- MS2 MILLWORK BENCH, SEE MILLWORK
- MS3 MILLWORK BENCH, SEE MILLWORK
- MS4 MILLWORK BENCH, SEE MILLWORK
- MS5 MILLWORK BENCH, SEE MILLWORK
- (FD) FLOOR DRAIN - SEE MECHANICAL

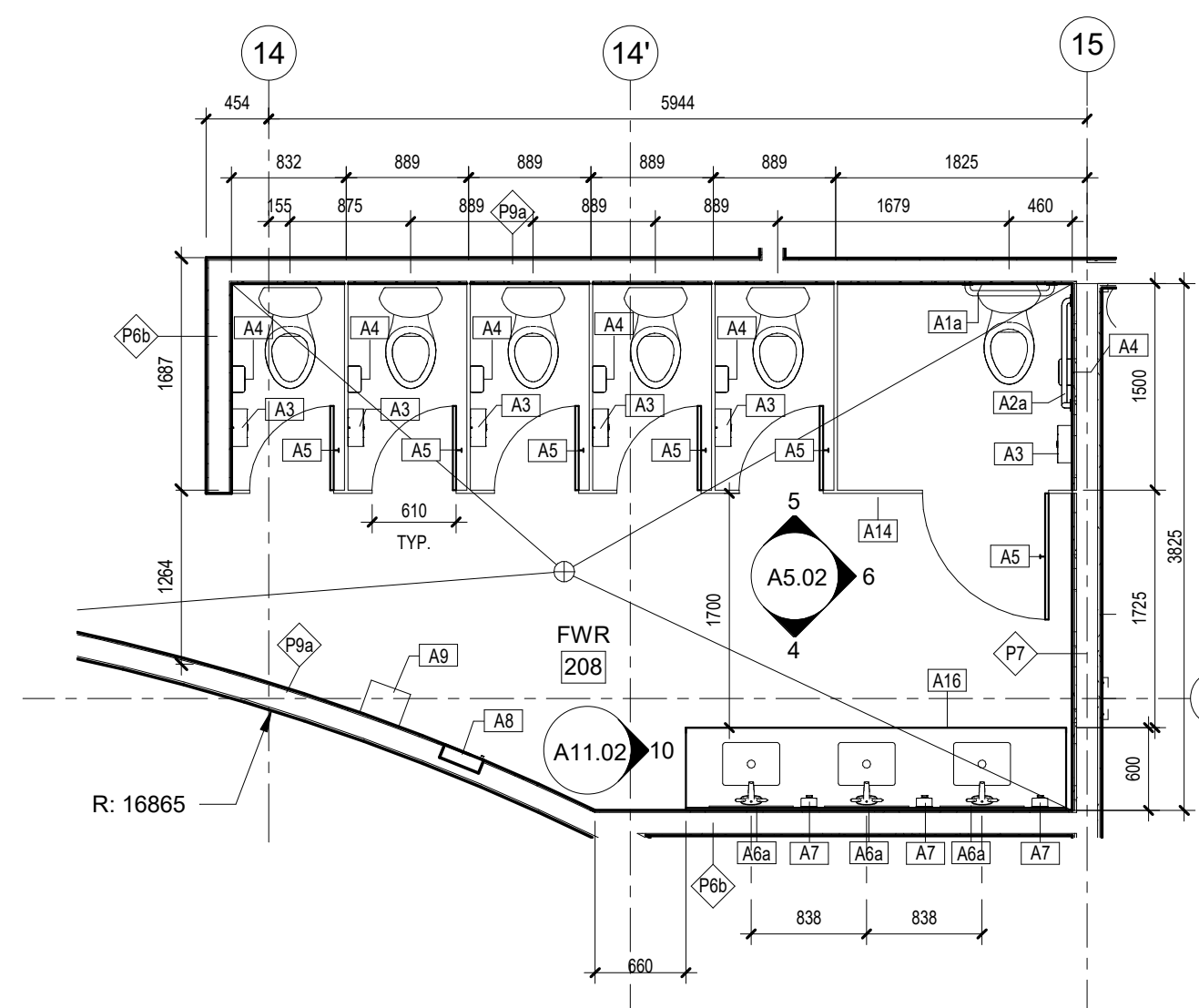
NOTE: PROVIDE WOOD BLOCKING WHERE REQUIRED FOR ALL WASHROOM ACCESSORIES



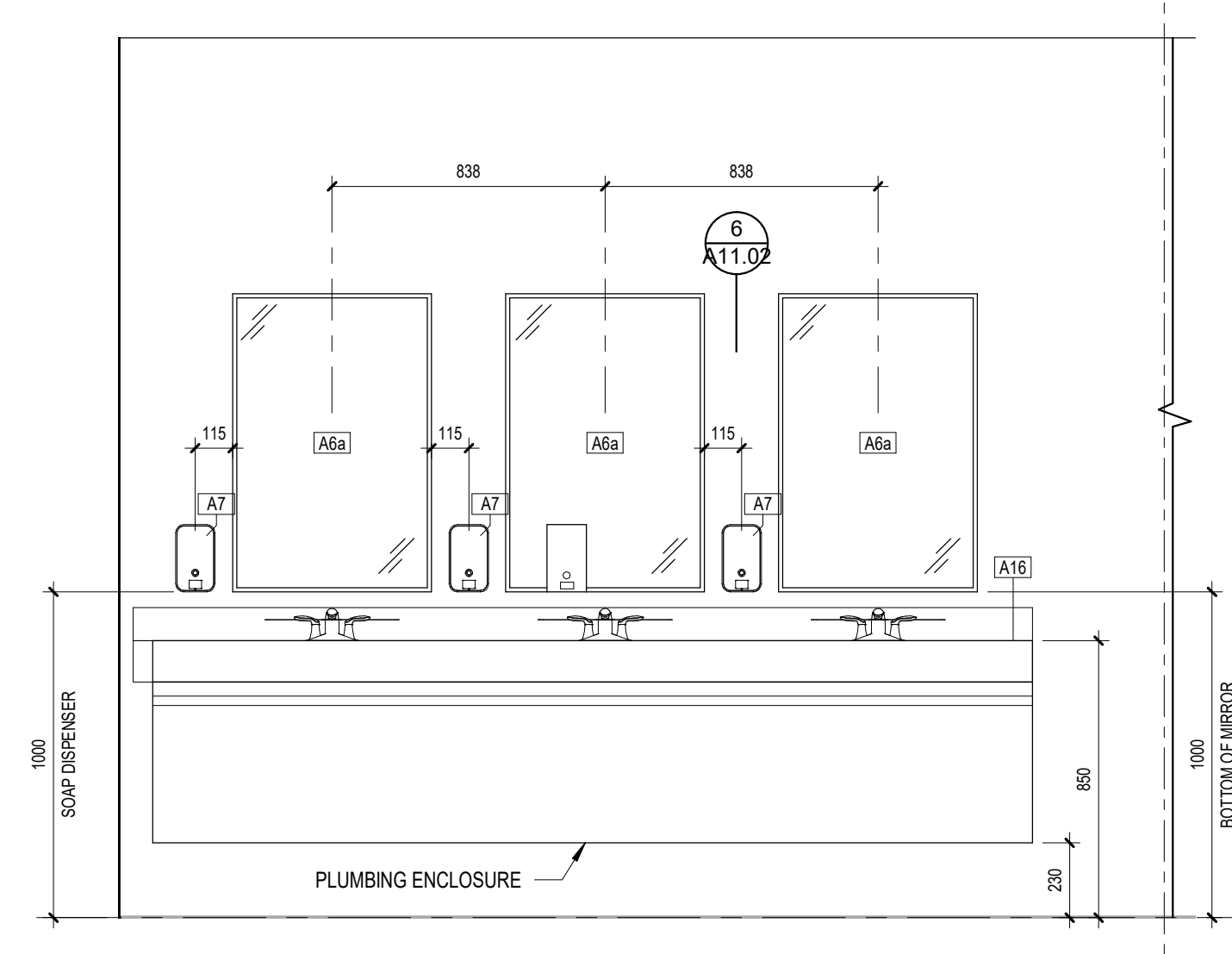
1 ENLARGED PLAN - WASHROOM 205
AS.02 / 1:50



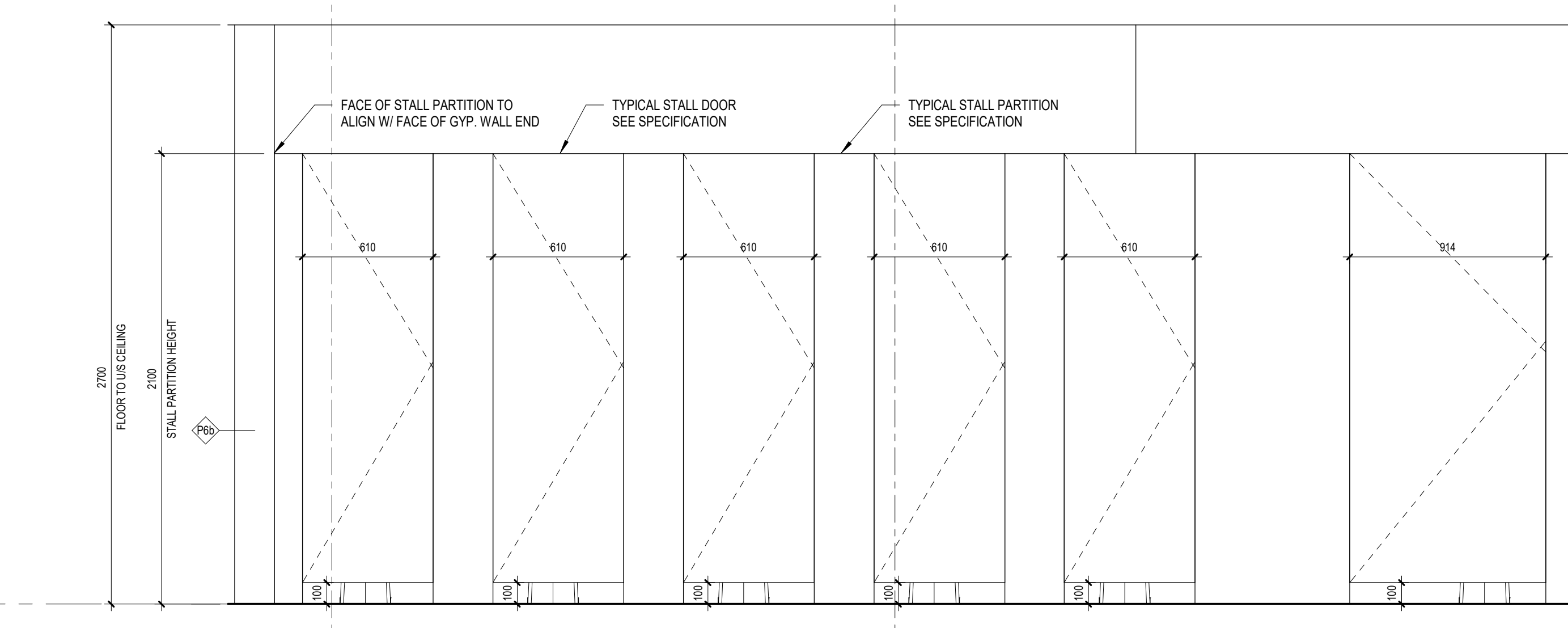
2 WASHROOM 205 ELEVATION
AS.02 / 1:20



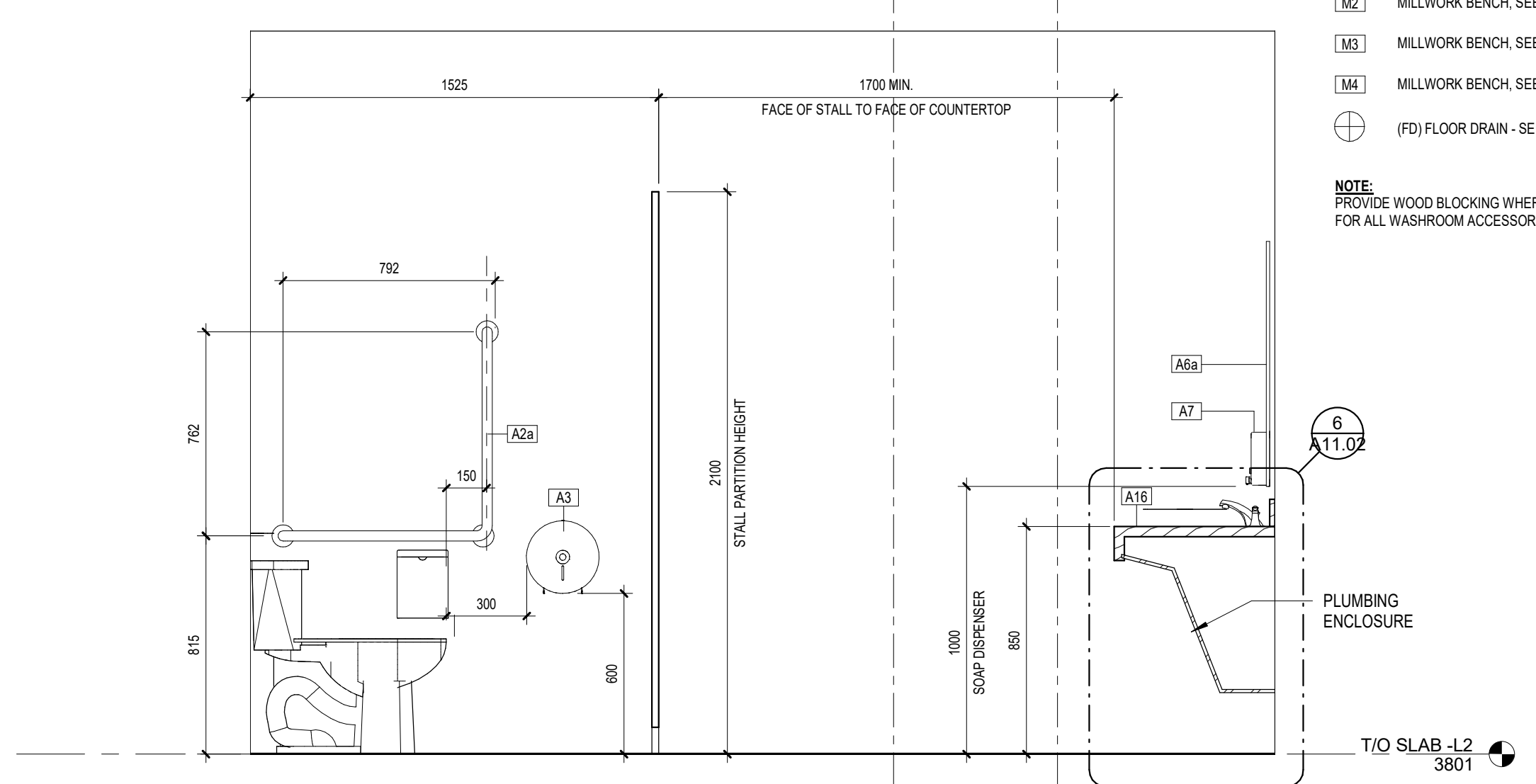
3 ENLARGED PLAN - WASHROOM 208
AS.02 / 1:50



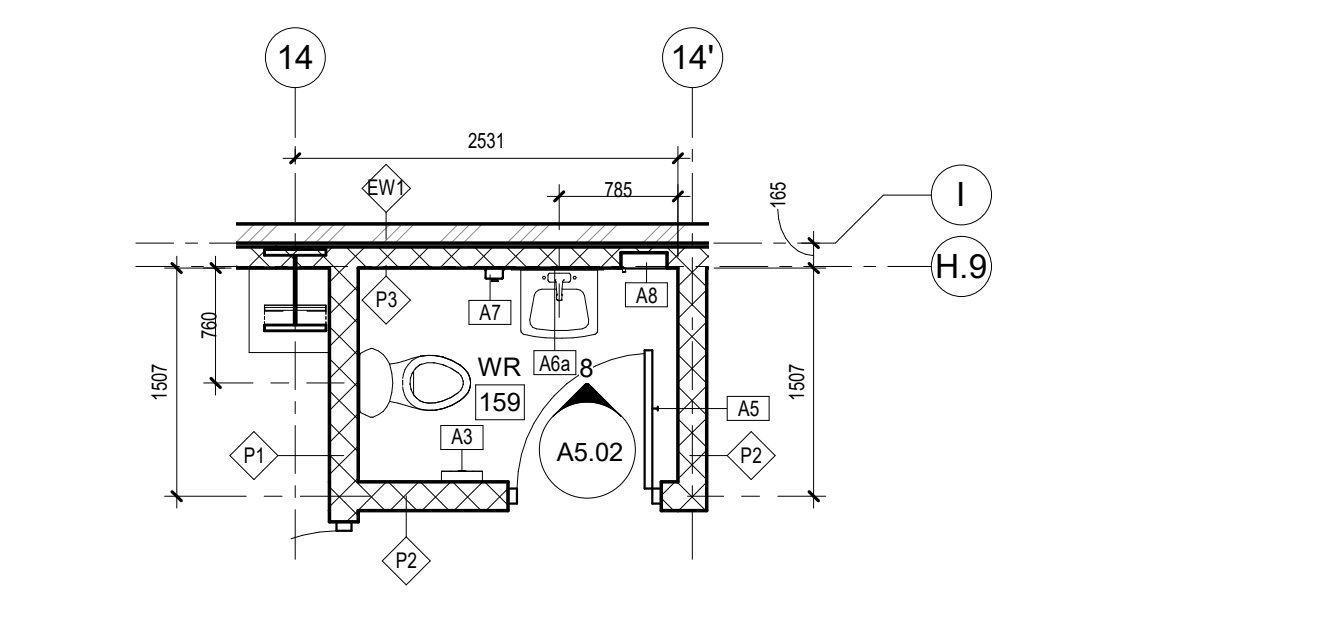
4 WASHROOM 208 - VANITY ELEVATION
AS.02 / 1:20



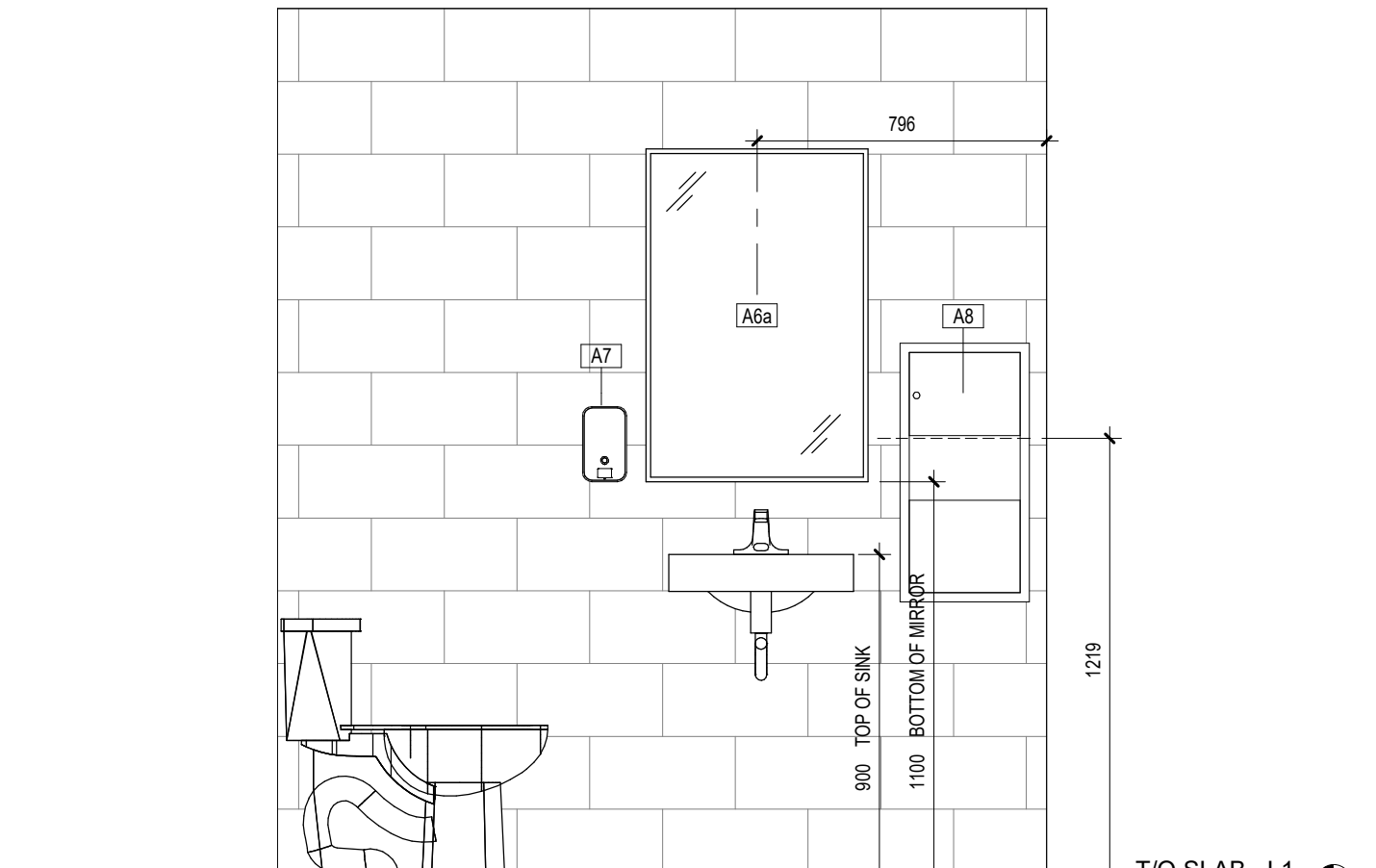
5 WASHROOM 208 - WC ELEVATION
AS.02 / 1:20



6 WASHROOM 208 - ELEVATION
AS.02 / 1:20



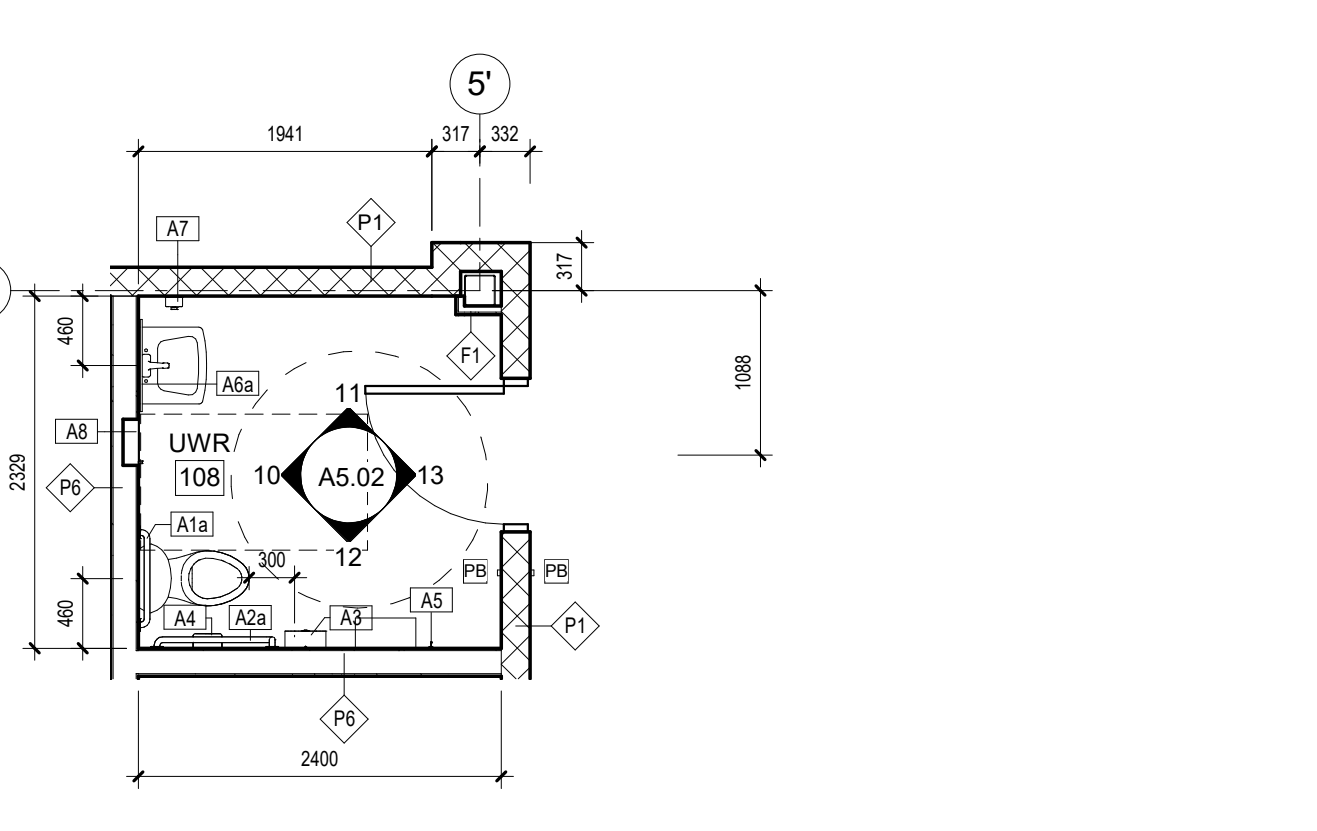
7 ICE RESURFACER WASHROOM
AS.02 / 1:50



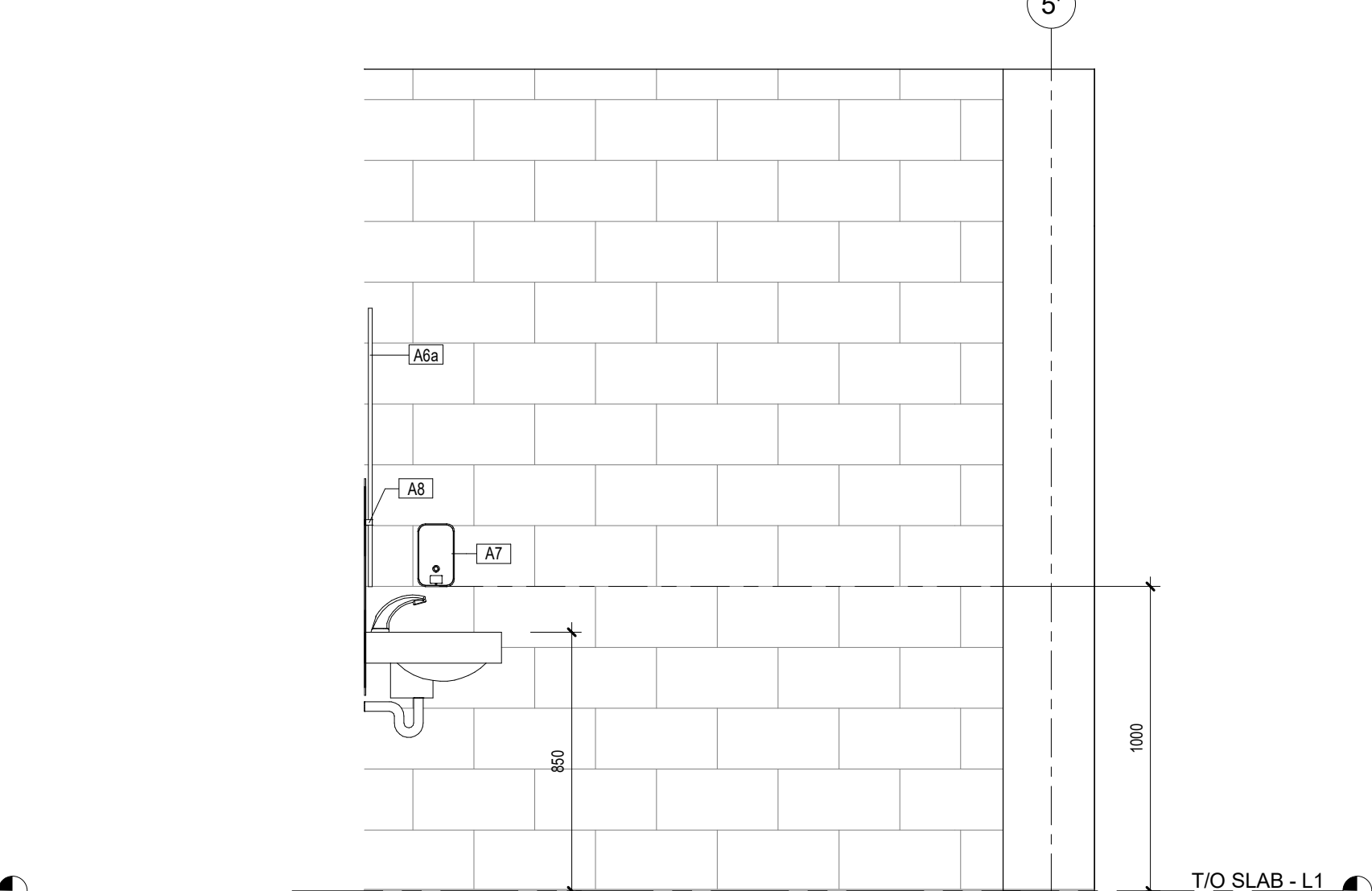
8 RM 159 ELEVATION
AS.02 / 1:20



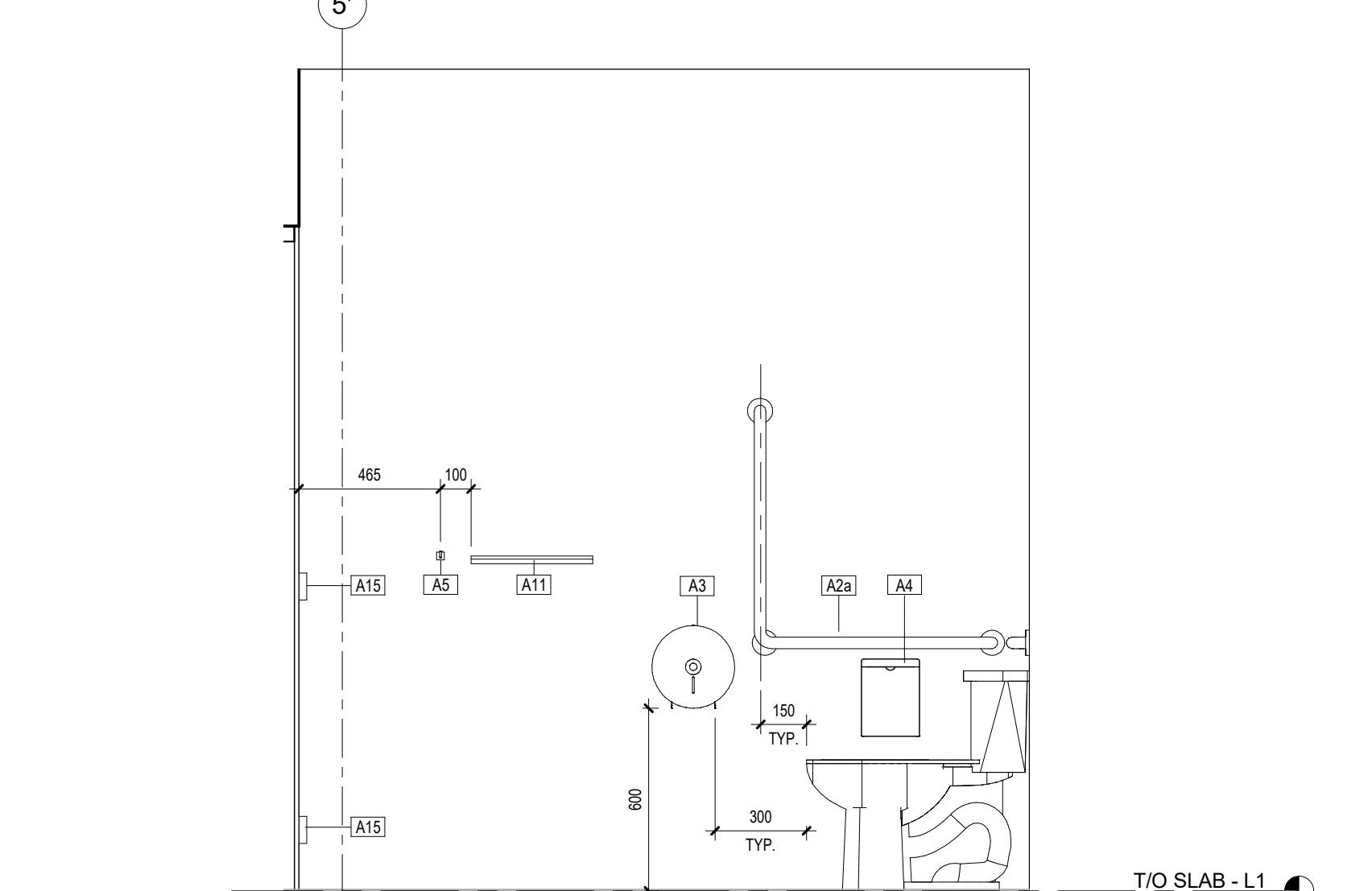
9 LOBBY UNIVERSAL WASHROOM 108 - ELEVATION 1
AS.02 / 1:20



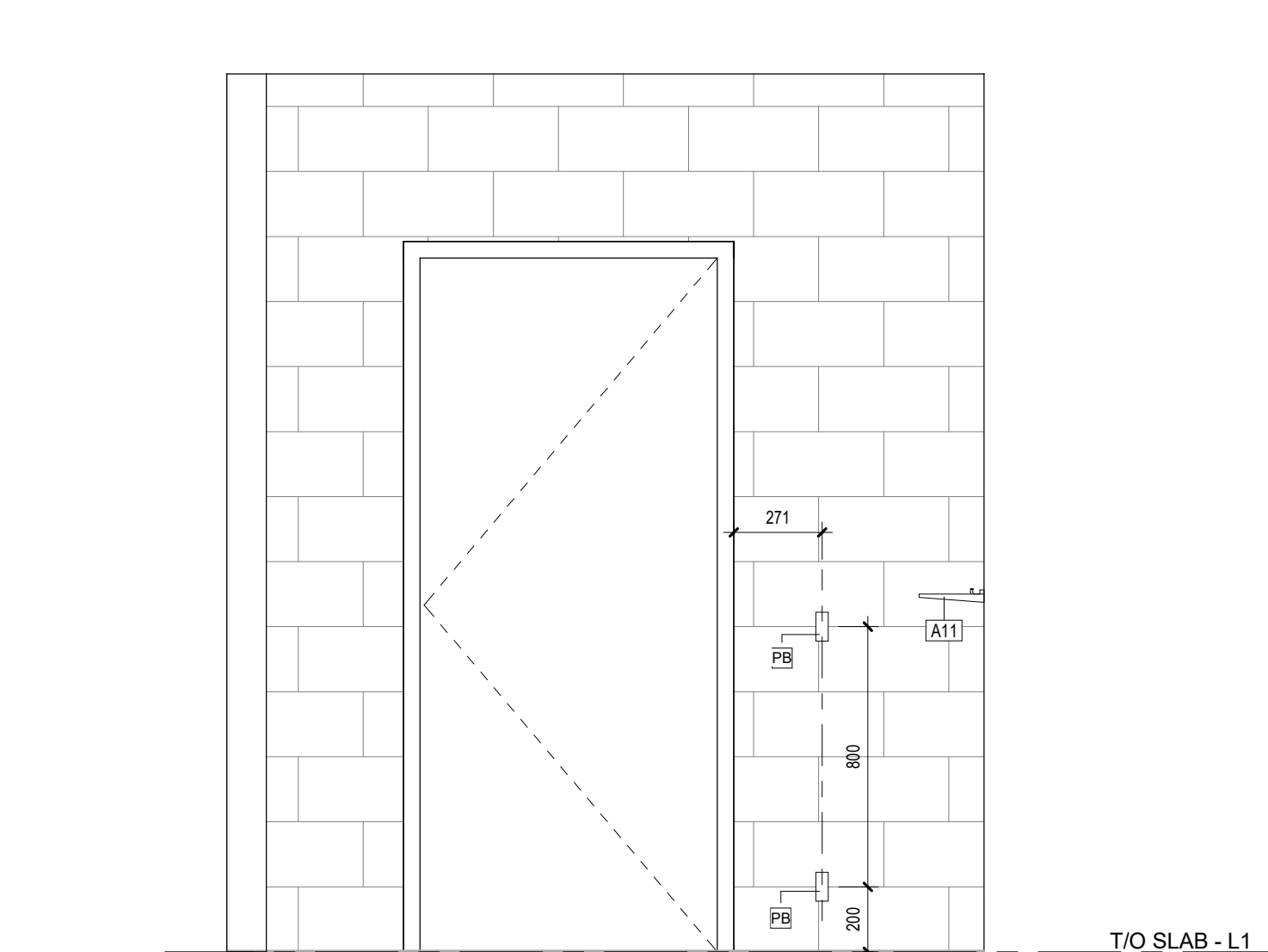
9 LOBBY UNIVERSAL WASHROOM 108
AS.02 / 1:50



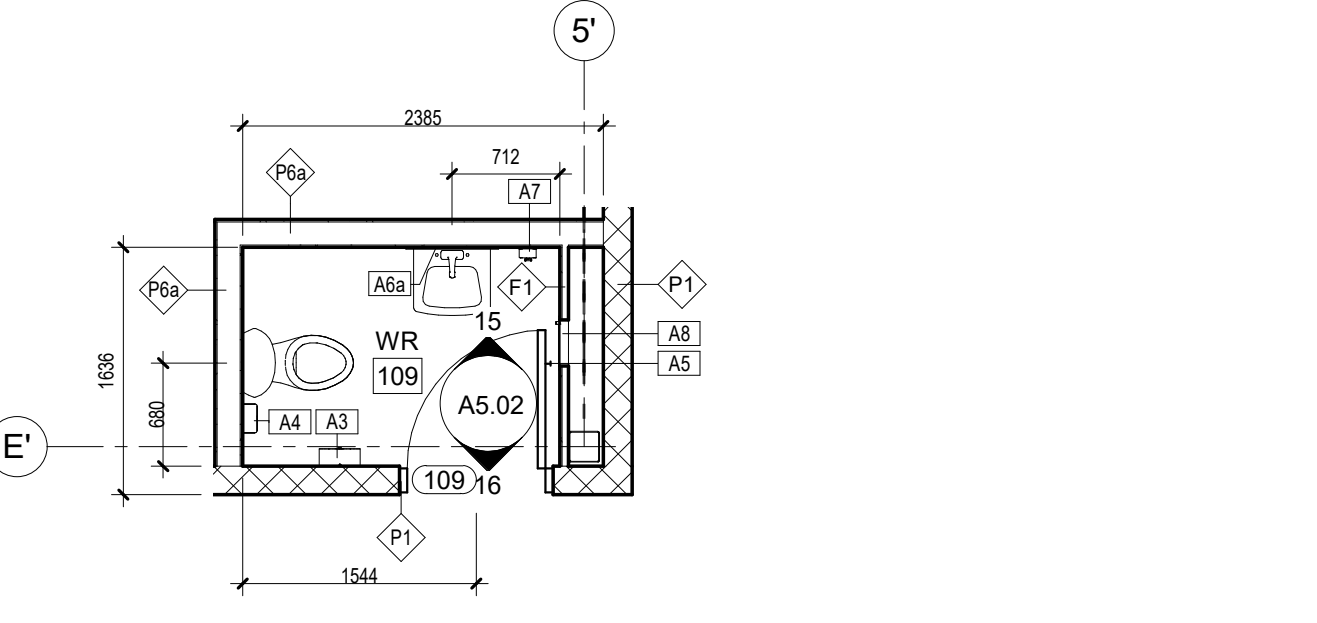
10 LOBBY UNIVERSAL WASHROOM 108 - ELEVATION 2
AS.02 / 1:20



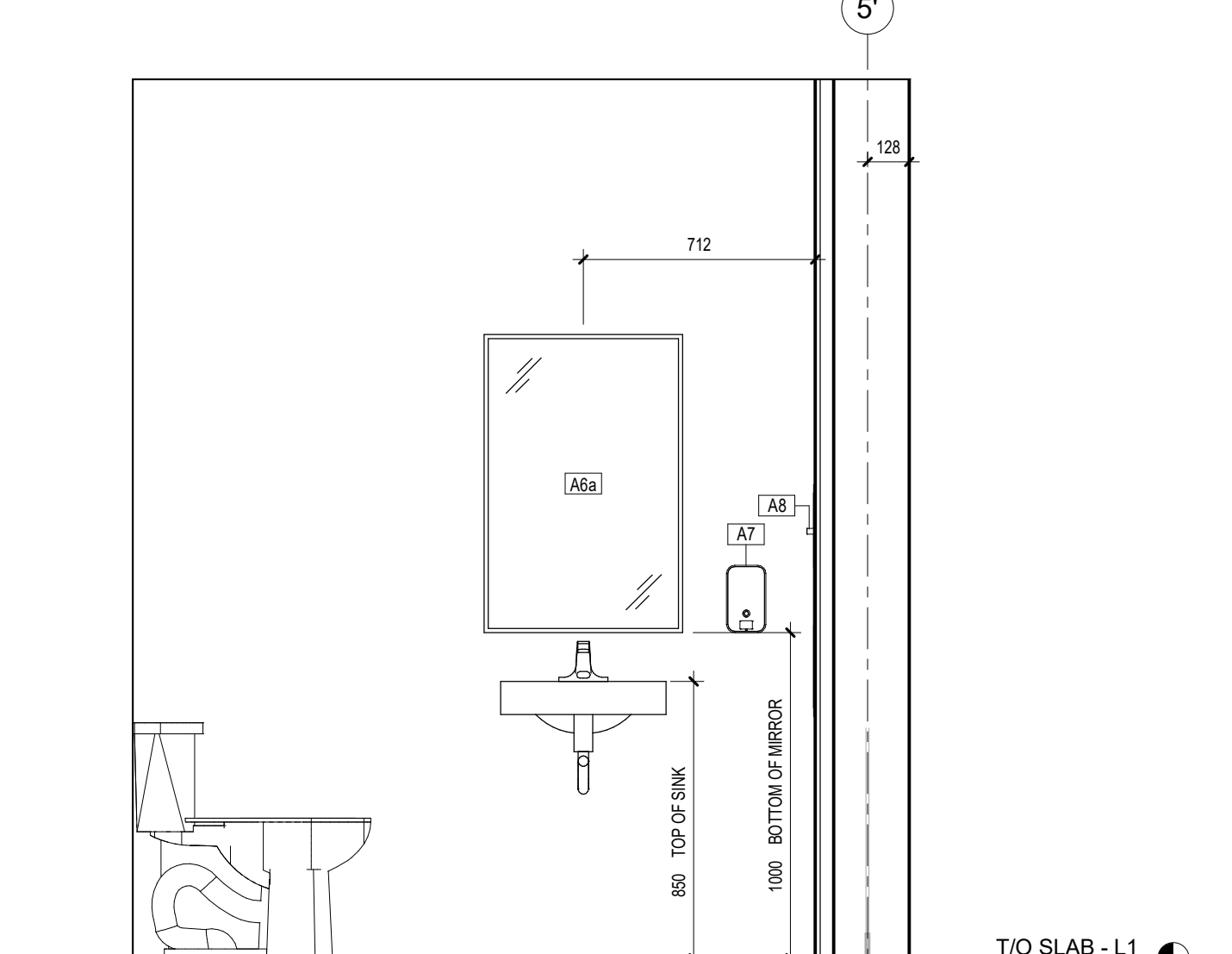
11 LOBBY UNIVERSAL WASHROOM 108 - ELEVATION 3
AS.02 / 1:20



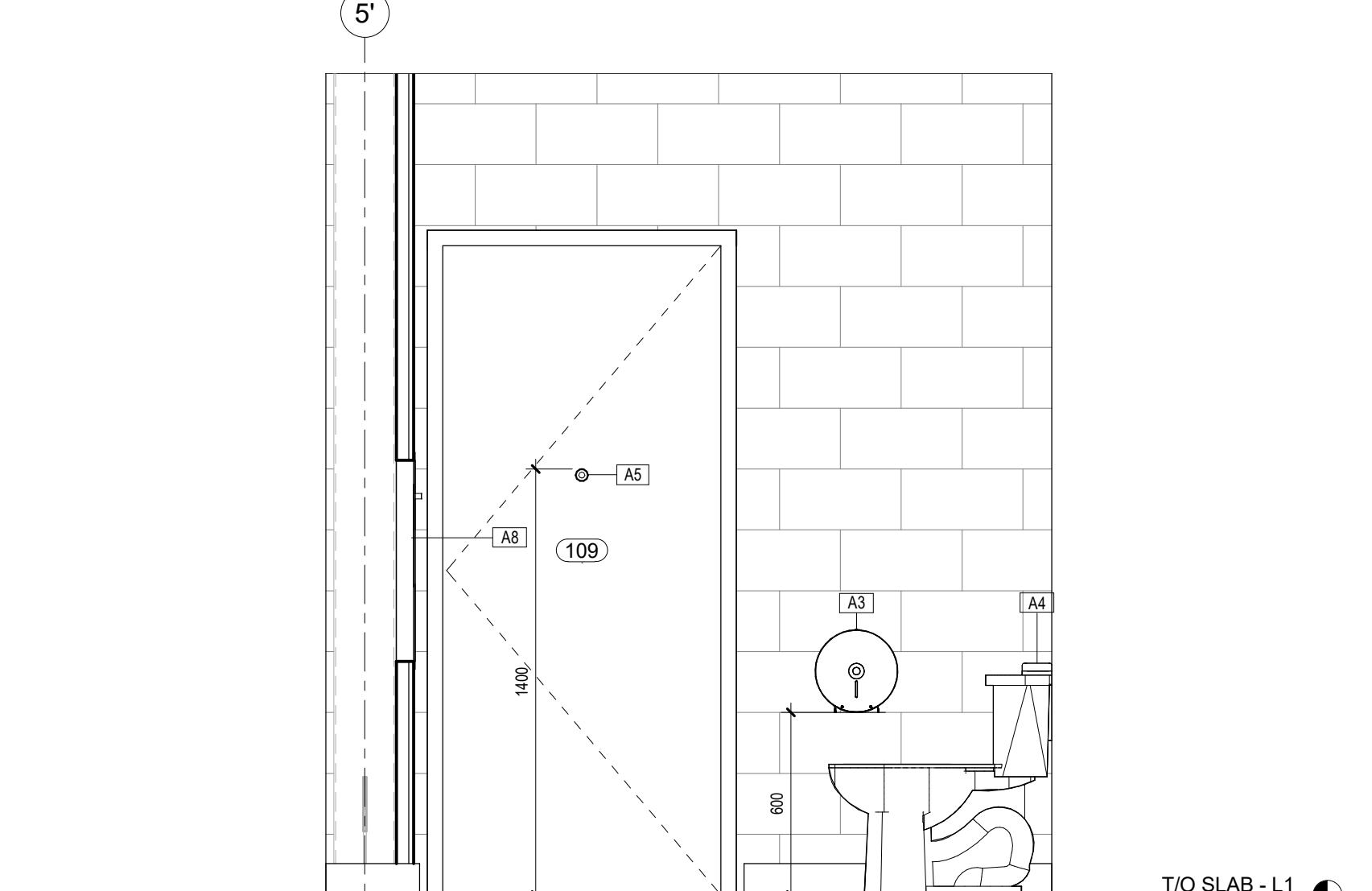
12 LOBBY UNIVERSAL WASHROOM 108 - ELEVATION 4
AS.02 / 1:20



14 LOBBY WASHROOM 109
AS.02 / 1:50



15 WASHROOM 109 ELEVATION
AS.02 / 1:20



16 WASHROOM 109 ELEVATION
AS.02 / 1:20

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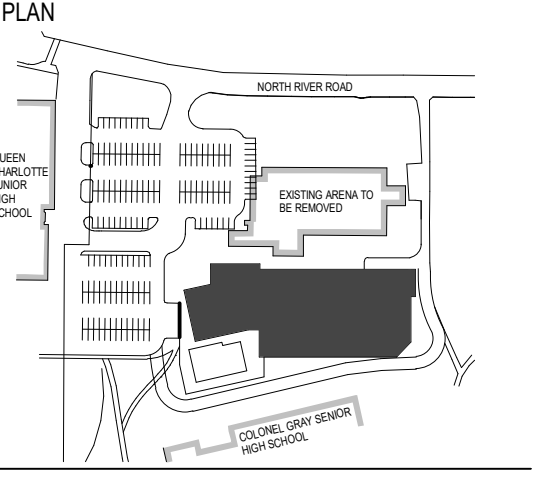


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CHECKED BY: MGG / PC
SCALE: As indicated

WASHROOMS

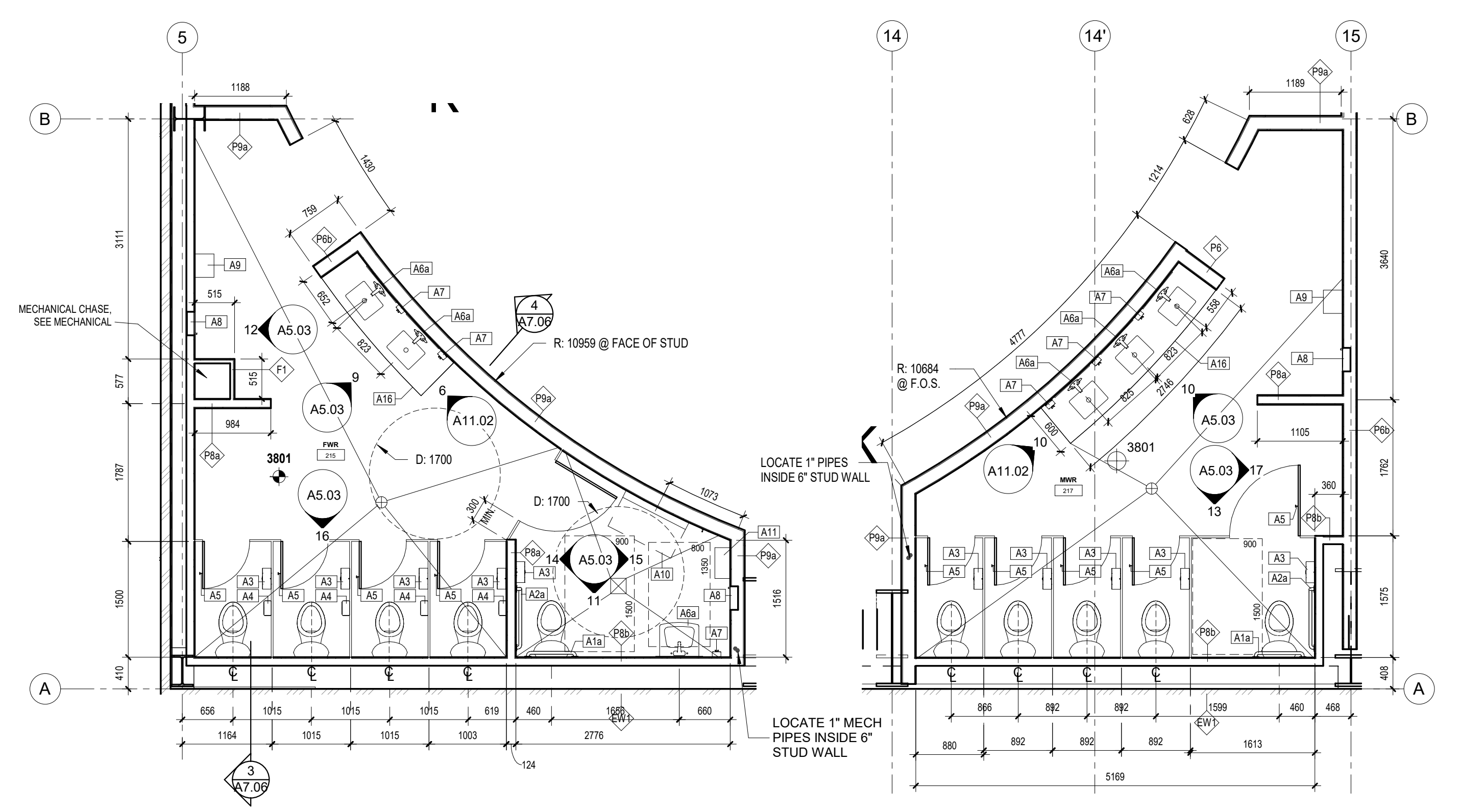
A5.02



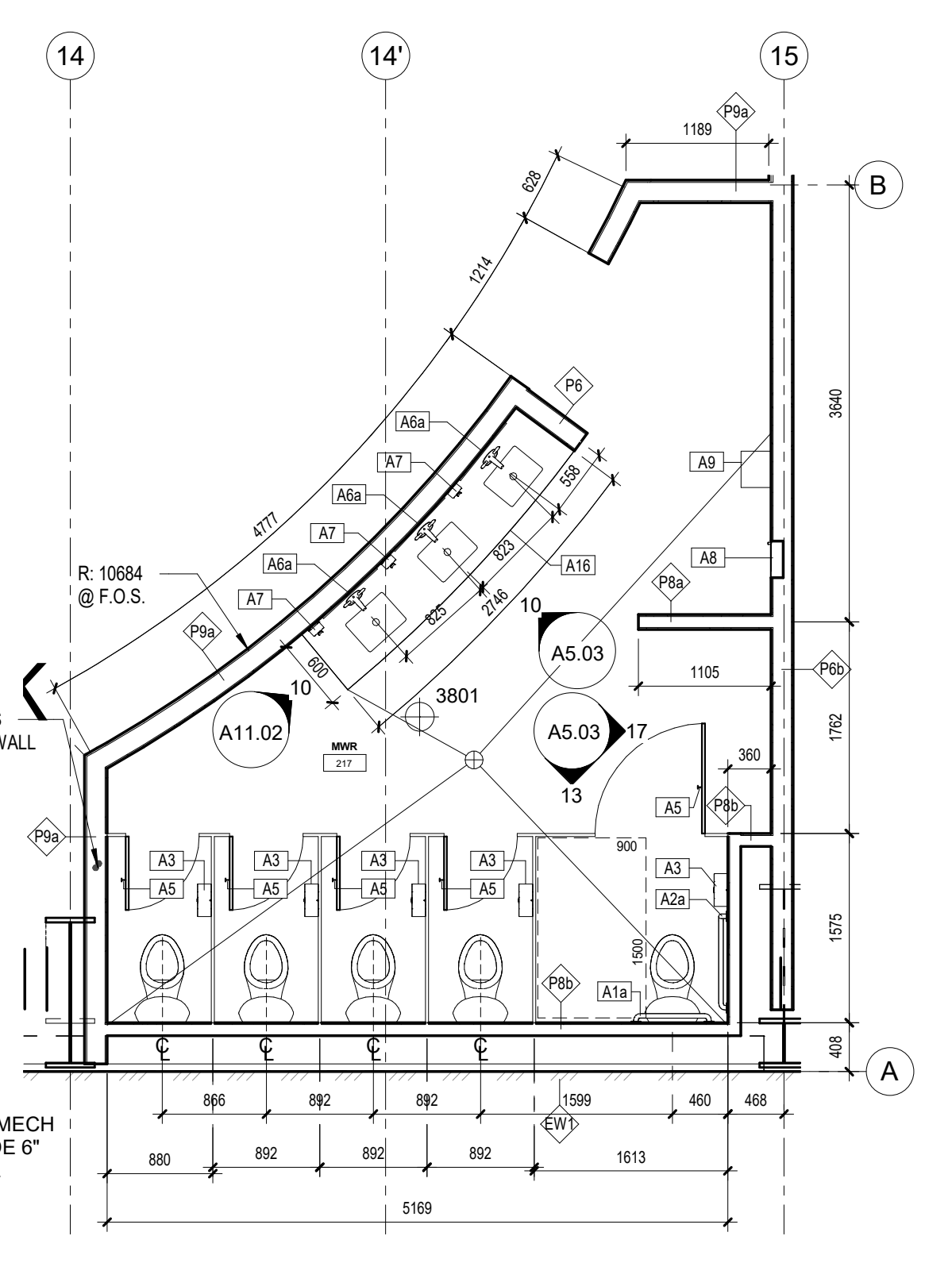
WASHROOM ACCESSORIES

- AS1 2" GRAB BAR
- AS2 42" GRAB BAR
- AS3 30" x 30" L-SHAPED GRAB BAR
- AS4 TOILET TISSUE DISPENSER
- AS5 SANITARY NAPKIN DISPOSAL
- AS6 ROBE HOOK
- AS7 610 x 914 FRAMELESS MIRROR
- AS8 30" x 30" x 1/2" FRAMELESS MIRROR
- AS9 SOAP DISPENSER
- AS10 PAPER TOWEL DISPENSER / WASTE RECEPT
- AS11 HAIR DRYER
- AS12 BABY CHANGING TABLE
- AS13 400mm x 200mm SHELF
- AS14 FOLDING BENCHER SEAT
- AS15 SOAP DISH
- AS16 SOLID PLASTIC TOILET PARTITION
- AS17 SOLID PLASTIC TOILET PARTITION, FLOOR TO CEILING
- AS18 SHOWER CURTAIN & ROD
- AS19 SOLID SURFACE COUNTERTOP AND BACKSPLASH PER TO DETAILS 60A11.02 AND 10A11.02
- LT LOCKER, SEE SPECIFICATIONS
- MT MILLWORK BENCH, SEE MILLWORK
- M2 MILLWORK BENCH, SEE MILLWORK
- M3 MILLWORK BENCH, SEE MILLWORK
- M4 MILLWORK BENCH, SEE MILLWORK
- MF FLOOR DRAIN - SEE MECHANICAL

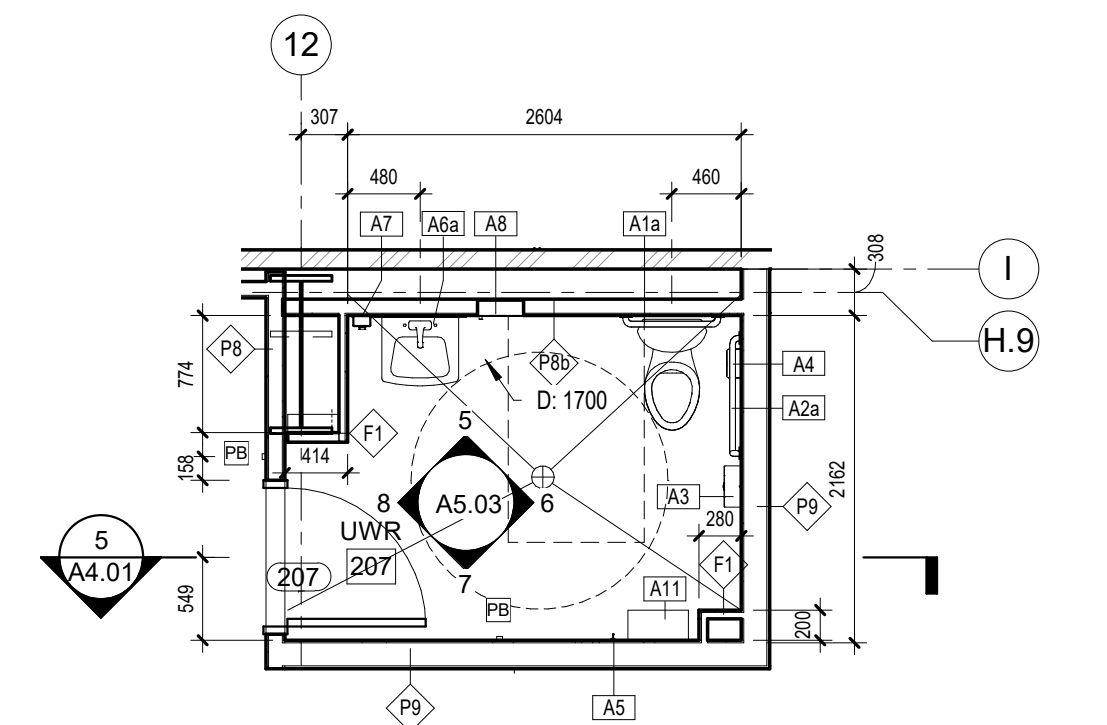
NOTE: PROVIDE WOOD BLOCKING WHERE REQUIRED FOR ALL WASHROOM ACCESSORIES



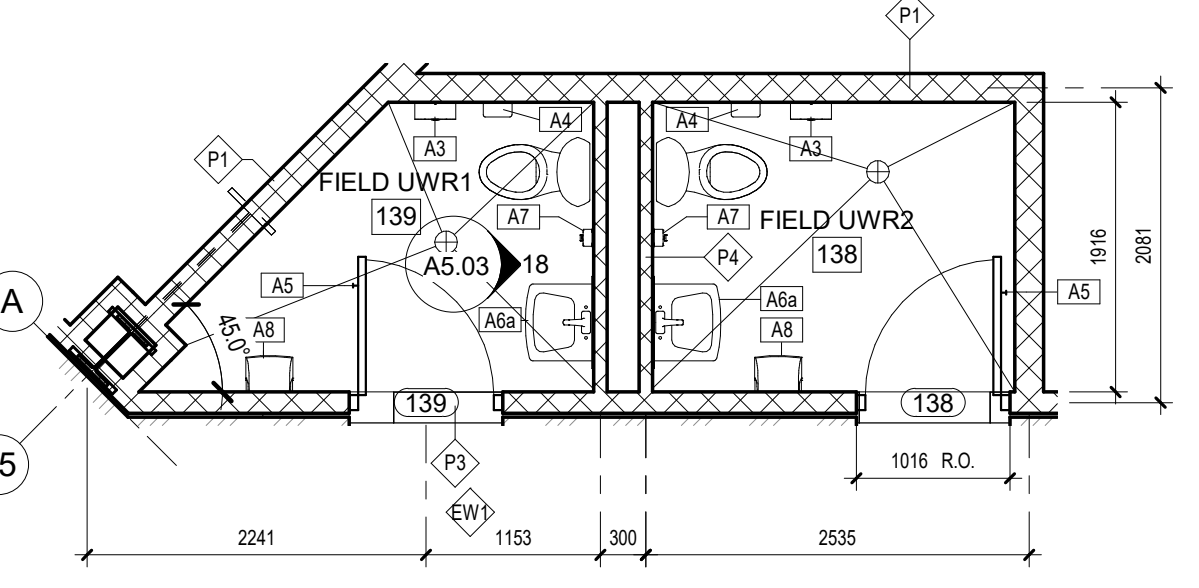
1 ENLARGED PLAN - WASHROOM 215
AS.03/ 1: 50



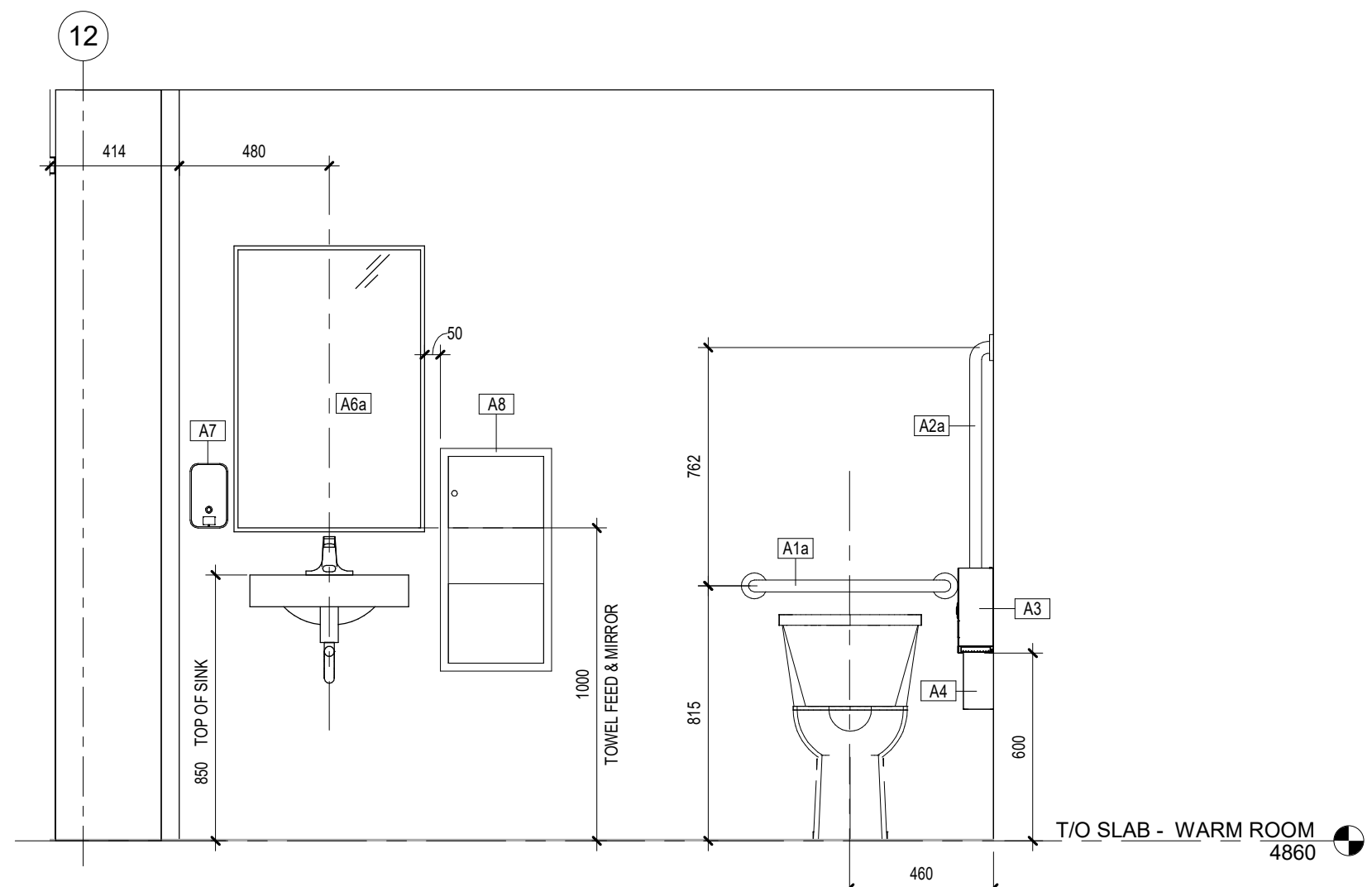
2 ENLARGED PLAN - WASHROOM 217
AS.03/ 1: 50



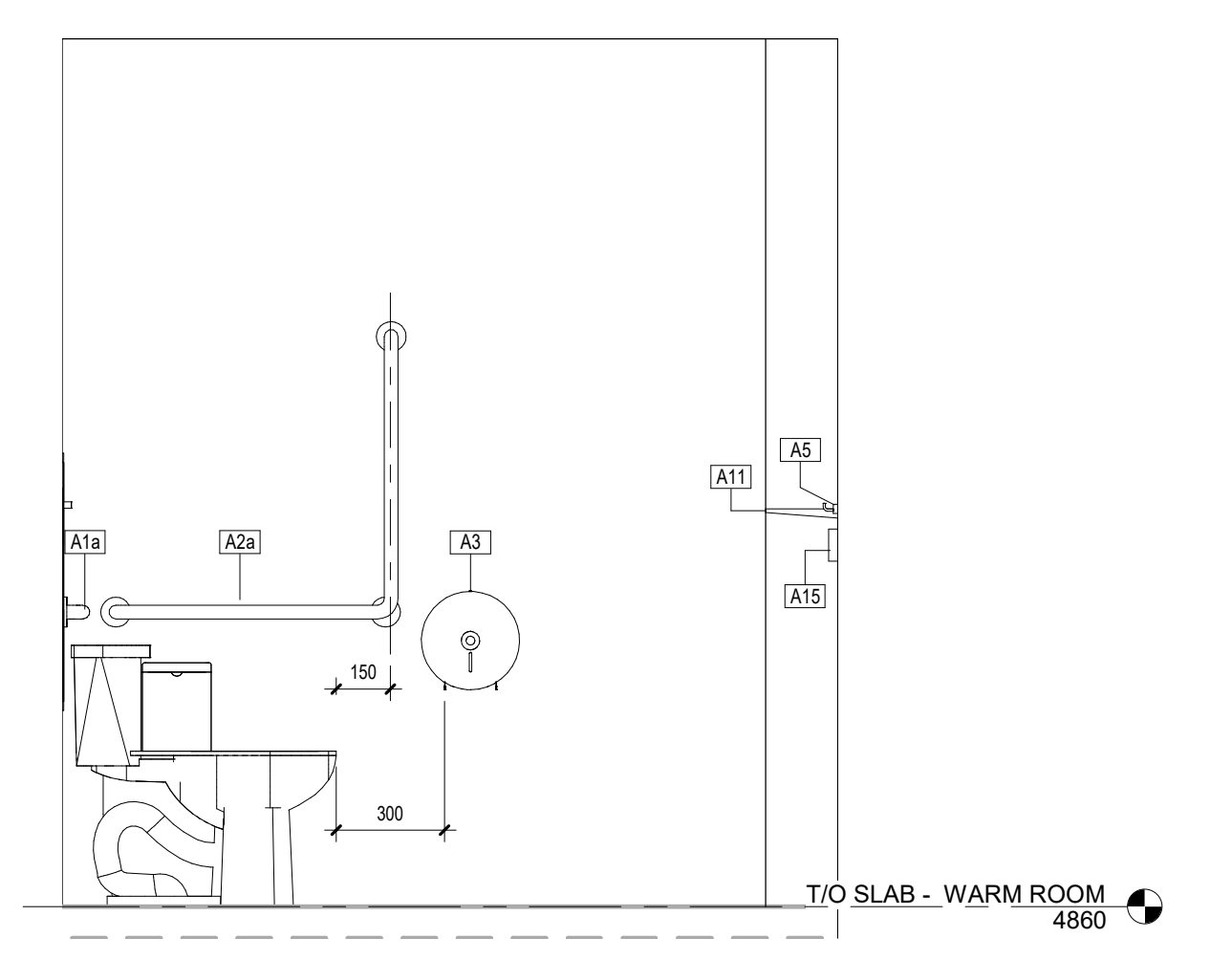
3 WARM ROOM UNIV. WASHROOM
AS.03/ 1: 50



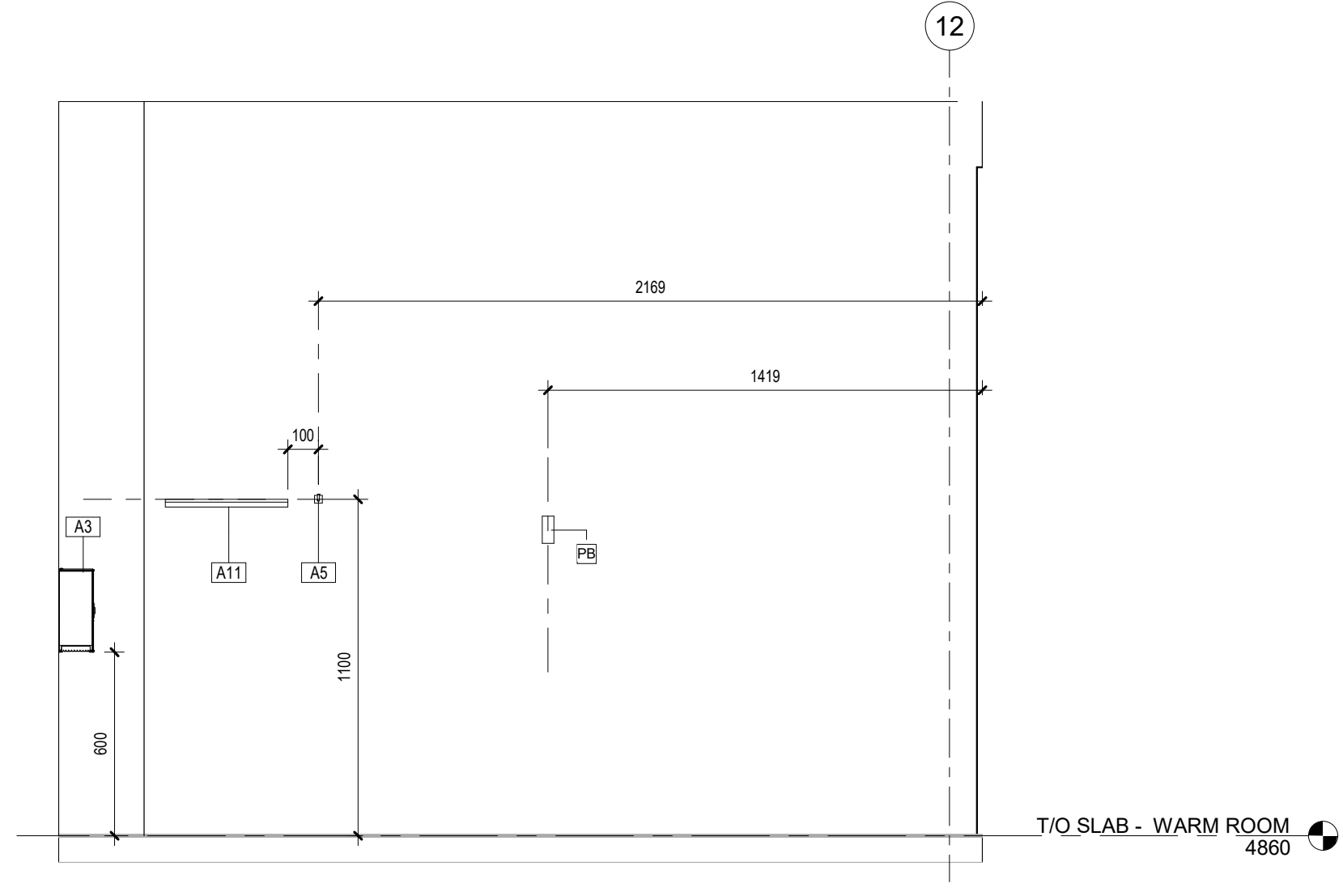
4 FIELD WASHROOMS
AS.03/ 1: 50



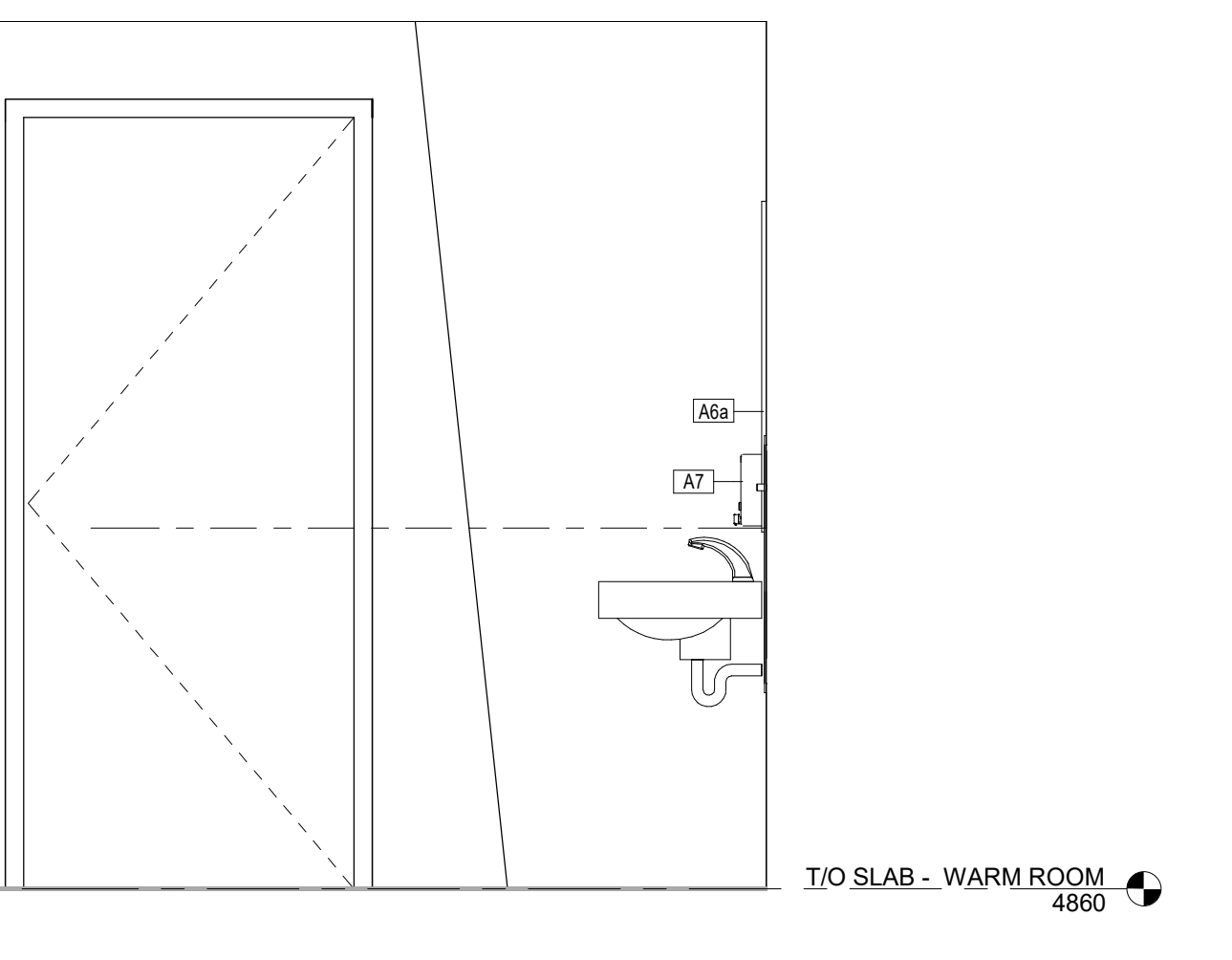
5 WARM ROOM UNIV. WASHROOM - ELEVATION 1
AS.03/ 1: 20



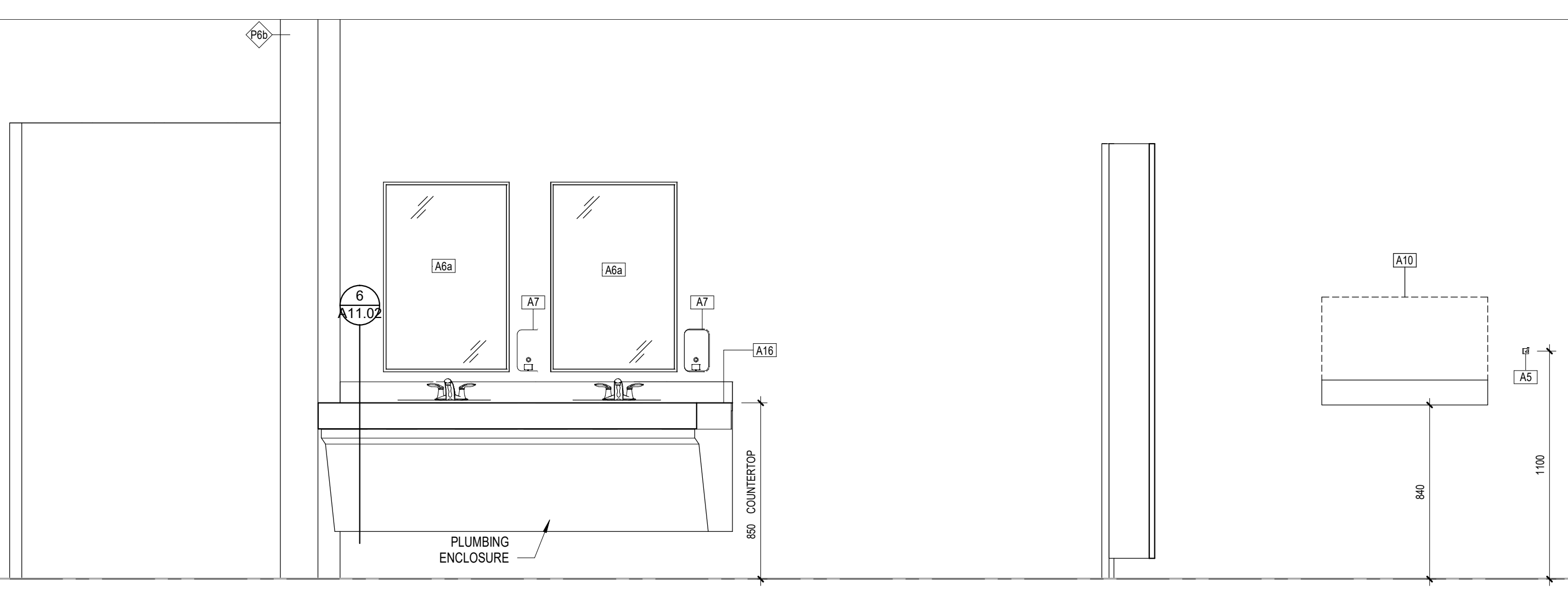
6 WARM ROOM UNIV. WASHROOM - ELEVATION 2
AS.03/ 1: 20



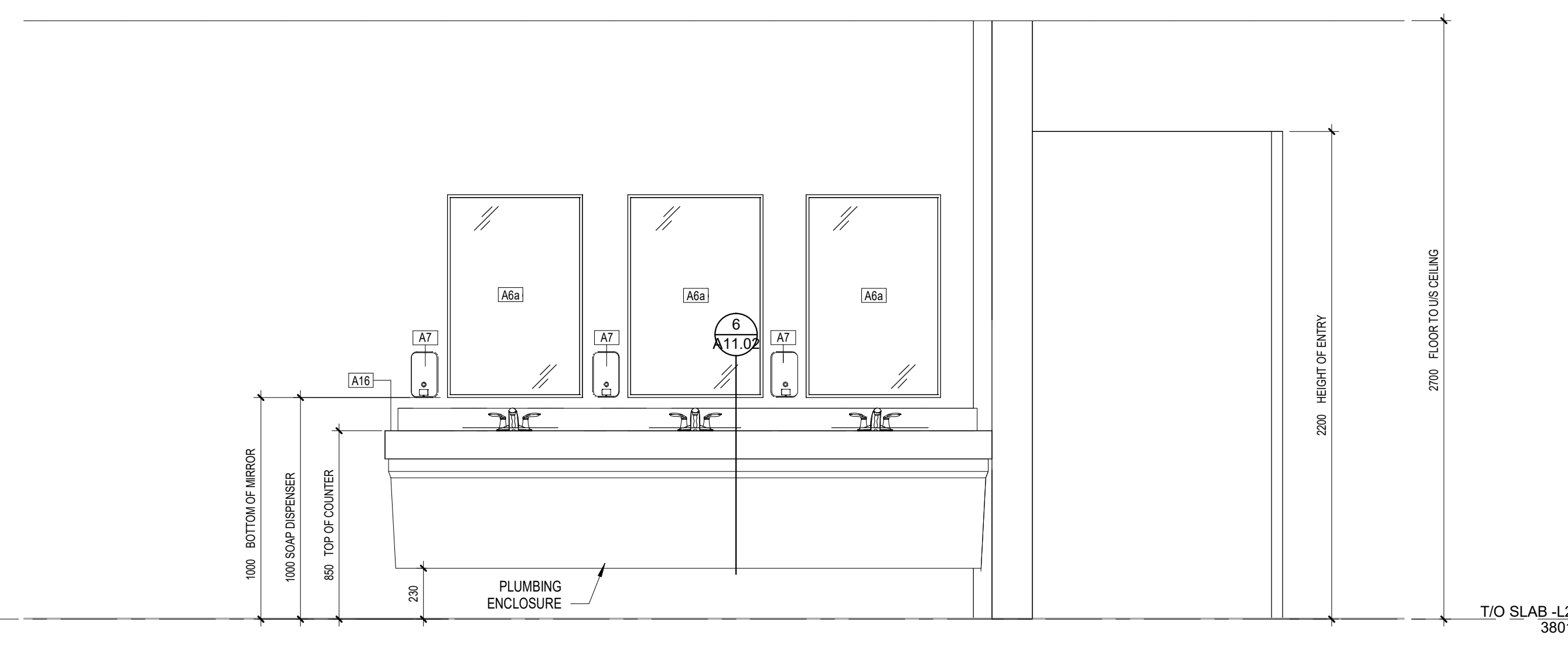
7 WARM ROOM UNIV. WASHROOM - ELEVATION 3
AS.03/ 1: 20



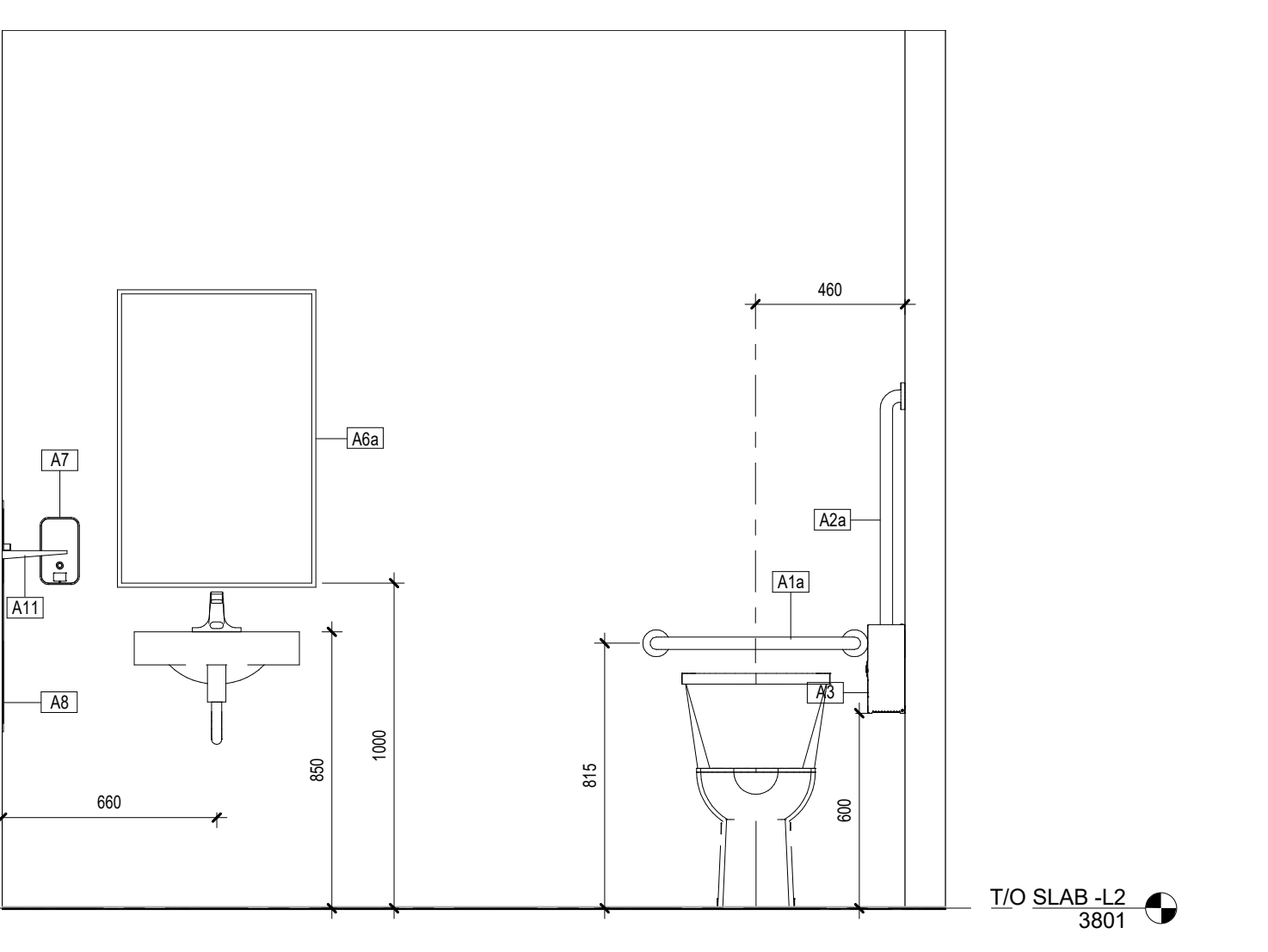
8 WARM ROOM UNIV. WASHROOM - ELEVATION 4
AS.03/ 1: 20



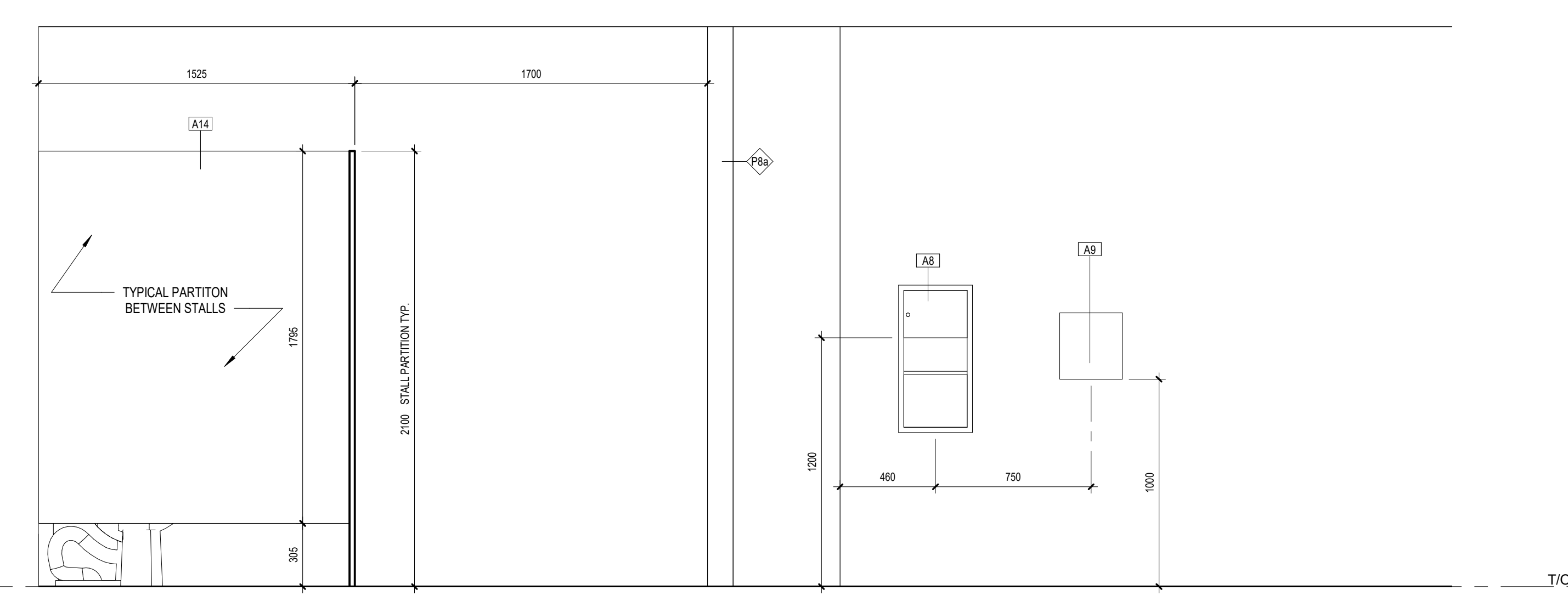
9 WASHROOM 215 - VANITY ELEVATION
AS.03/ 1: 20



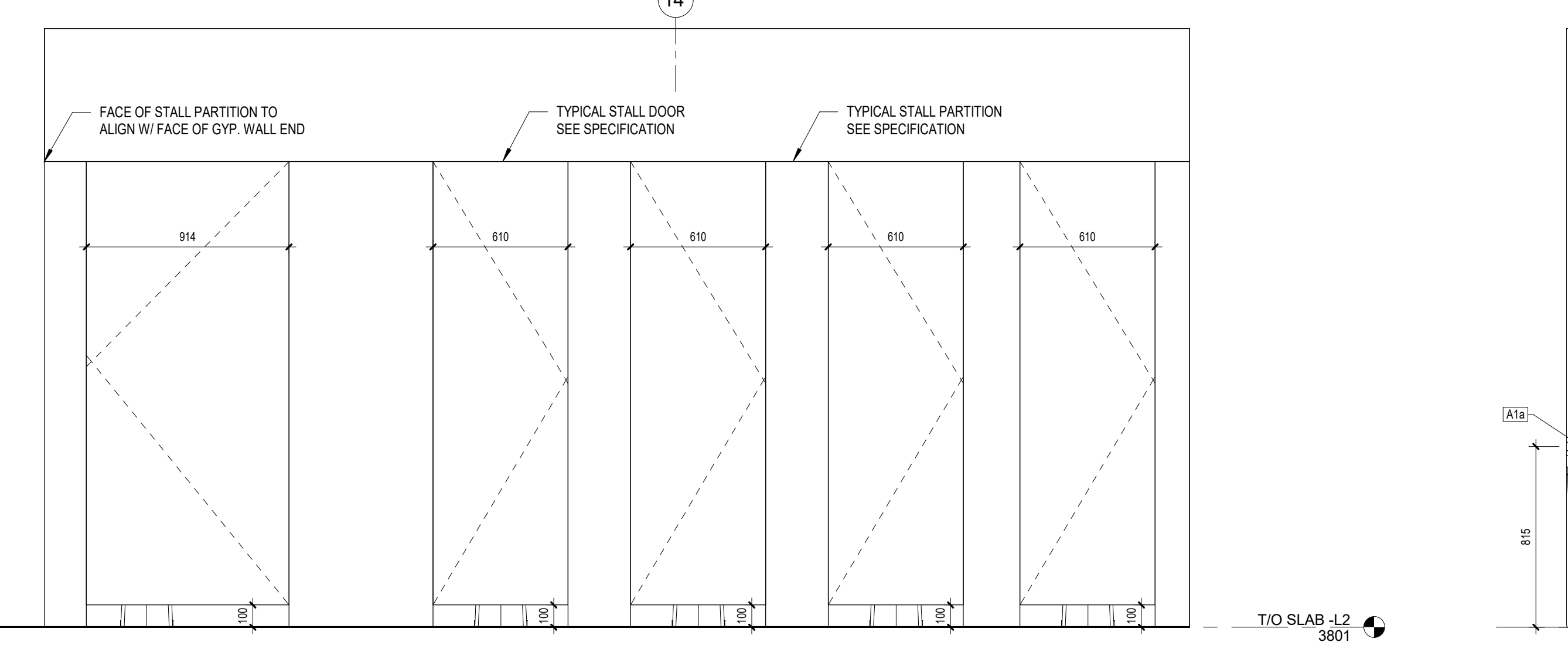
10 WASHROOM 214 - VANITY ELEVATION
AS.03/ 1: 20



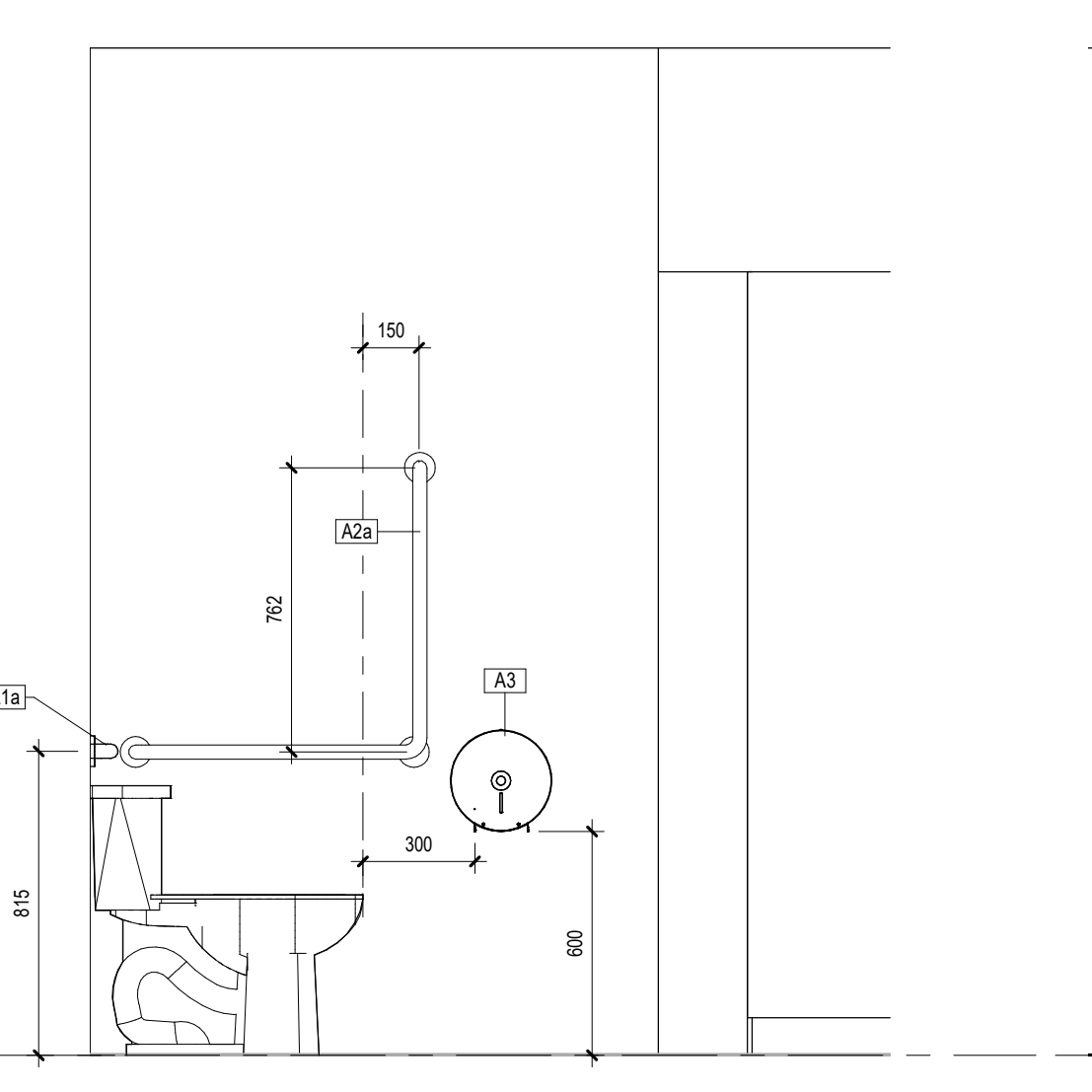
11 WASHROOM 215 - BF WC ELEVATION 1
AS.03/ 1: 20



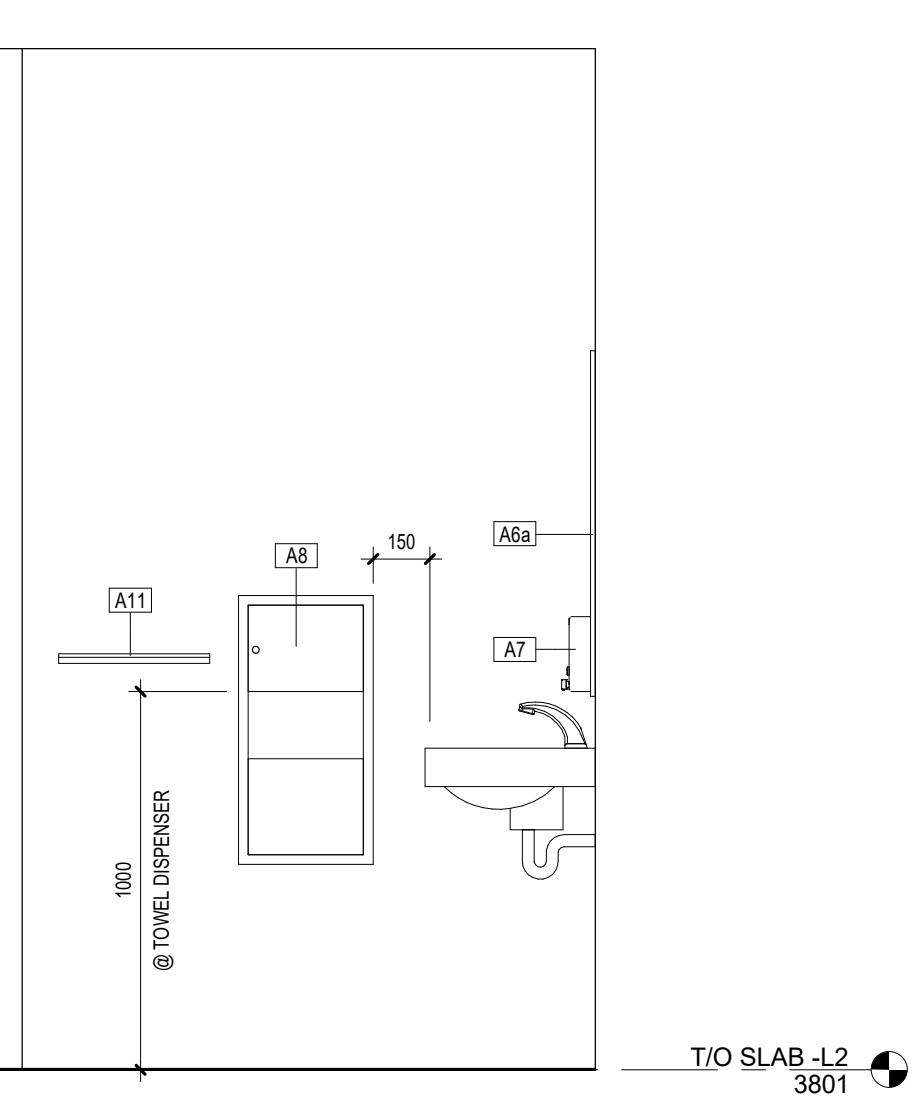
12 WASHROOM 215 - ELEVATION 2
AS.03/ 1: 20



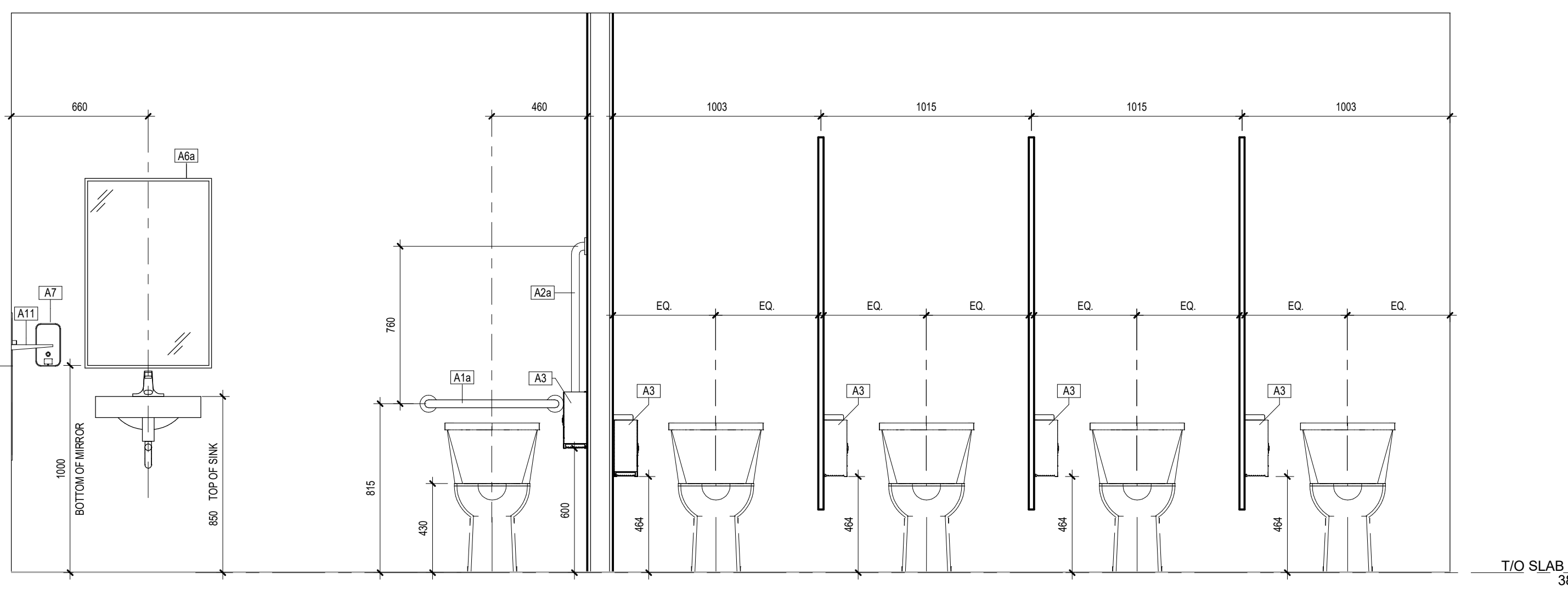
13 WASHROOM 214 - WC ELEVATION
AS.03/ 1: 20



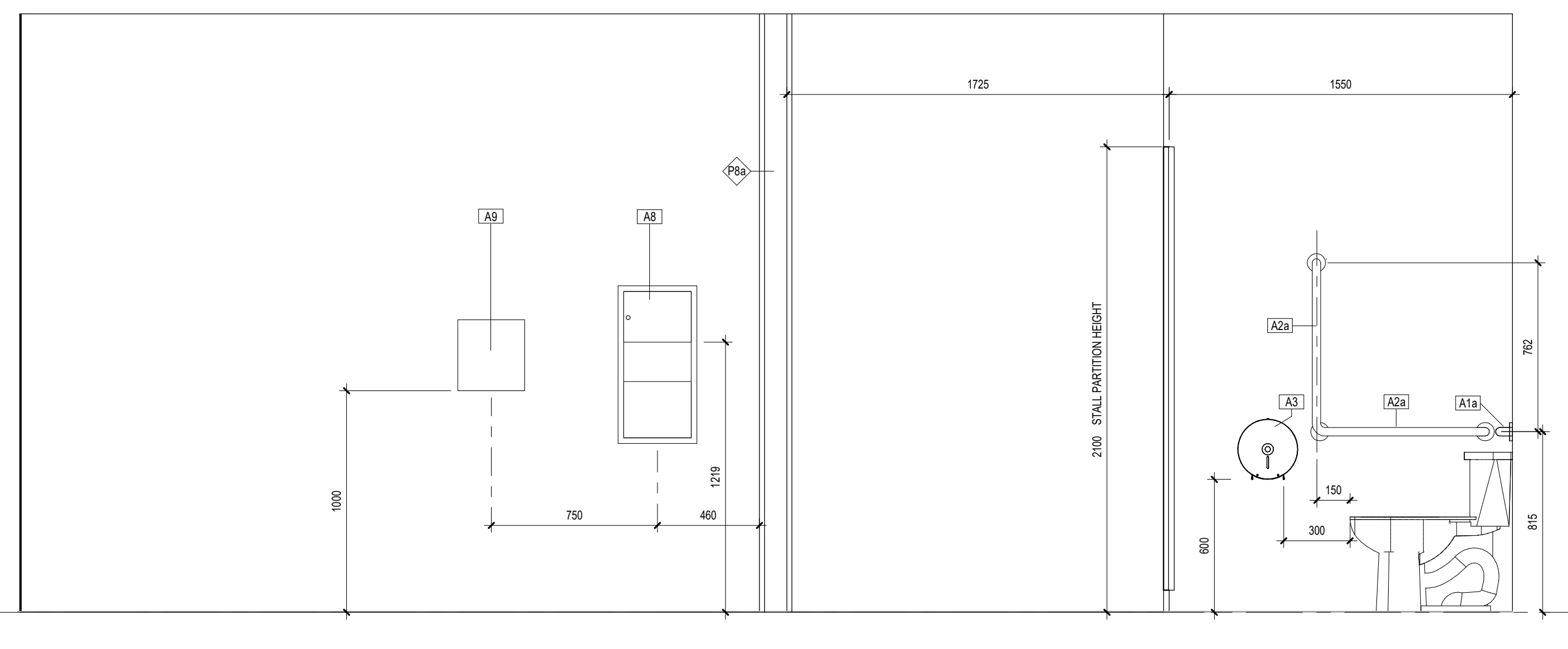
14 WASHROOM 215 - BF WC ELEVATION 2
AS.03/ 1: 20



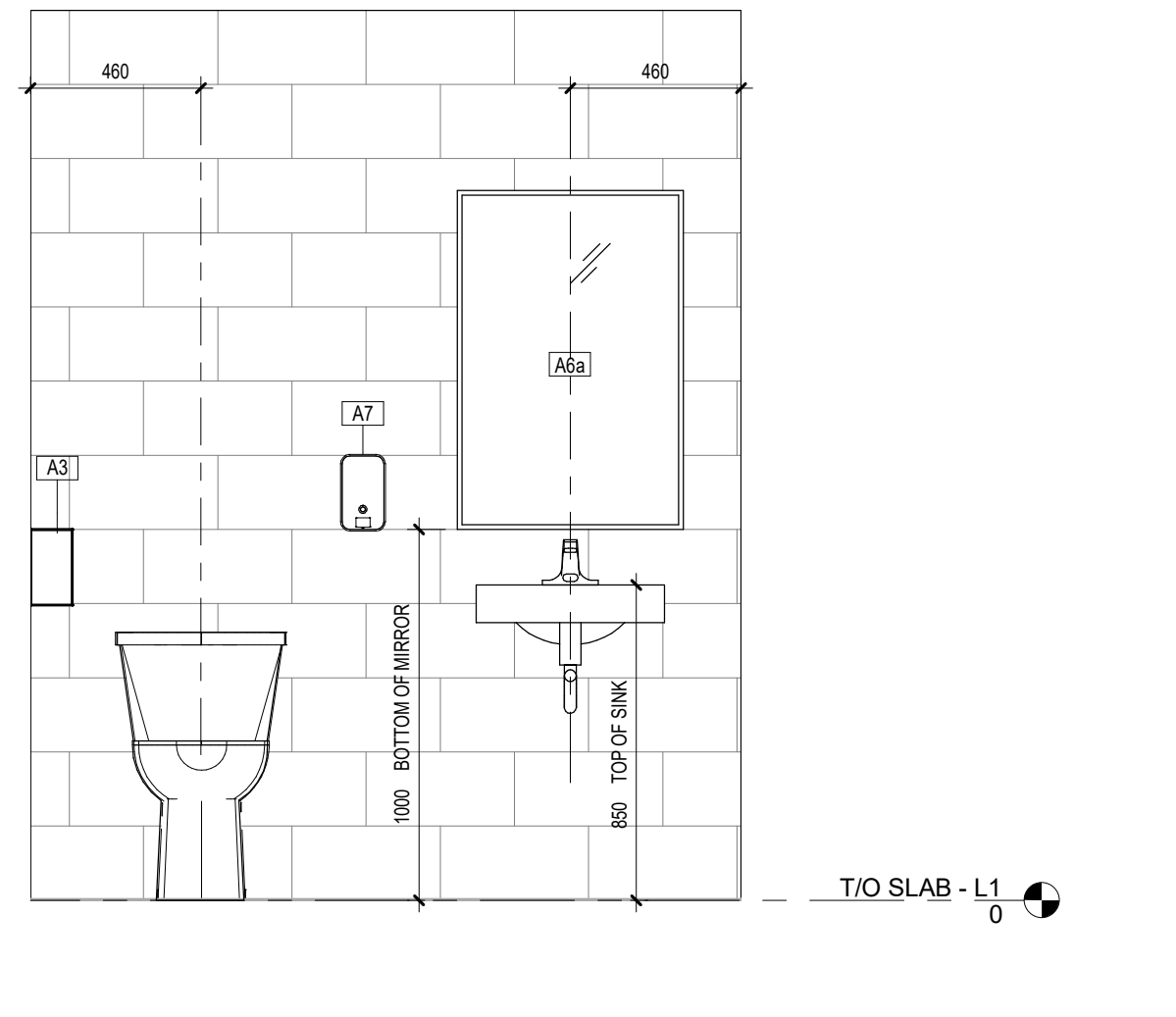
15 WASHROOM 215 - BF WC ELEVATION 3
AS.03/ 1: 20



16 WASHROOM 215 - WC ELEVATION
AS.03/ 1: 20



17 WASHROOM 214 - ELEVATION
AS.03/ 1: 20



18 TYP. FIELD WASHROOM ELEVATION
AS.03/ 1: 20

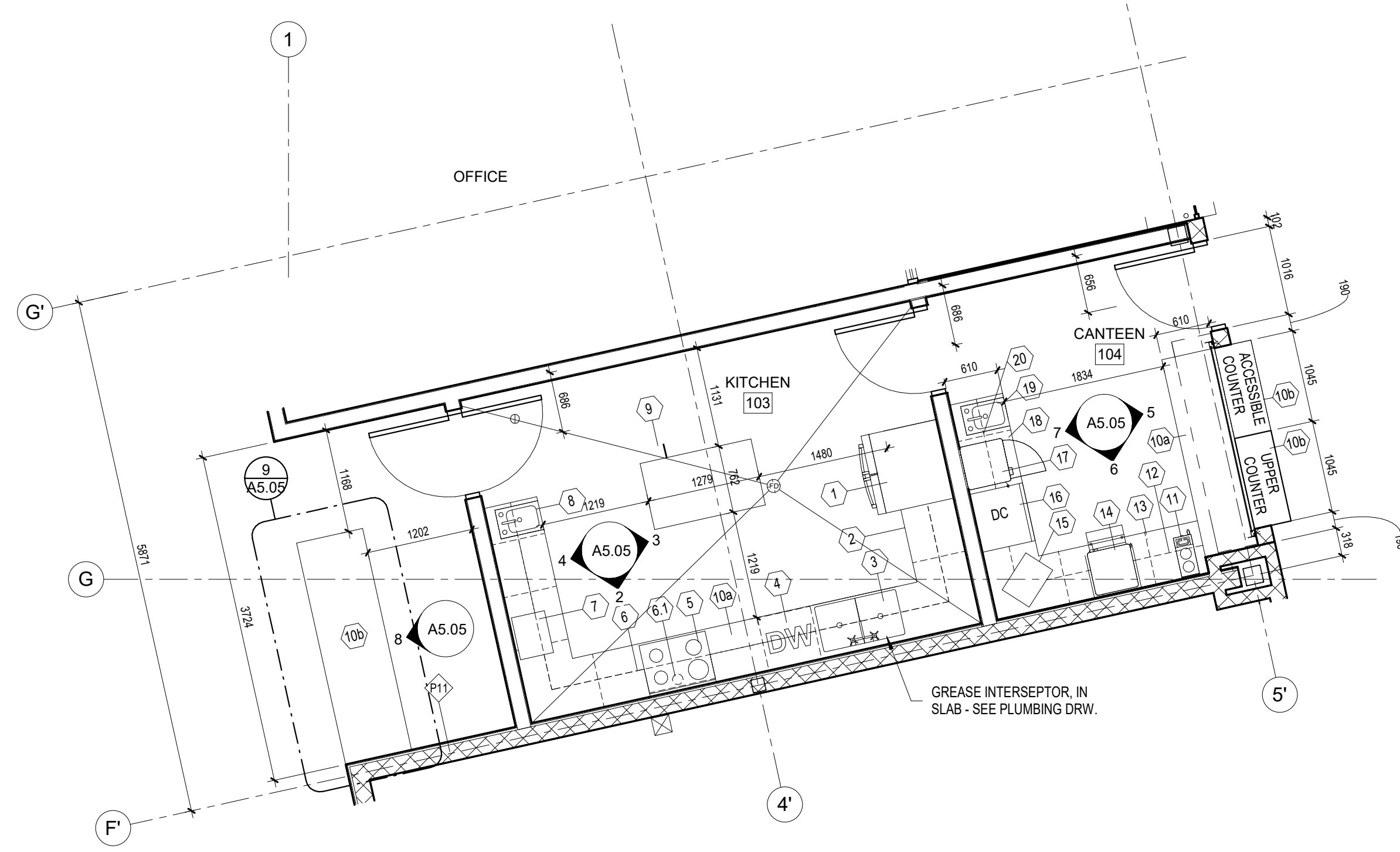
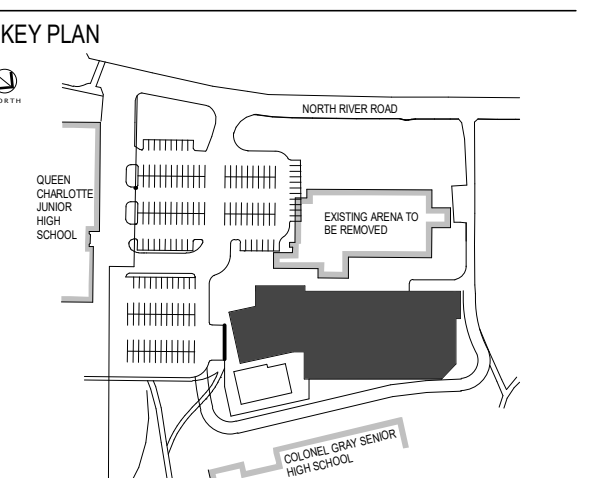
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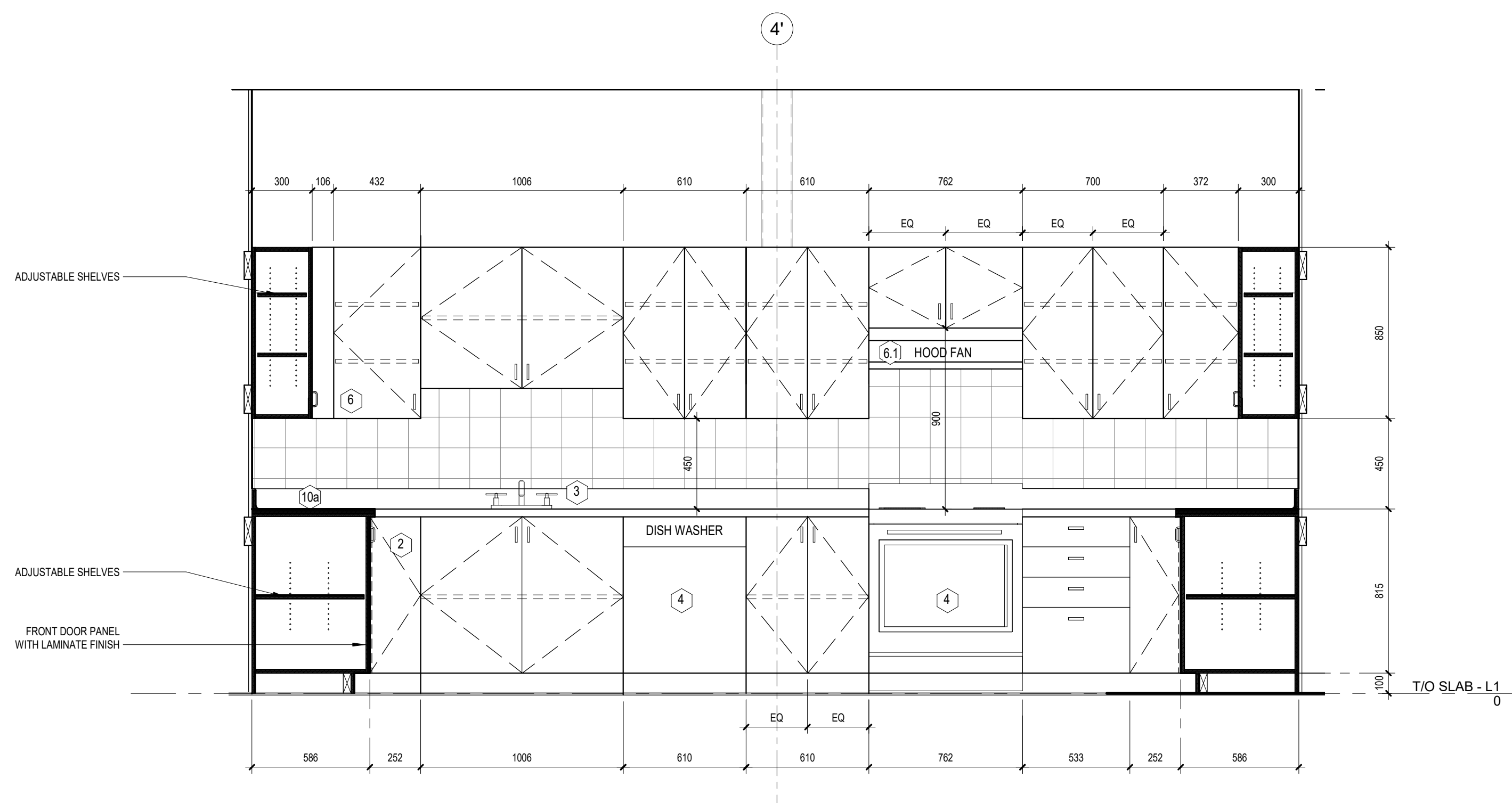
PROJECT NAME:
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170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

PROJECT NO.: 21111
DRAWN BY: OM / MV / DE
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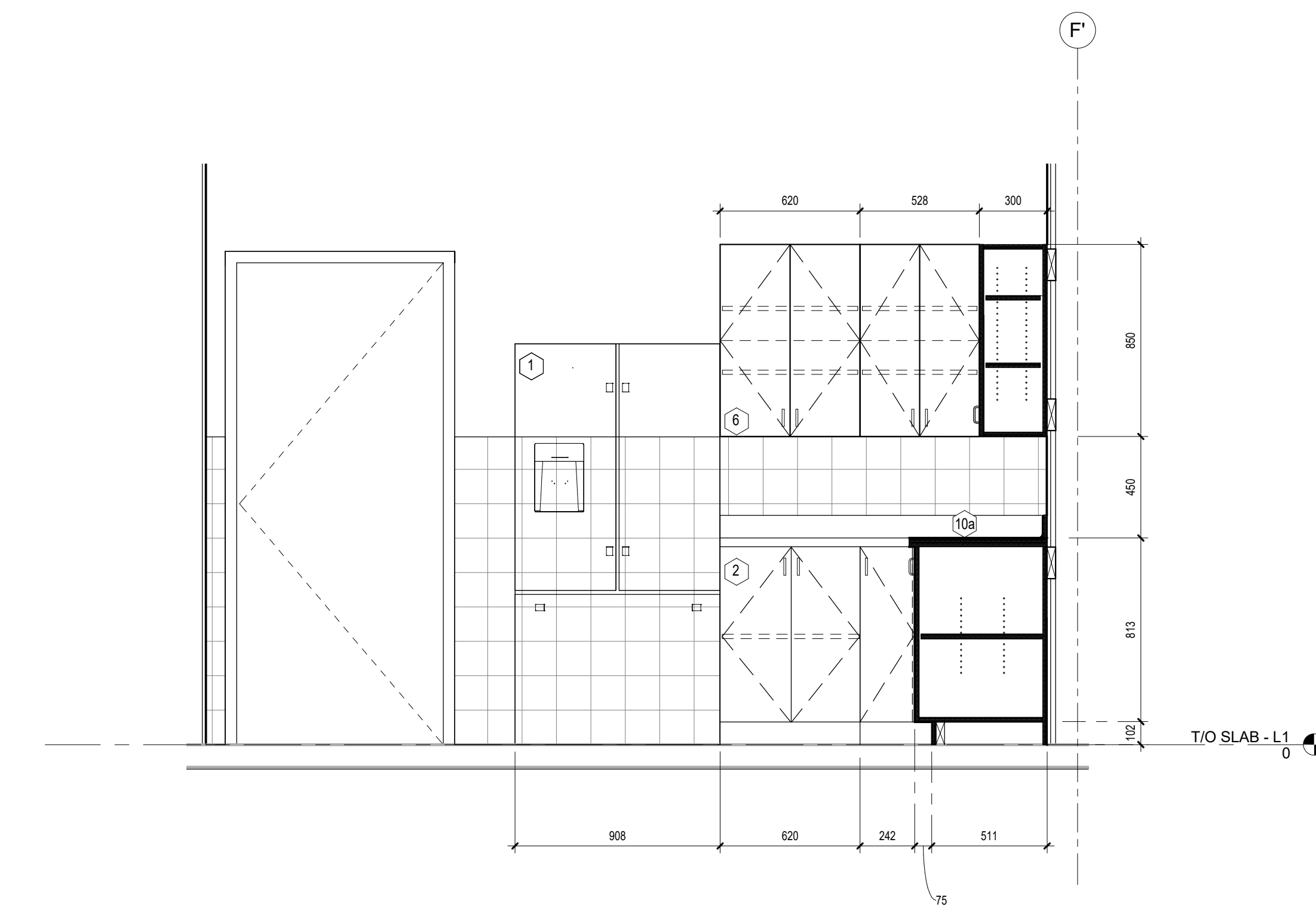
WASHROOMS



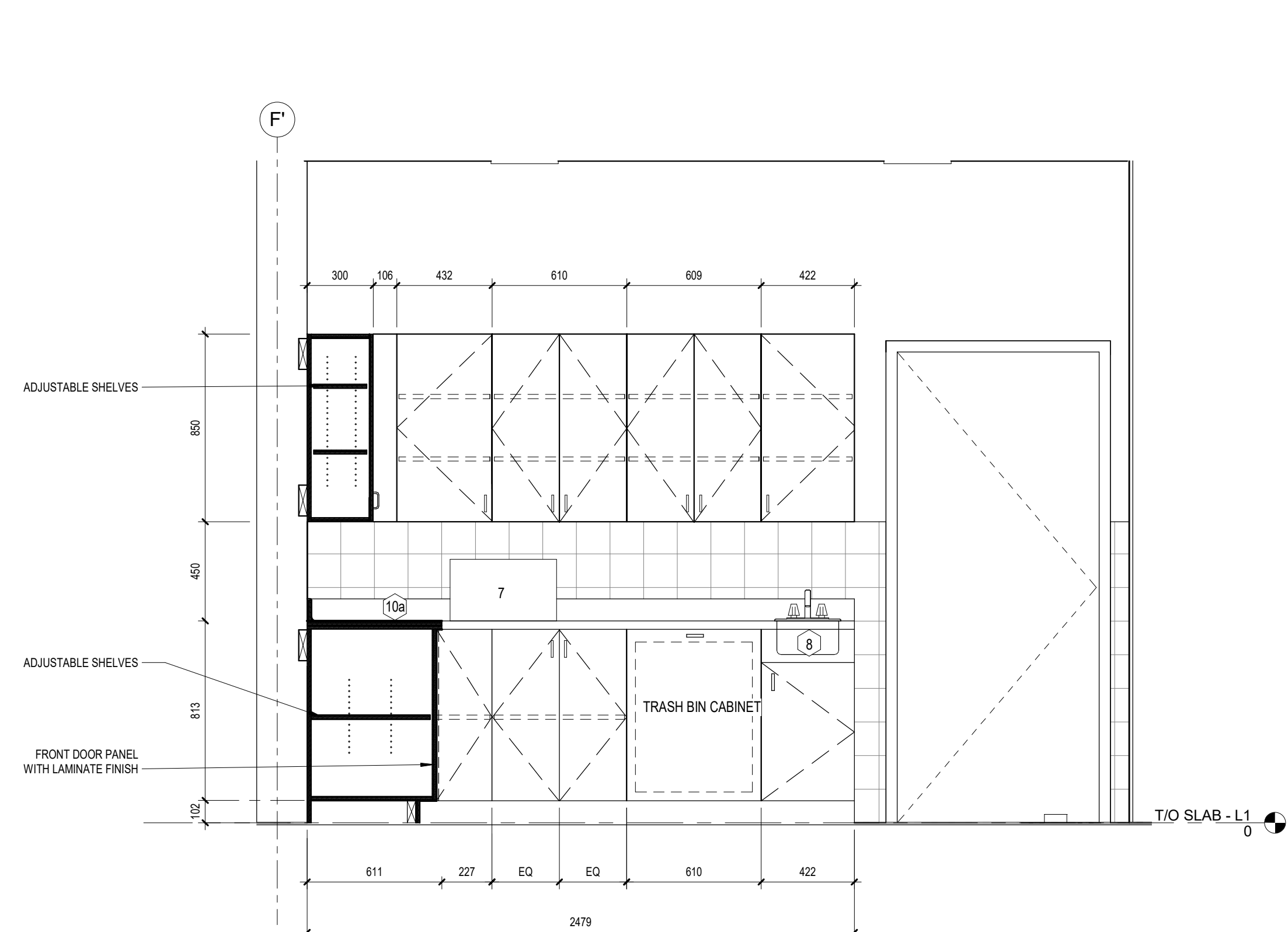
1 ENLARGED PLAN - CANTEEN & KITCHEN
AS.05/ 1 : 50



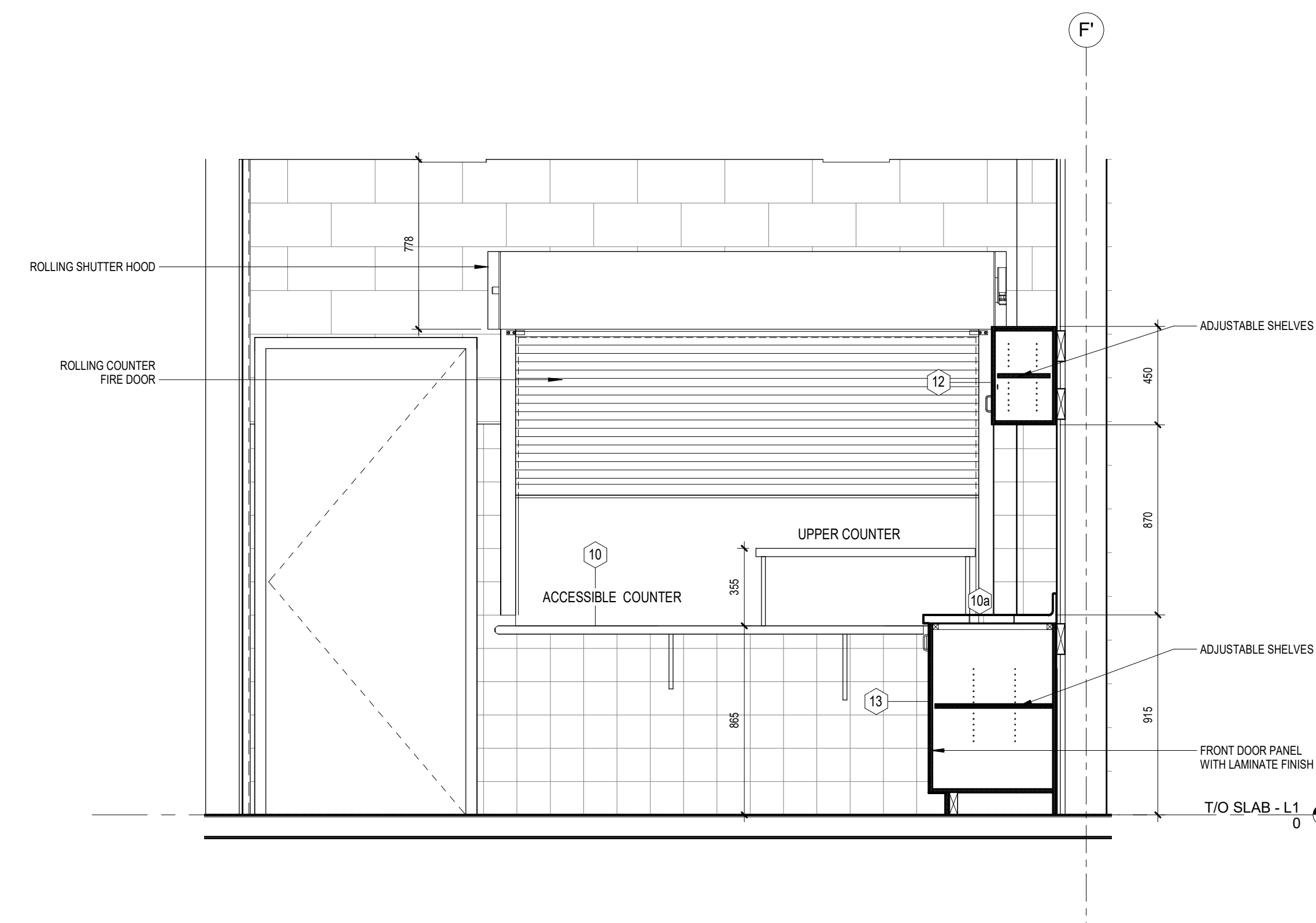
2 ELEVATION EAST - KITCHEN
AS.05/ 1 : 20



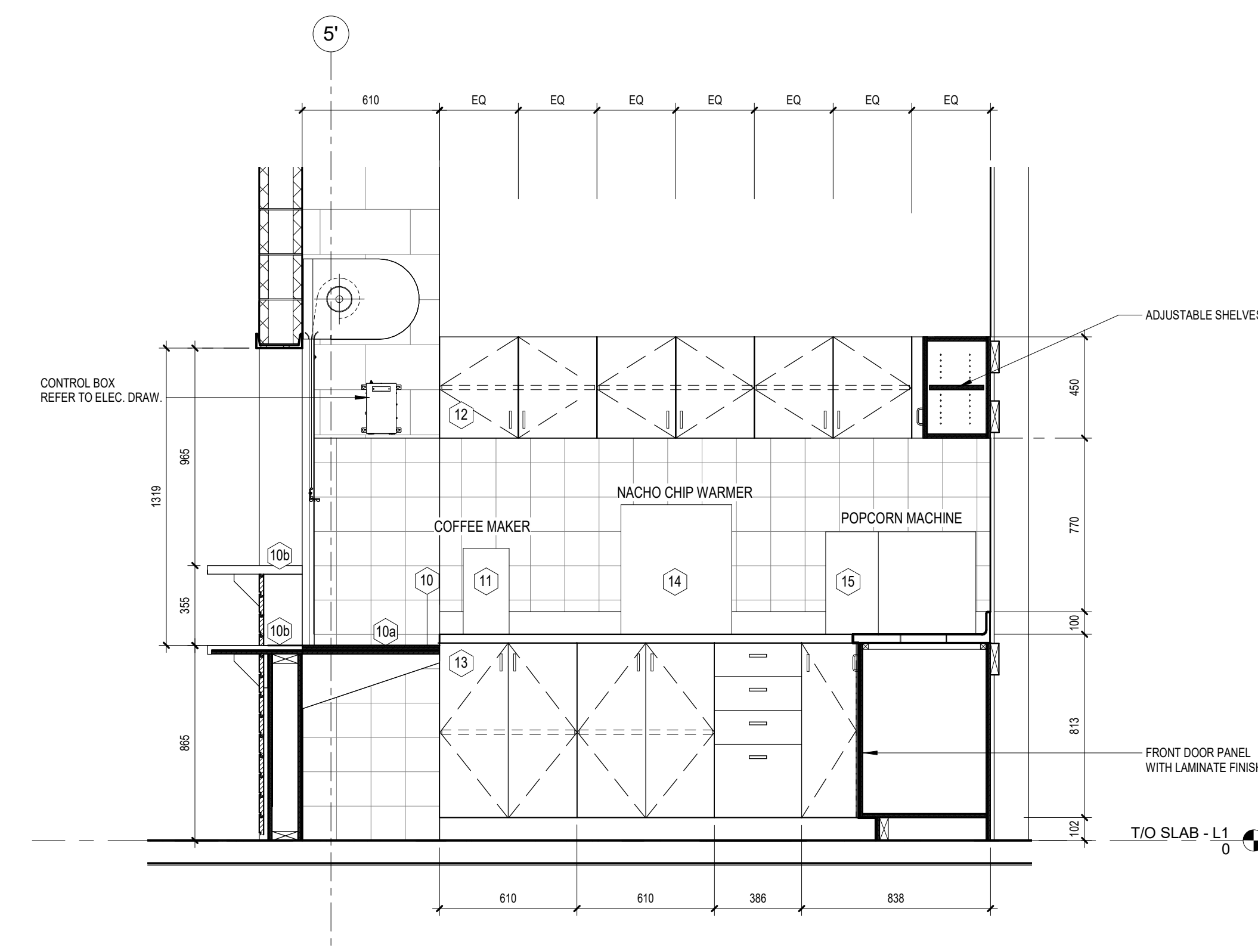
3 ELEVATION NORTH - KITCHEN
AS.05/ 1 : 20



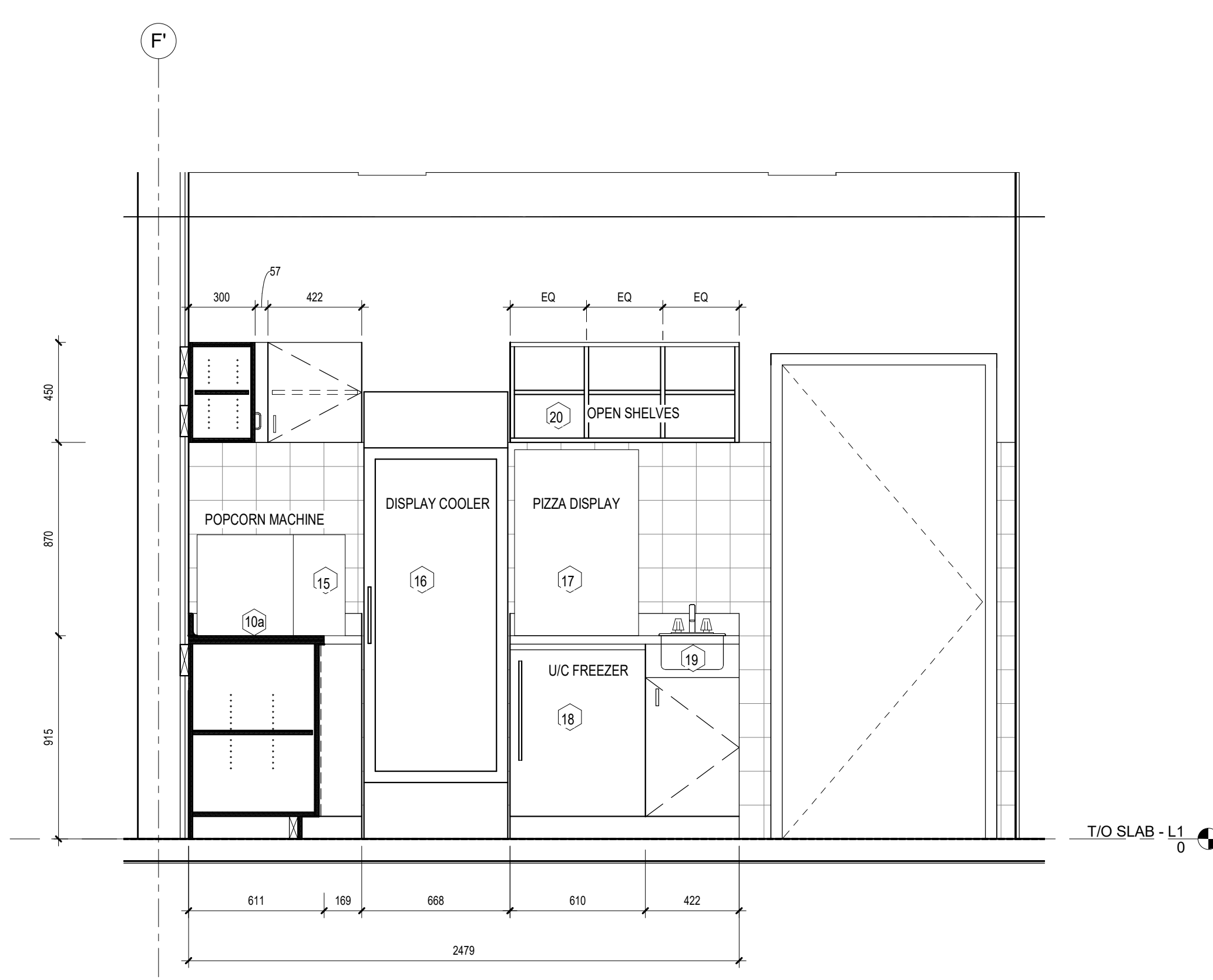
4 ELEVATION SOUTH - KITCHEN
AS.05/ 1 : 20



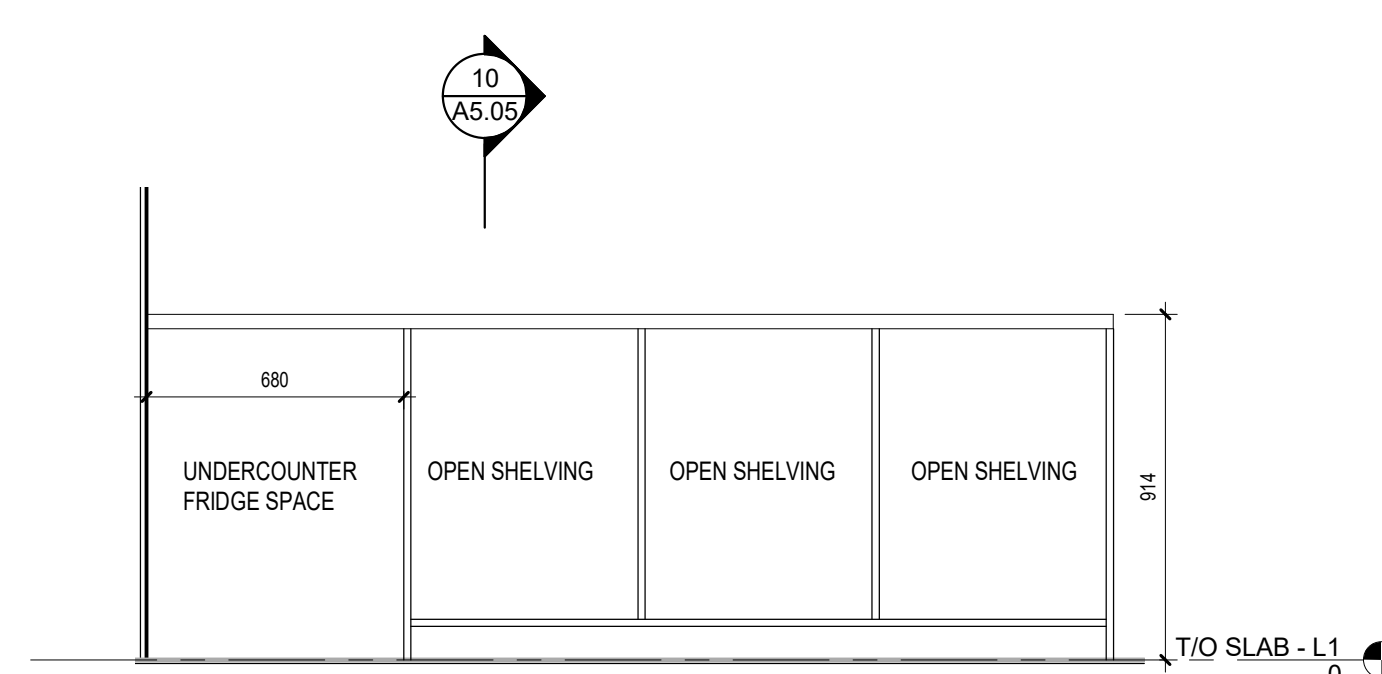
5 ELEVATION NORTH - CANTEEN
AS.05/ 1 : 20



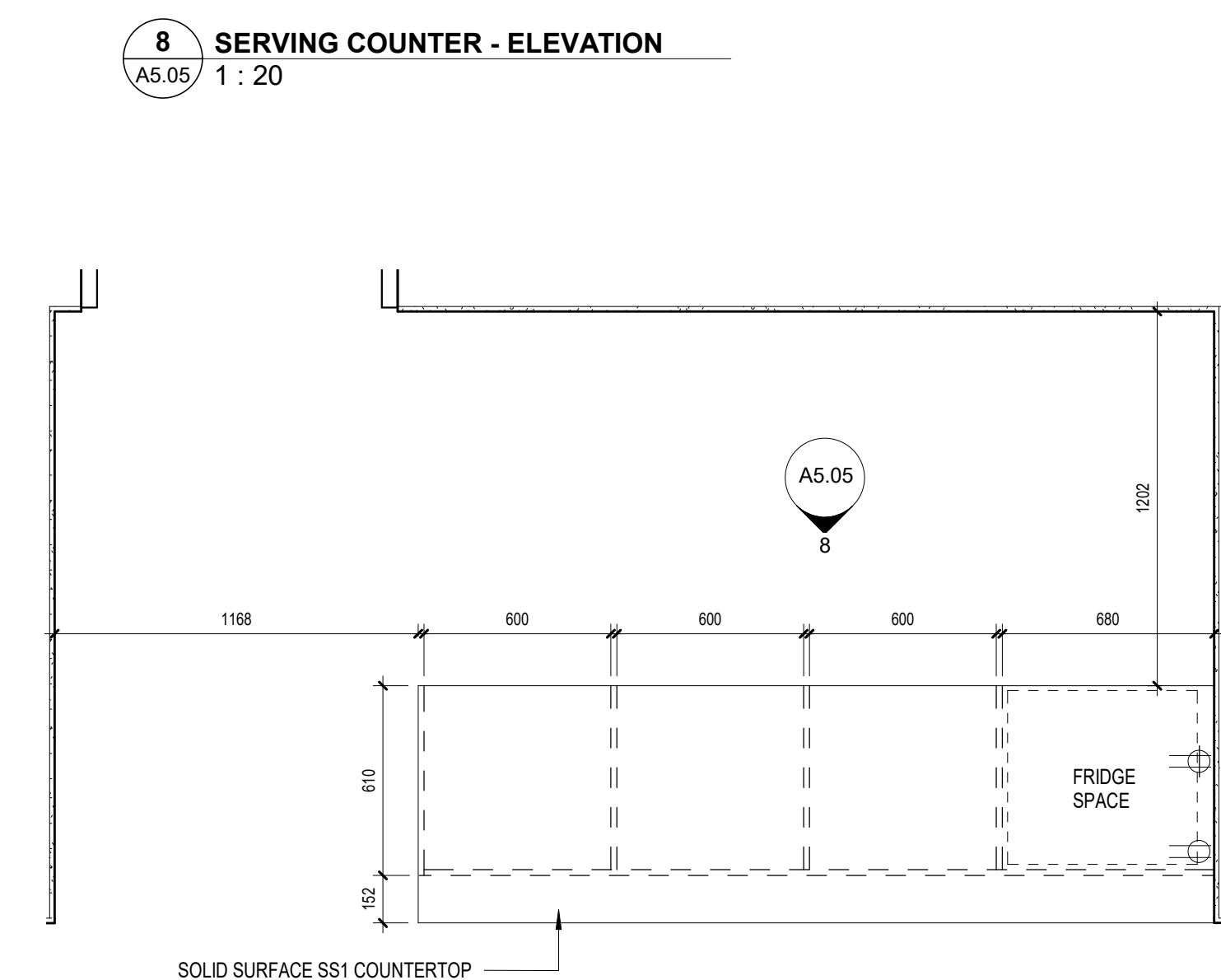
6 ELEVATION EAST - CANTEEN
AS.05/ 1 : 20



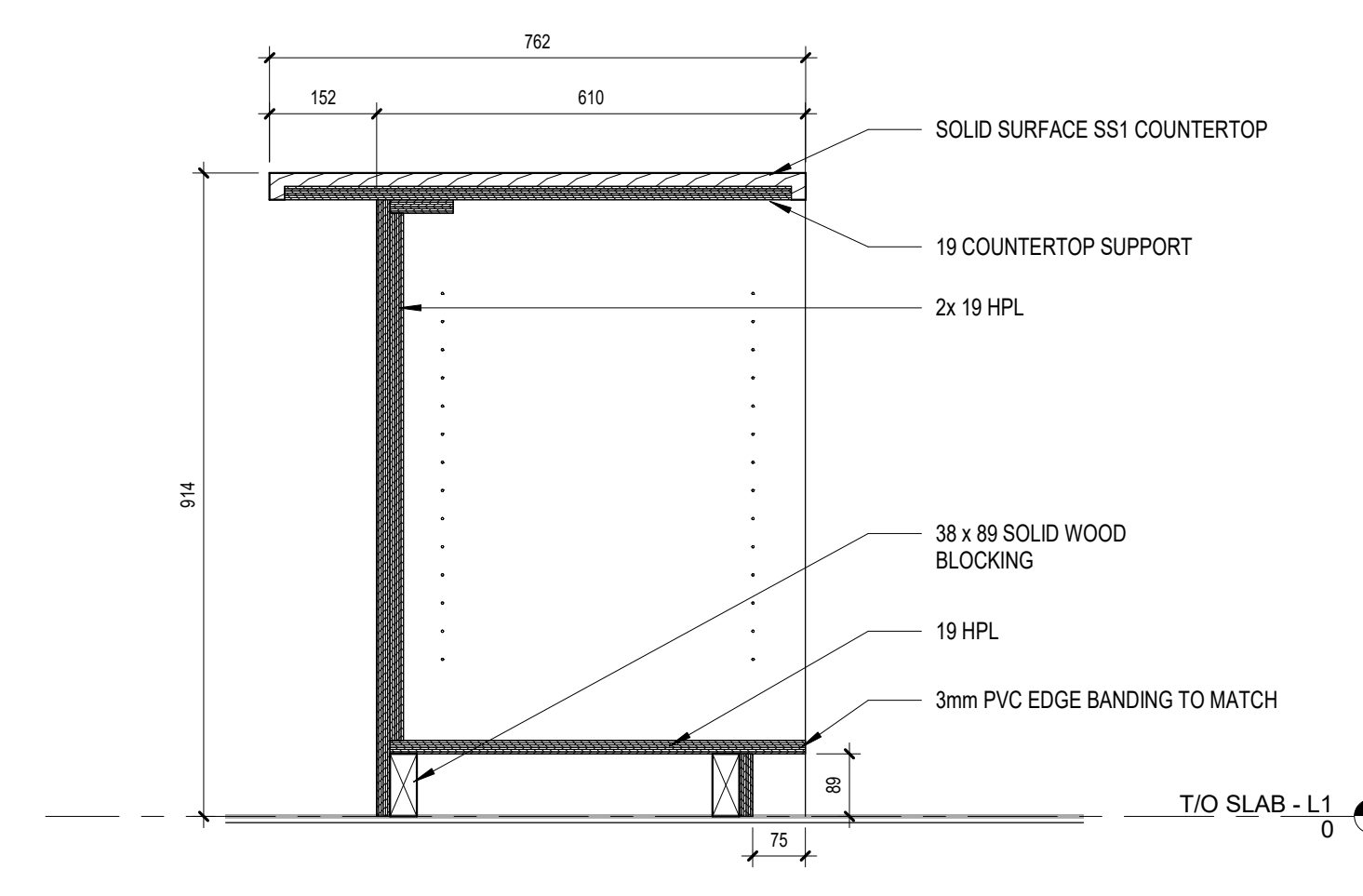
7 ELEVATION SOUTH - CANTEEN
AS.05/ 1 : 20



8 SERVING COUNTER - ELEVATION
AS.05/ 1 : 20



9 SERVING COUNTER - PLAN
AS.05/ 1 : 20



10 SERVING COUNTER - SECTION
AS.05/ 1 : 10

No	DESCRIPTION	Qty	MANUF'R
1	FRIDGE	1	
2	BASE CABINETS	1	MILLWORK
3	TWO COMPARTMENTS SINK	1	
4	DISH WASHER	1	
5	ELECTRIC RANGE	1	
6	WALL CABINETS	1	MILLWORK
6.1	OVER THE RANGE HOOD	1	
7	MICROWAVE		
8	HAND SINK	1	
9	WORK TABLE - CUSTOM	1	MILLWORK
10a	STAINLESS STEEL COUNTER	1	
10b	SOLID SURFACE COUNTER	1	
11	COFFEE MAKER	1	
12	WALL CABINETS	1	MILLWORK
13	BASE CABINETS	1	MILLWORK
14	NACHO CHIP WARMER	1	
15	POPCORN MACHINE	1	
16	DISPLAY COOLER	1	
17	PIZZA DISPLAY	1	
18	UNDER COUNTER FREEZER	1	
19	HAND SINK	1	
20	WALL OPEN SHELVES	1	MILLWORK

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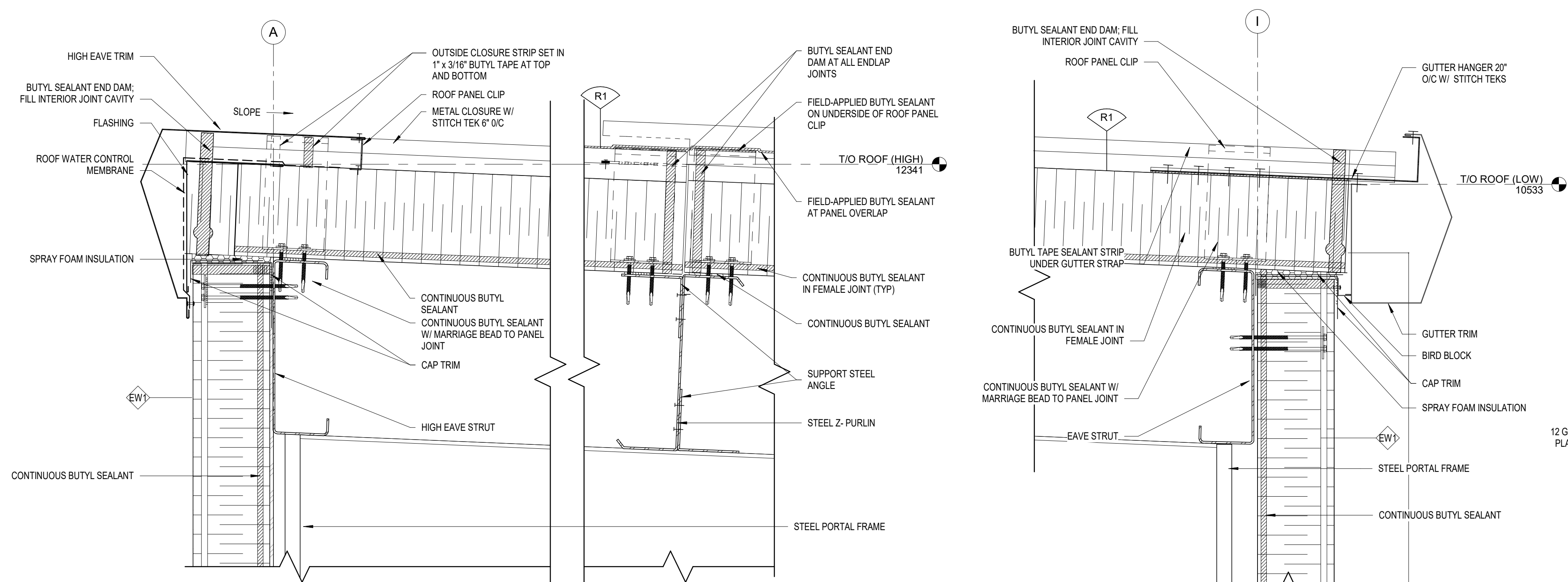
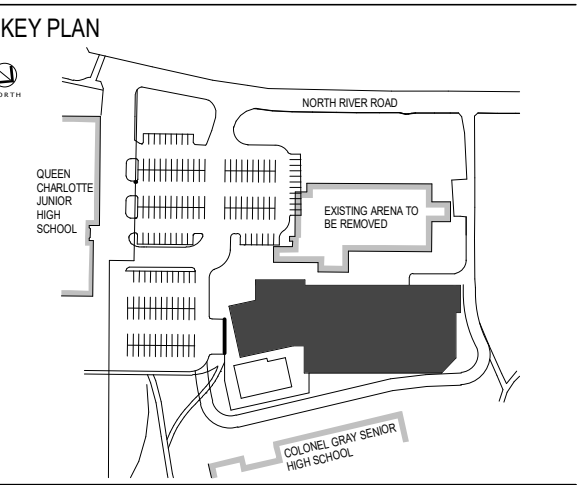


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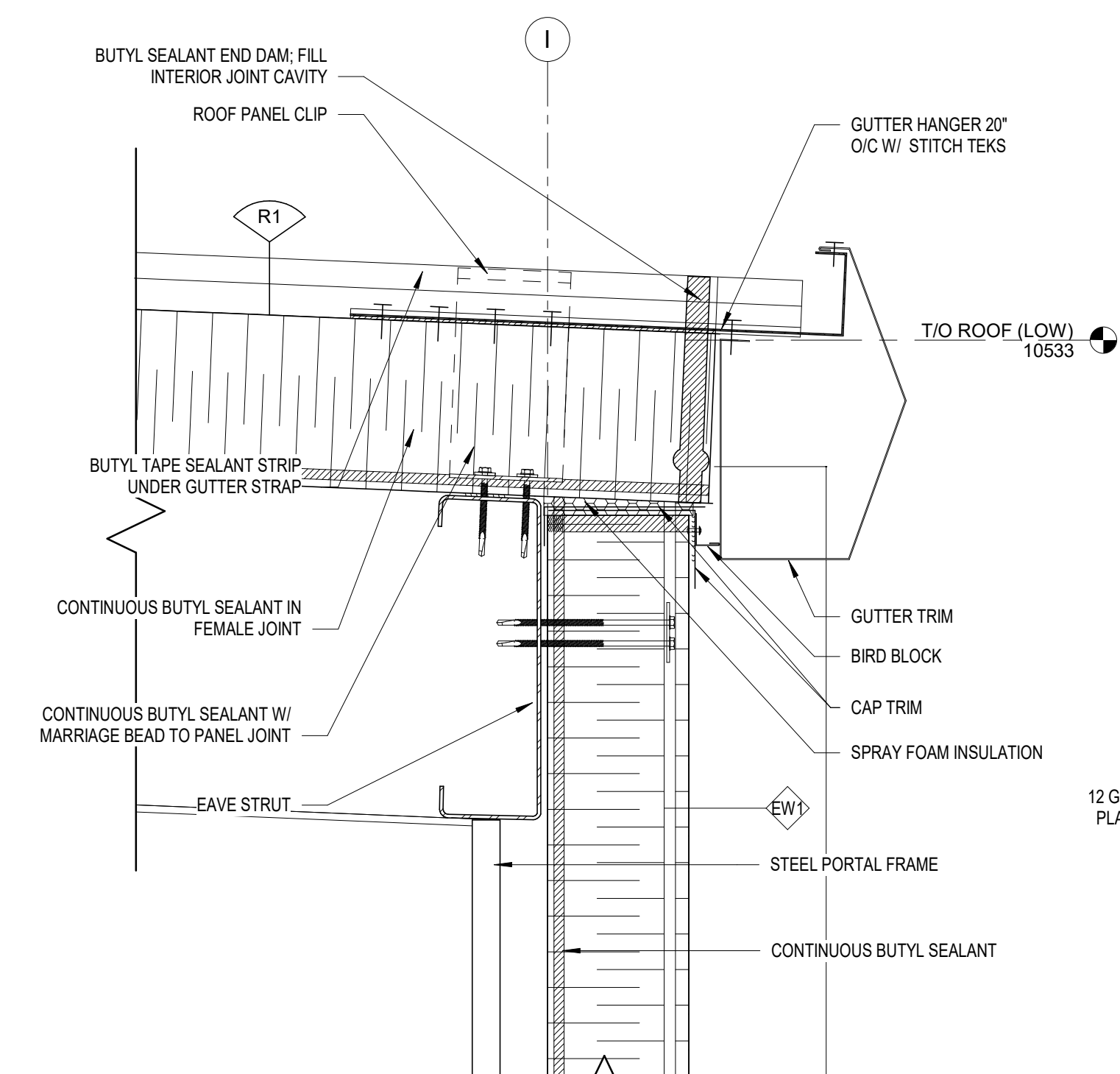
PROJECT NO.: 21111
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KITCHEN & CANTEEN
DETAILS

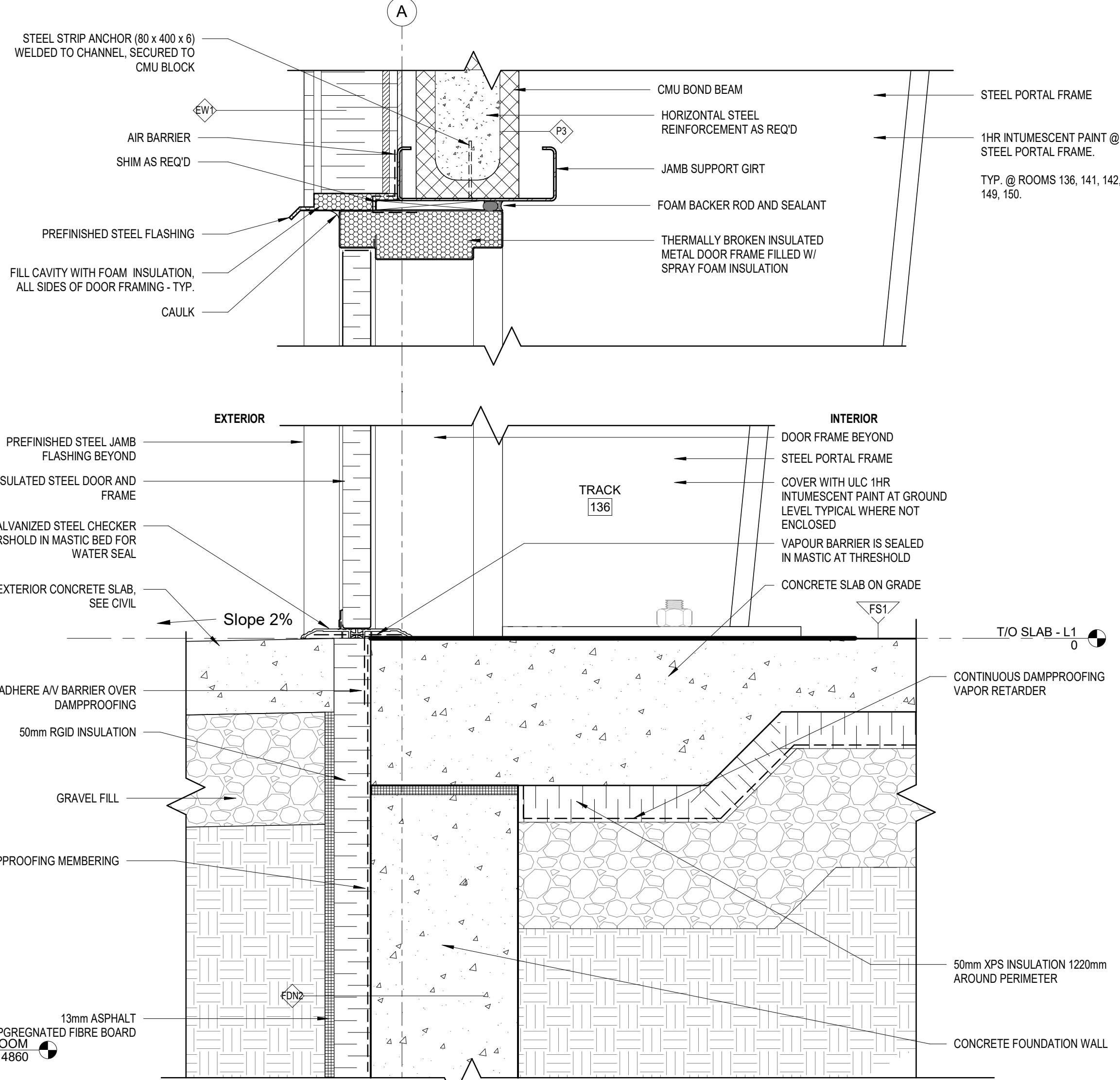
A5.05



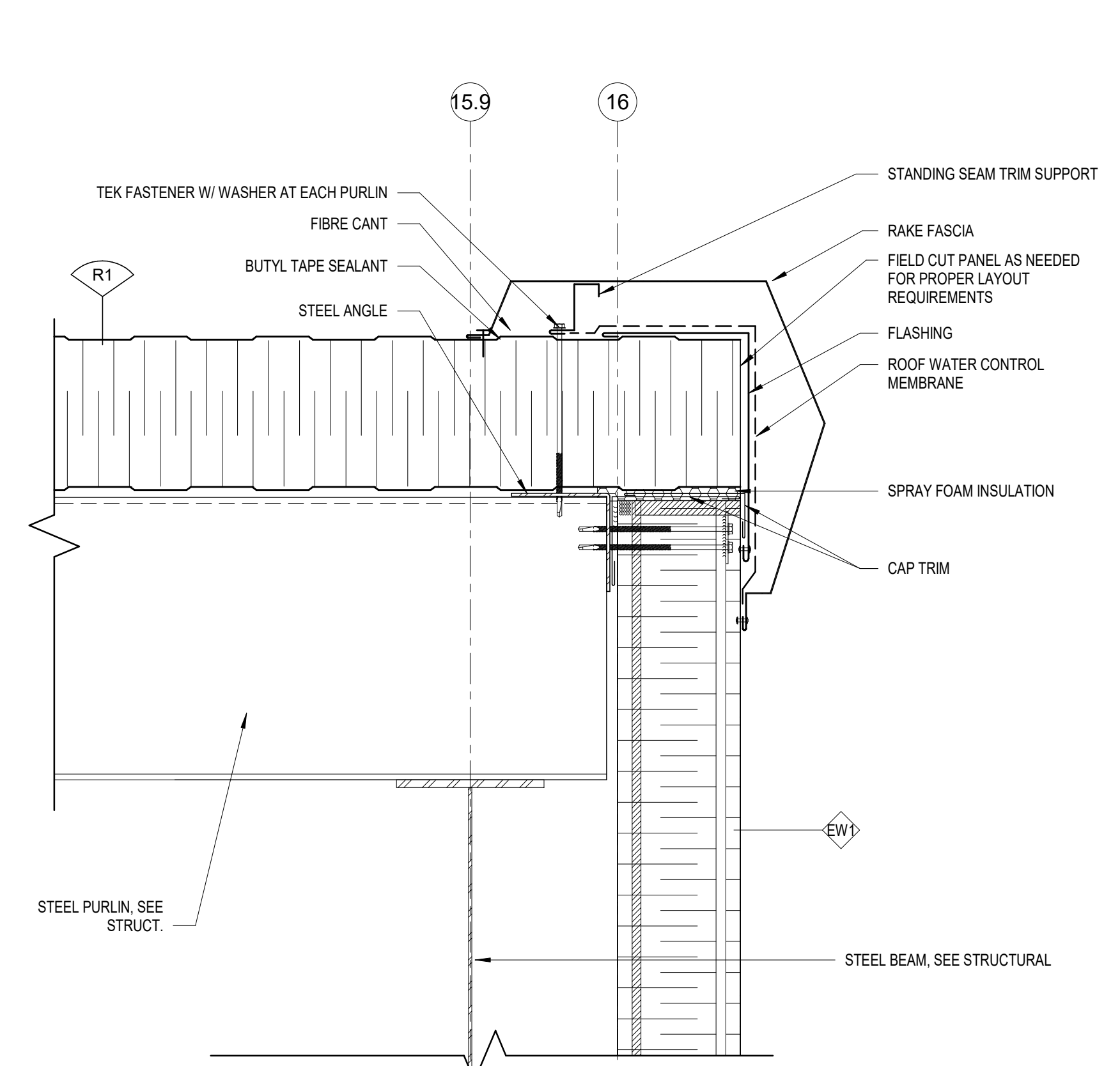
1 SECTION DETAIL @ MAIN ROOF PARAPET 1
A7.01 / A4.11 1:5



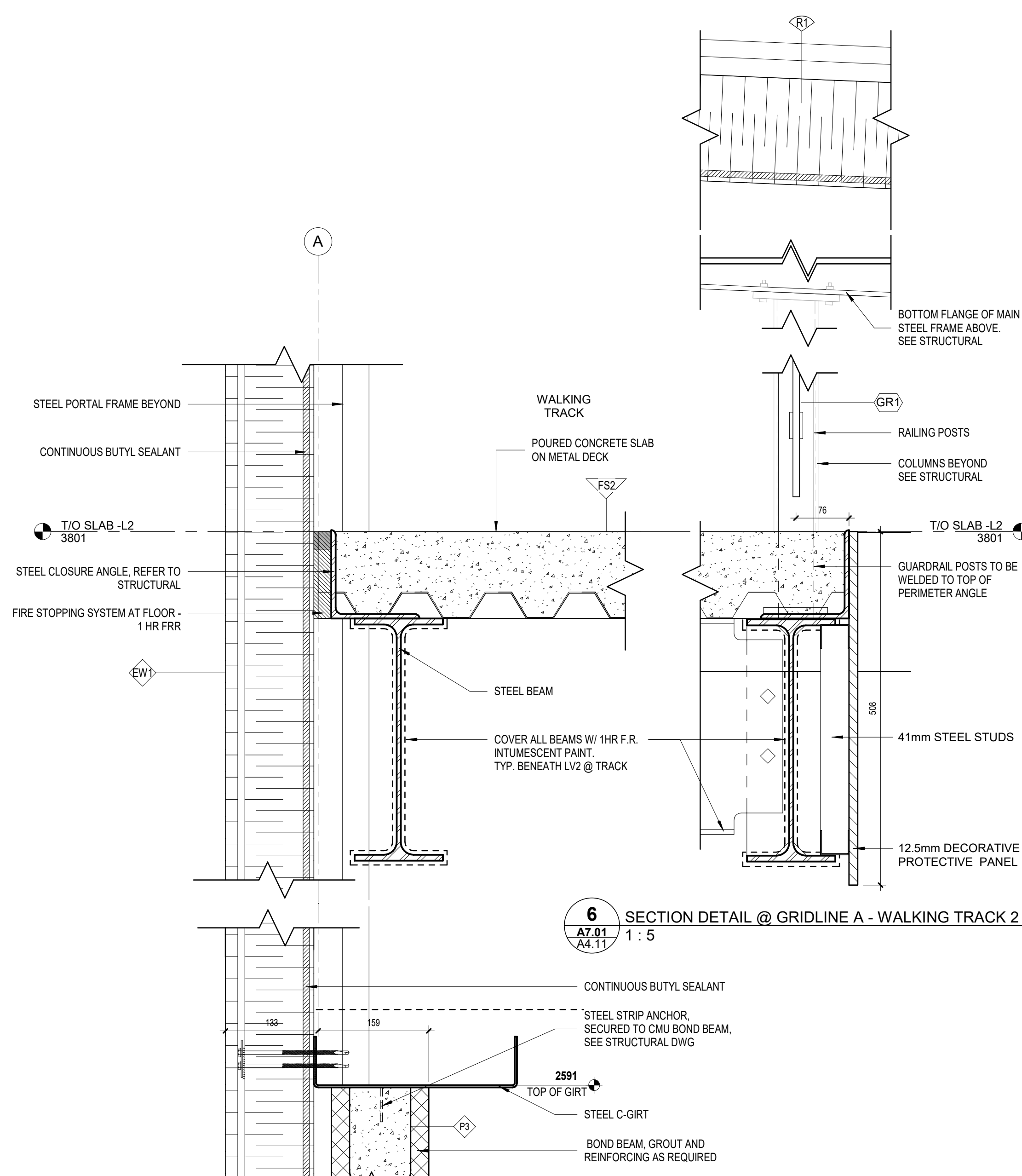
2 SECTION DETAIL @ MAIN ROOF GUTTER
A7.01 / A4.11 1:5



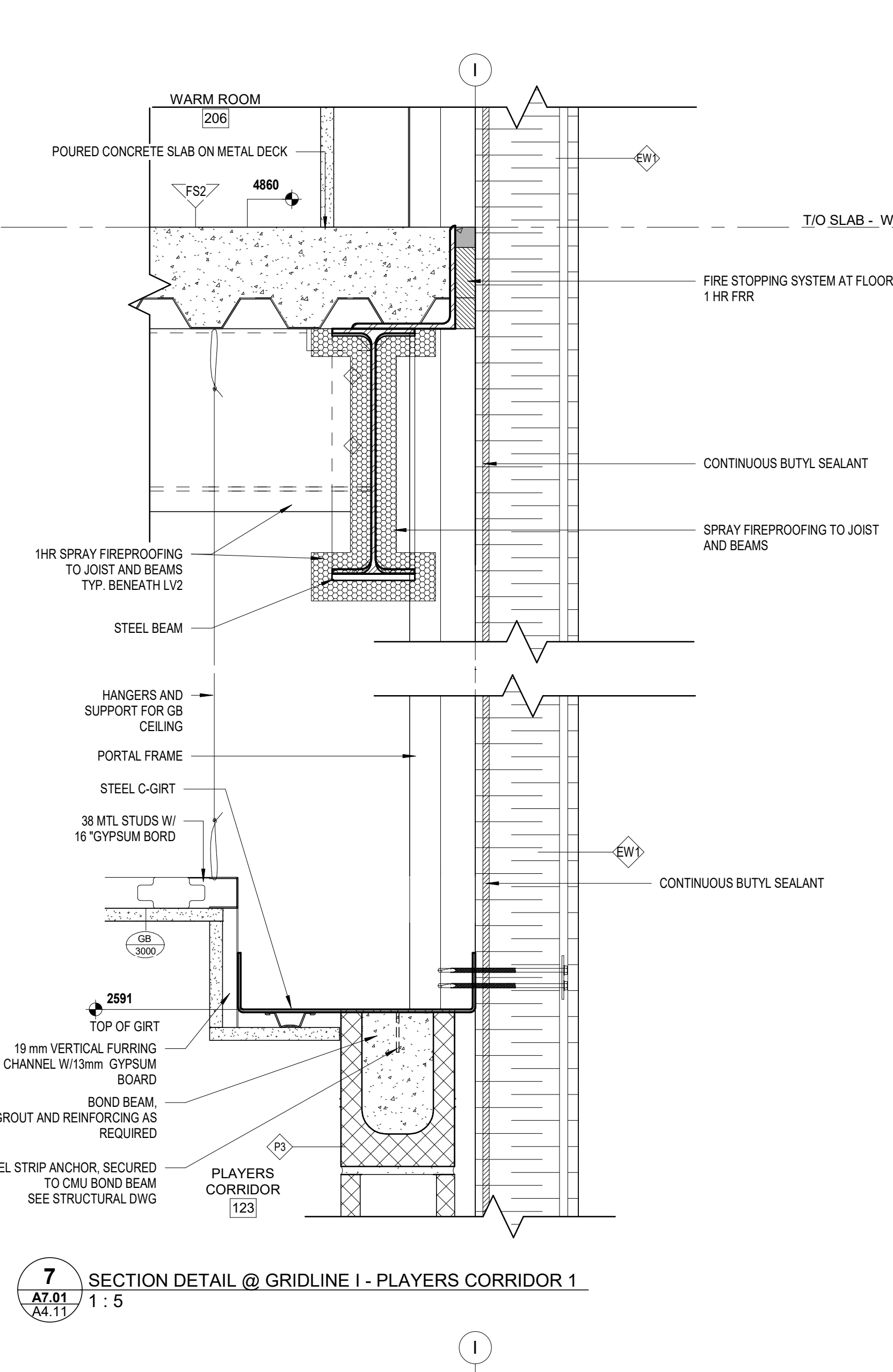
3 SECTION DETAIL @ ARENA EXIT DOOR
A7.01 / A1.10 1:5



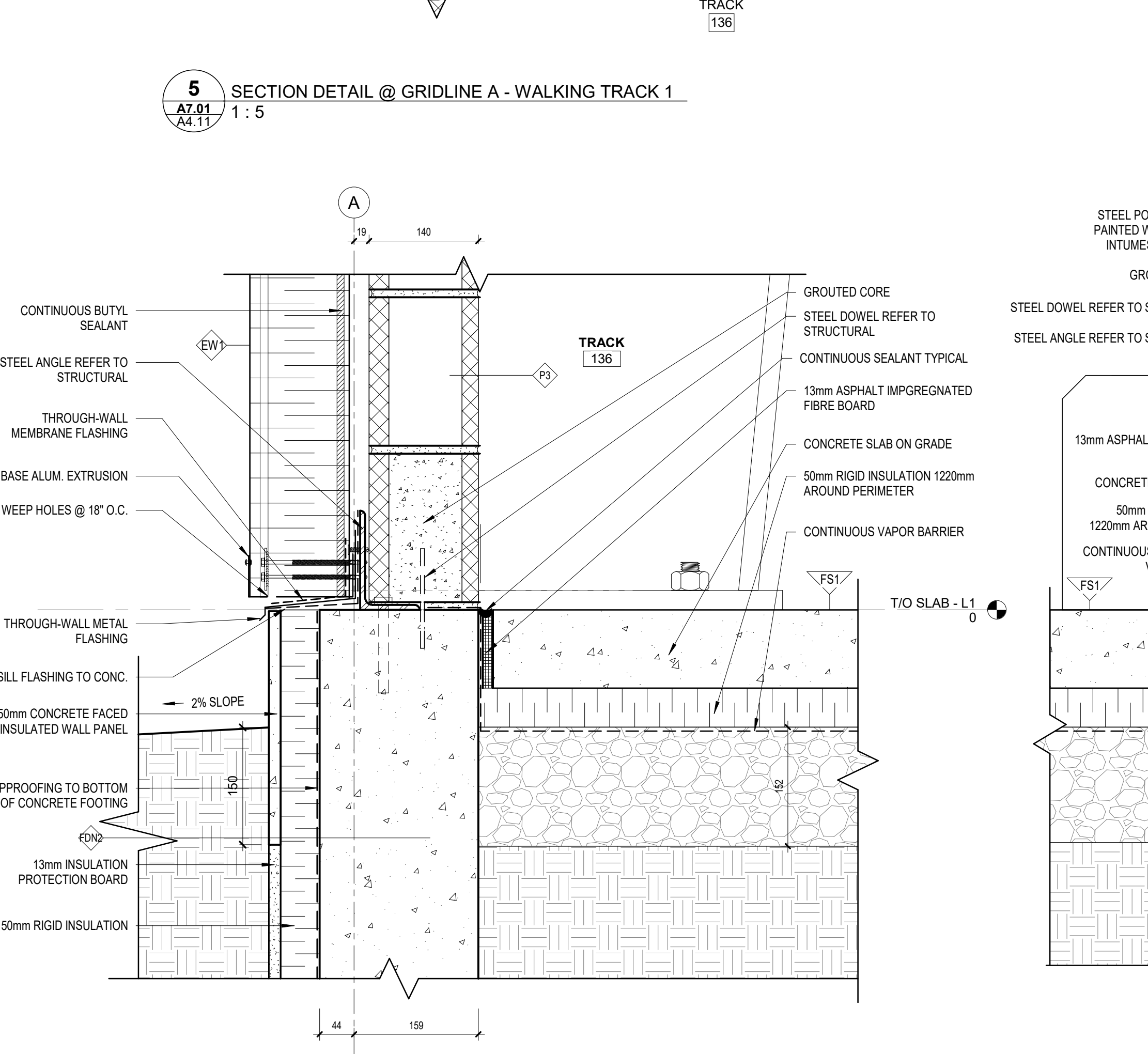
4 SECTION DETAIL @ MAIN ROOF PARAPET 2
A7.01 / A4.11 1:5



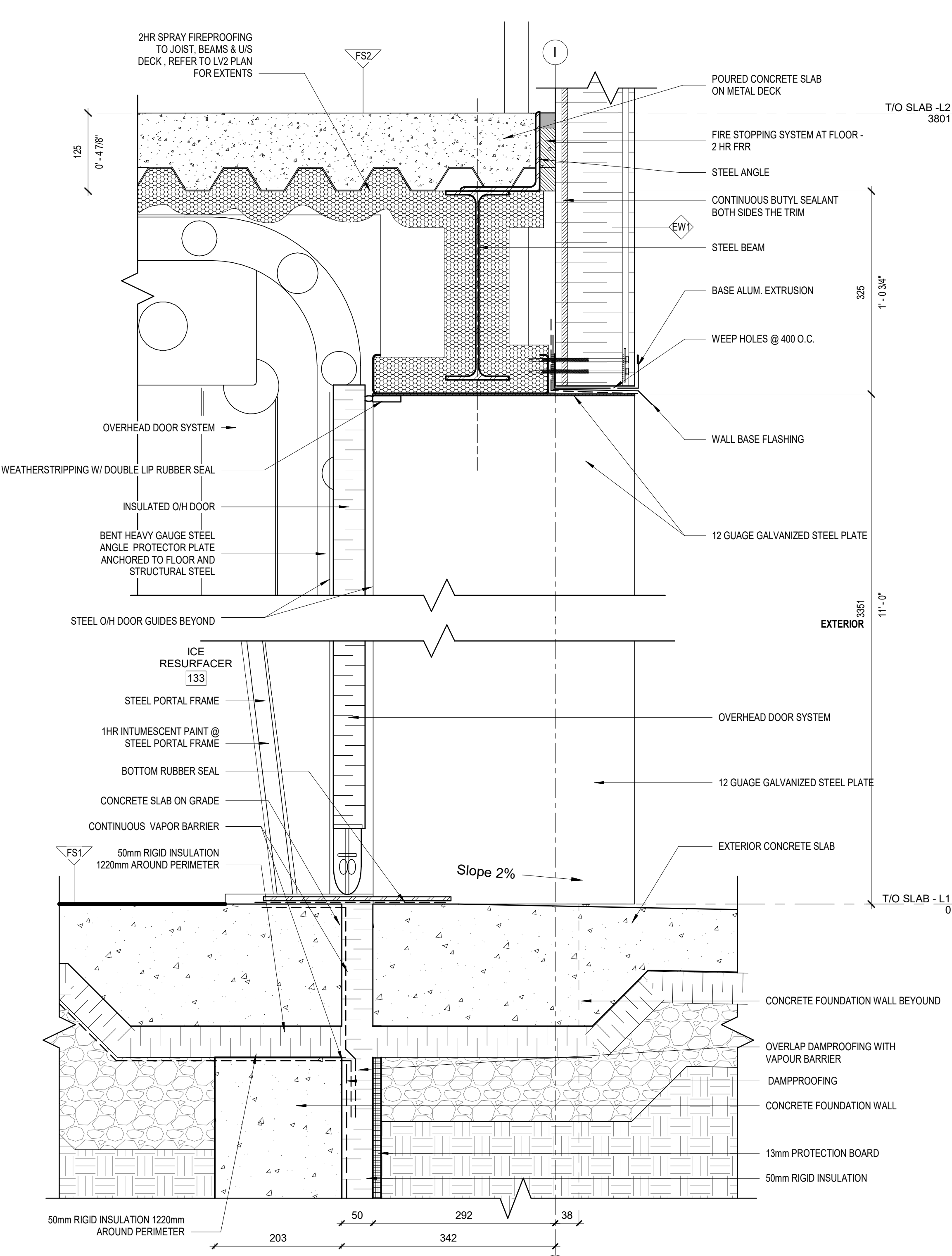
6 SECTION DETAIL @ GRIDLINE A - WALKING TRACK 2
A7.01 / A4.11 1:5



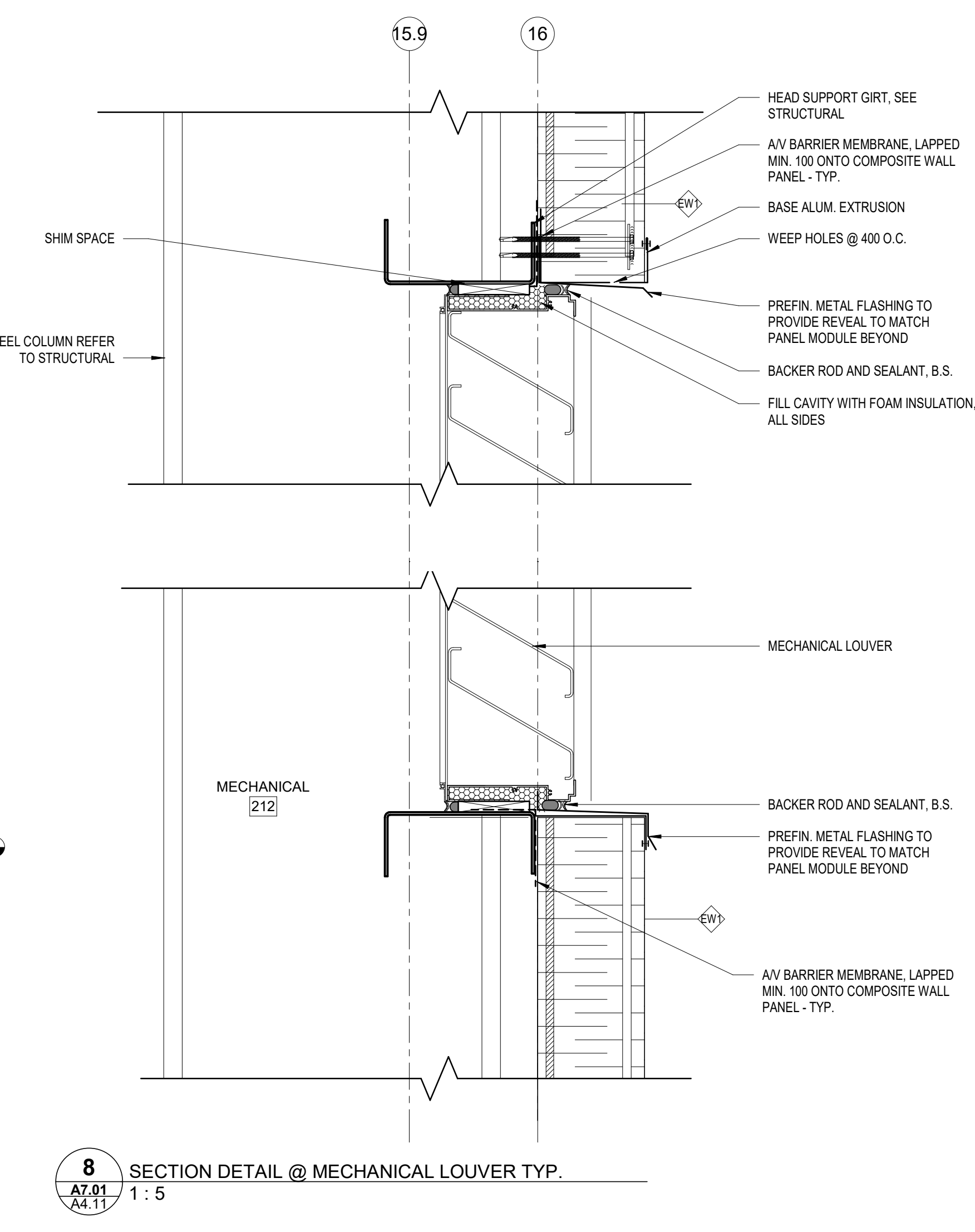
7 SECTION DETAIL @ GRIDLINE I - PLAYERS CORRIDOR 1
A7.01 / A4.11 1:5



5 SECTION DETAIL @ GRIDLINE A - WALKING TRACK 1
A7.01 / A4.11 1:5



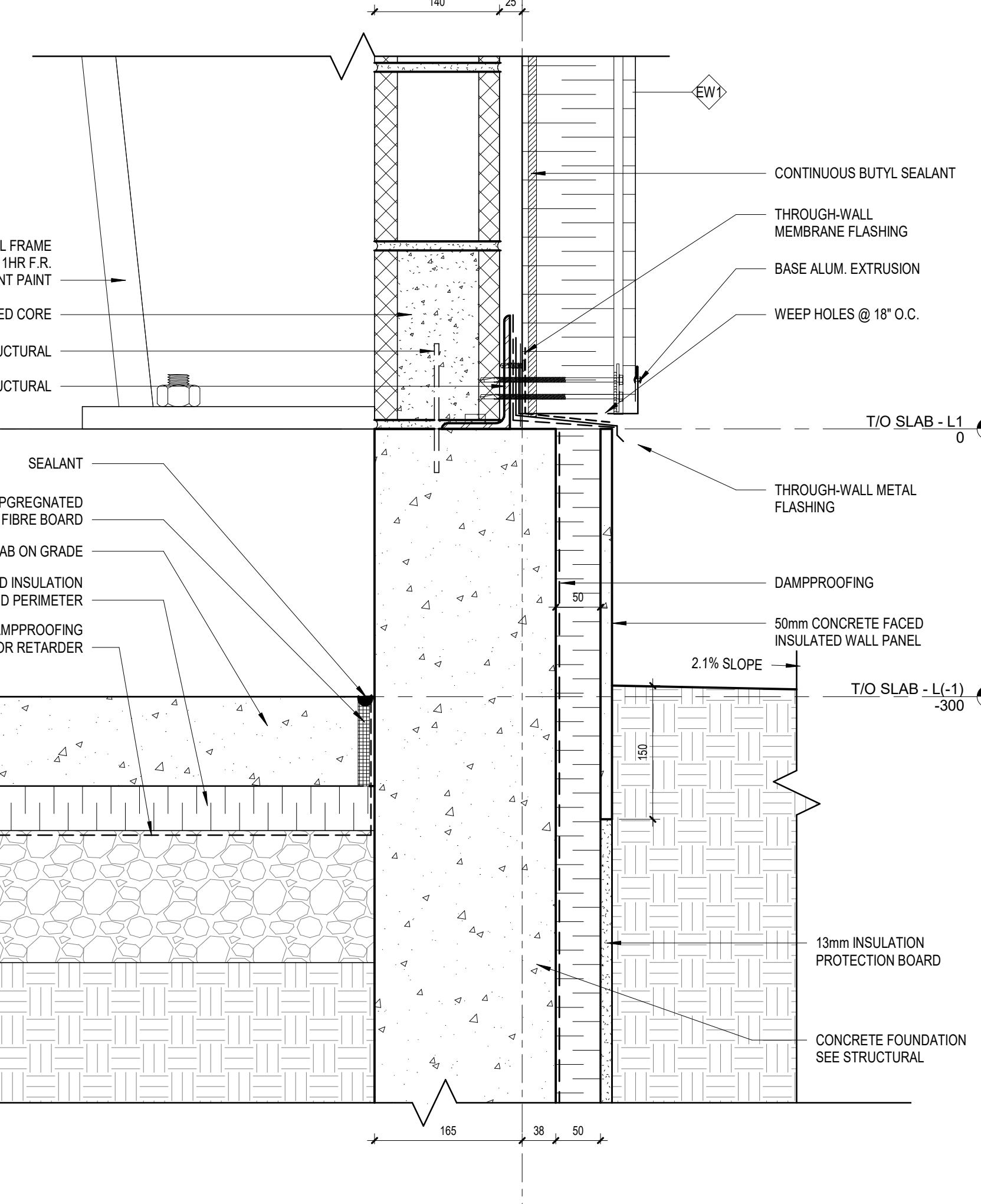
11 SECTION DETAIL @ OVERHEAD DOOR
A7.01 / A1.10 1:5



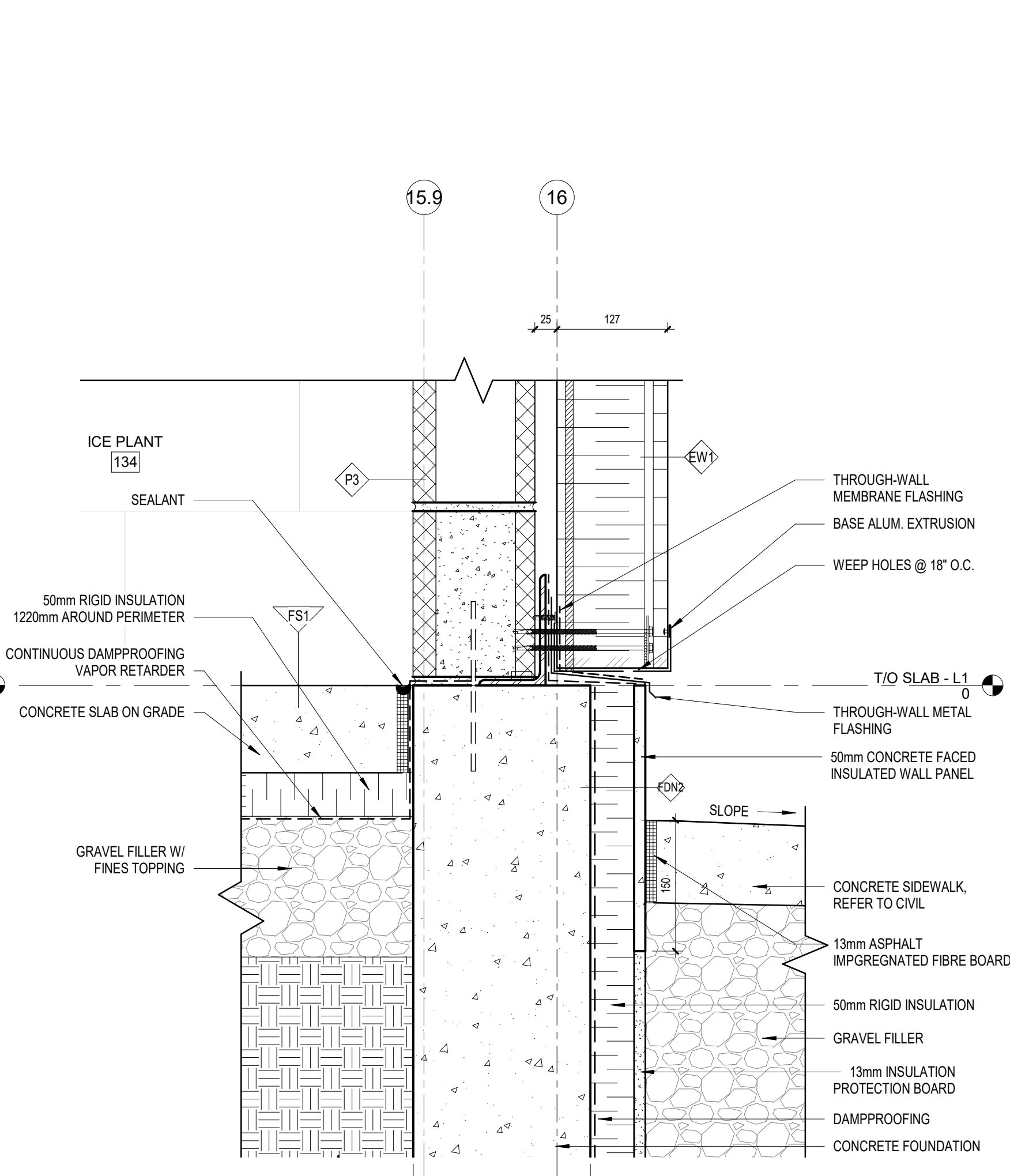
8 SECTION DETAIL @ MECHANICAL LOUVER TYP.
A7.01 / A4.11 1:5



9 SECTION DETAIL @ GRIDLINE A - ARENA
A7.01 / A4.11 1:5

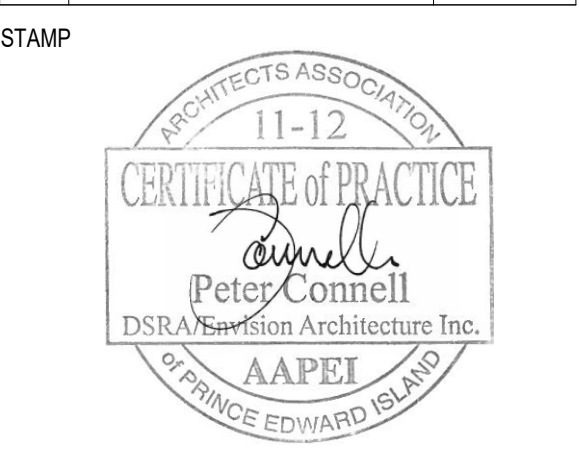


10 SECTION DETAIL @ GRIDLINE I - PLAYERS CORRIDOR 2
A7.01 / A4.11 1:5

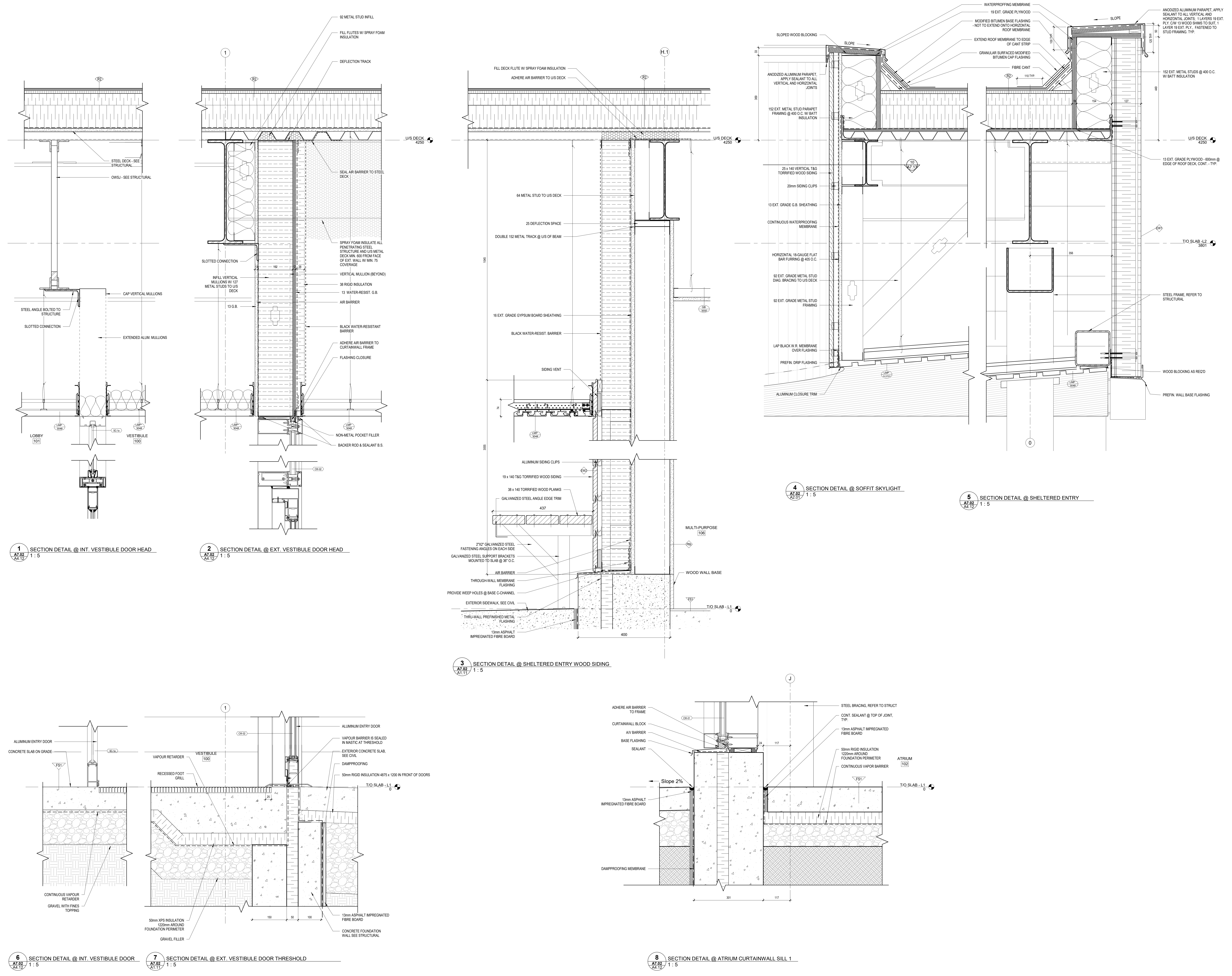


12 SECTION DETAIL @ ICE PLANT
A7.01 / A4.11 1:5

Table with 4 columns: No., Description, Revision, Date. Contains revision history for the drawings.



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PROJECT NO.: 21111
DRAWN BY: OM / MM / DE
CHECKED BY: MMG / PC
SCALE: 1:5



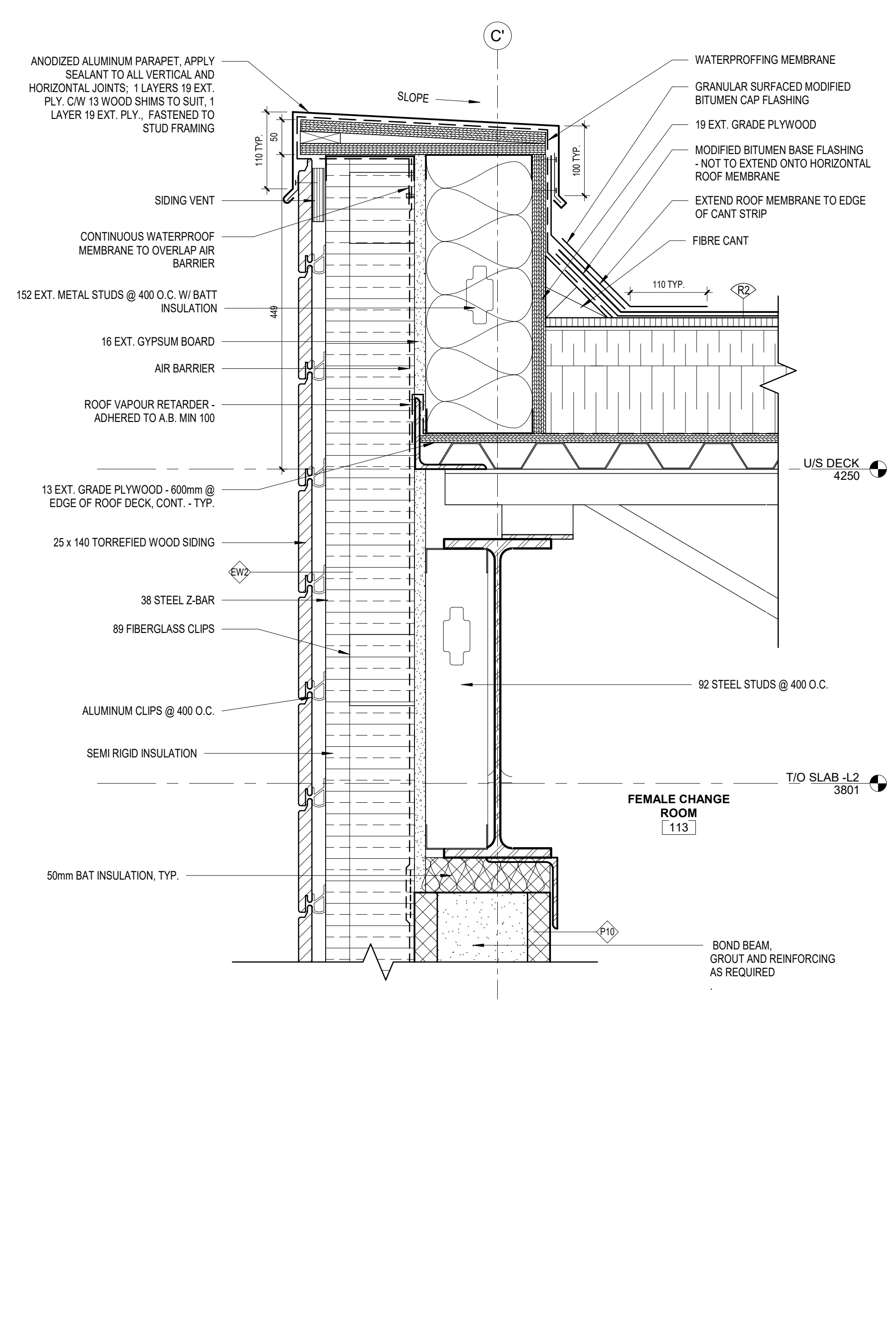
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NO.	REVISION	DATE

STAMP

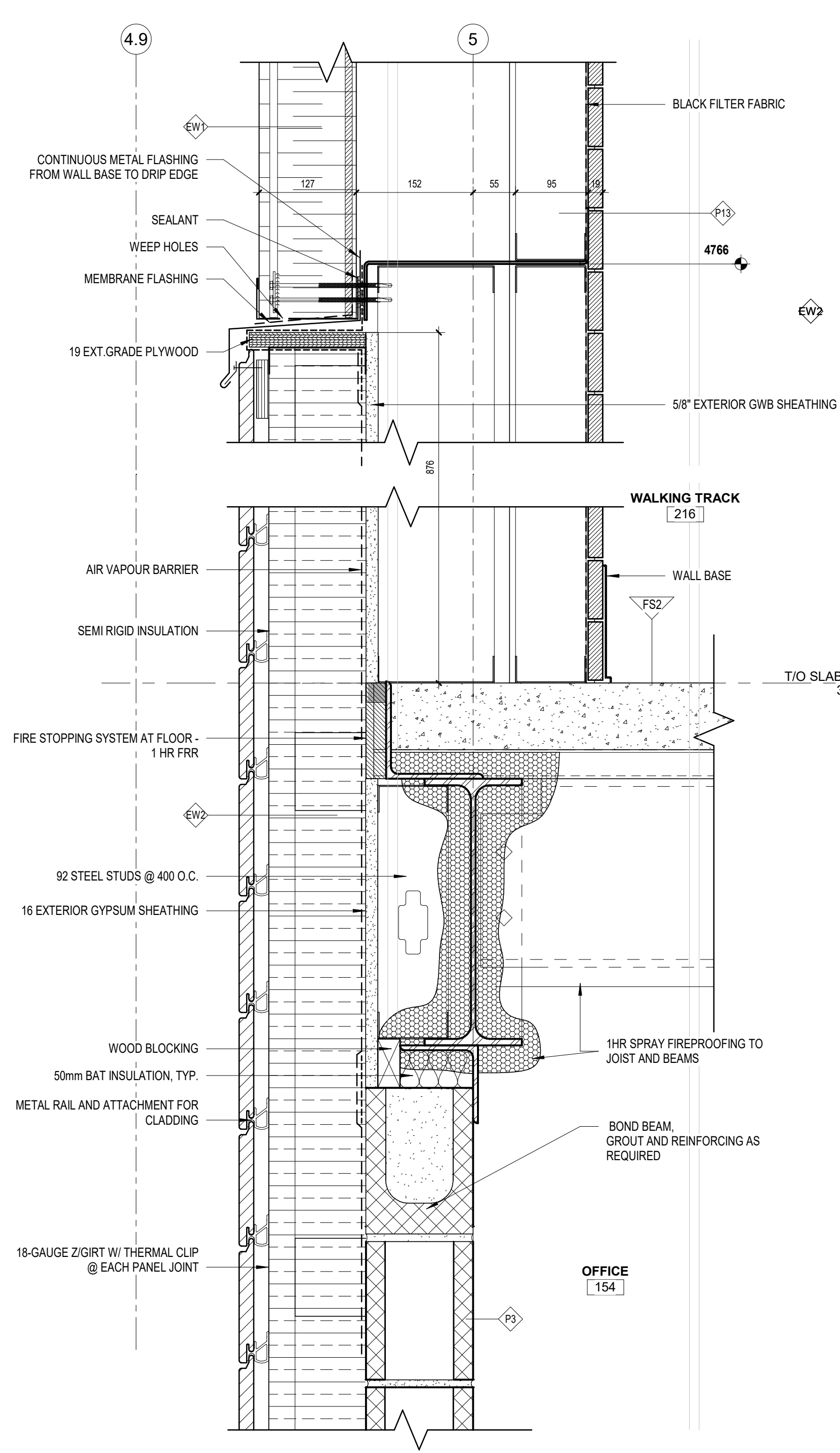
CERTIFICATE OF PRACTICE
 Peter Cormier
 DSRA (Certified Architect) Inc.
 A.A.P.E.I.
 CHARLES EDWARD (1980)

PROJECT NAME
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

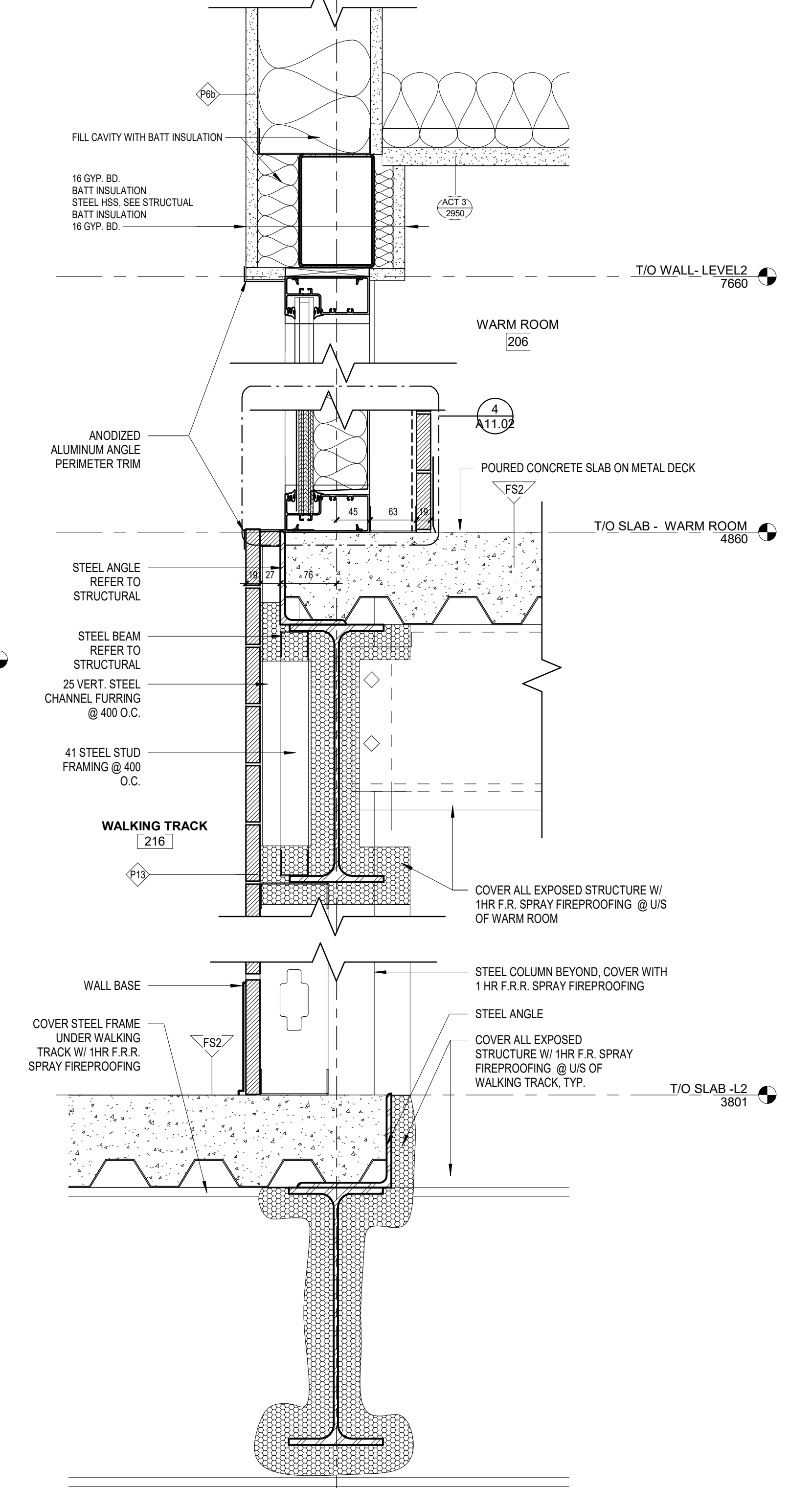
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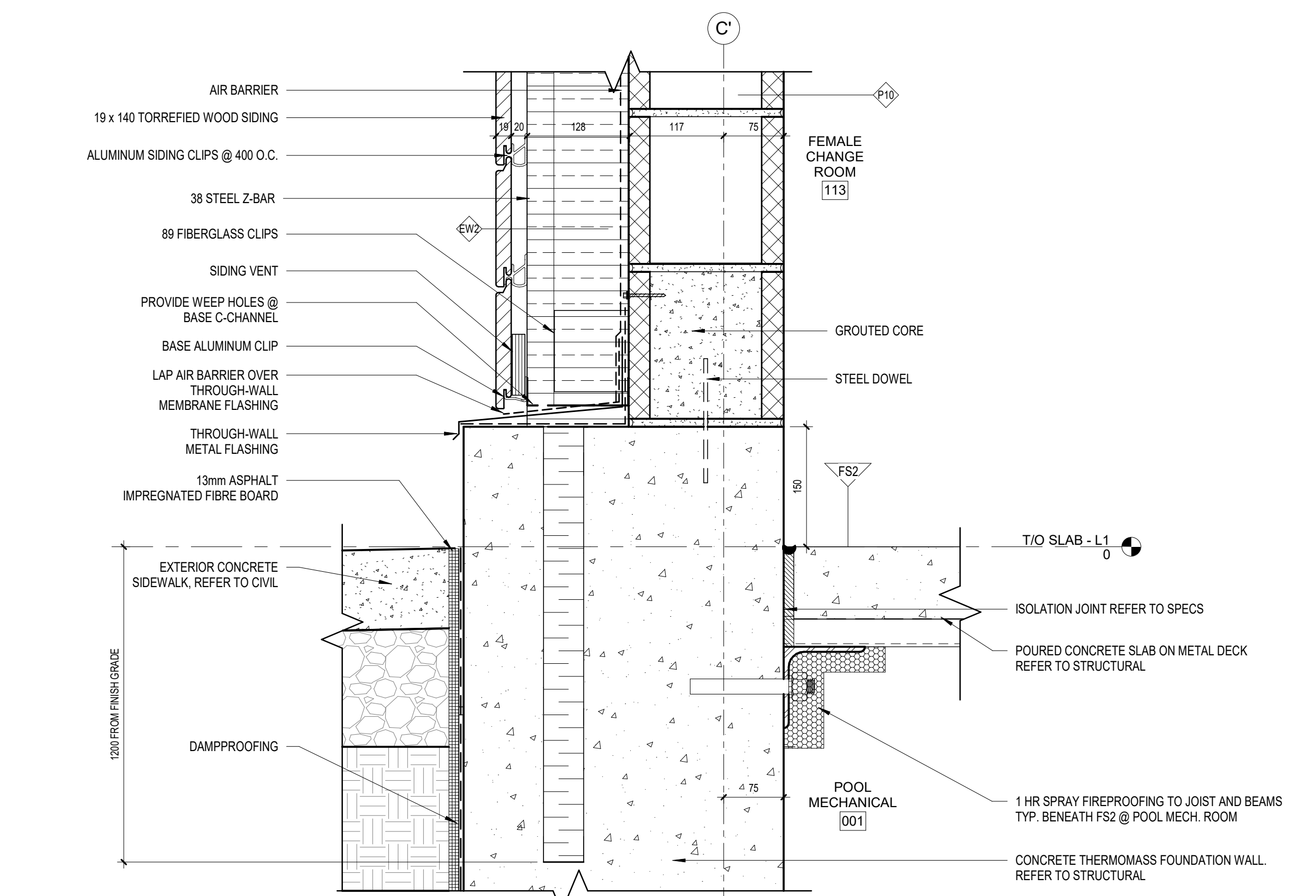
1 SECTION DETAIL @ CHANGE ROOM WALL PARAPET
 A7.03 A4.12 1:5



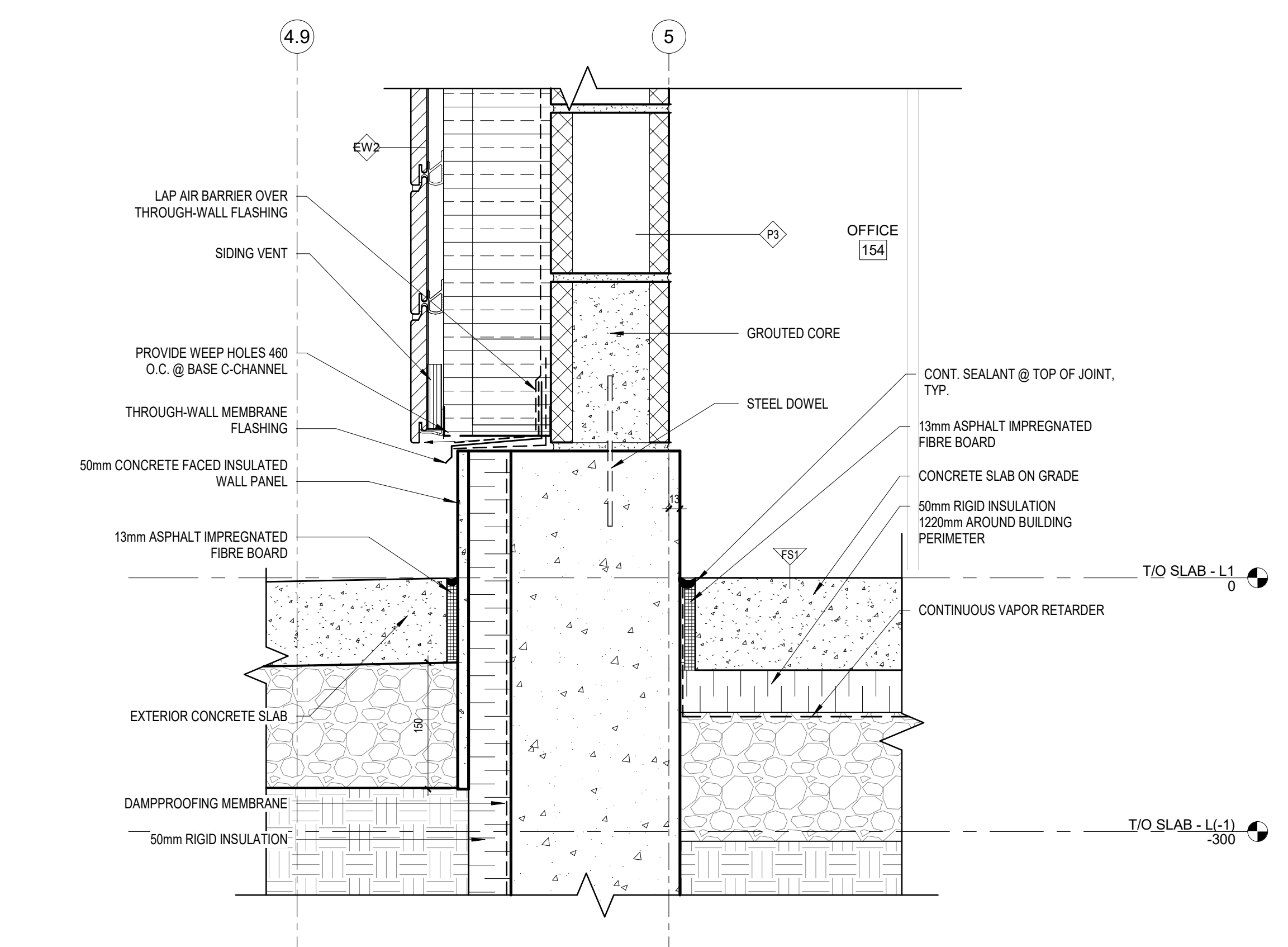
2 SECTION DETAIL @ WALKING TRACK EXT. WALL
 A7.03 A4.11 1:5



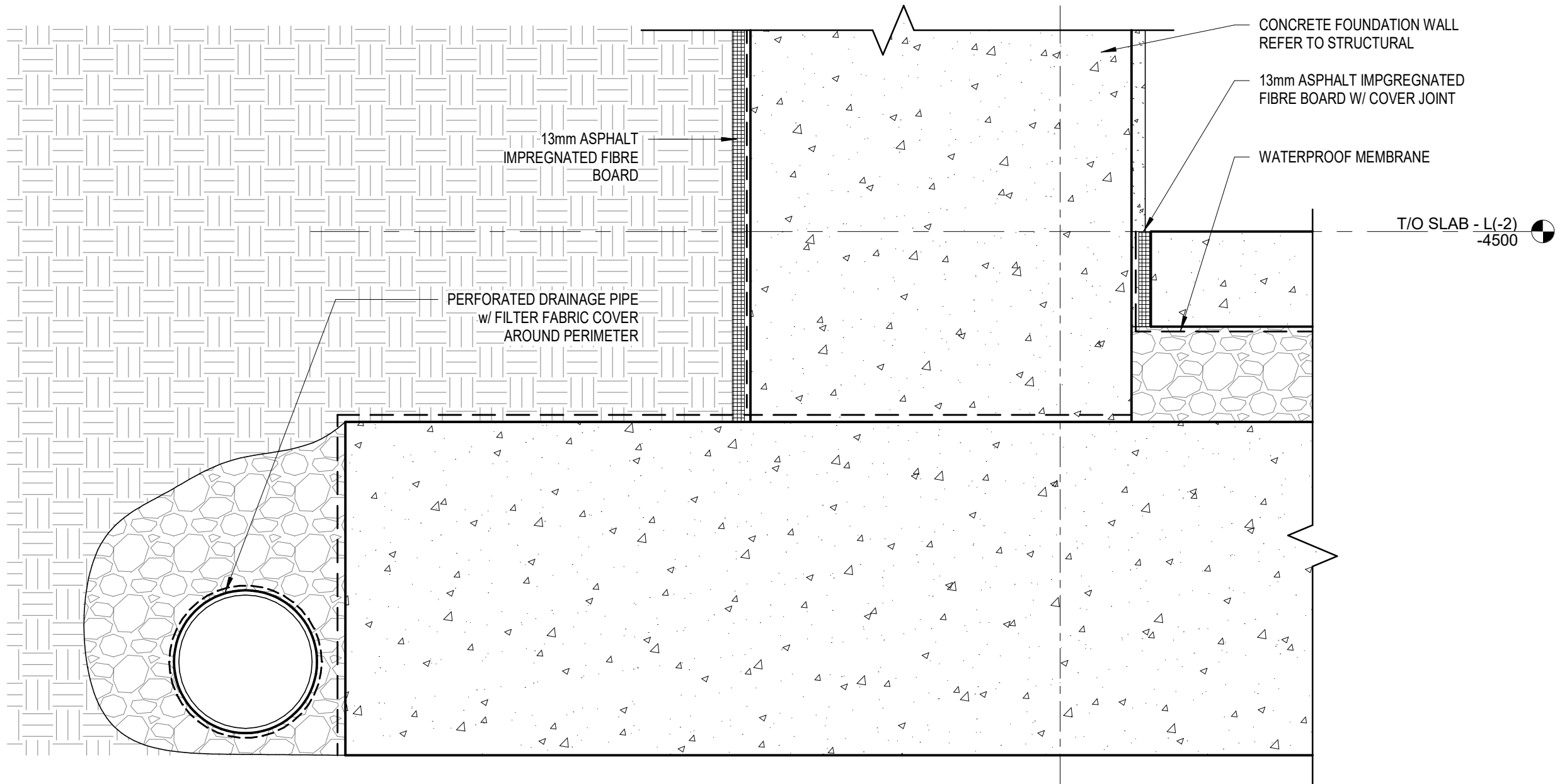
3 SECTION DETAIL @ WARM ROOM WALL
 A7.03 A4.11 1:5



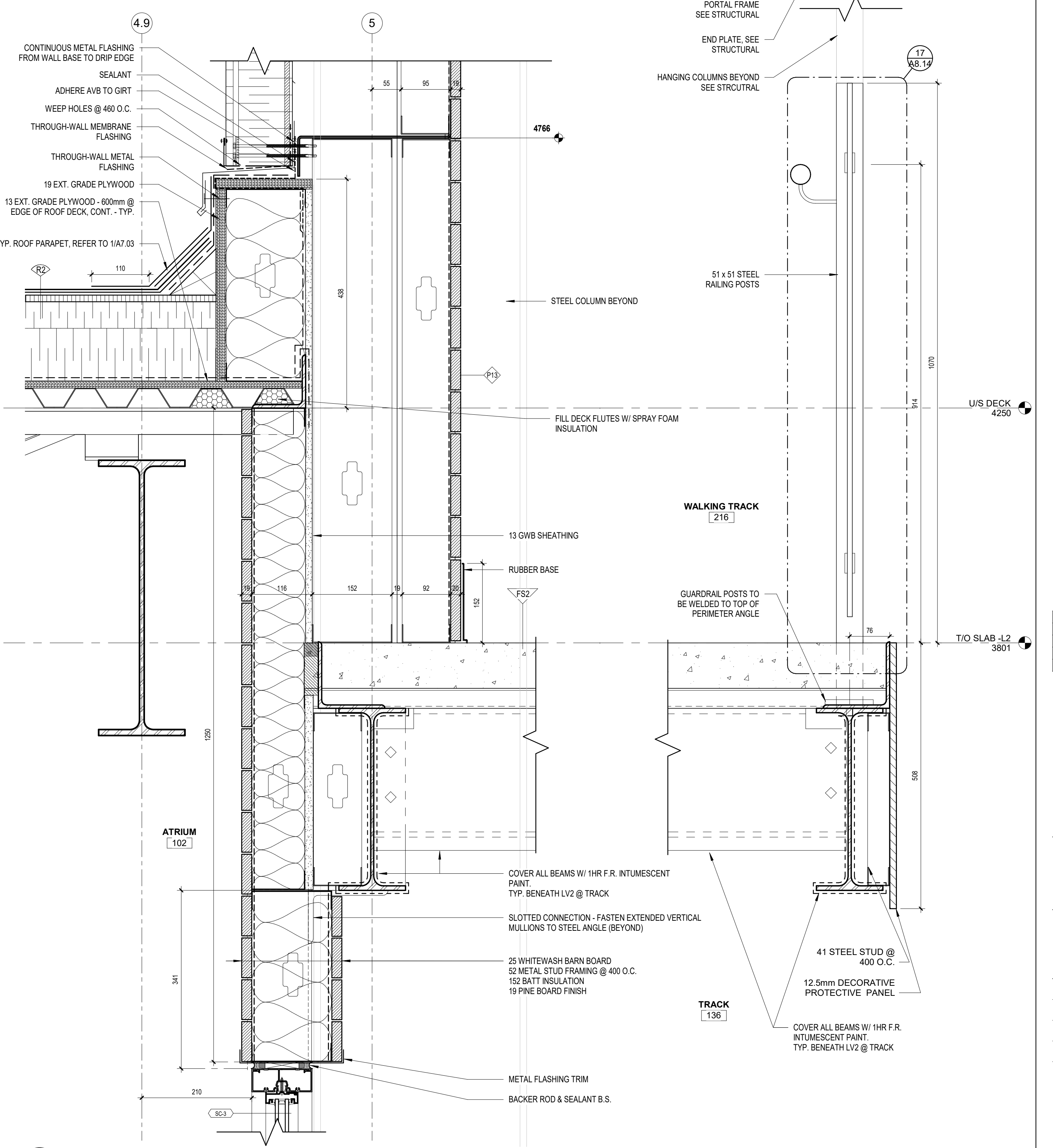
4 SECTION DETAIL @ CHANGE ROOM WALL
 A7.03 A4.12 1:5



5 SECTION DETAIL @ OFFICE EXT. WALL
 A7.03 A4.11 1:5



6 SECTION DETAIL - POOL MECHANICAL ROOM
 A7.03 A4.12 1:5



7 WALL SECTION @ ARENA TRACK ENTRANCE DOOR
 A7.03 A4.11 1:5

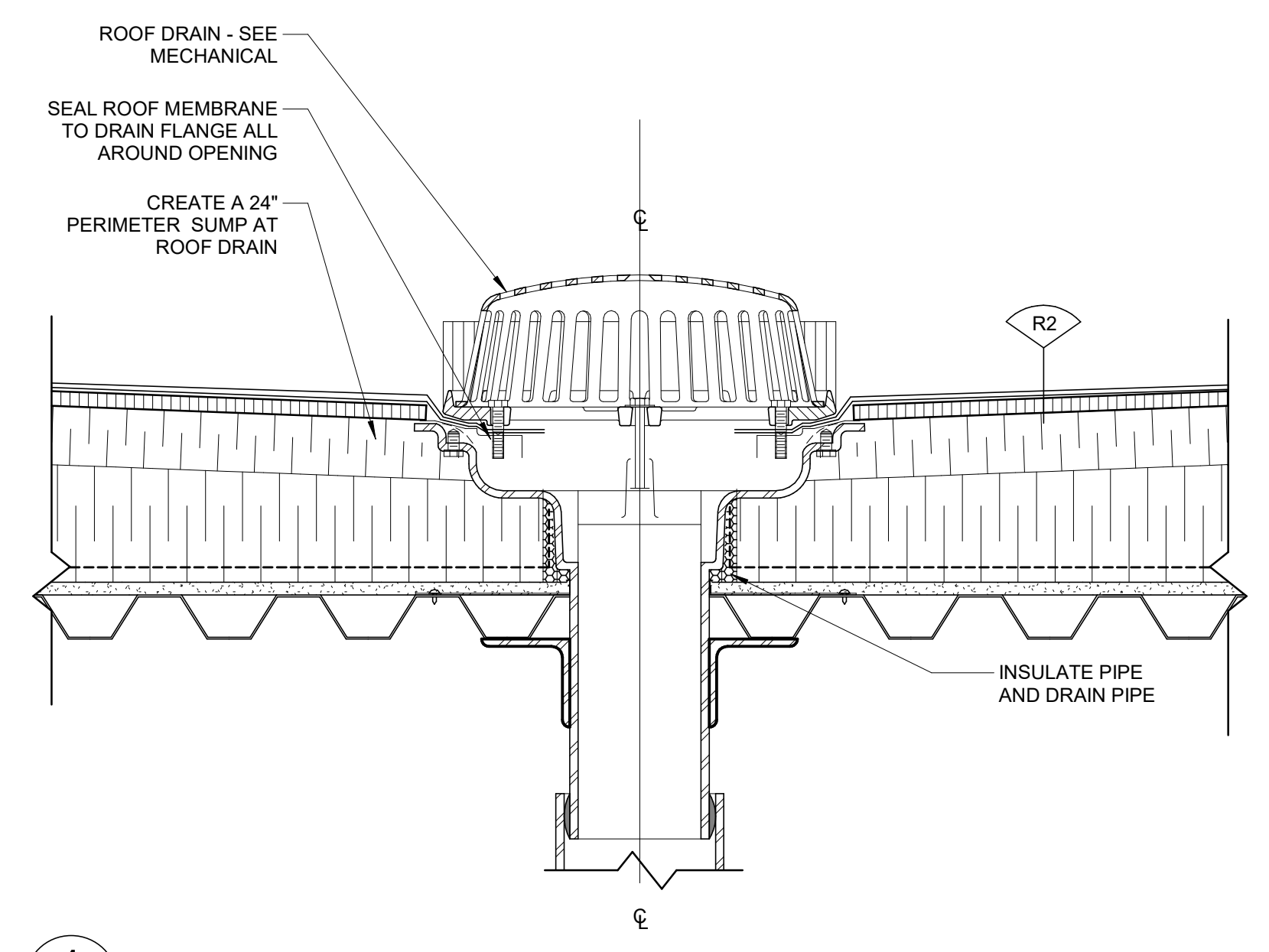
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1	TR1 - ASSEMBLY	2022-08-09
0	TR1 - ISSUED FOR TENDER	2022-03-24



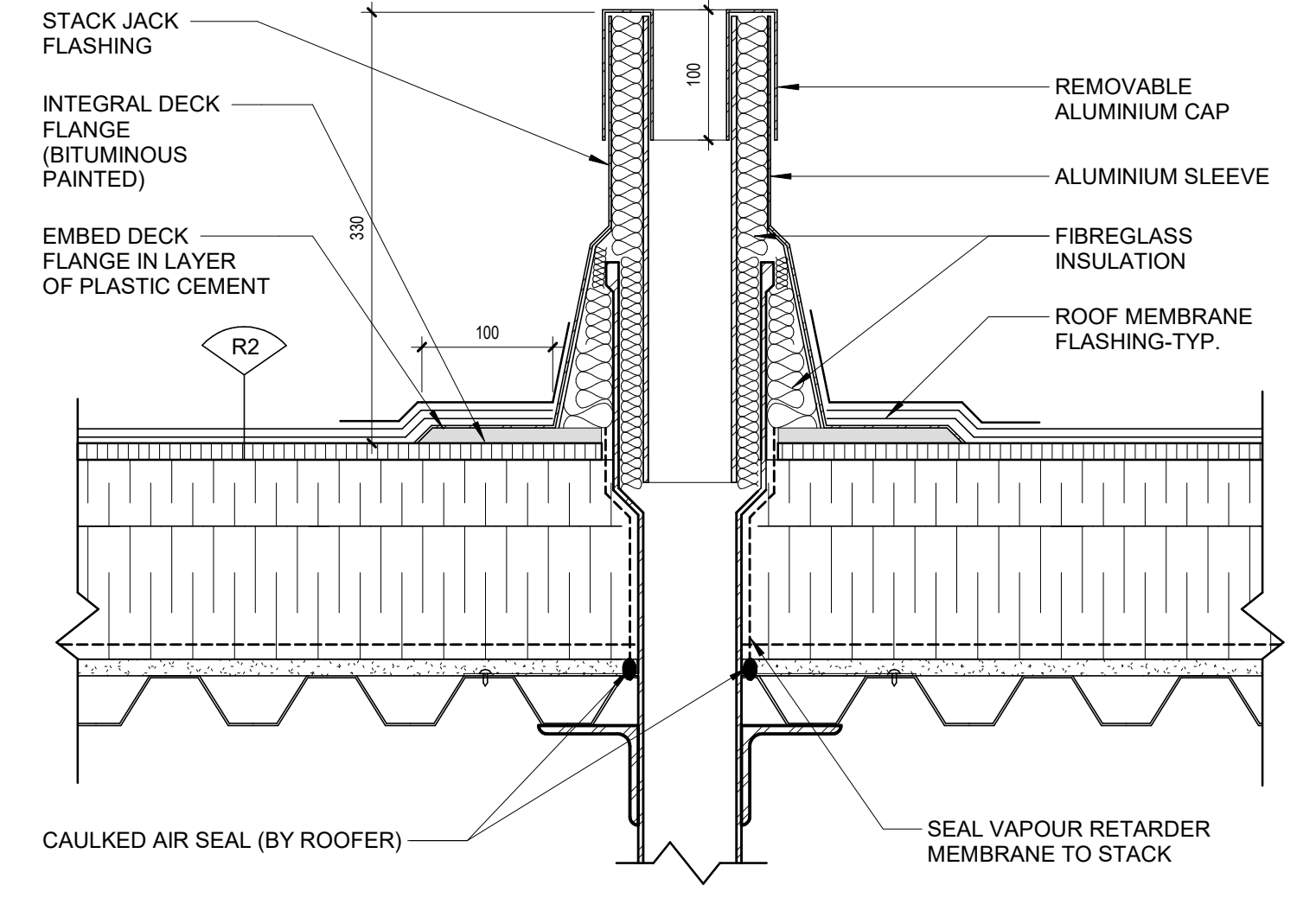
PROJECT NAME
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

PROJECT NO: 21111
 DRAWN BY: OM / MM / DE
 CHECKED BY: MMG / FC
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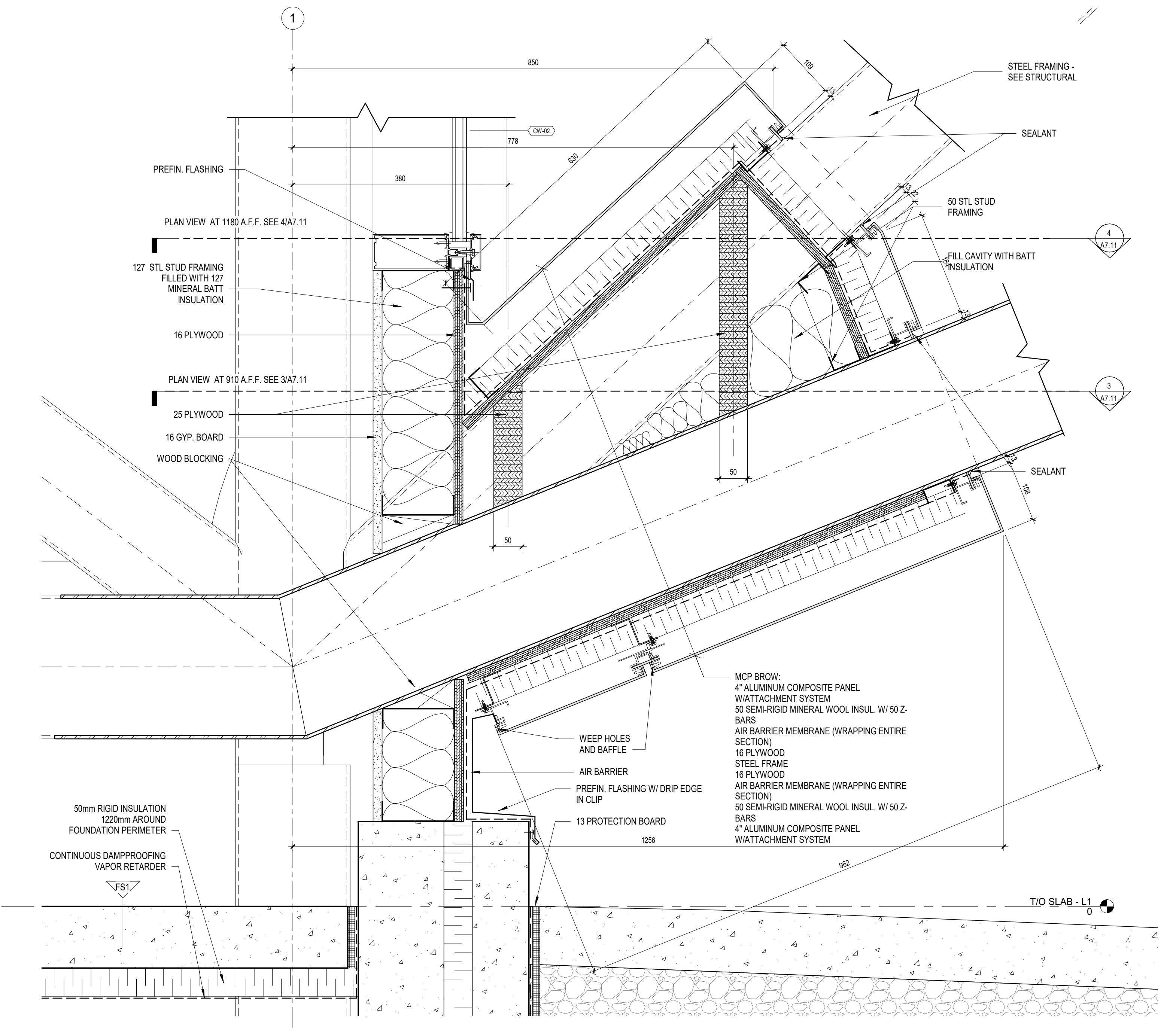
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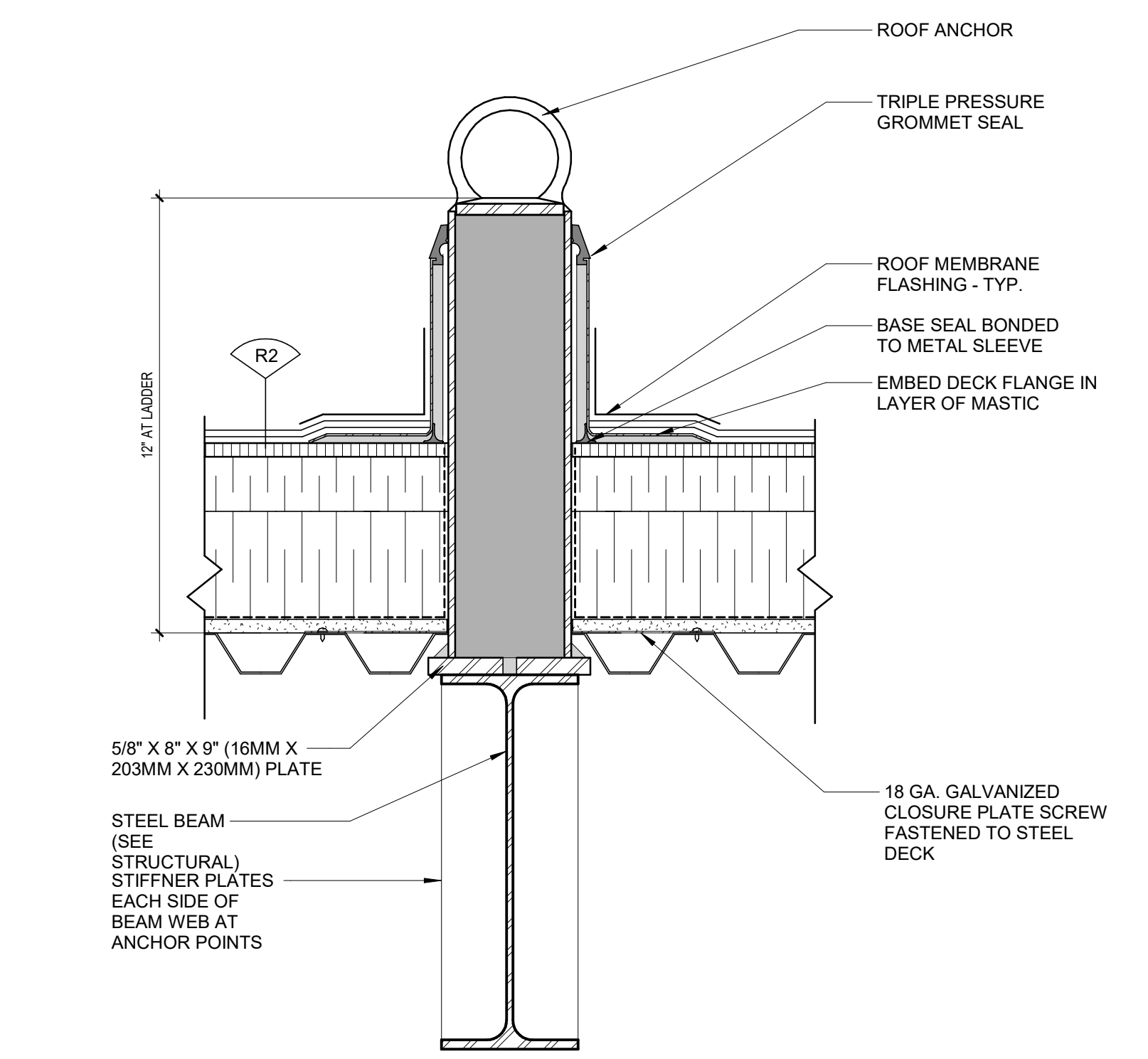
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 SECTION DETAIL - ROOF DRAIN
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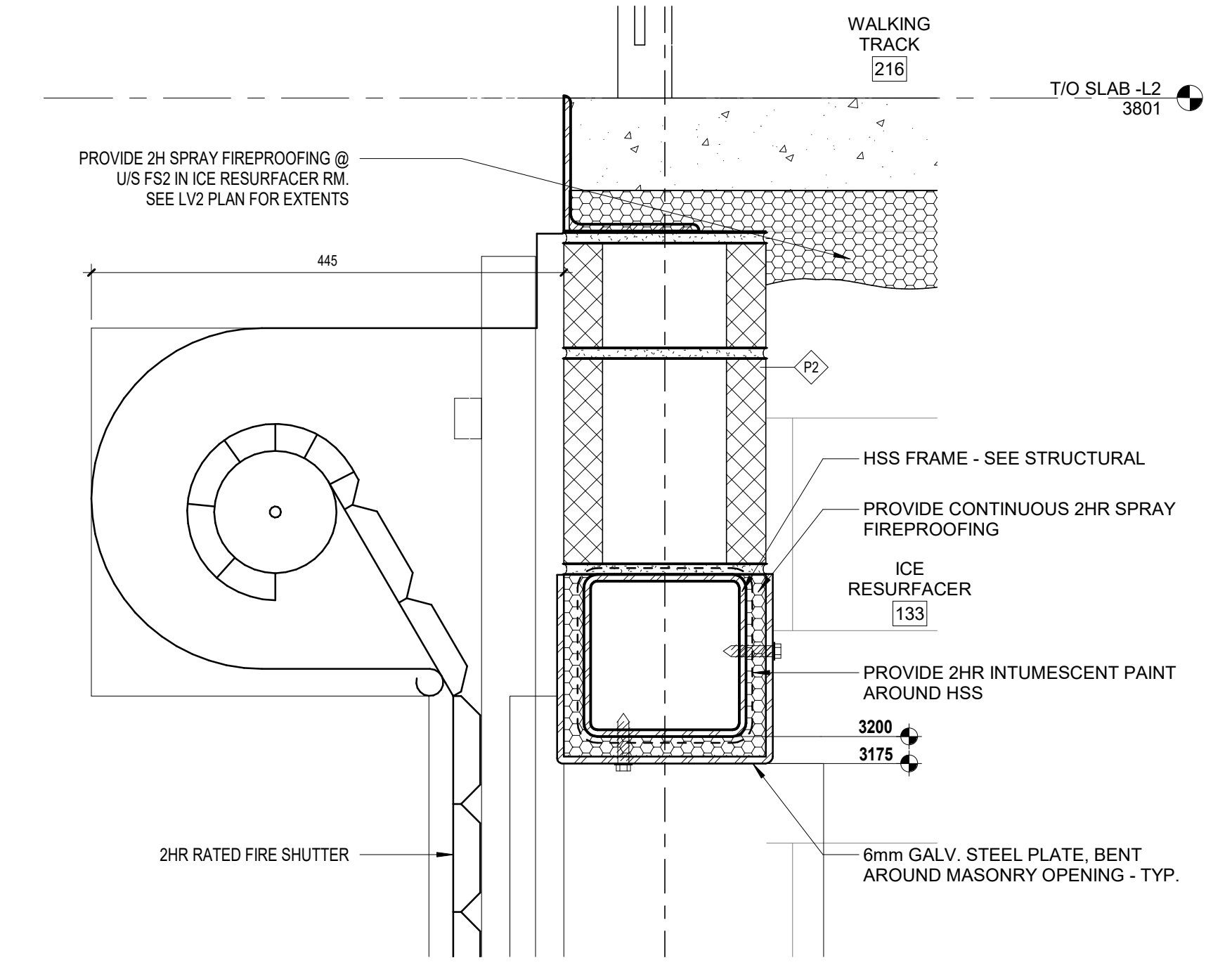
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 SECTION DETAIL - VENT PIPE
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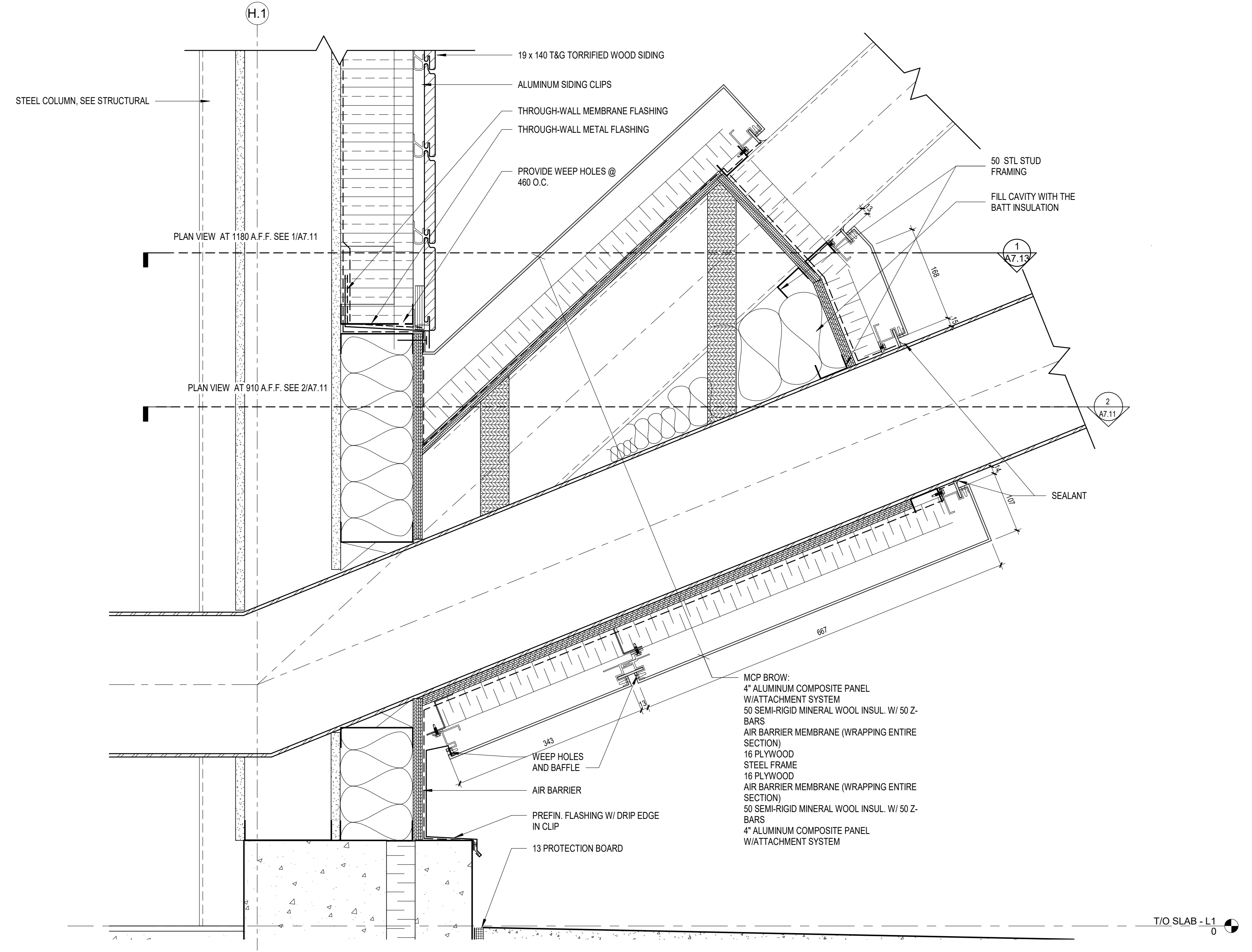
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 SECTION DETAIL - METAL SLEEVE @ STEEL FRAME GRID LINE 1
 1:5



3
 SECTION DETAIL - FALL ARREST ANCHOR @ STEEL ROOF
 1:5



4
 SECTION DETAIL @ HEAD OF 2HR FIRE SHUTTER
 1:5



8
 SECTION DETAIL - METAL SLEEVE @ STEEL FRAME GRID LINE 0
 1:5

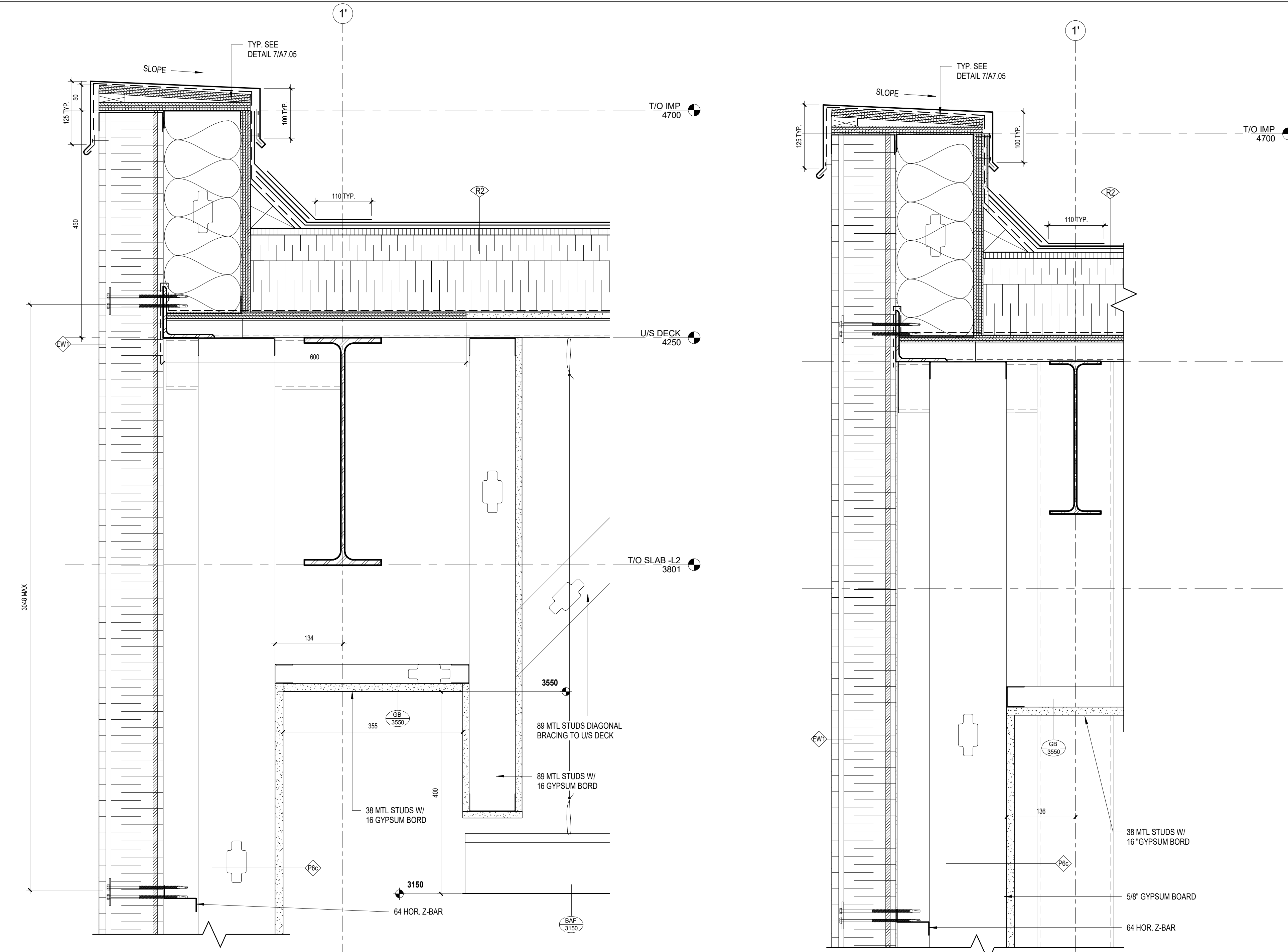
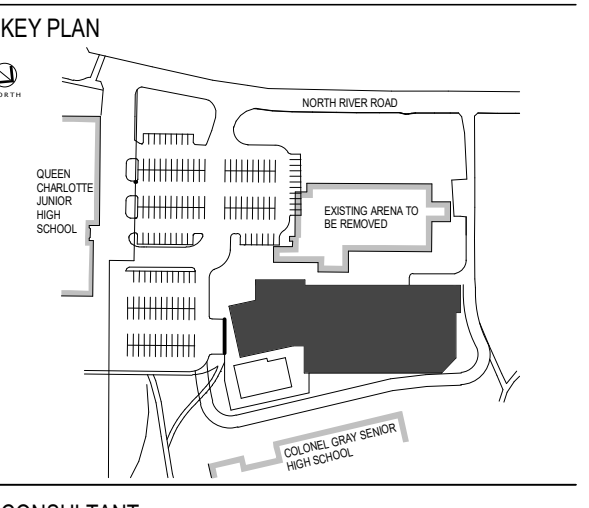
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NO.	REVISION	DATE



PROJECT NAME:
 SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

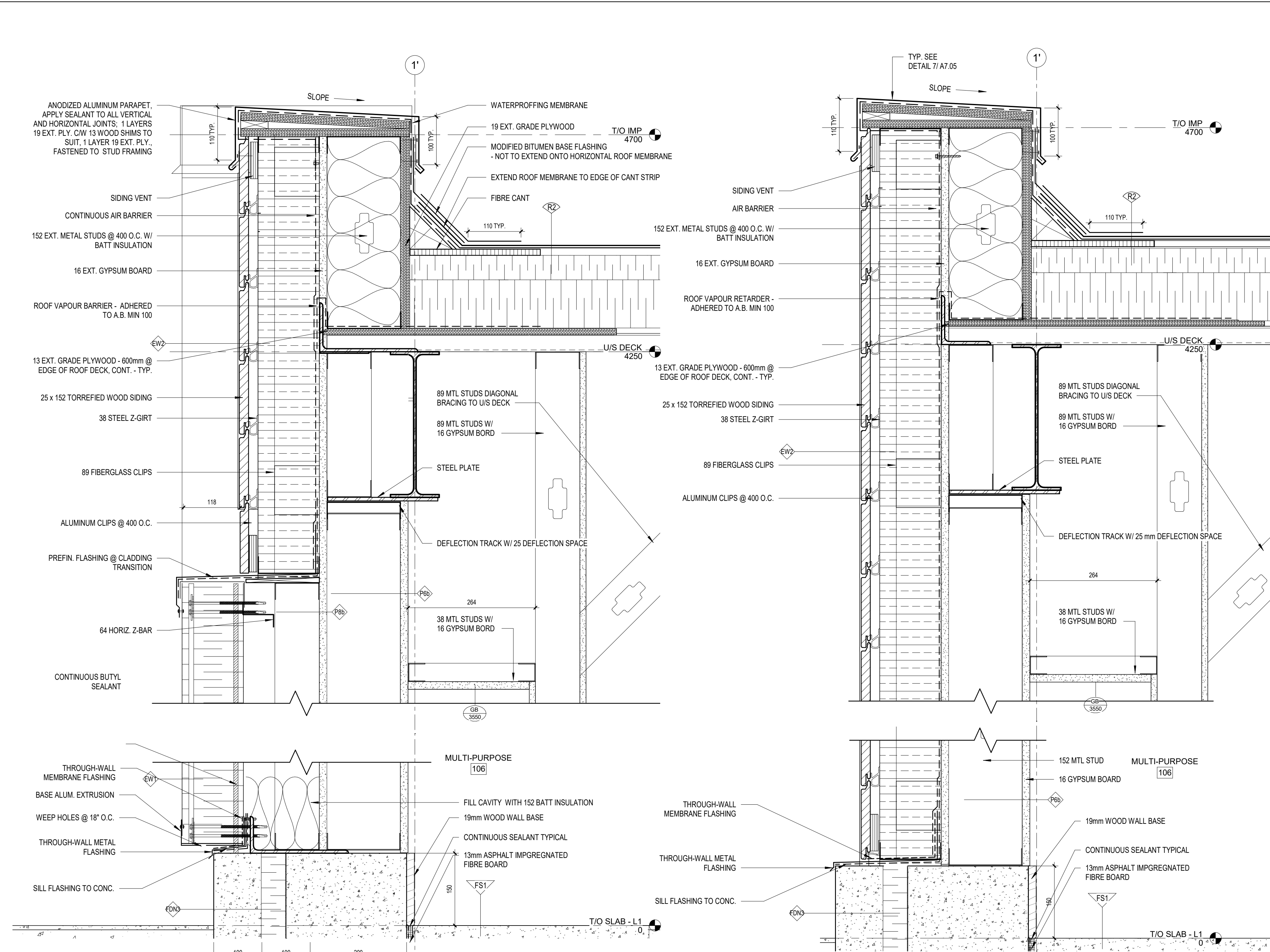
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SECTION DETAILS



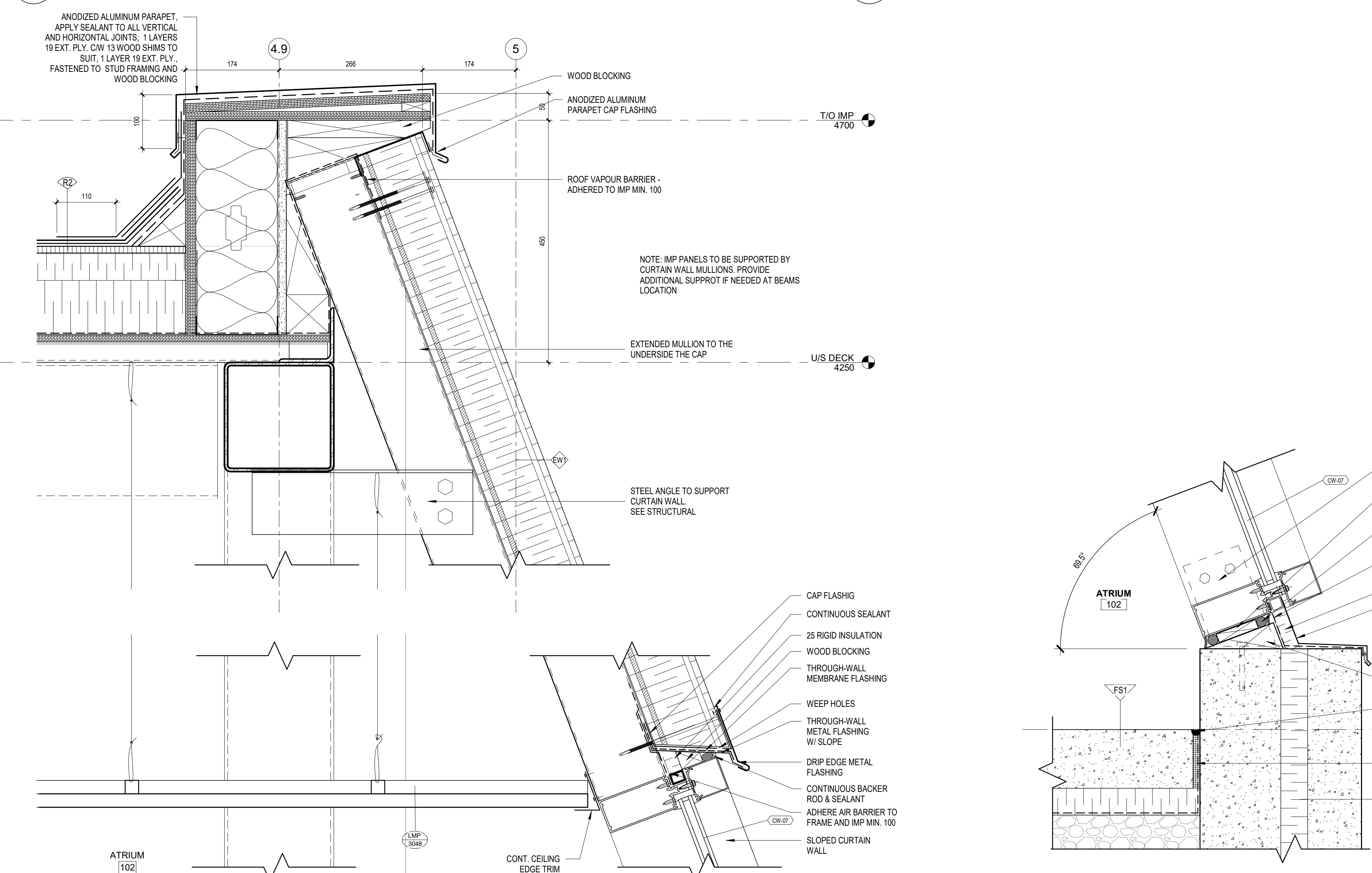
1 SECTION DETAIL - MULTI-PURPOSE ROOM @ GLAZING
A7.05 1:5

2 WALL SECTION - MULTI-PURPOSE RM @ IMP PANELS
A7.05 1:5



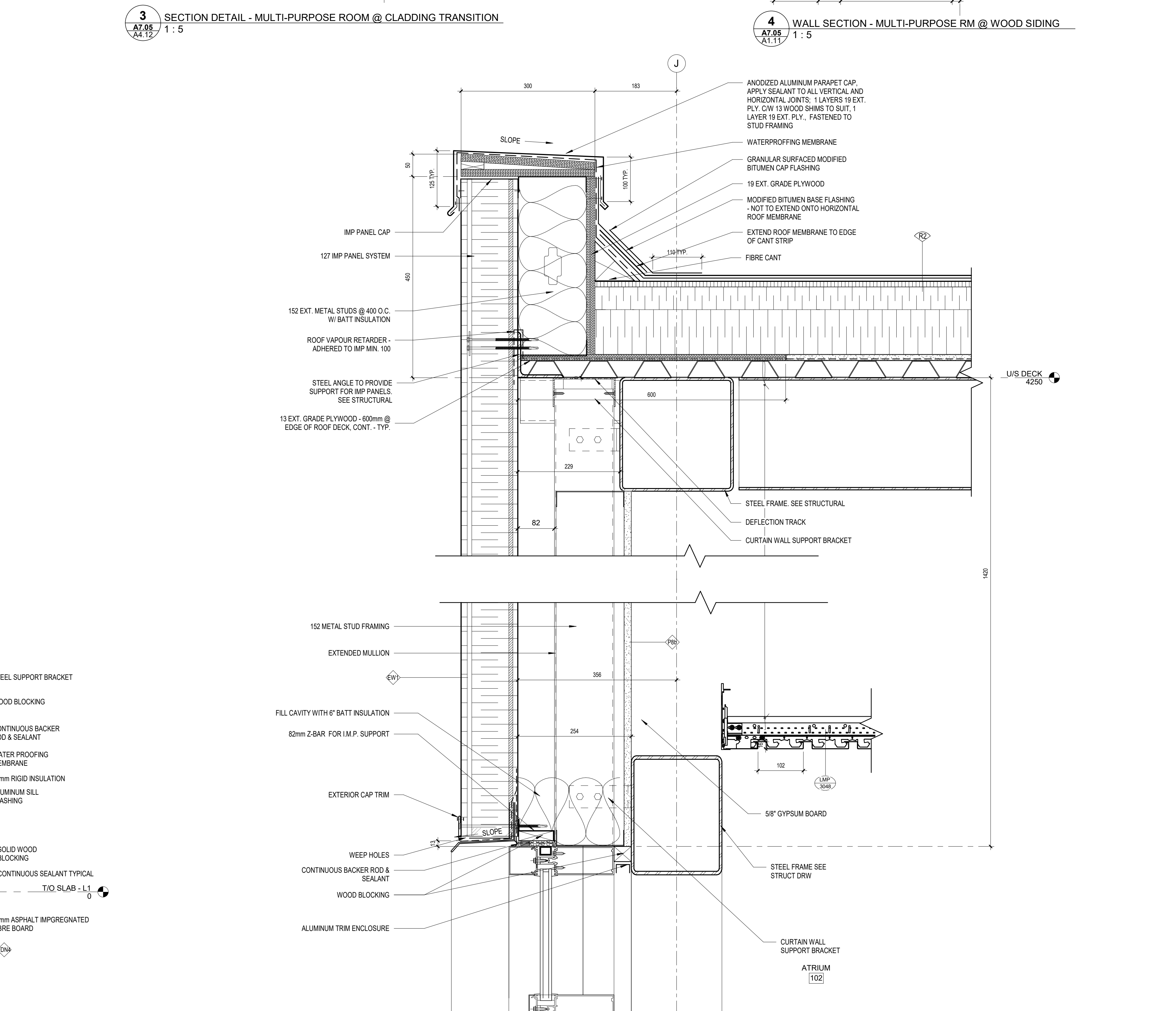
3 SECTION DETAIL - MULTI-PURPOSE ROOM @ CLADDING TRANSITION
A7.05 1:5

4 WALL SECTION - MULTI-PURPOSE RM @ WOOD SIDING
A7.05 1:5



5 SECTION DETAIL - SLOPED ATRIUM GLAZING @ ROOF
A7.05 1:5

6 SECTION DETAIL - SLOPED ATRIUM GLAZING @ FNDN
A7.05 1:5



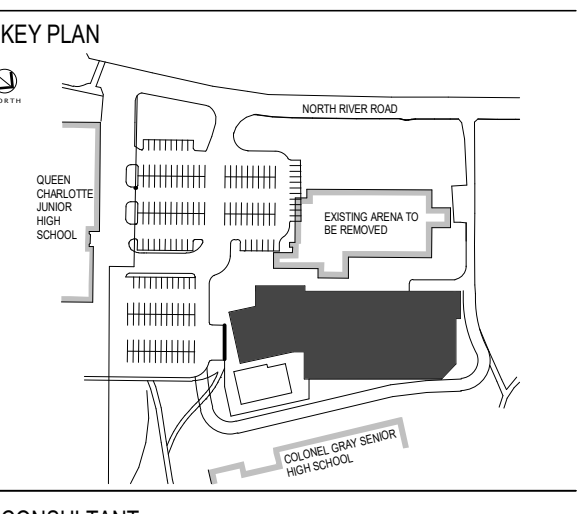
7 WALL SECTION - LOBBY @ IMP PARAPET
A7.05 1:5

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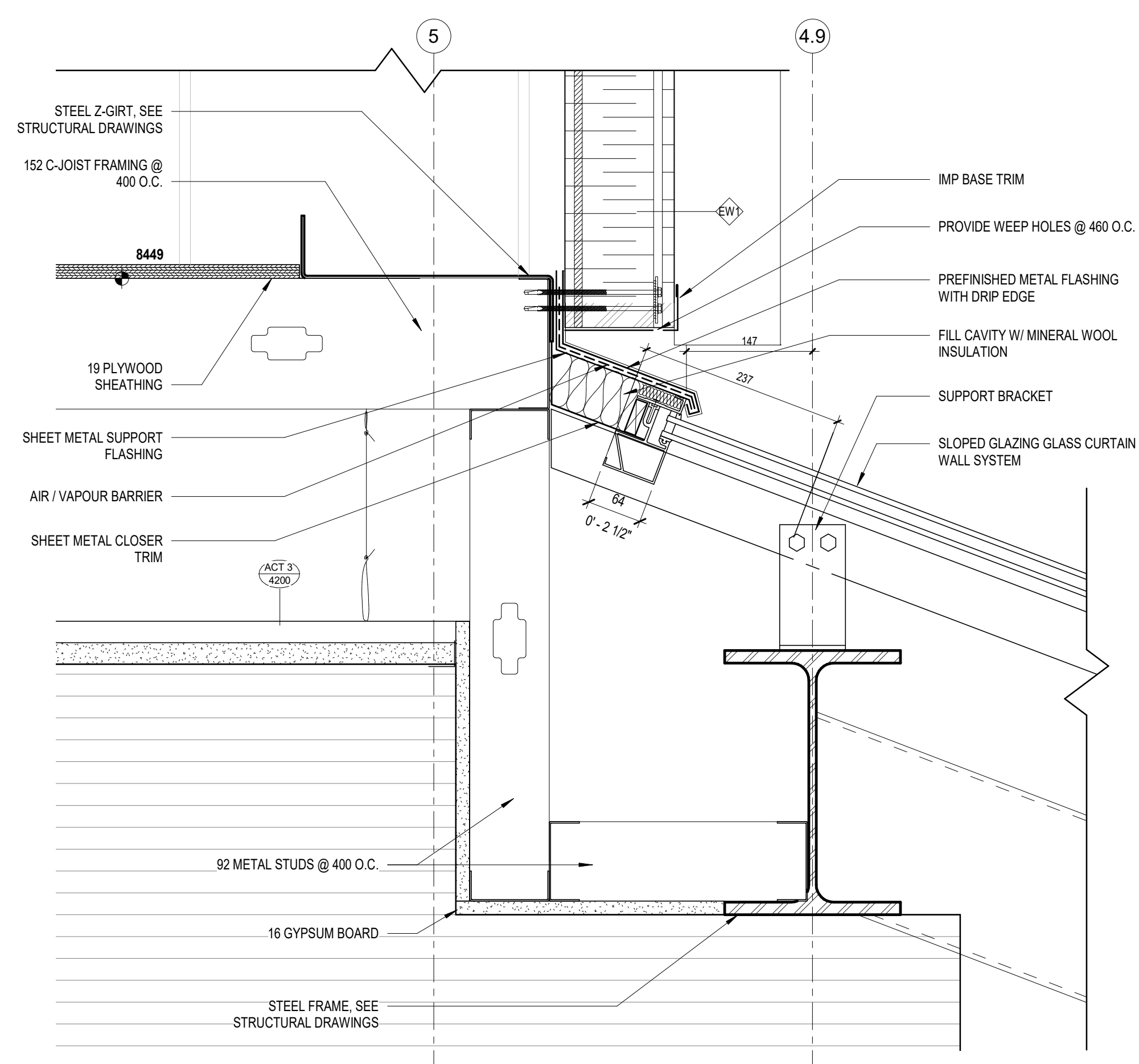


PROJECT NAME: SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
170 NORTH RIVER ROAD CHARLOTTETOWN, PEI

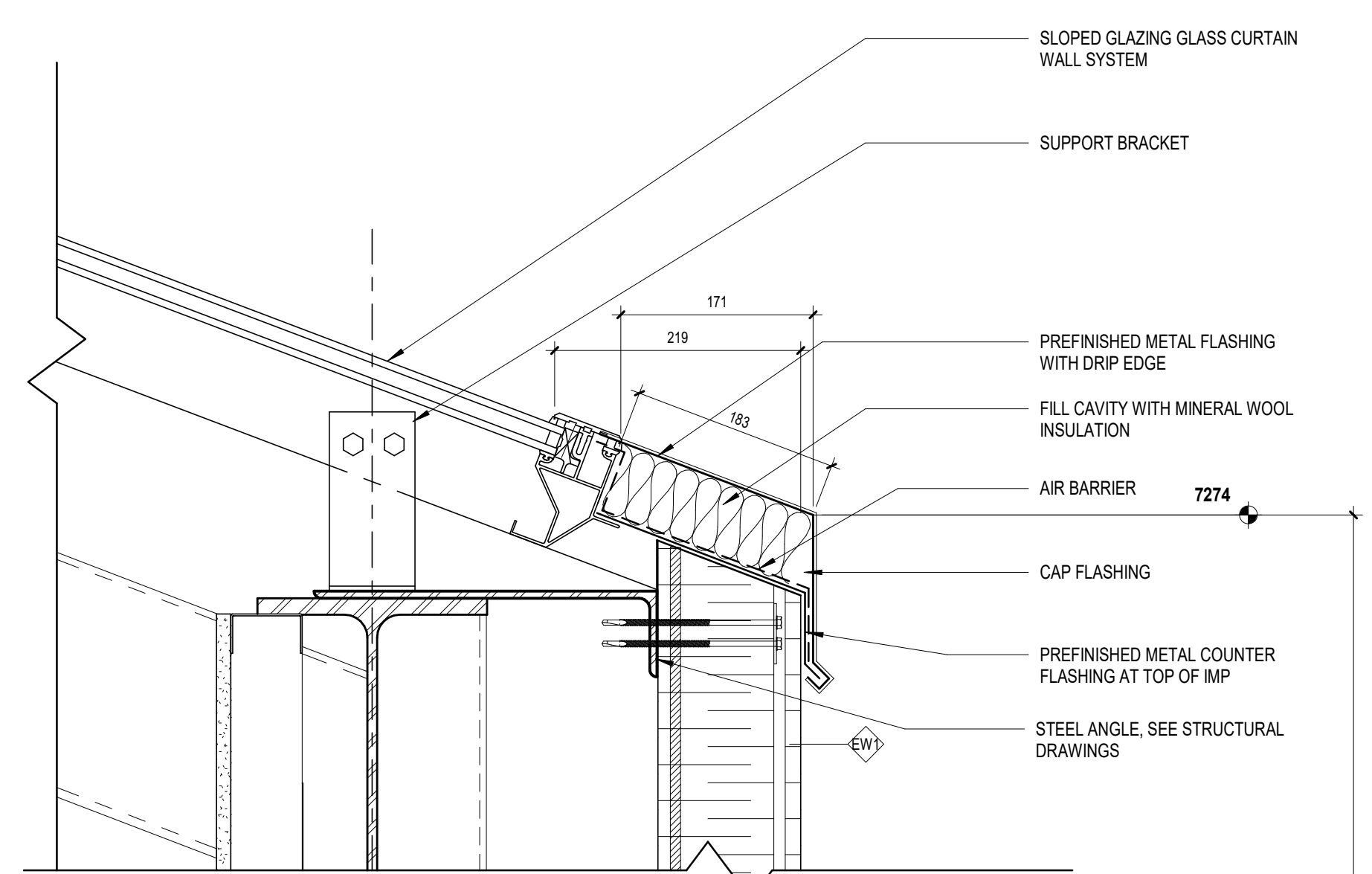
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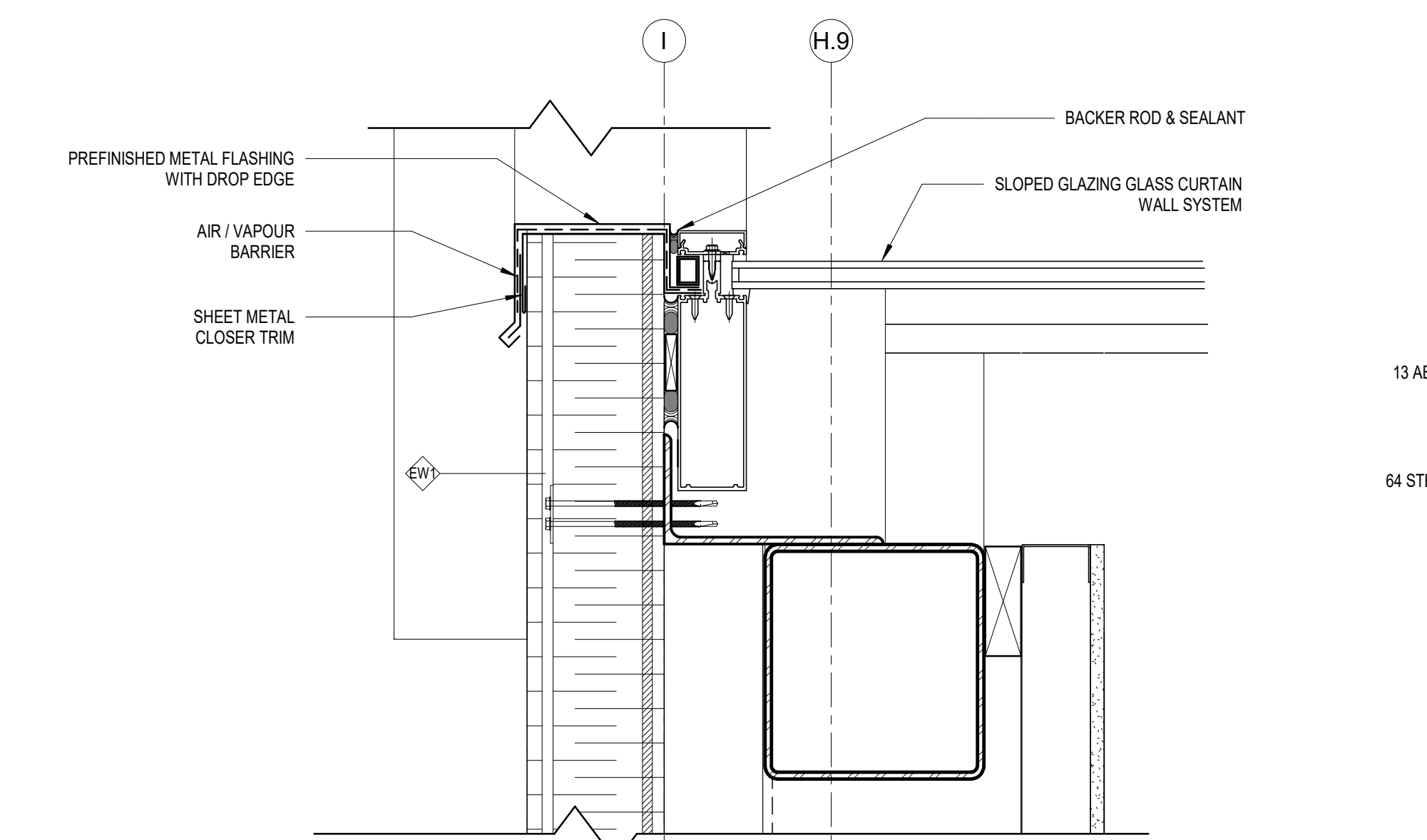
GENERAL NOTE: ENSURE ALL WINDOW HEADS, SILLS ANDS JAMBS ARE AIR AND WATER TIGHT.



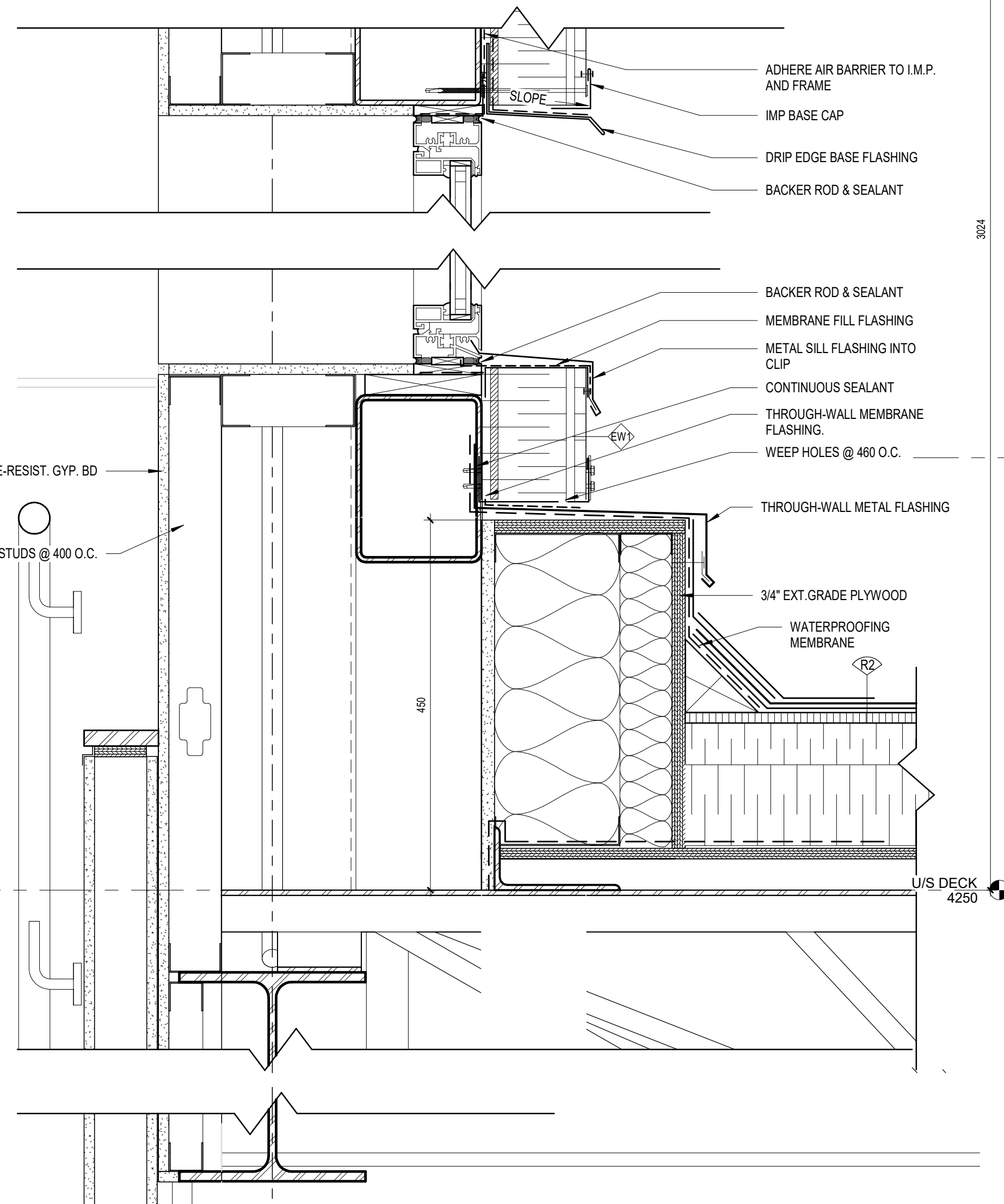
1 SECTION DETAIL @ SKYLIGHT HEAD
A7.06
A3.02
1:5



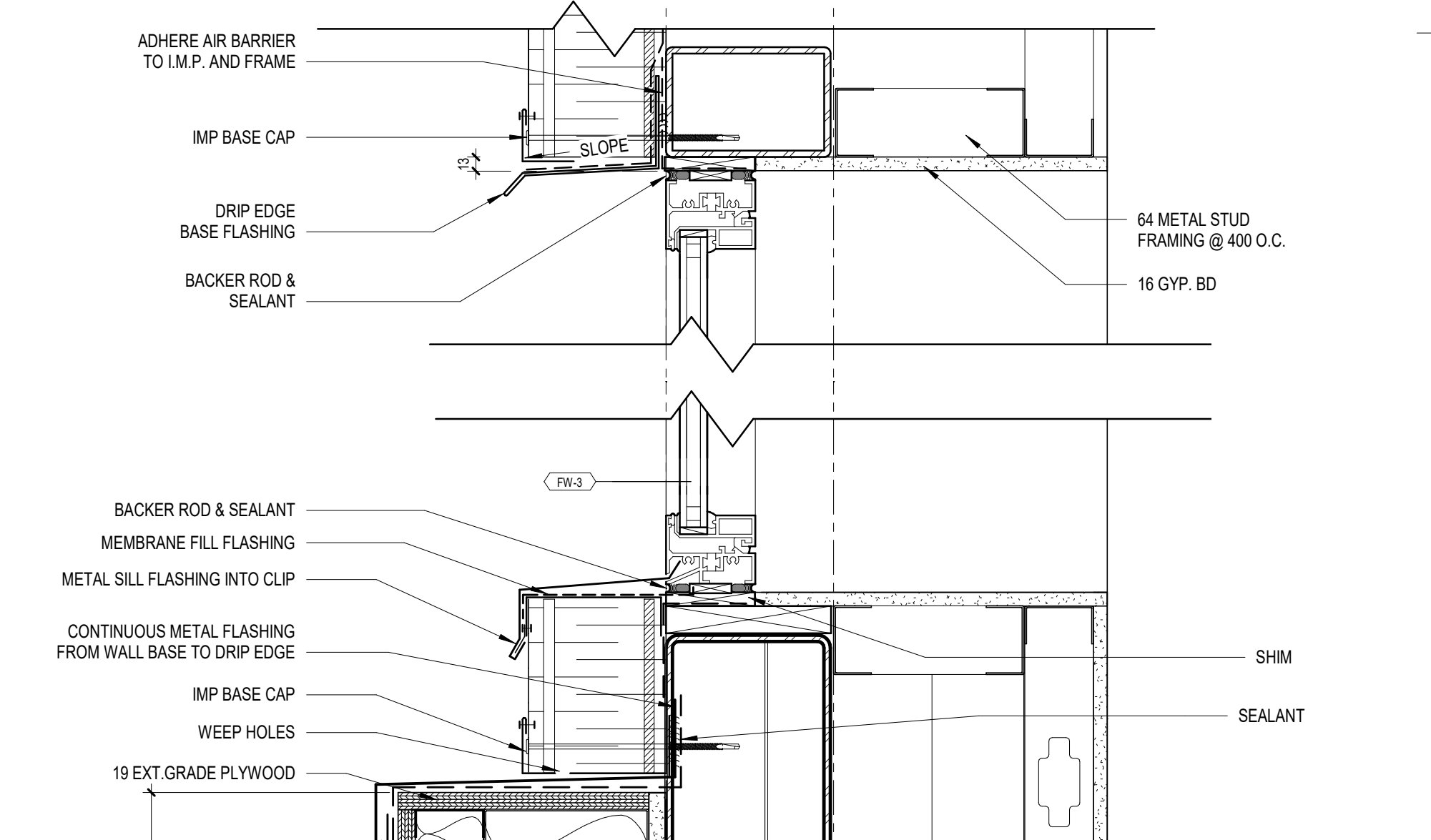
2 SECTION DETAIL @ SKYLIGHT SILL AND ROOF
A7.06
A3.02
1:5



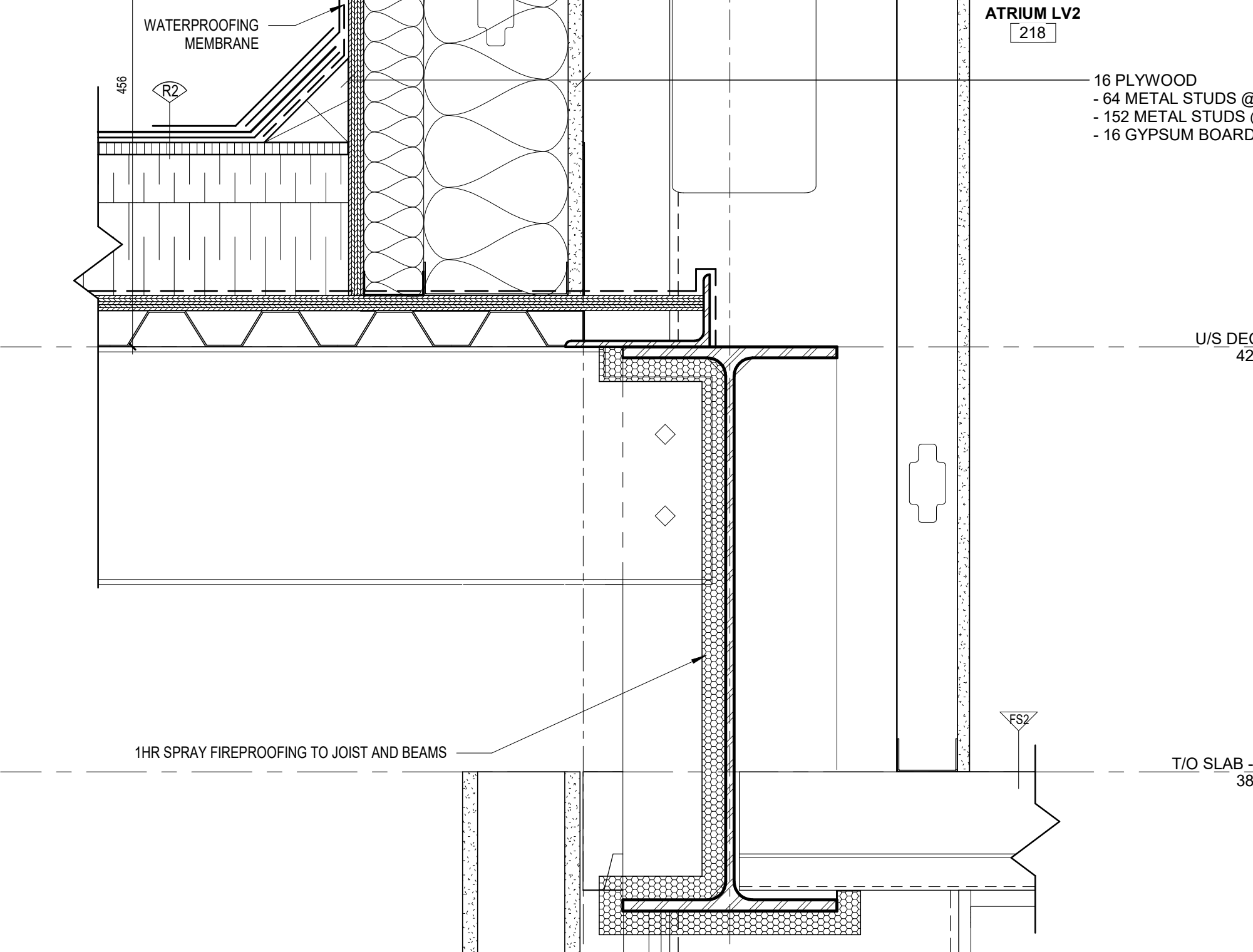
5 SECTION DETAIL @ SKYLIGHT JAMB AND ROOF
A7.06
A2.01
1:5



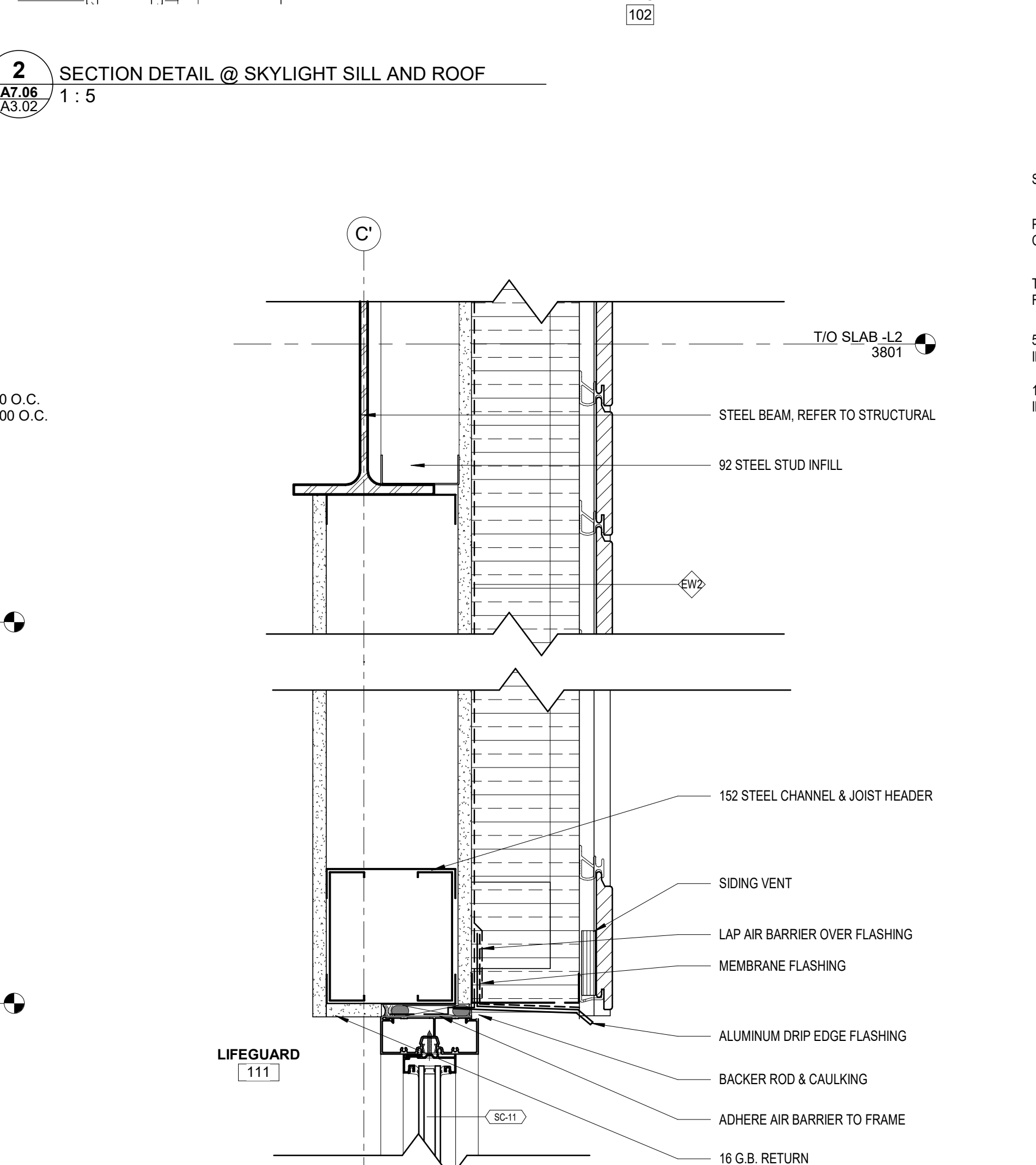
6 SECTION DETAIL - SC-11 @ HEAD
A7.06
A1.1
1:5



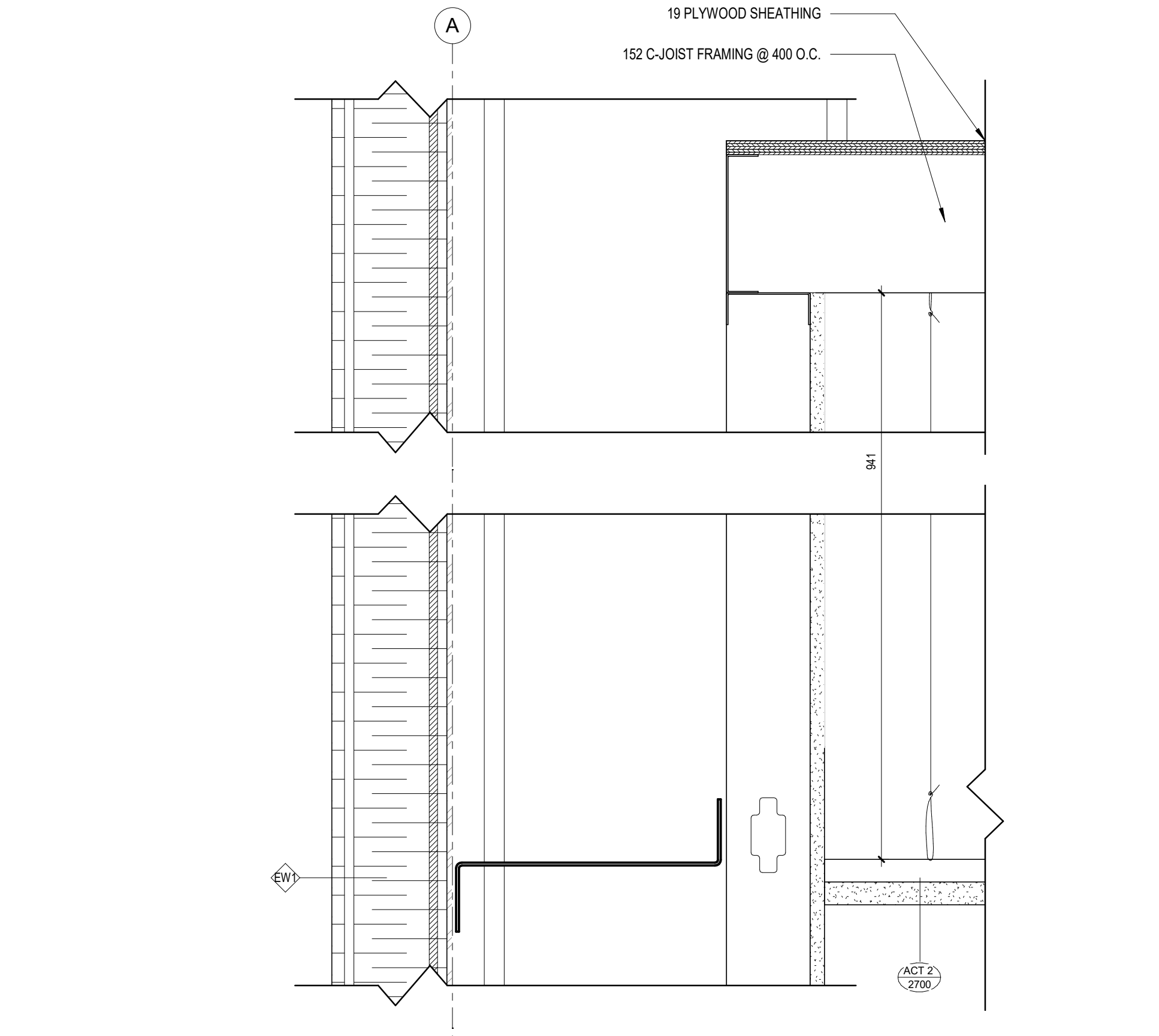
3 SECTION DETAIL - ARENA CLADDING TRANSITION
A7.06
A1.16
1:5



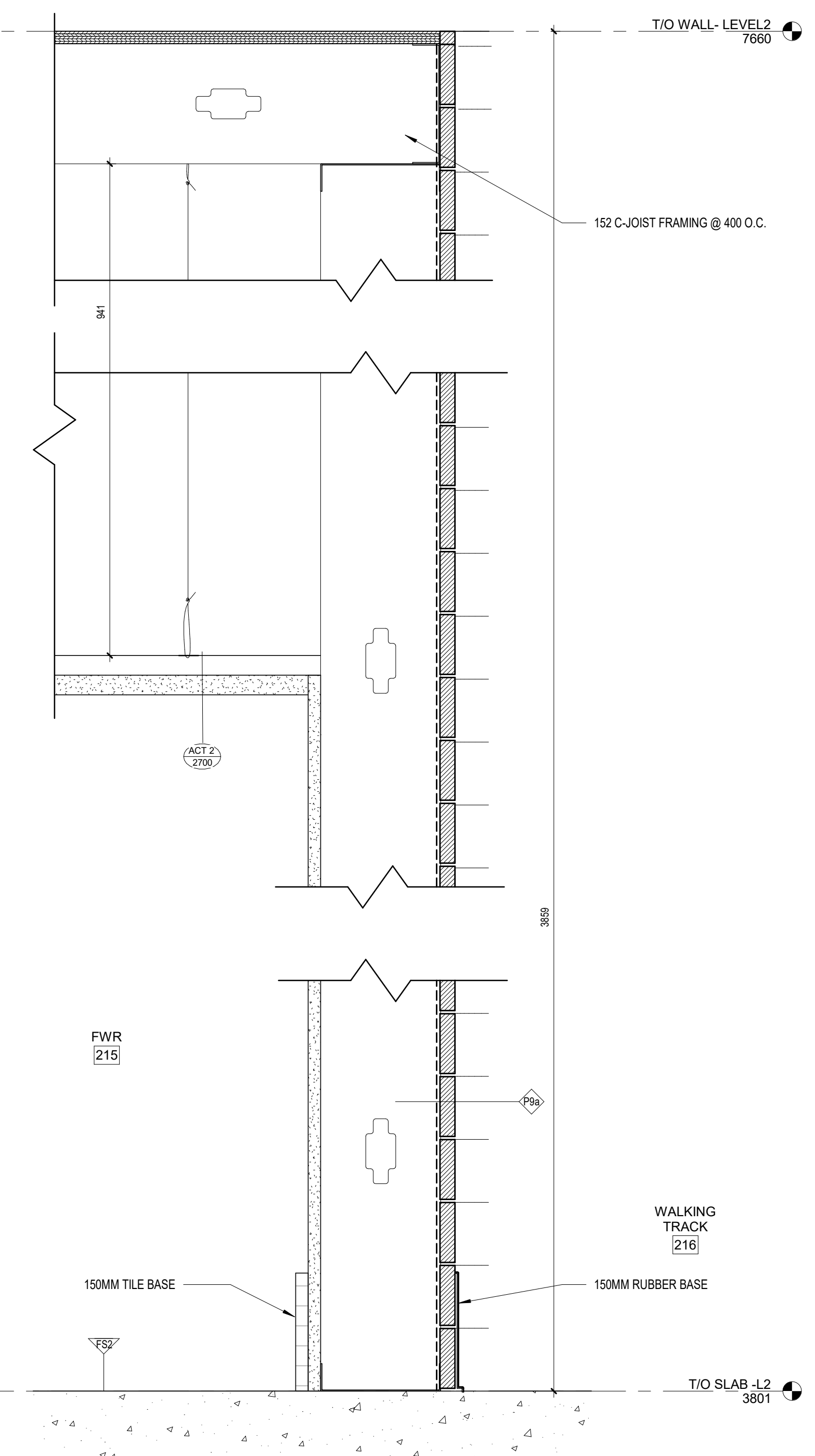
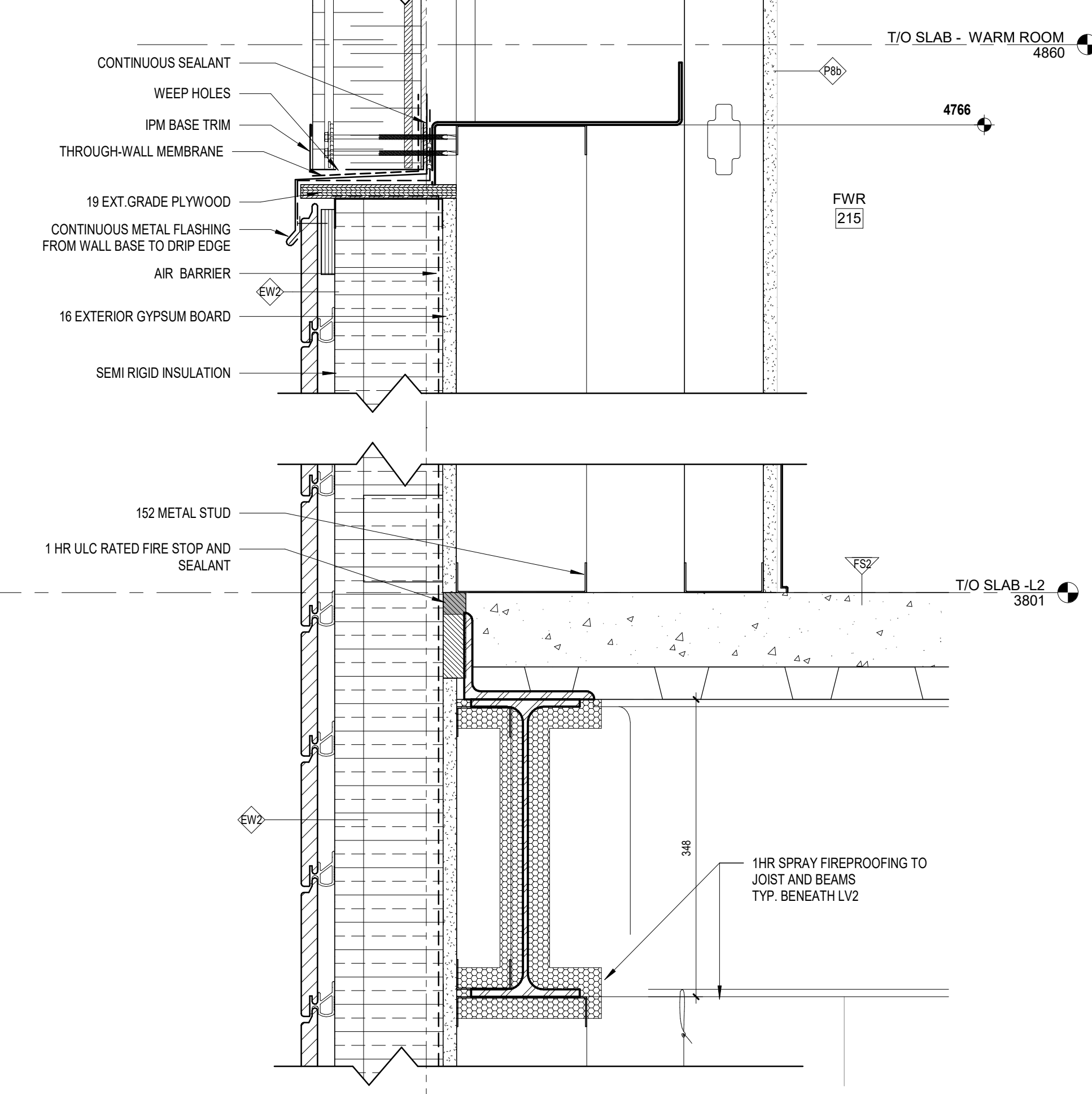
7 SECTION DETAIL - ATRIUM CEILING BULKHEAD
A7.06
A3.02
1:5



4 SECTION DETAIL - LV2 WASHROOM WALL TYP.
A7.06
A3.02
1:5

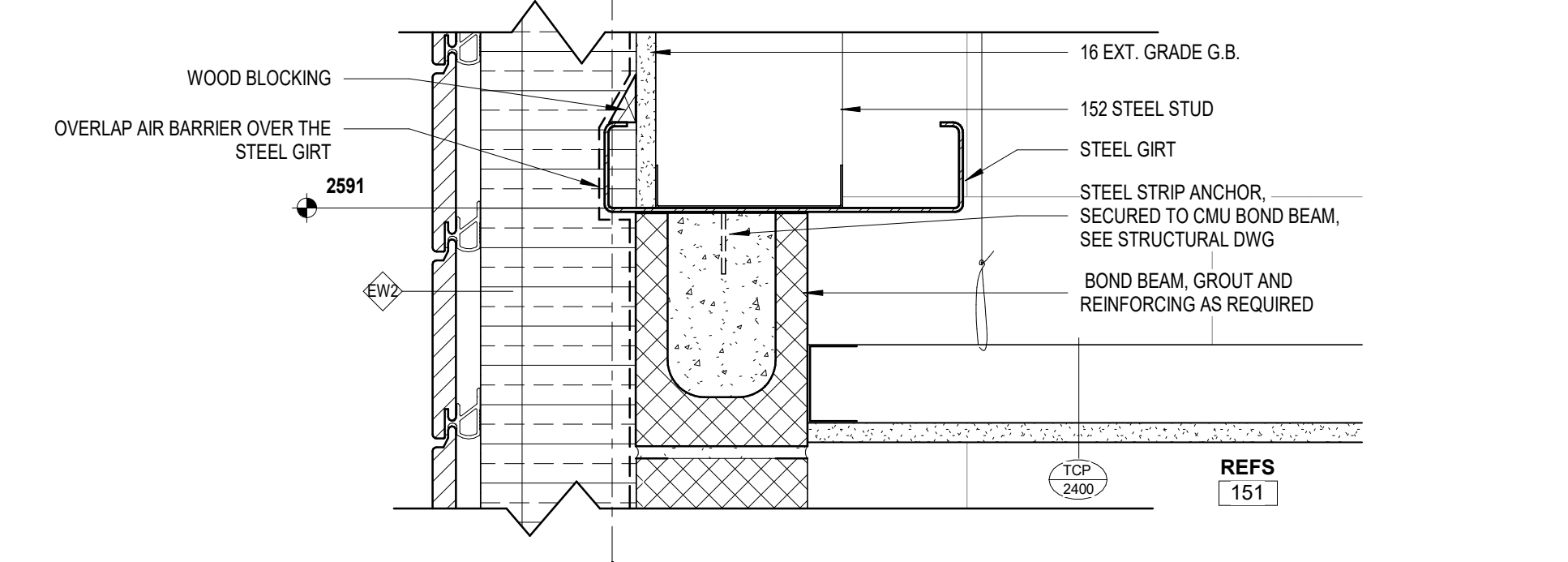


T/O SLAB - WARM ROOM 4860

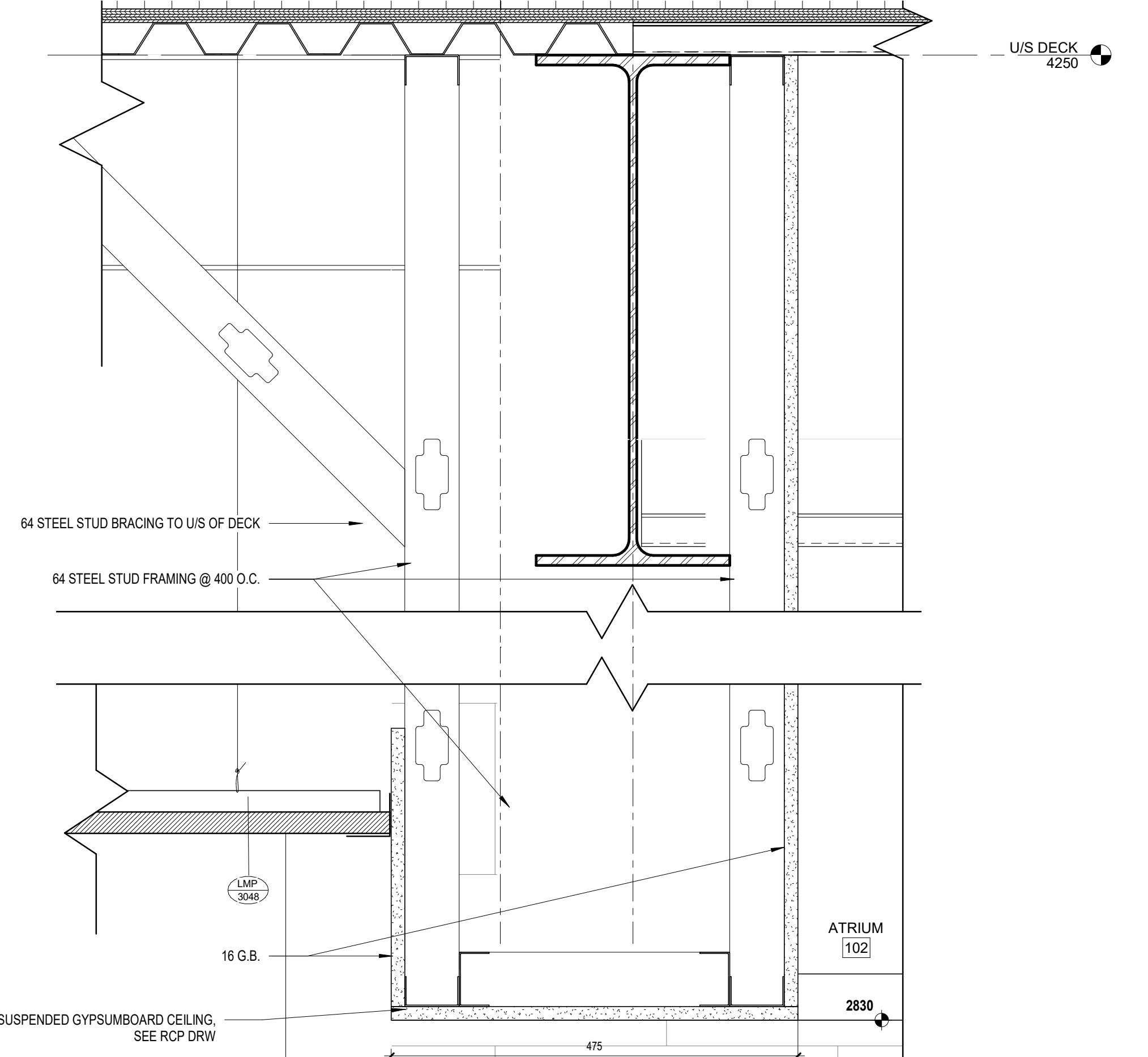


WALKING TRACK 216

4 SECTION DETAIL - LV2 WASHROOM WALL TYP.
A7.06
A3.02
1:5



3 SECTION DETAIL - ARENA CLADDING TRANSITION
A7.06
A1.16
1:5



7 SECTION DETAIL - ATRIUM CEILING BULKHEAD
A7.06
A3.02
1:5

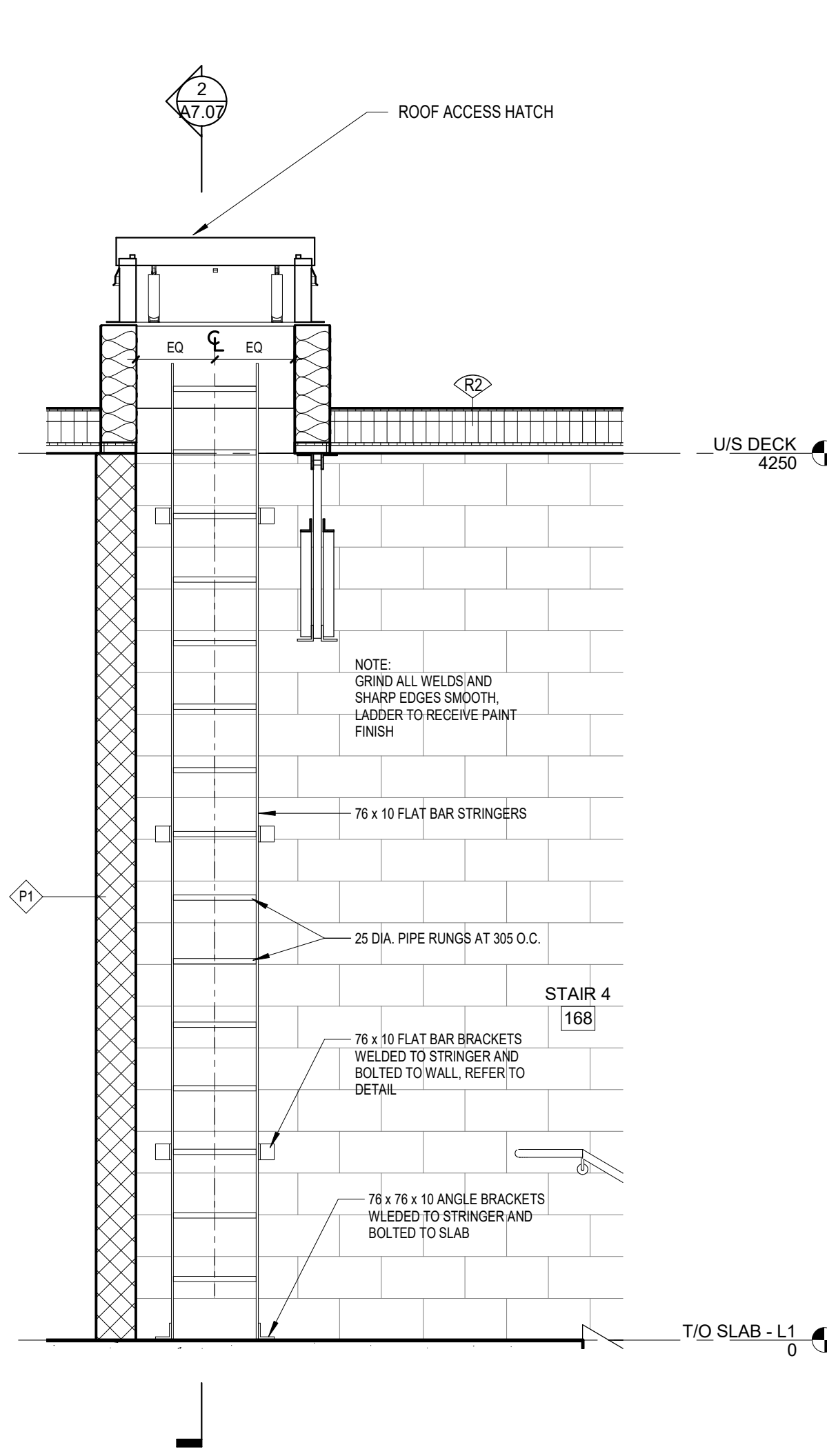
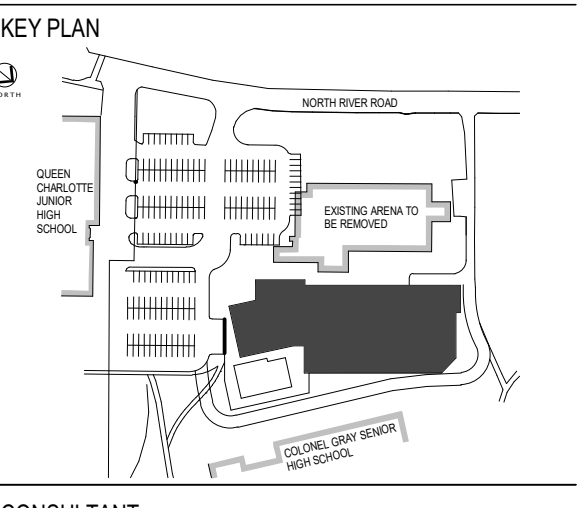
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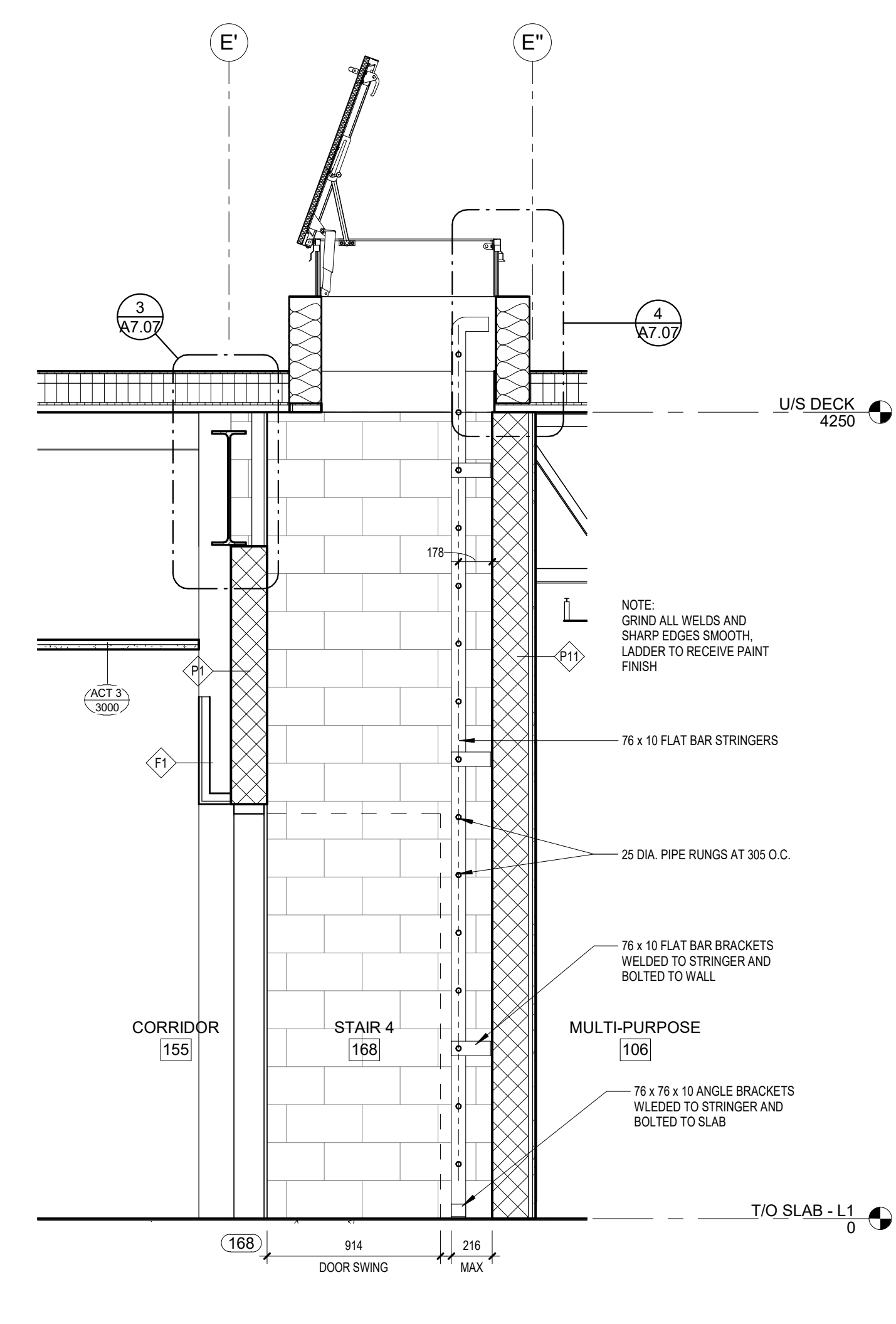
PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL
REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

PROJECT NO.: 21111
DRAWN BY: OM / MV / DE
CHECKED BY: MMG / PC
SCALE: 1:5

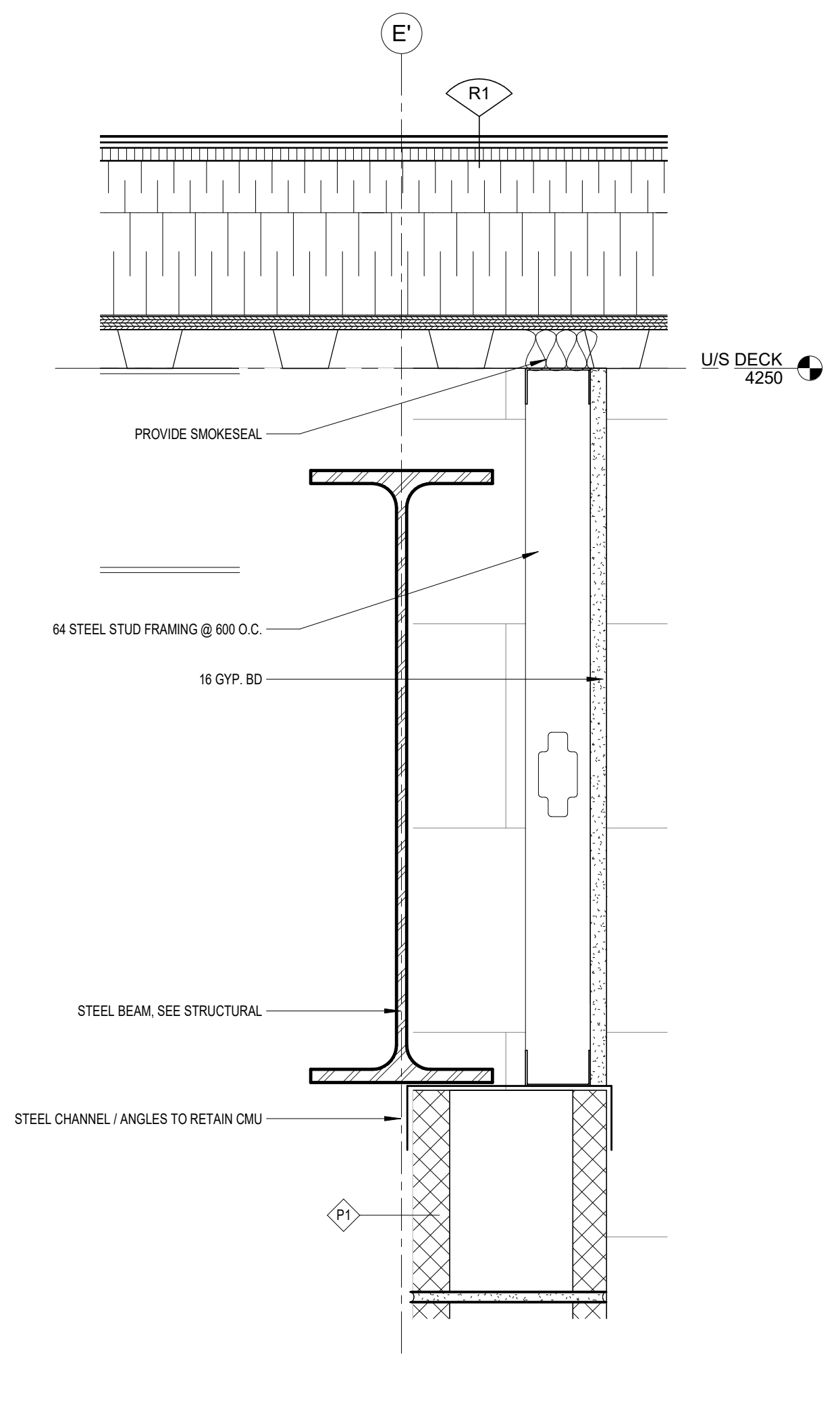
SECTION DETAILS



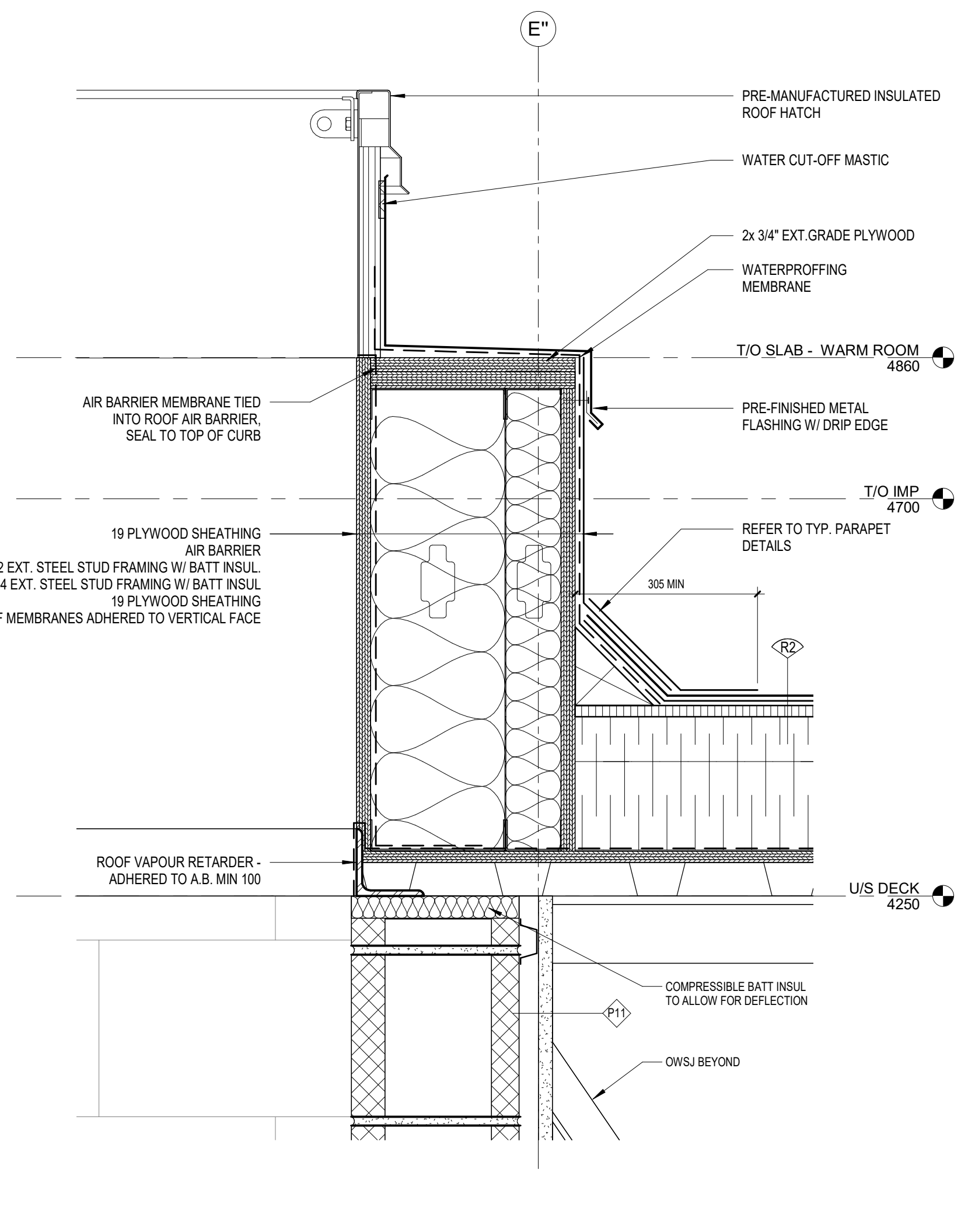
1 ELEVATION - ROOF ACCESS LADDER & HATCH
A7.07 / A1.11 1:25



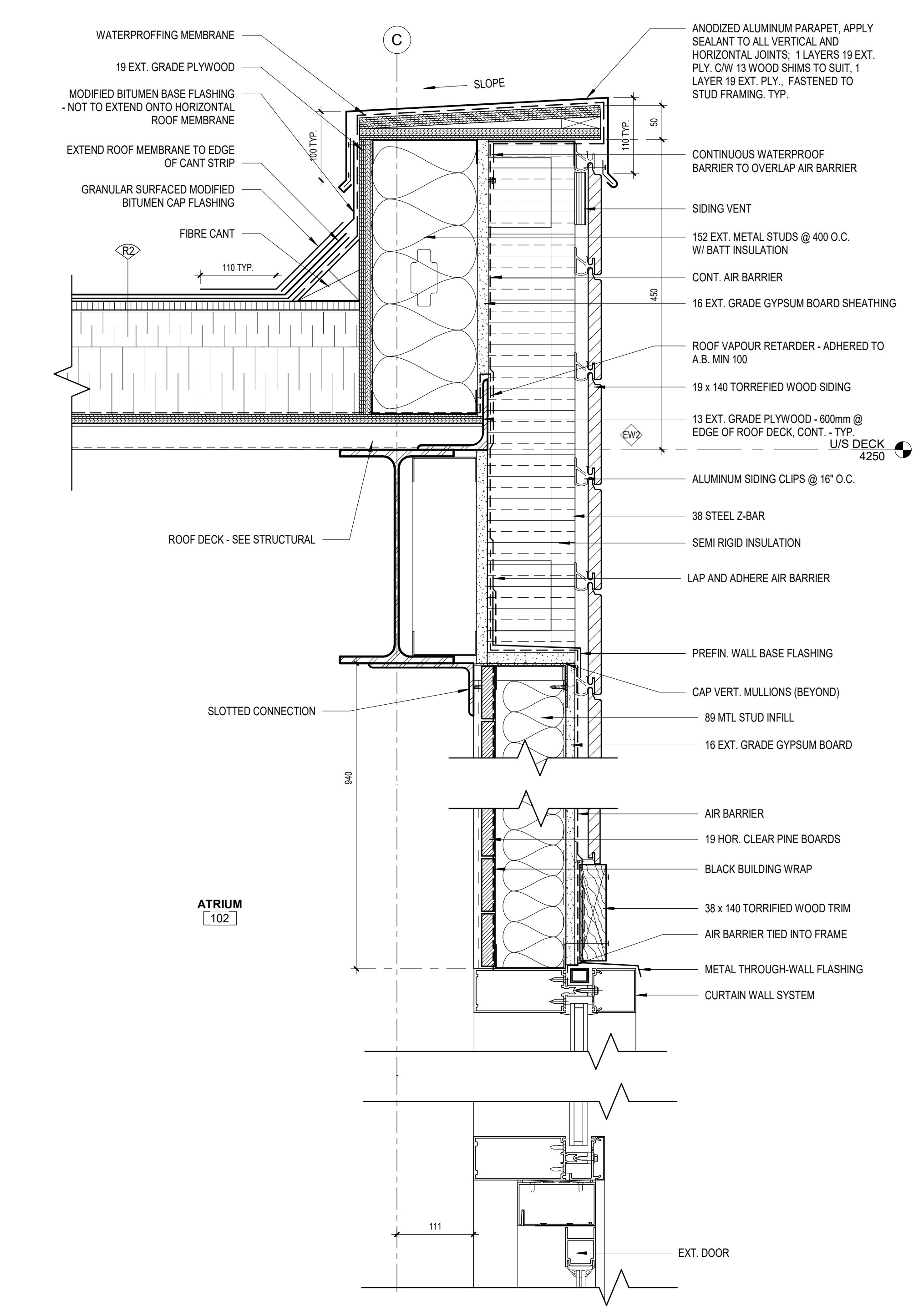
2 SECTION - ROOF ACCESS LADDER & HATCH
A7.07 / A1.25 1:25



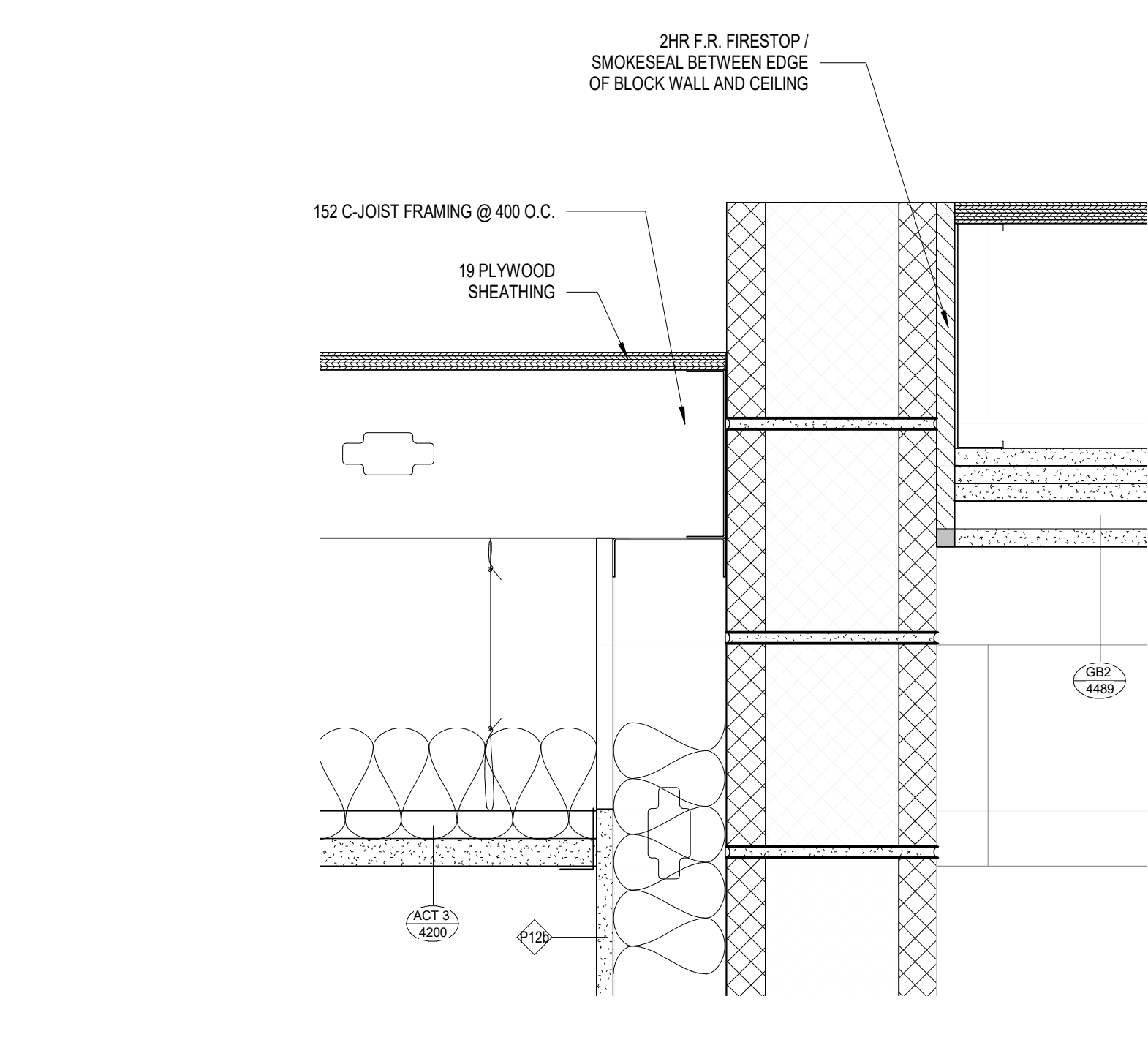
3 SECTION - STAIR 4 @ ROOF - 1HR FIRE SEPARATION
A7.07 1:5



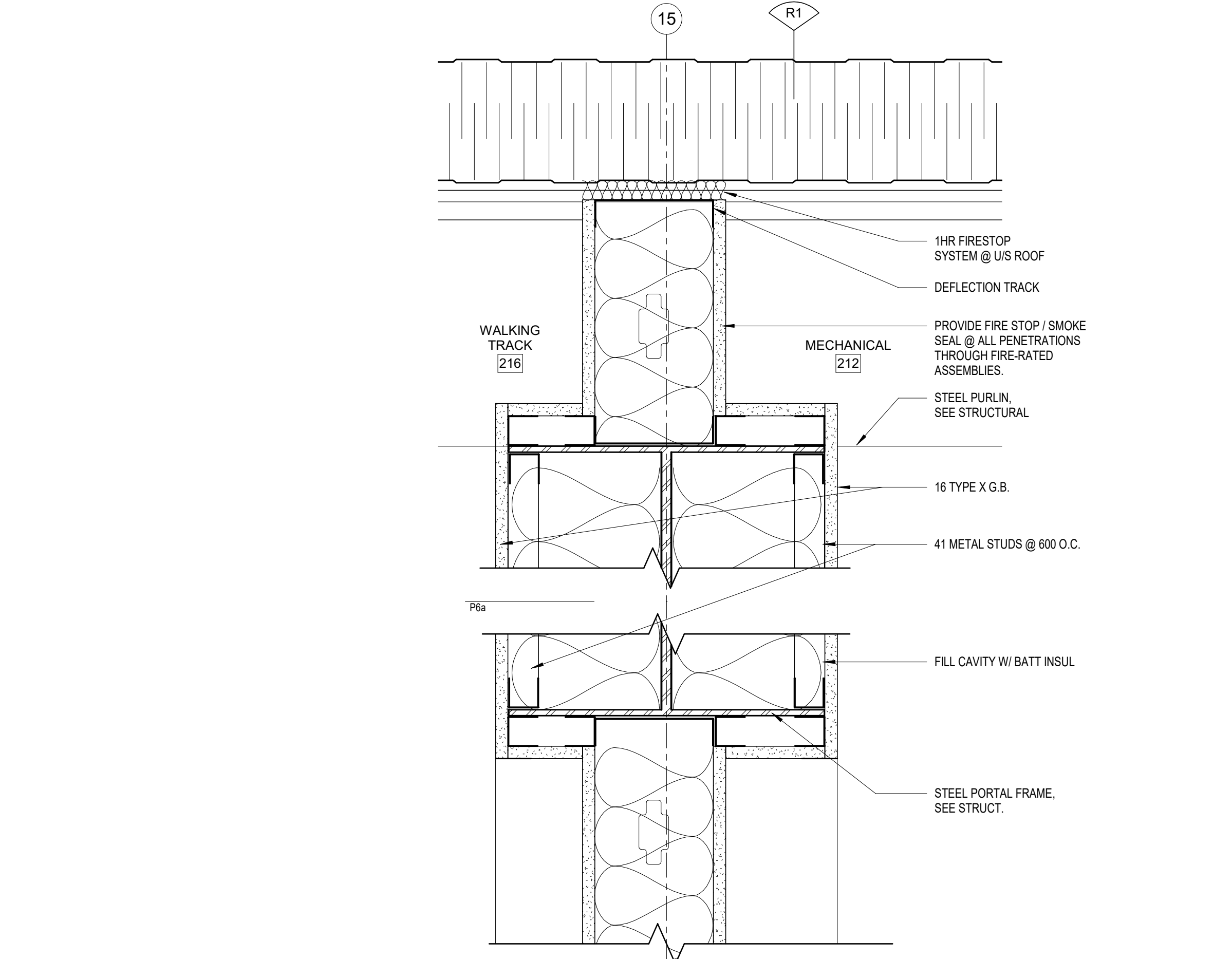
4 SECTION DETAIL - ROOF ACCESS HATCH
A7.07 / A3.02 1:5



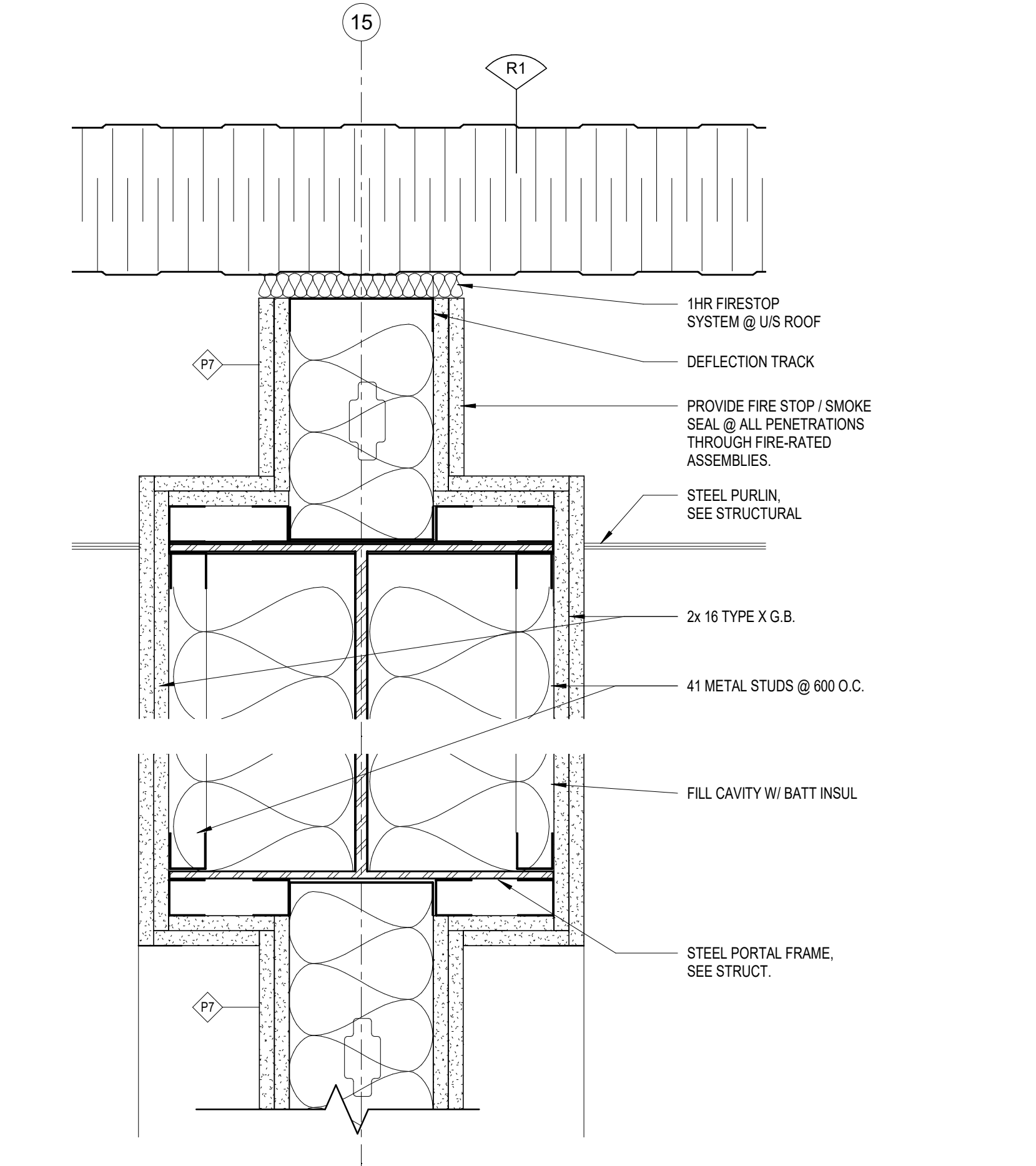
10 SECTION DETAIL - ATRIUM PARAPET @ POOL DECK
A7.07 1:5



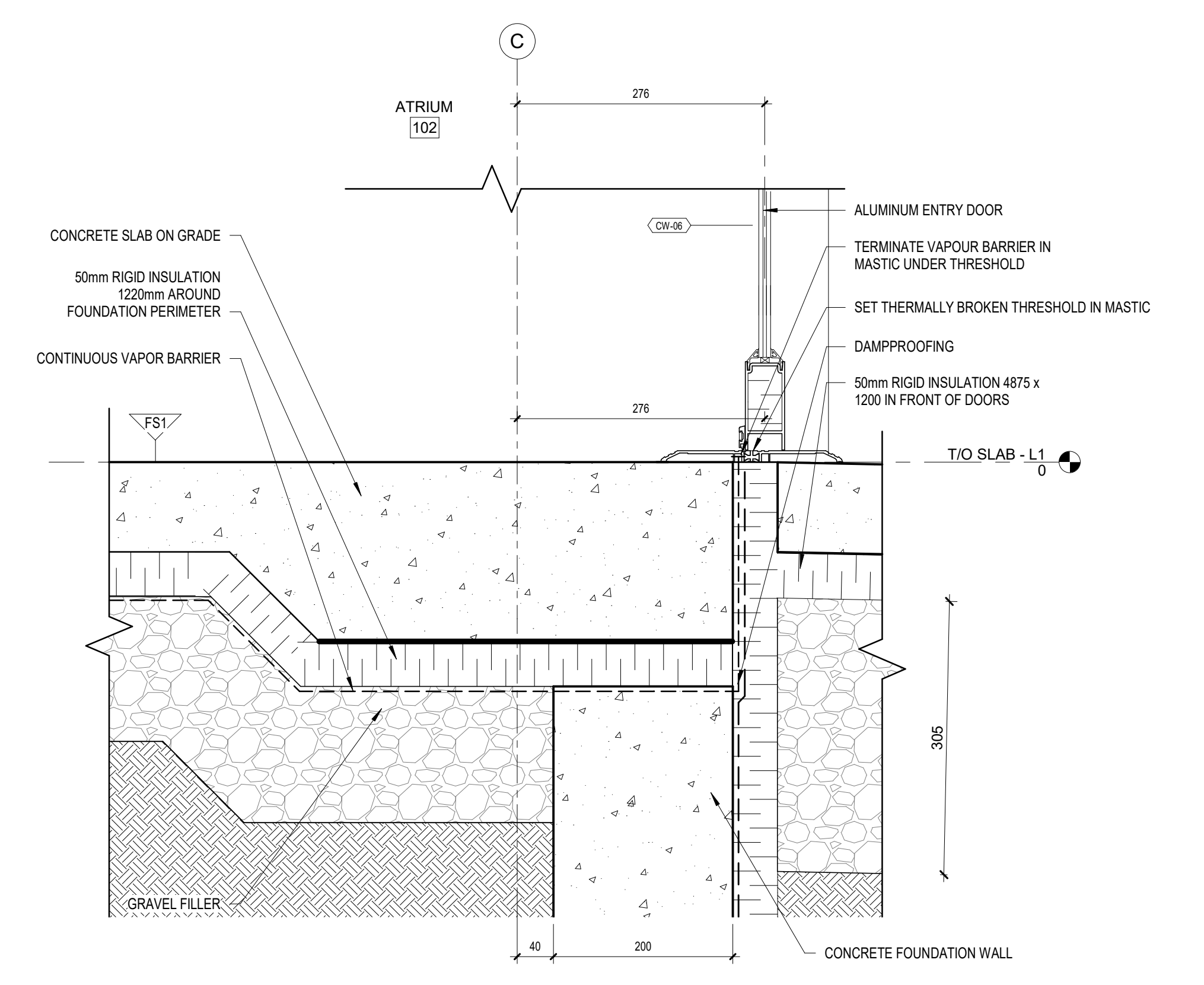
5 SECTION DETAIL @ ELEVATOR CEILING
A7.07 / A4.17 1:5



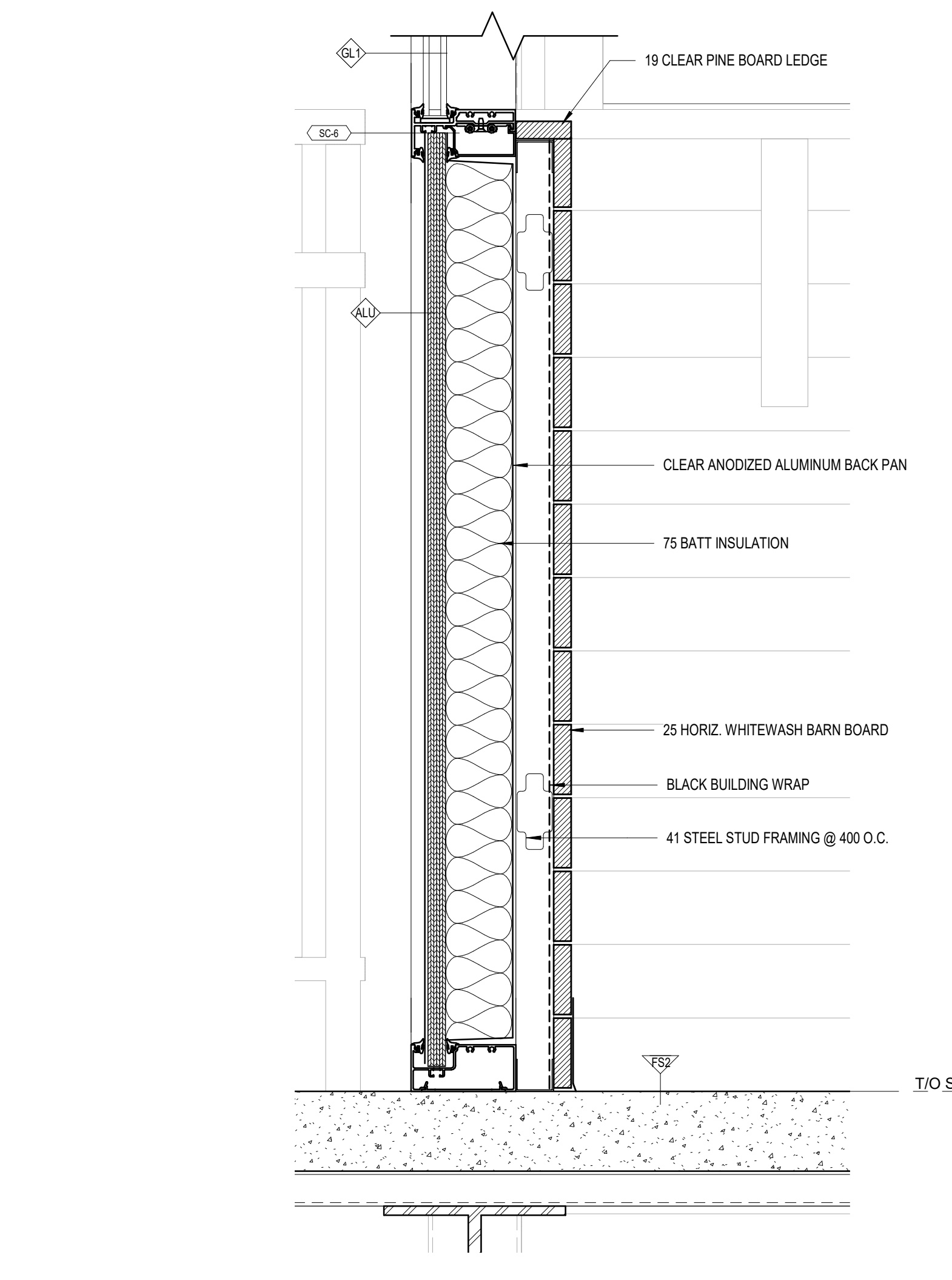
6 SECTION DETAIL @ MECH. ROOM WALL
A7.07 / A4.11 1:5



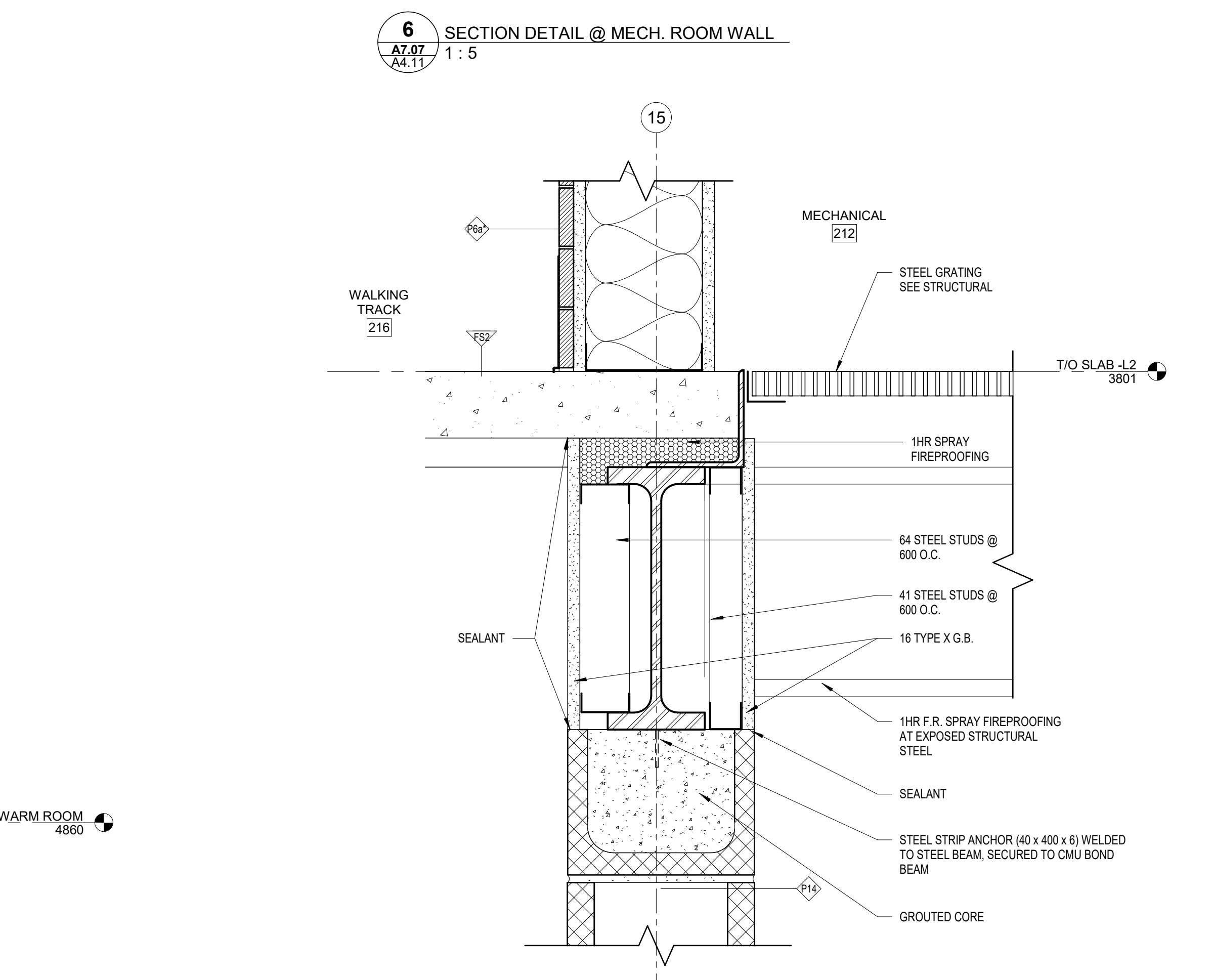
9 SECTION DETAIL @ ICE RESURFACER WALL
A7.07 1:5



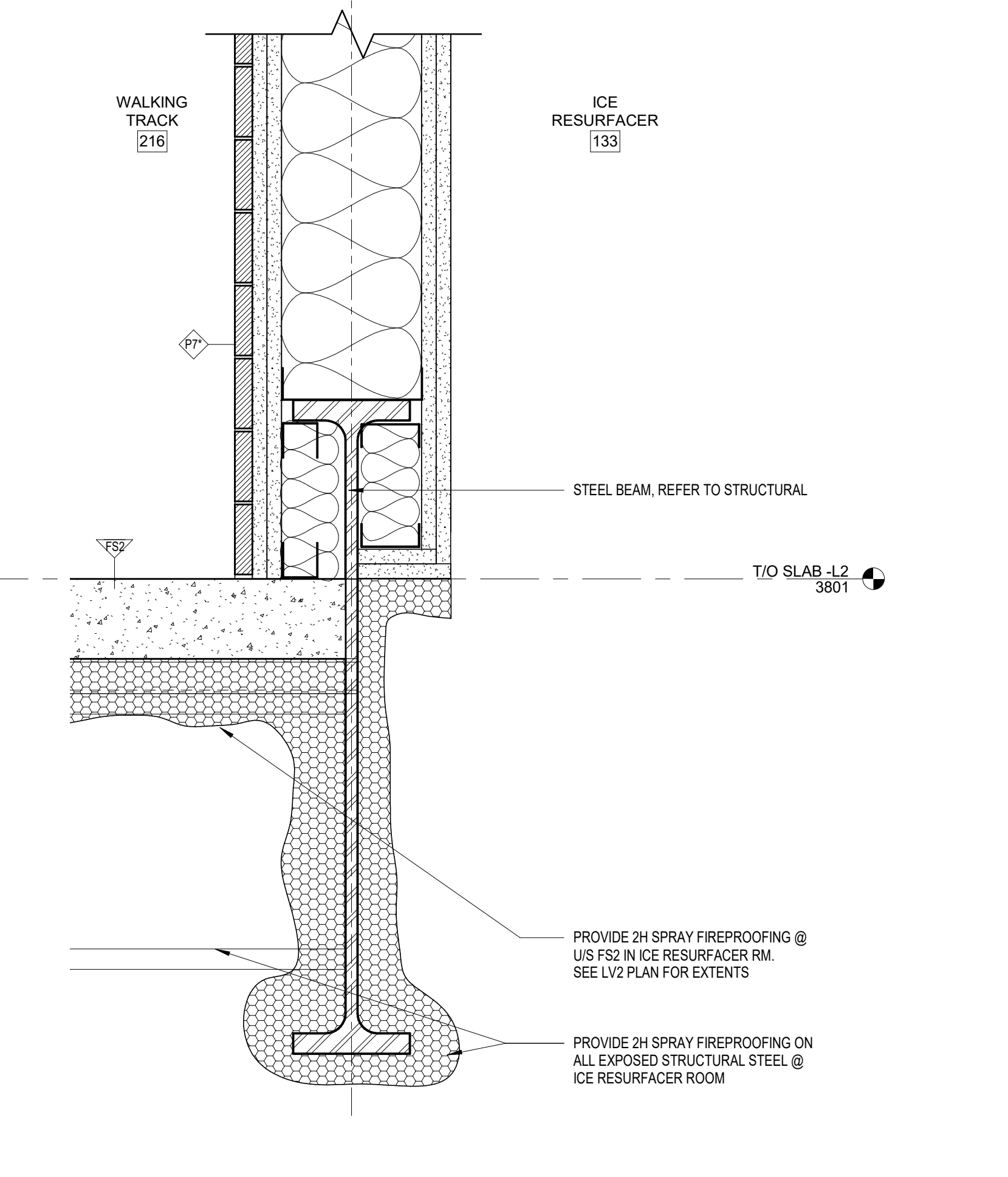
11 SECTION DETAIL @ ATRIUM CURTAINWALL SILL 2
A7.07 1:5



7 SECTION DETAIL @ WARM ROOM GLAZING
A7.07 / A3.02 1:5



8 SECTION DETAIL @ ICE PLANT WALL
A7.07 / A4.11 1:5



9 SECTION DETAIL @ ICE RESURFACER WALL
A7.07 1:5

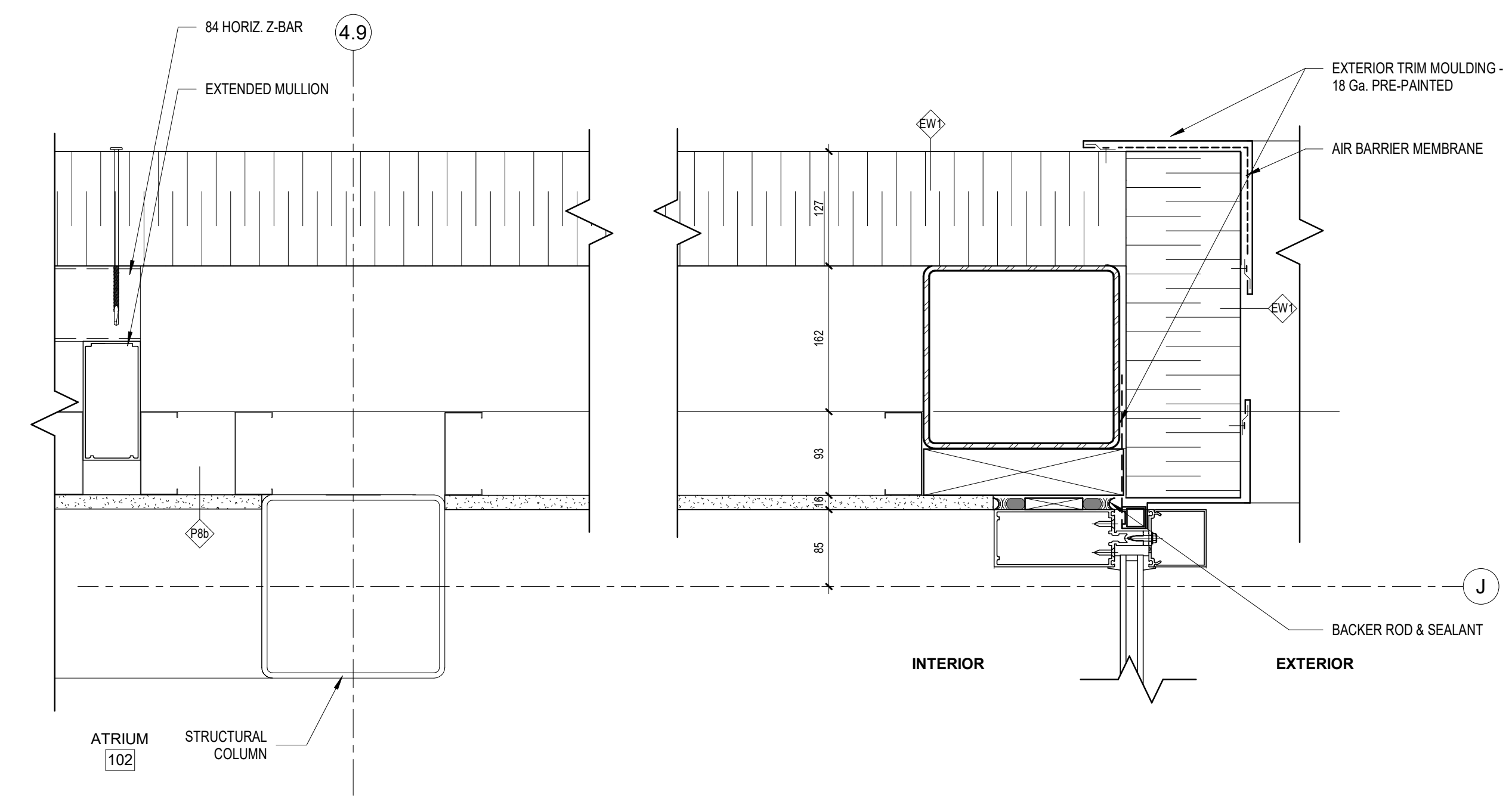
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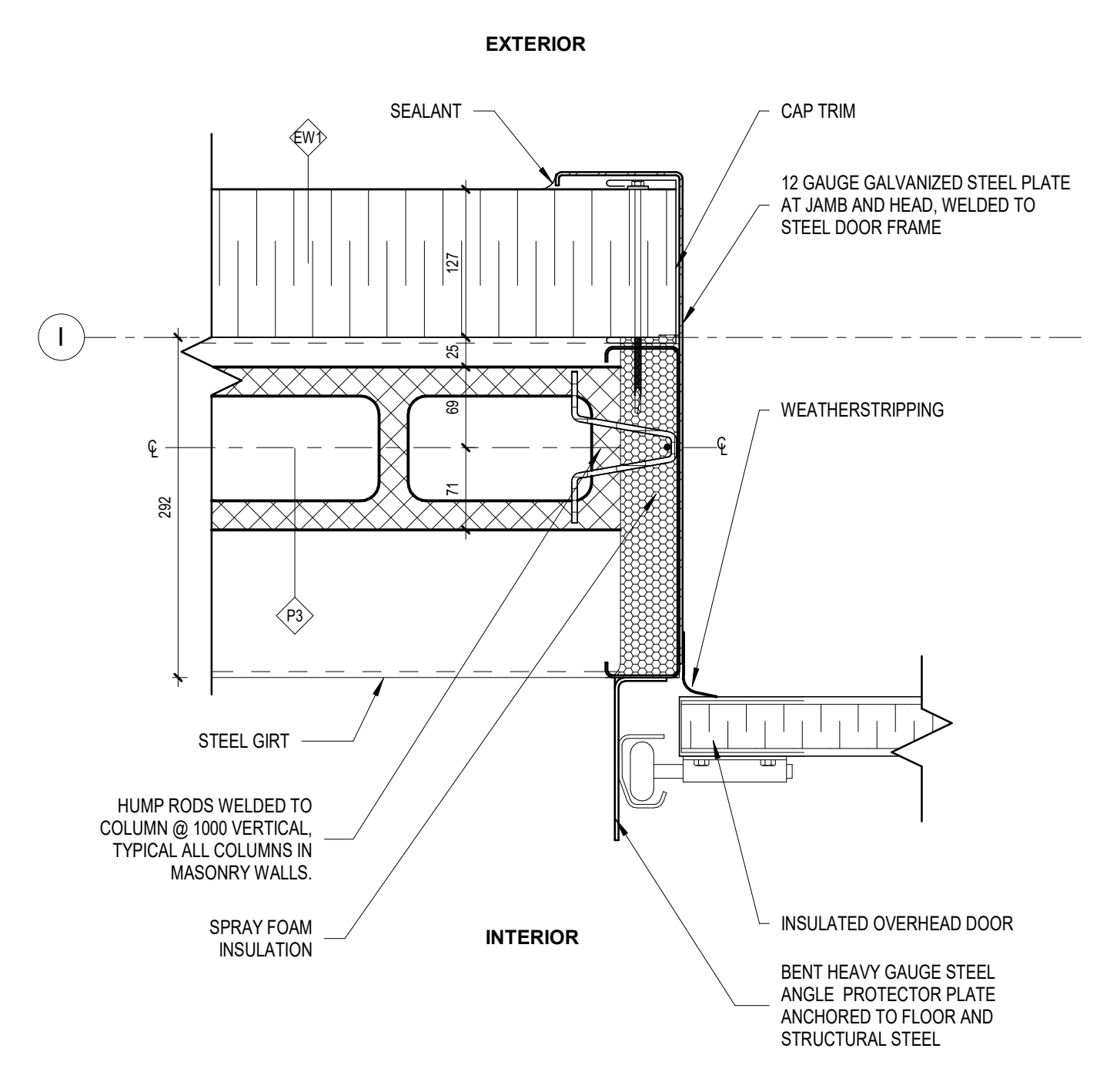
PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL
REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

PROJECT NO.: 21111
DRAWN BY: OM / MM / DE
CHECKED BY: MMG / PC
SCALE: As indicated

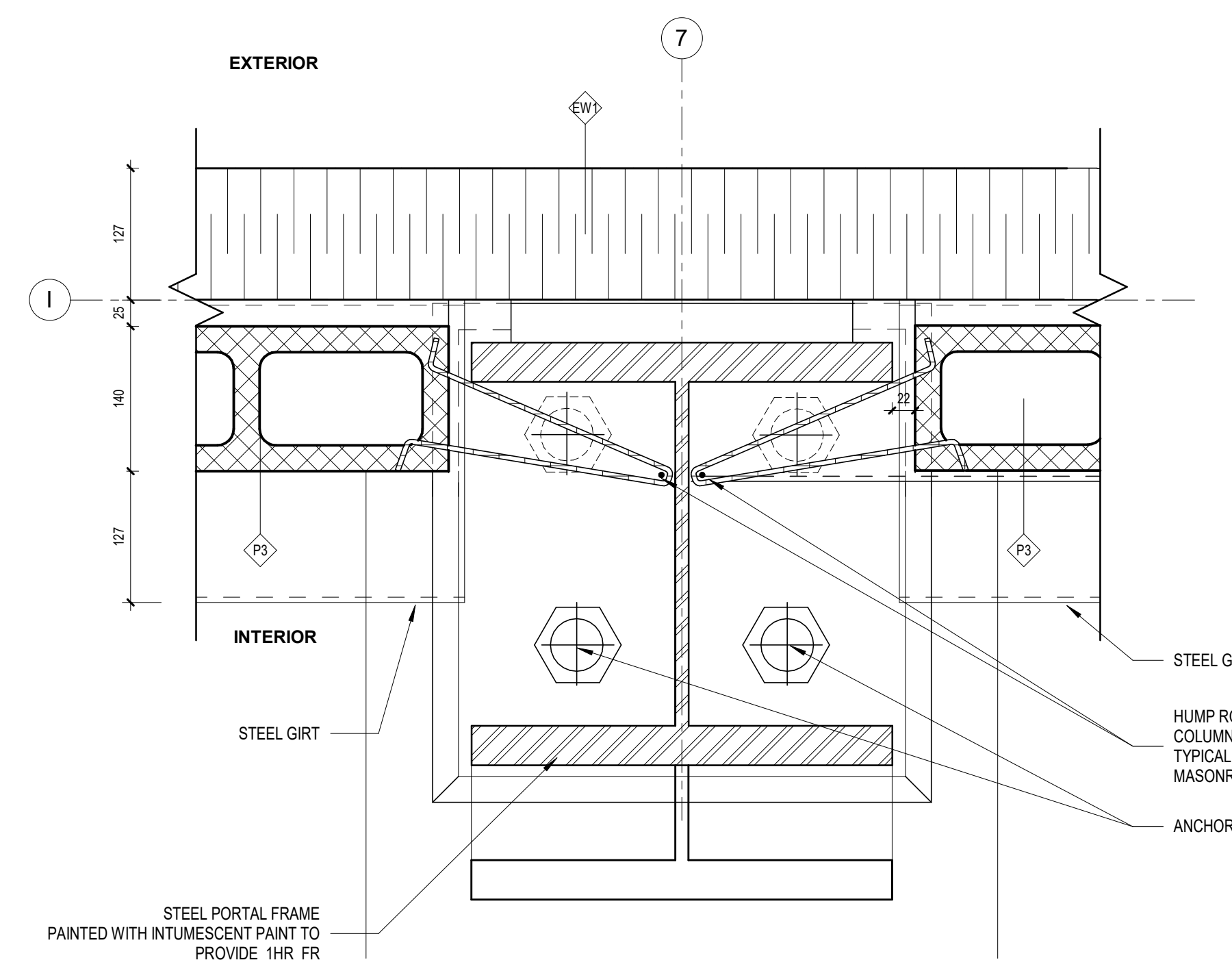
SECTION DETAILS & ROOF
HATCH



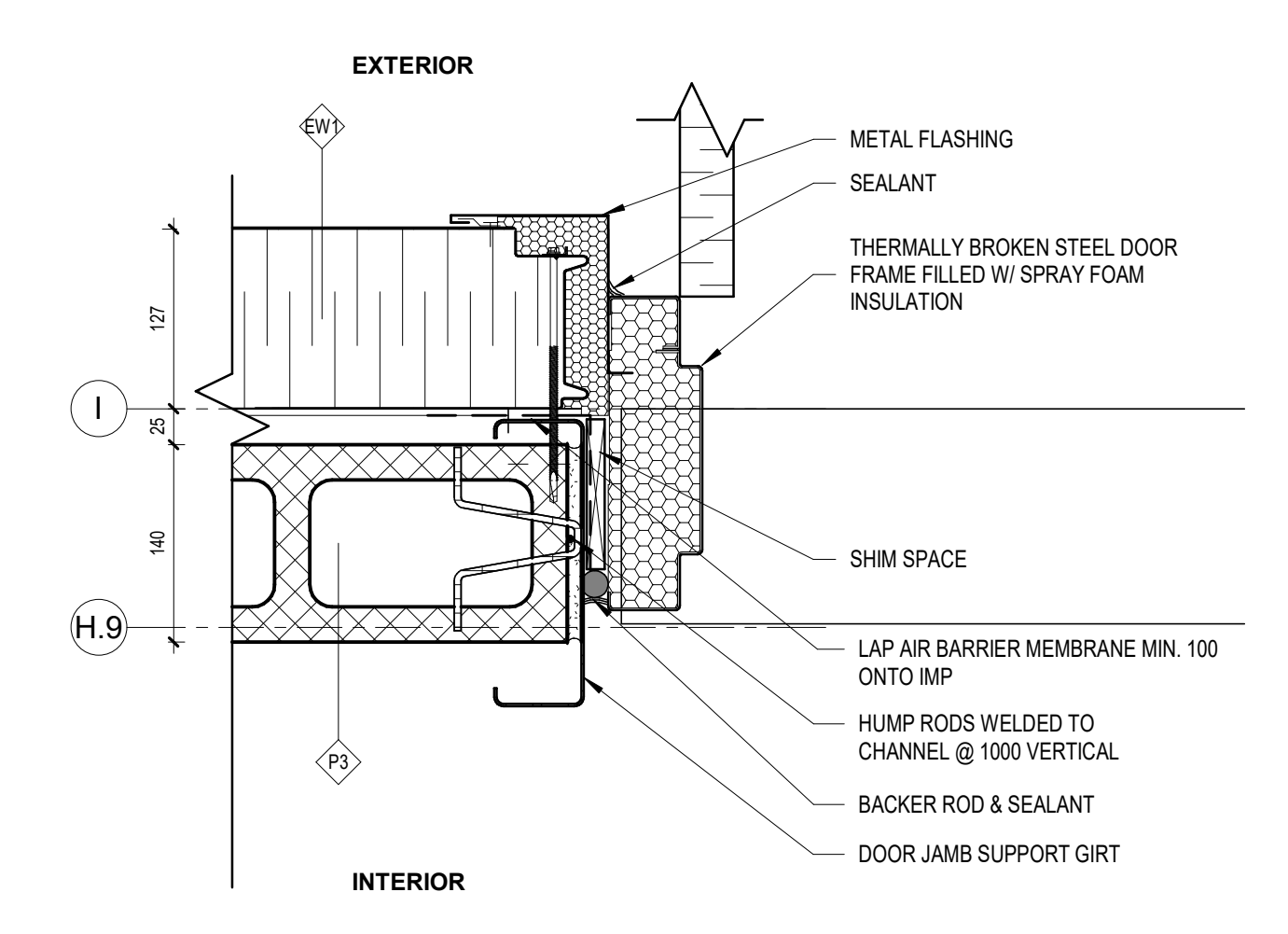
1 PLAN DETAIL - CORNER AT ATRIUM
 A7.10 AT.10 1:5



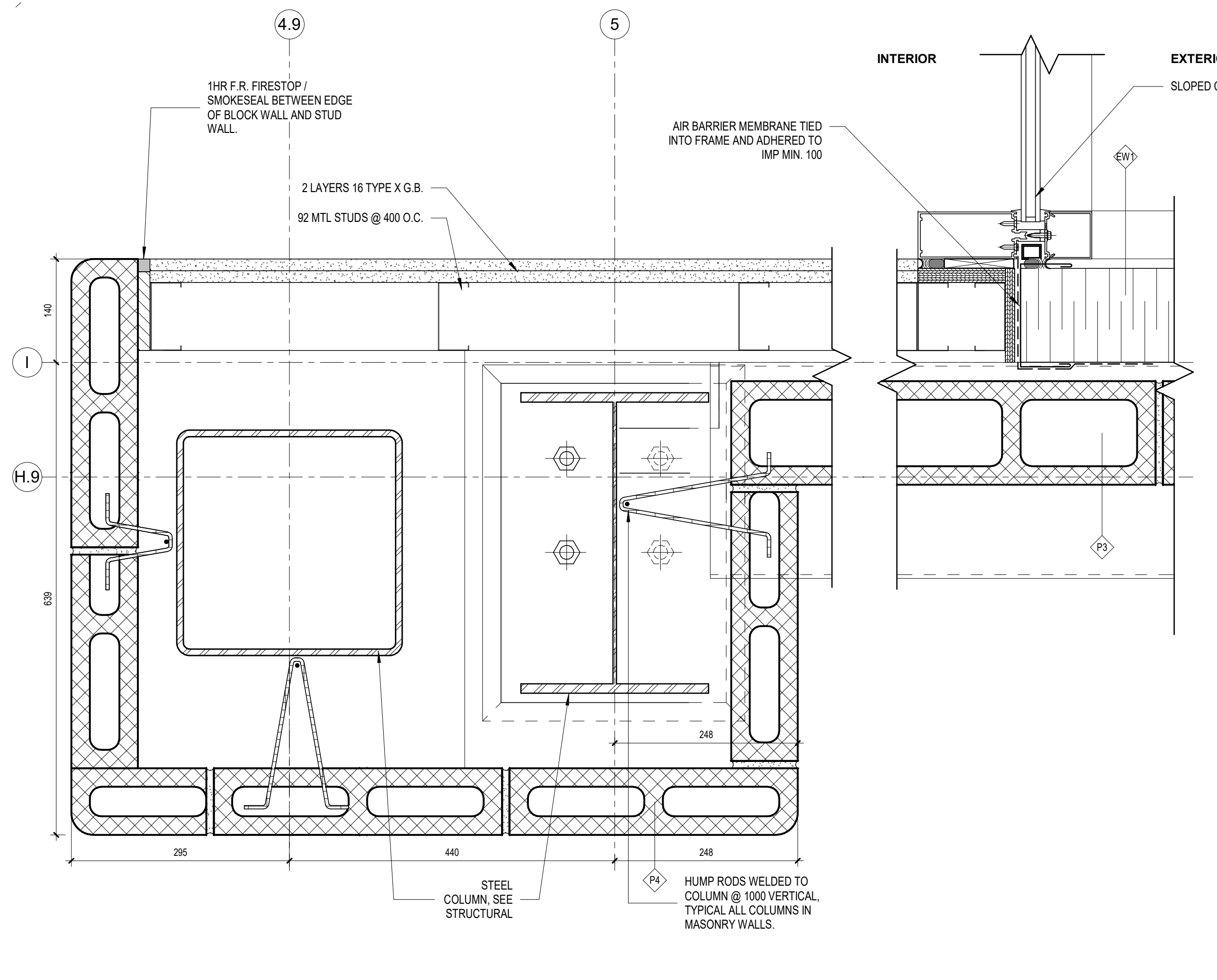
2 PLAN DETAIL @ OVERHEAD DOOR
 A7.10 AT.10 1:5



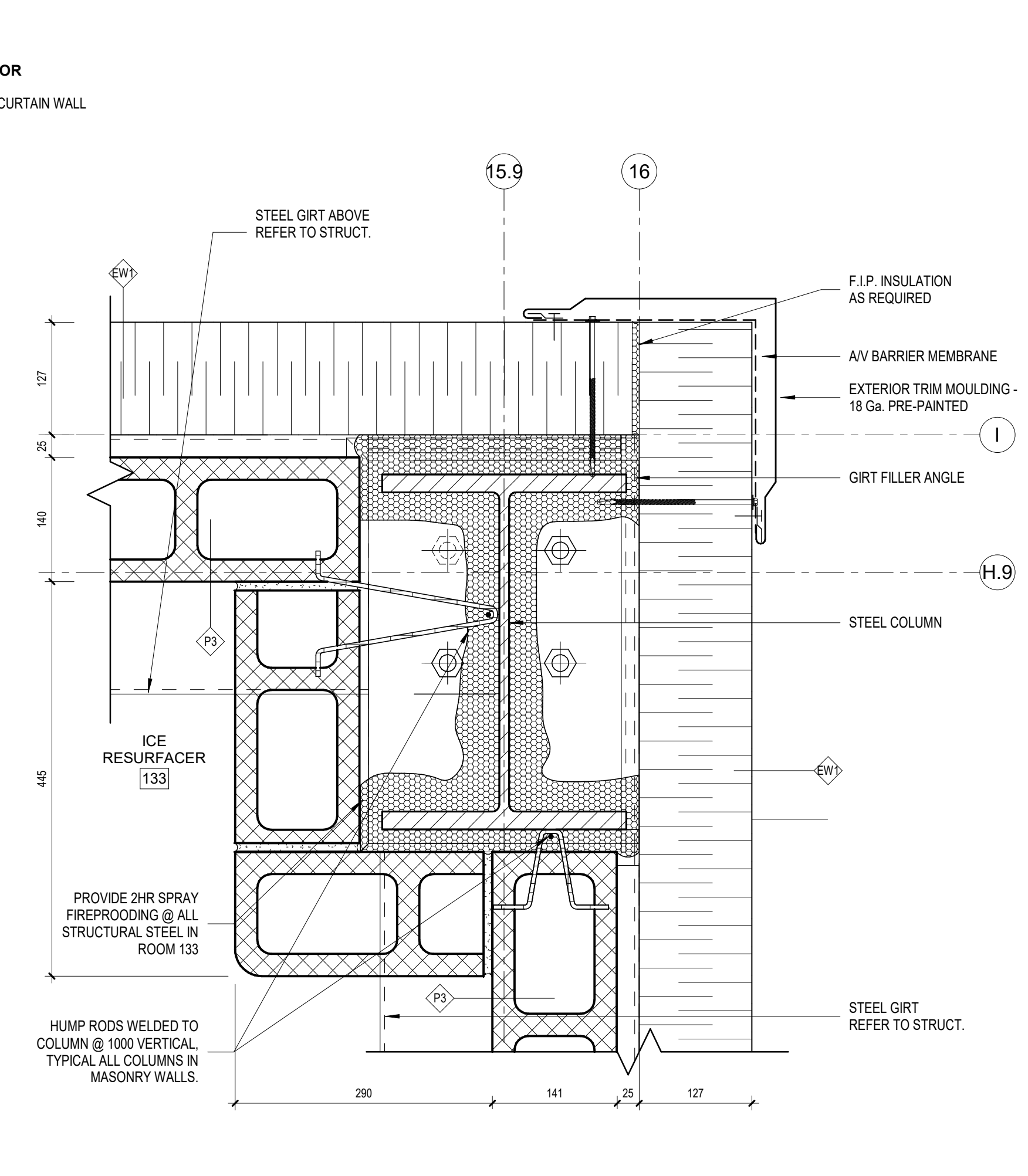
3 PLAN DETAIL - WALL AND COLUMN @ PLAYERS CORRIDOR - TYPICAL
 A7.10 AT.10 1:5



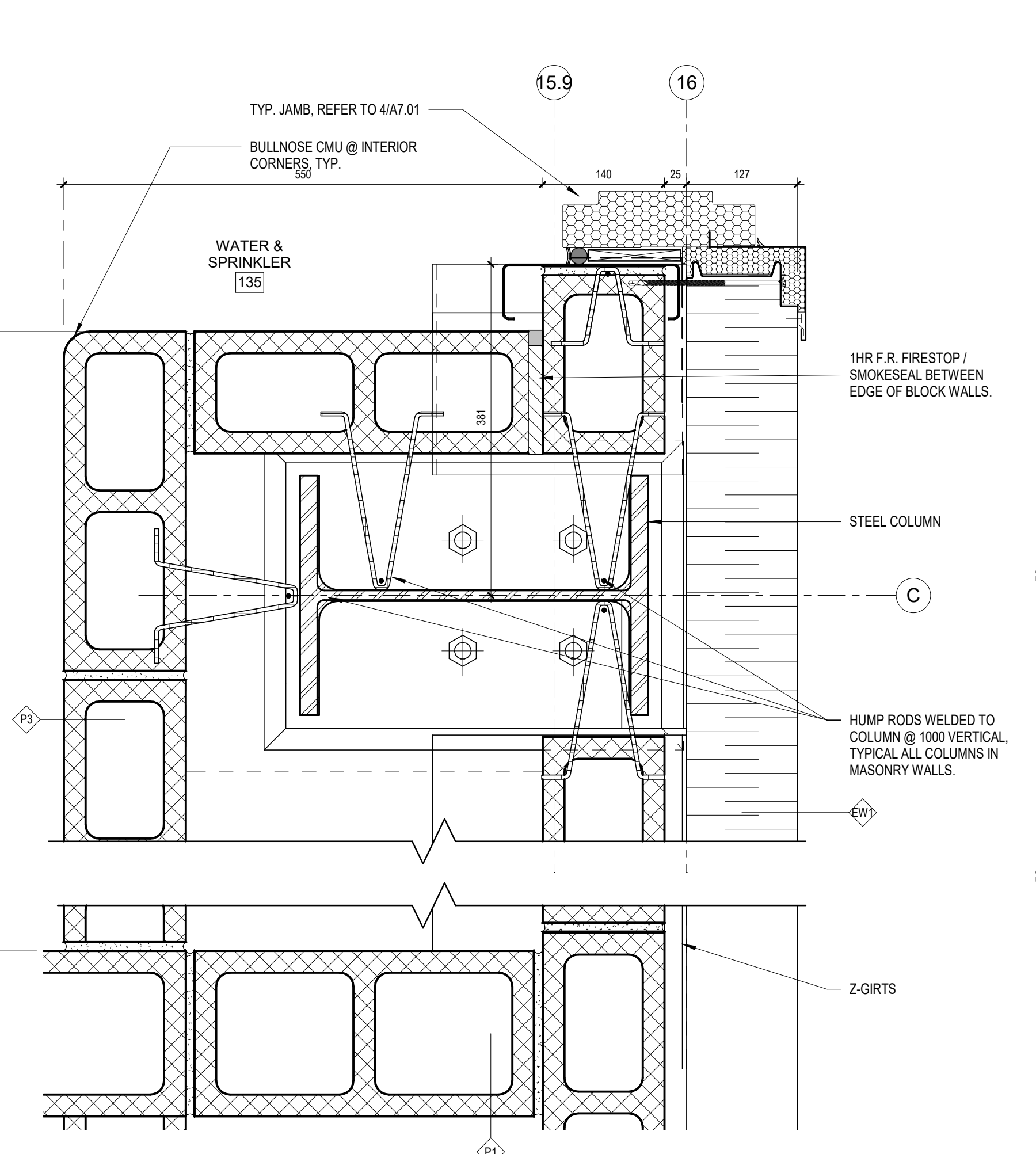
4 PLAN DETAIL @ DOOR JAMB - TYPICAL
 A7.10 AT.10 1:5



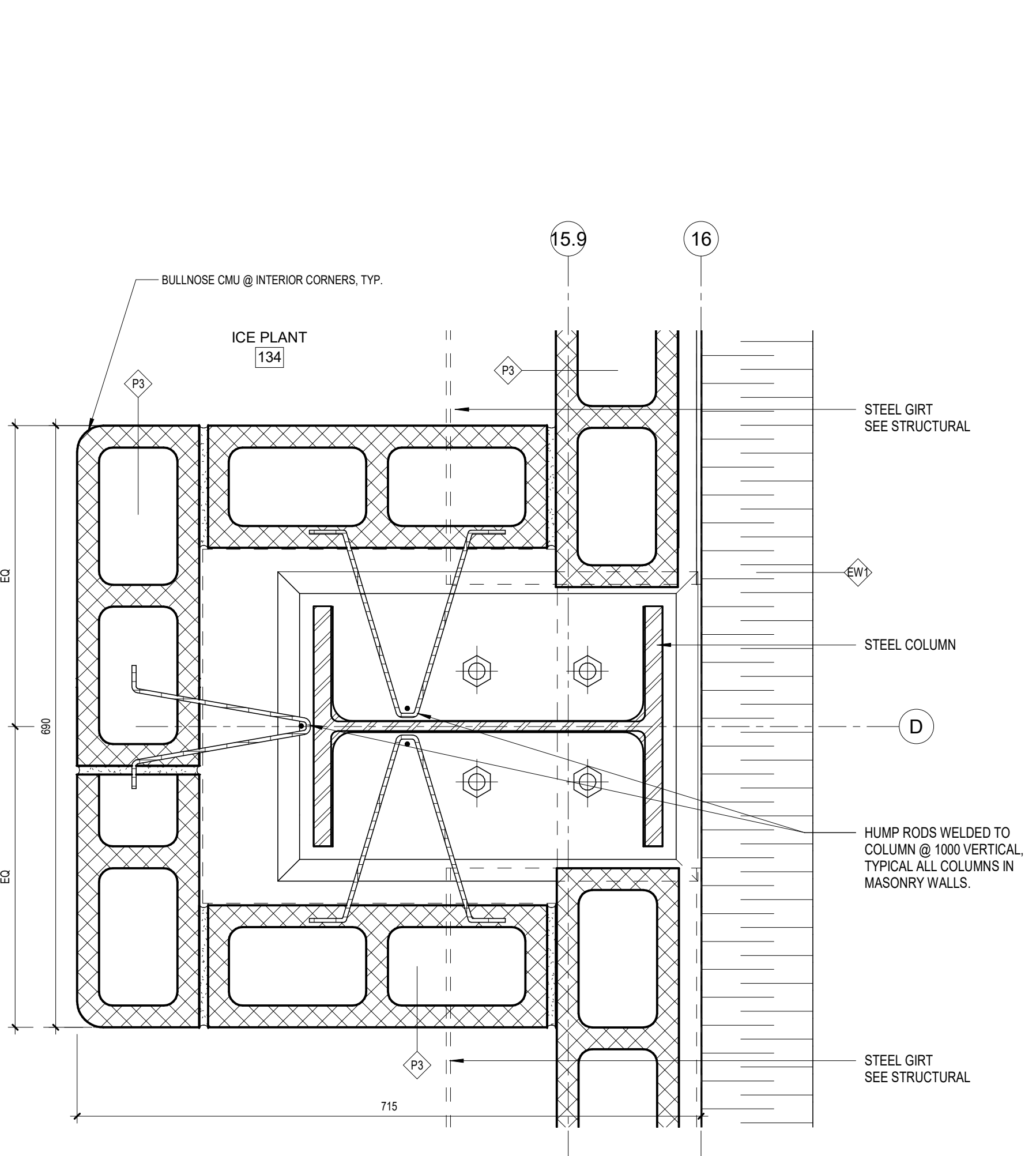
5 PLAN DETAIL - INNER CORNER @ GRIDLINE 5/1
 A7.10 AT.10 1:5



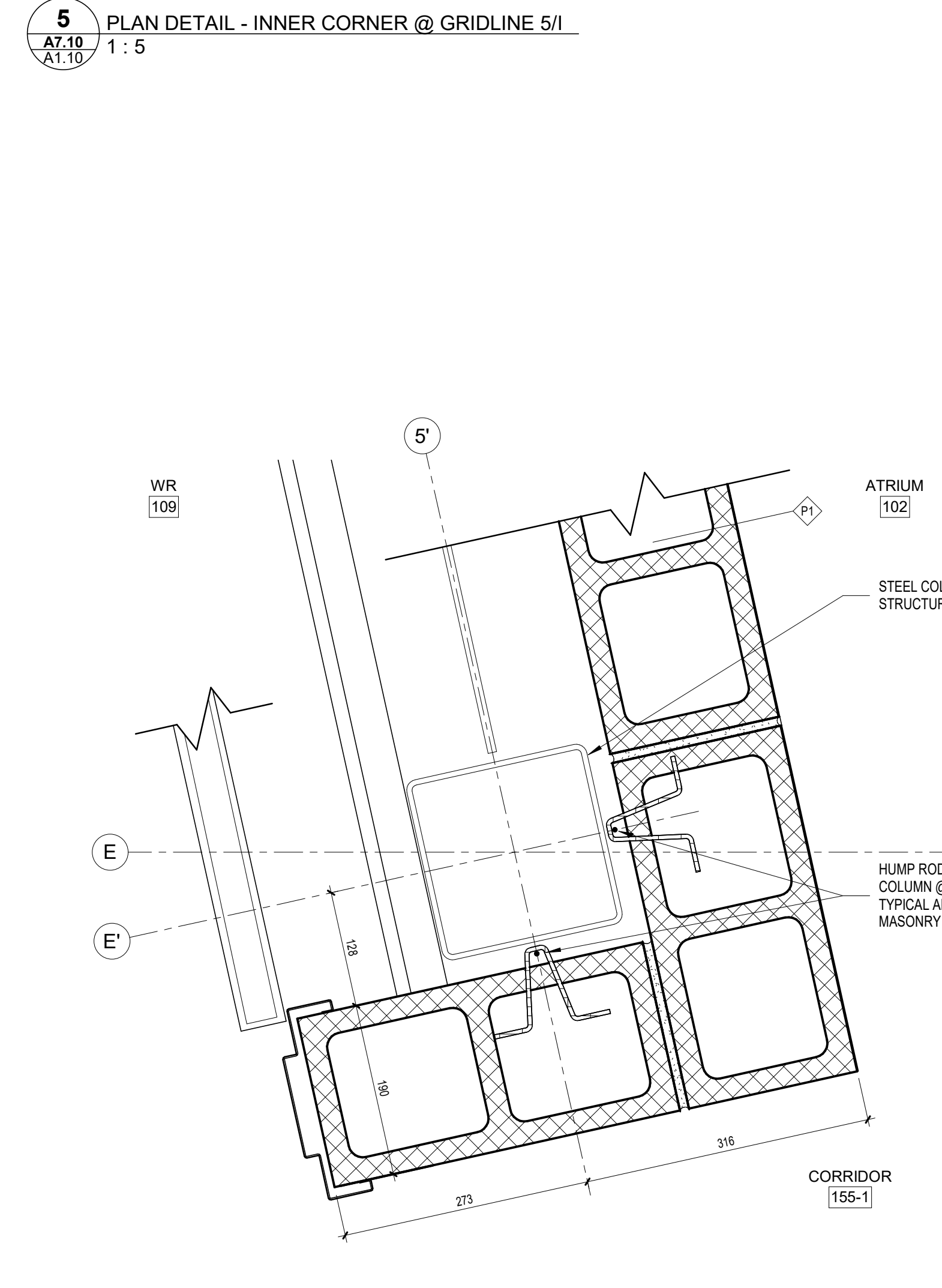
6 PLAN DETAIL - OUTSIDE CORNER @ GRIDLINE 1/16
 A7.10 AT.10 1:5



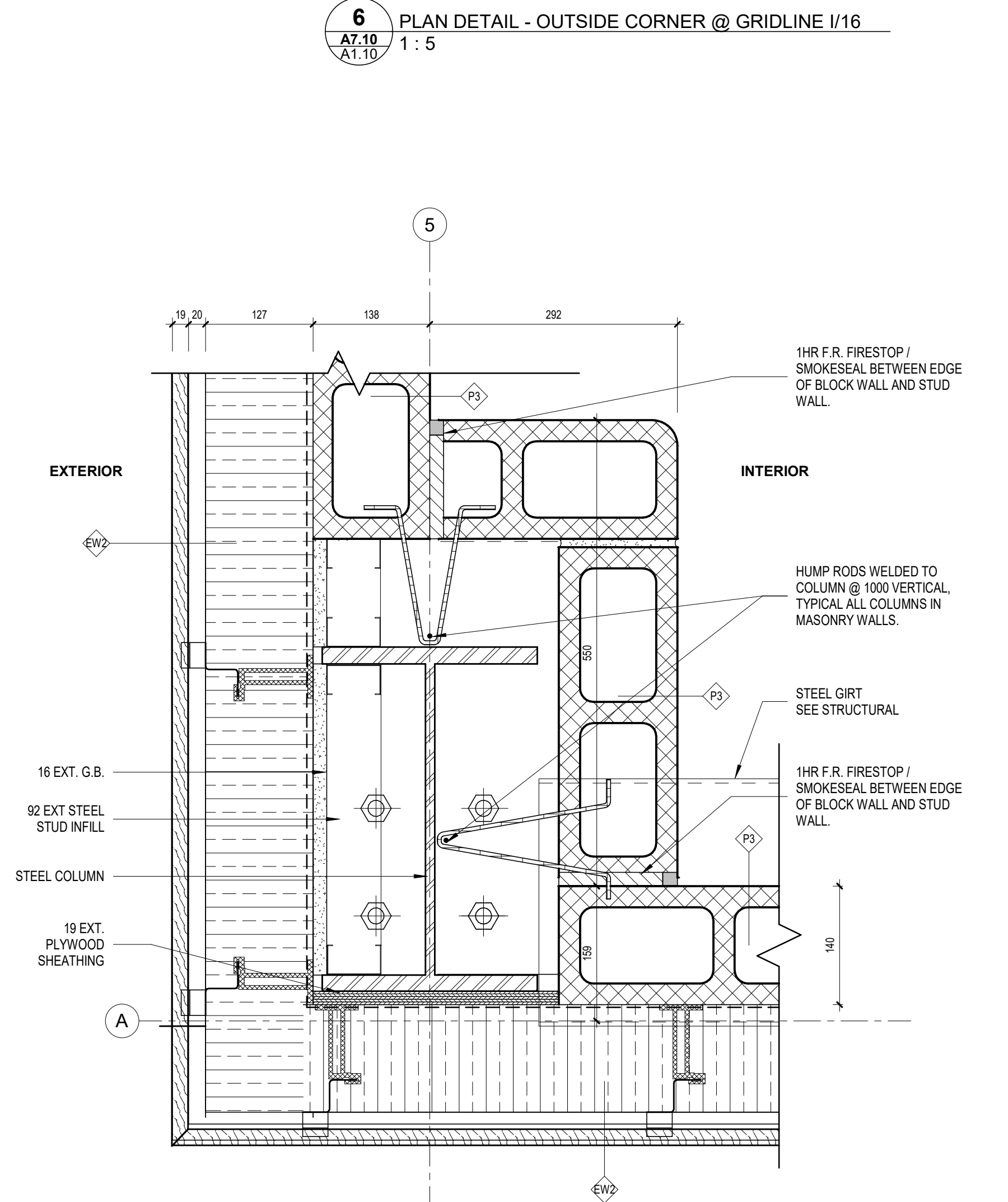
7 PLAN DETAIL - COLUMN @ 16 / C
 A7.10 AT.10 1:5



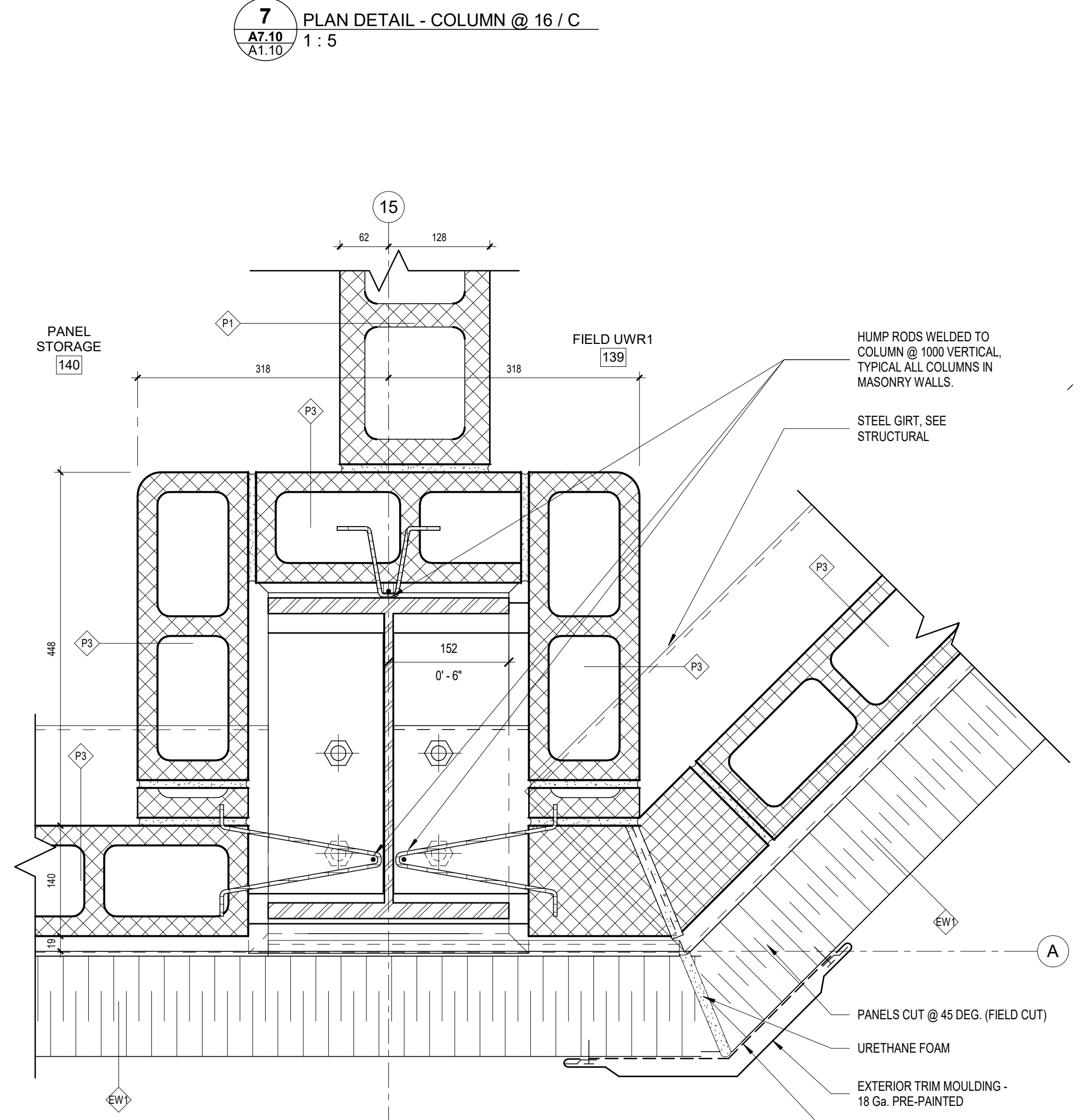
8 PLAN DETAIL - COLUMN @ 16 / D
 A7.10 AT.10 1:5



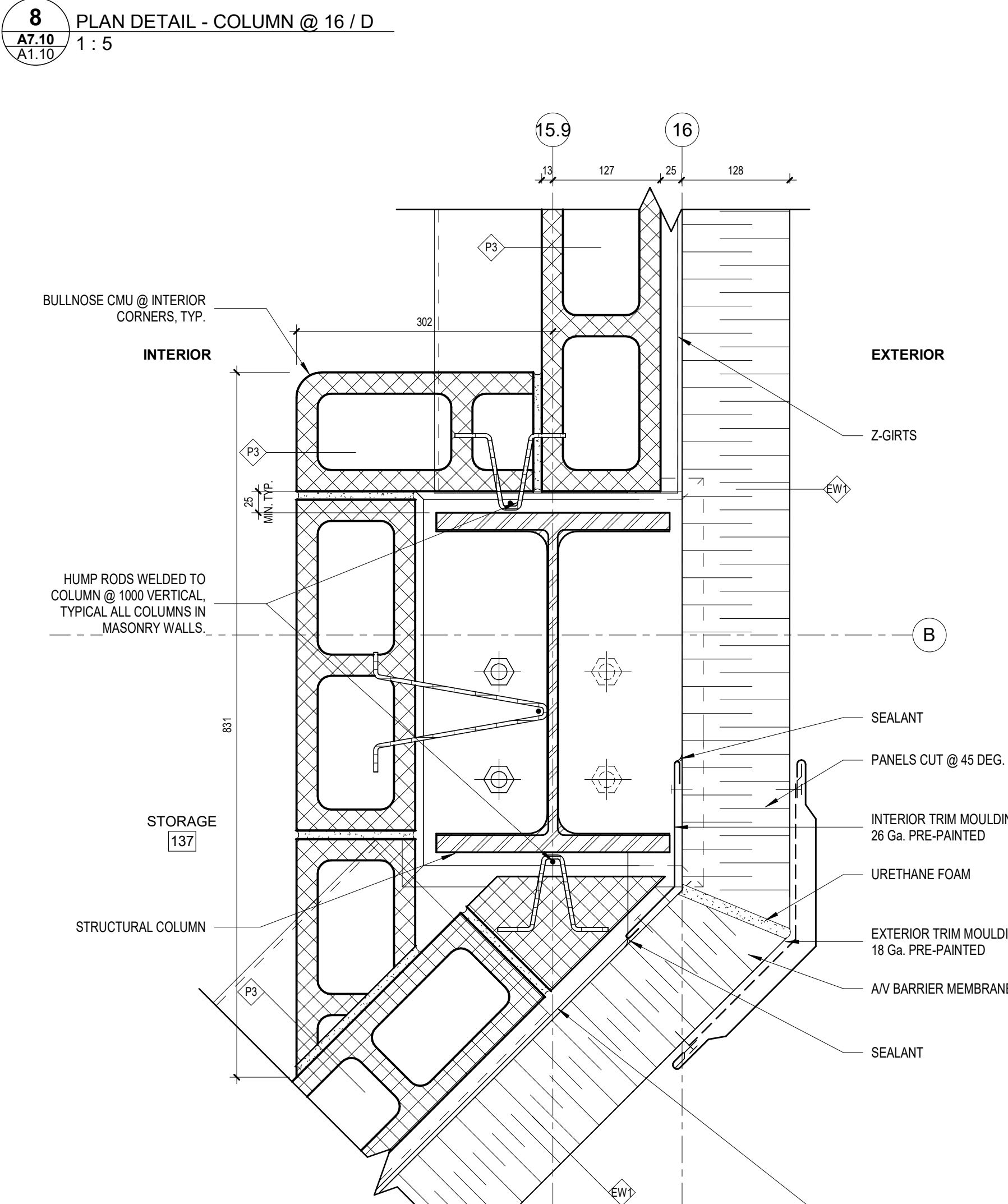
9 PLAN DETAIL @ GRIDLINE 5/1
 A7.10 AT.10 1:5



10 PLAN DETAIL @ GRIDLINES 5/A
 A7.10 AT.10 1:5

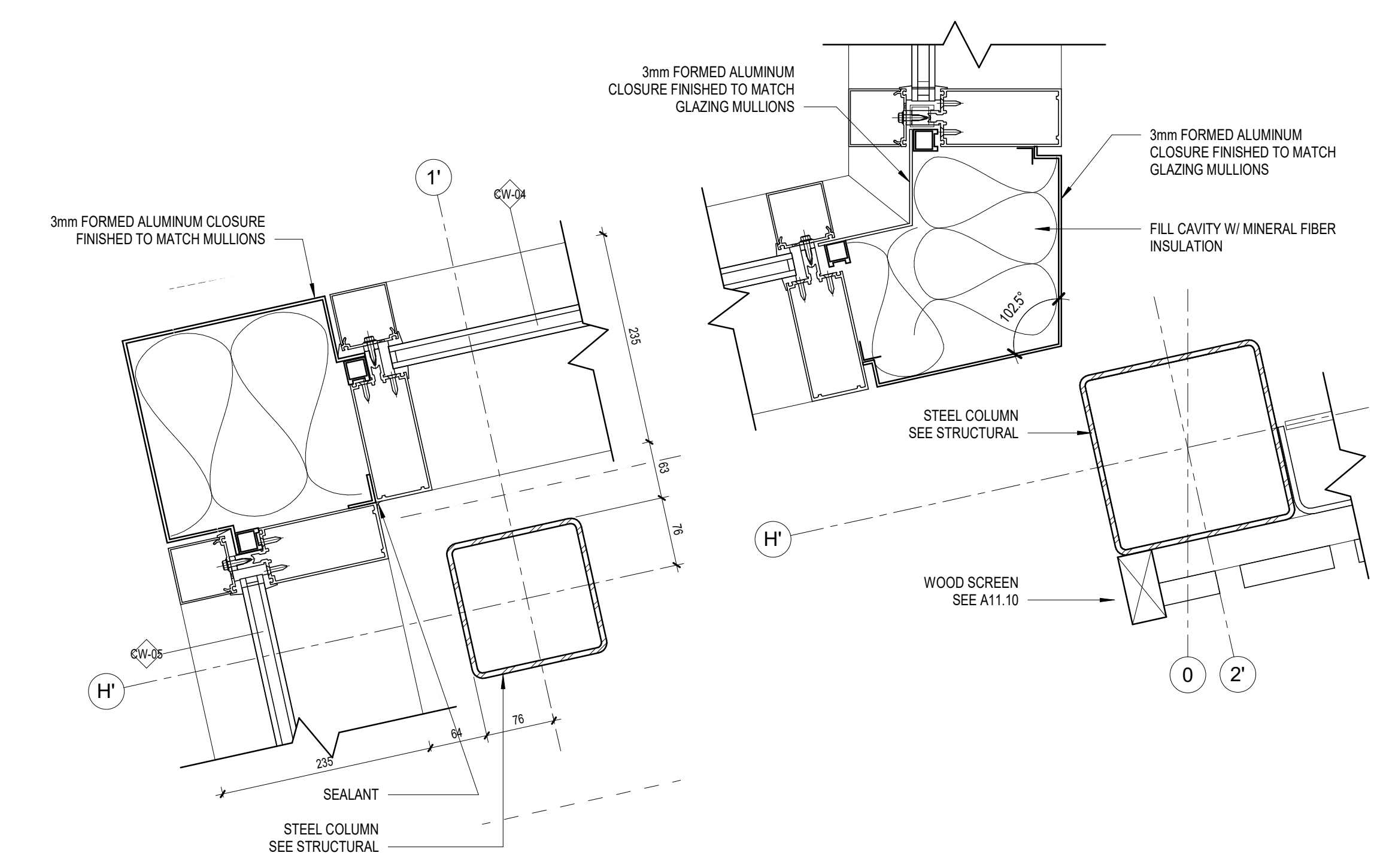


11 PLAN DETAIL - OUTSIDE CORNER @ GRIDLINE 15/A
 A7.10 AT.10 1:5

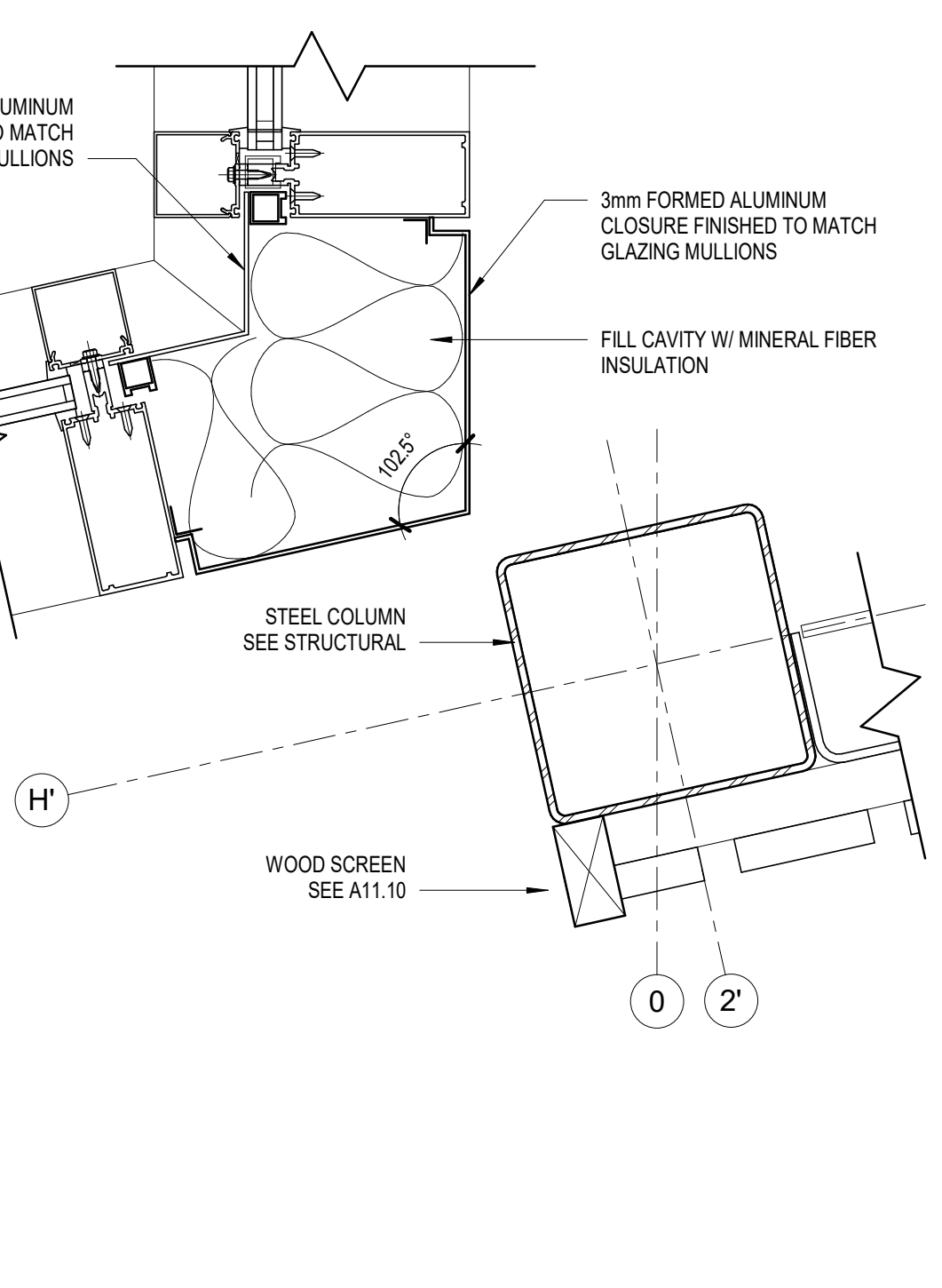


12 PLAN DETAIL - CORNER AT STORAGE
 A7.10 AT.10 1:5

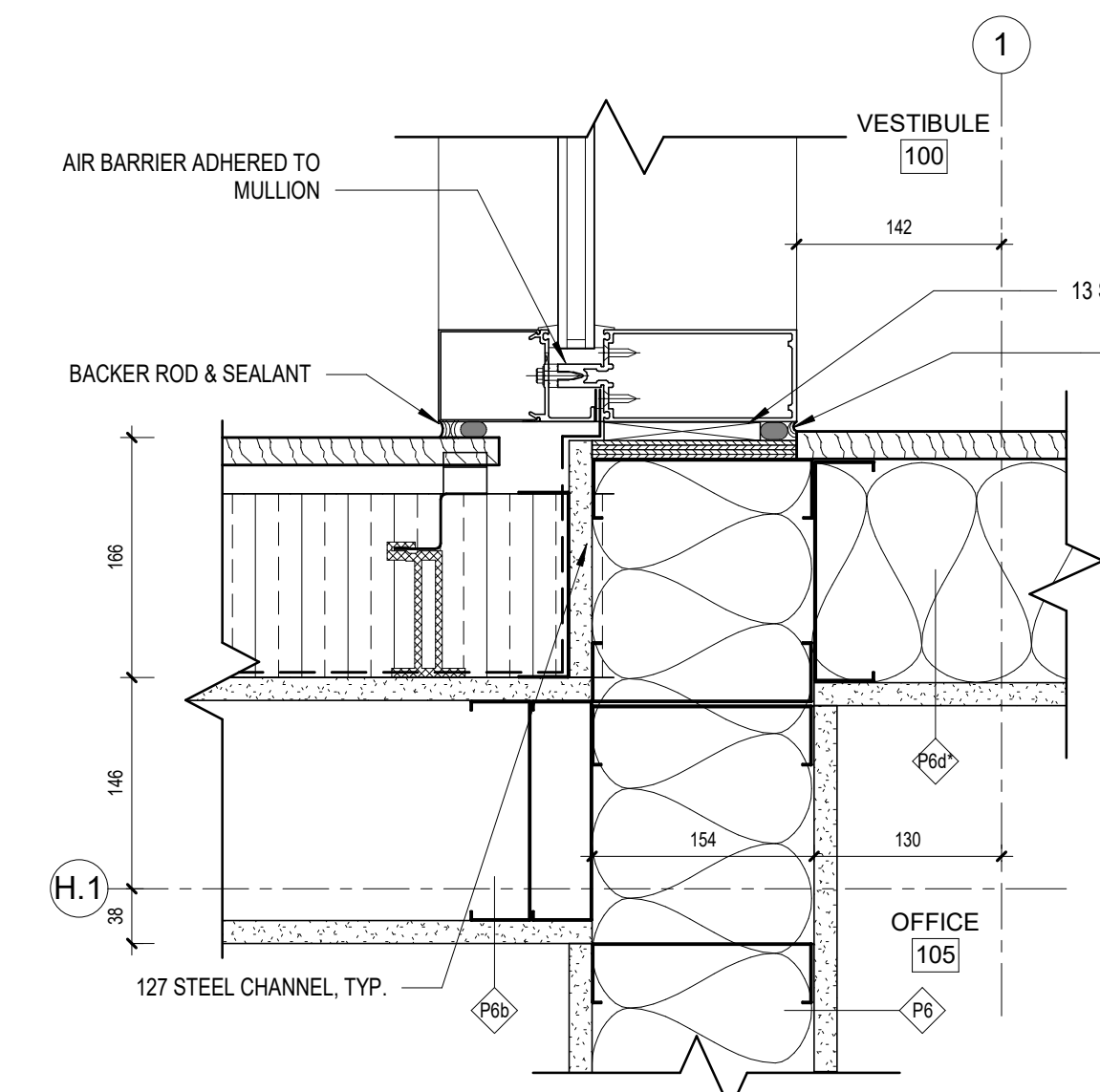
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NO.	REVISION	DATE
STAMP		
PROJECT NAME		
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT		
170 NORTH RIVER ROAD CHARLOTTETOWN, PEI		
PROJECT NO.: 21111		
DRAWN BY: OM / MM / DE		
CHECKED BY: MMG / PC		
SCALE: 1:5		



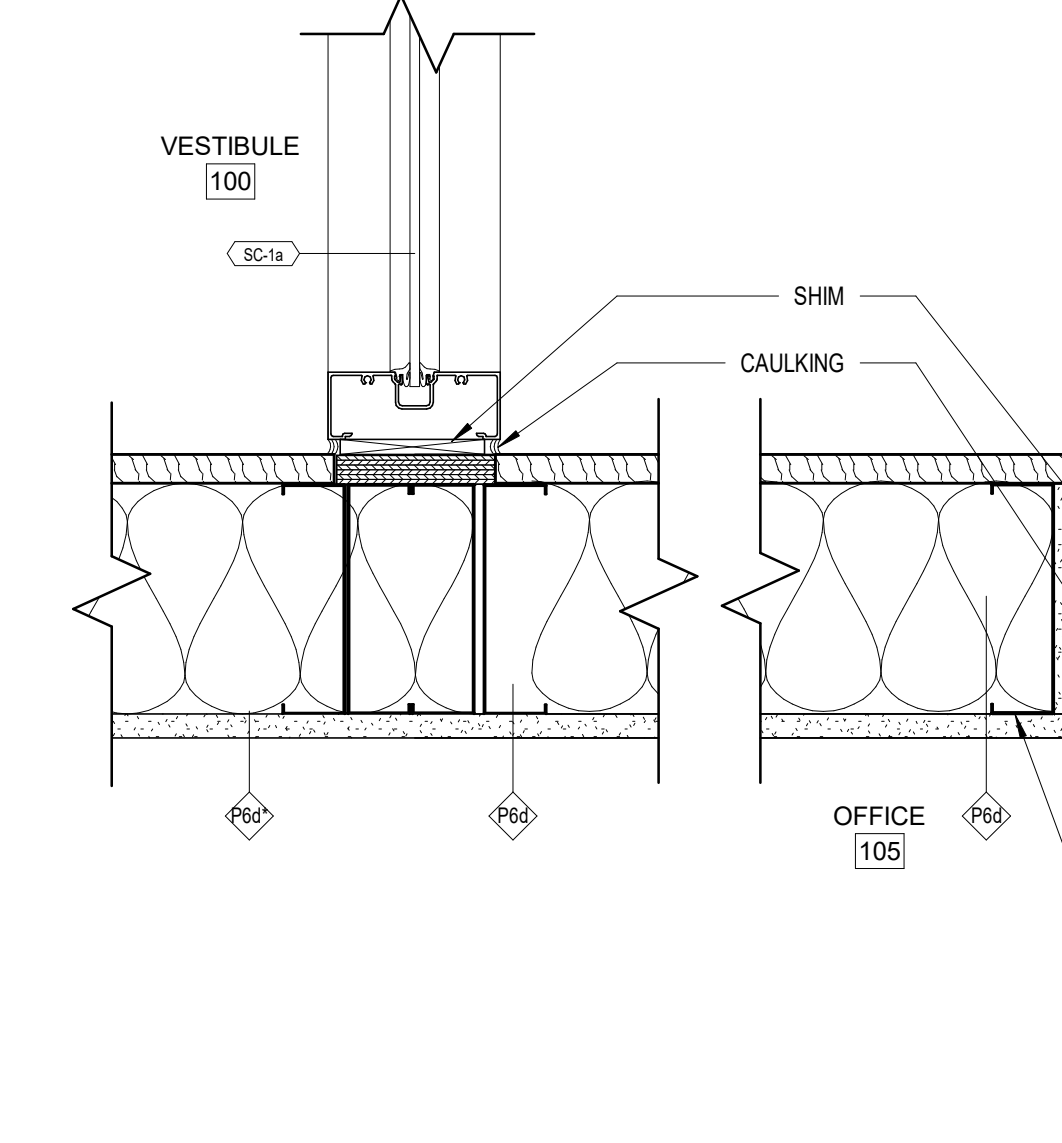
A PLAN DETAIL - MULTI-PURPOSE RM @ CLADDING TRANSITION1
 AT-11 1:5



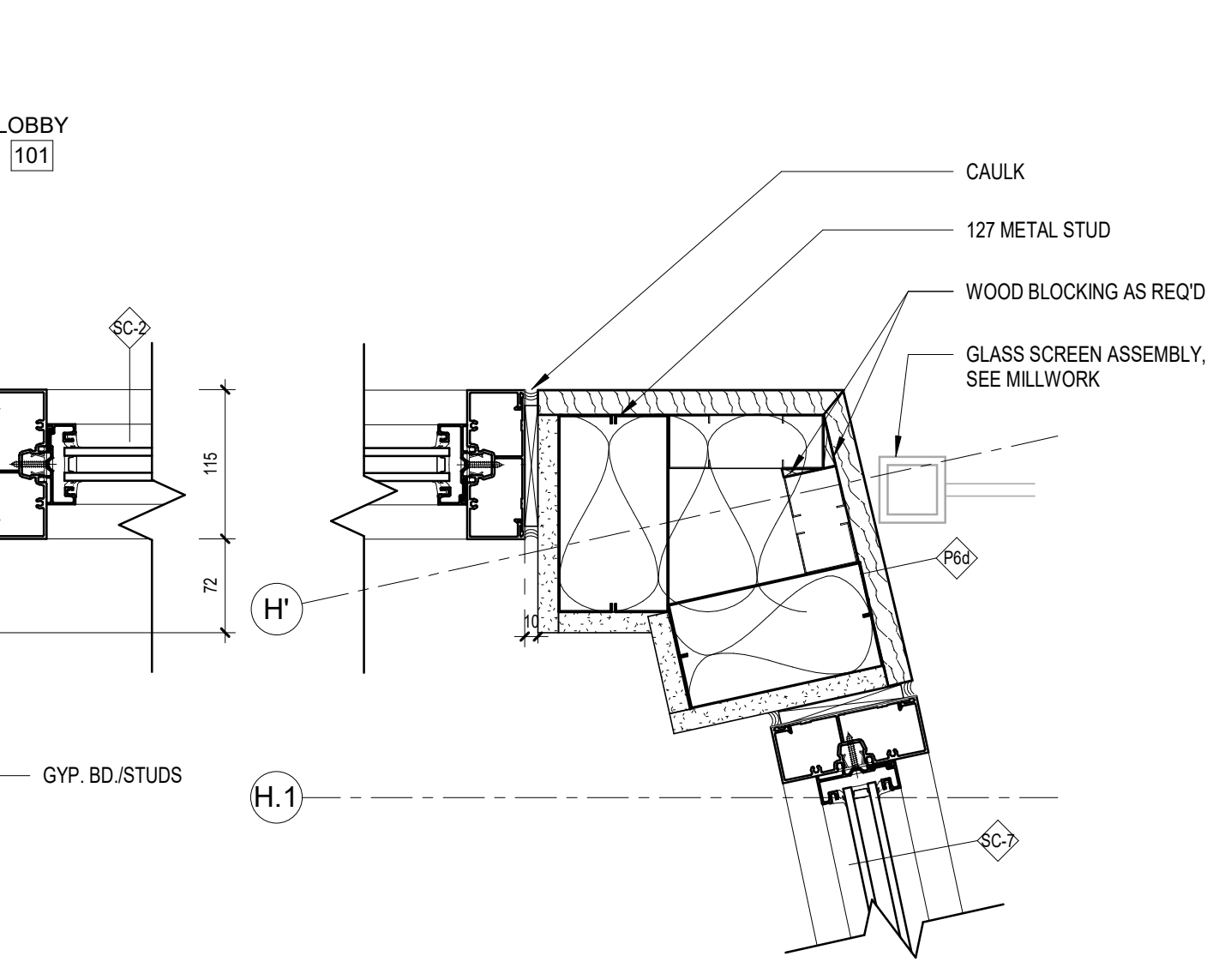
B PLAN DETAIL @ SHELTERED ENTRY
 AT-11 1:5



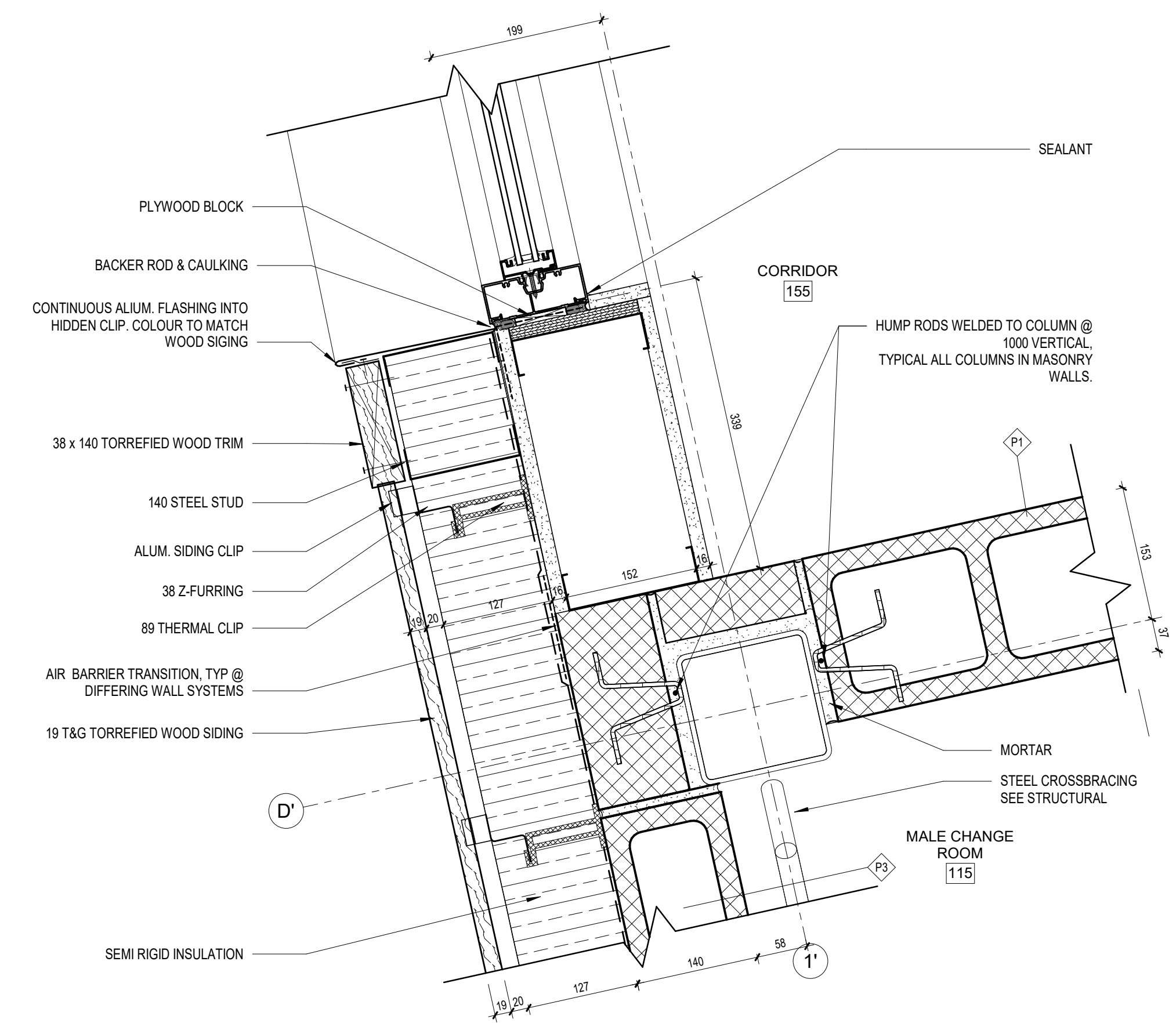
C PLAN DETAIL - ENTRY VESTIBULE CORNER
 AT-11 1:5



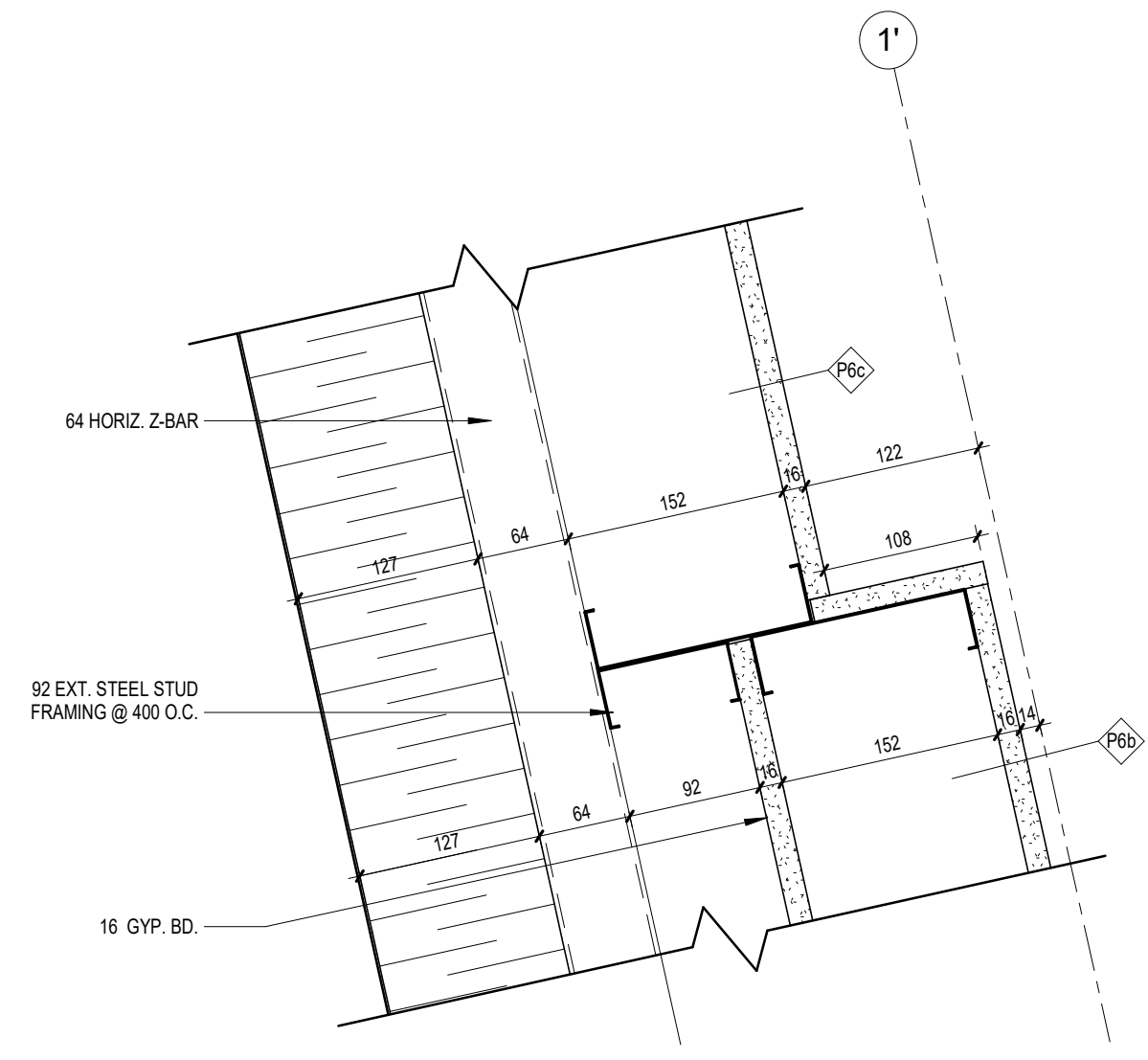
D PLAN DETAIL - LOBBY @ GRIDLINE 2H'
 AT-11 1:5



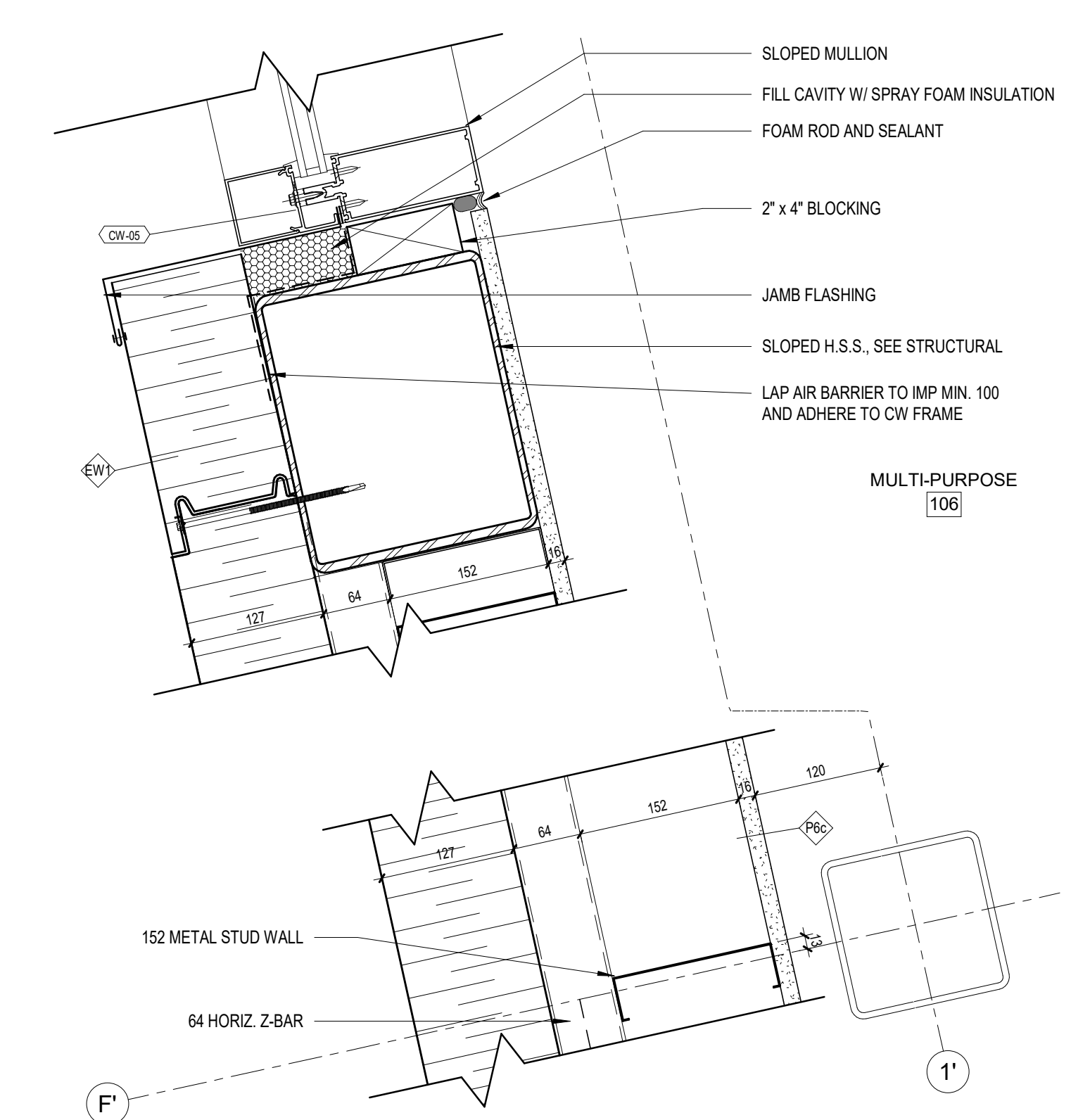
E PLAN DETAIL - LOBBY @ GRIDLINE 2H'1
 AT-11 1:5



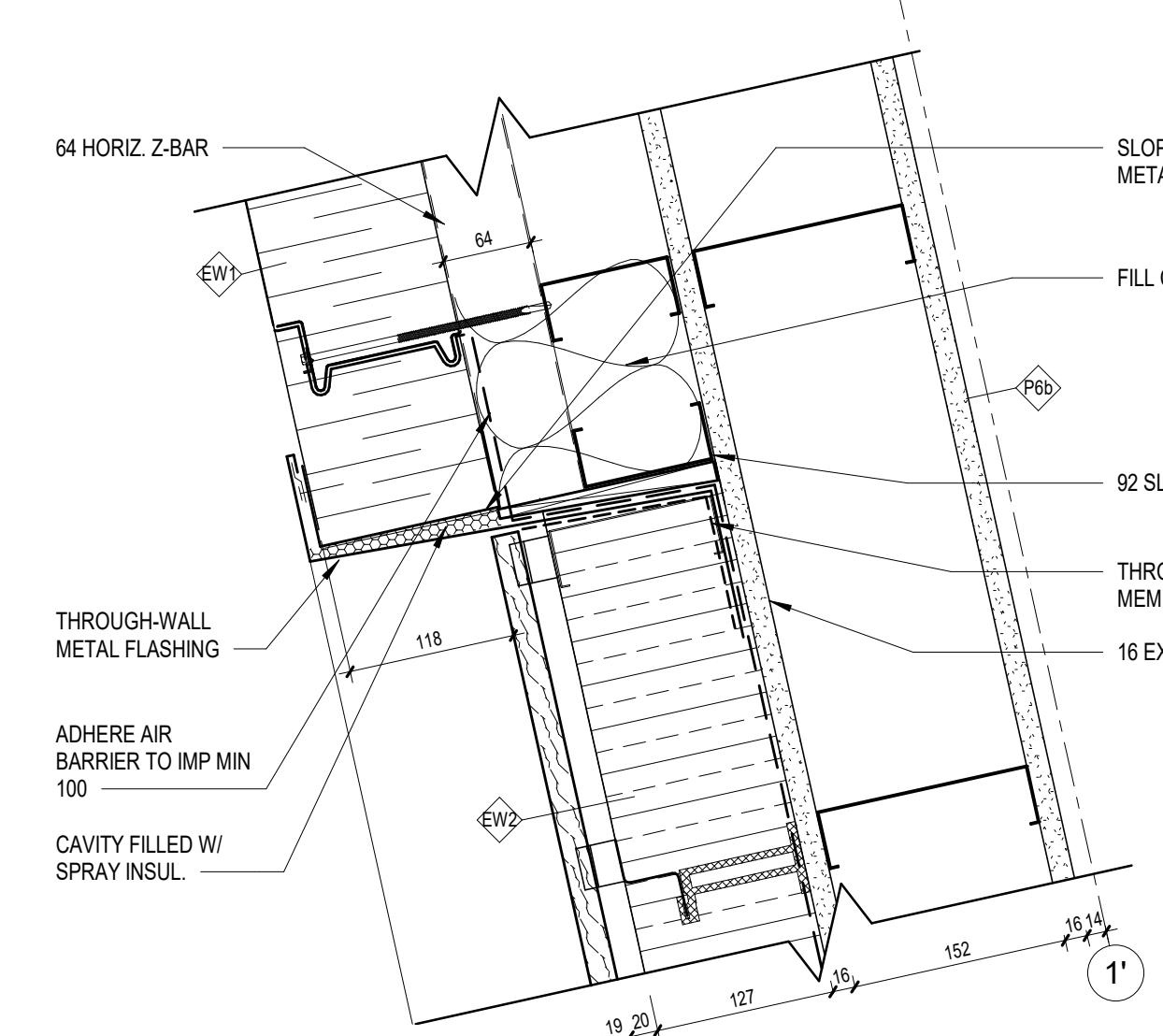
F PLAN DETAIL @ GRIDLINE 1'D'
 AT-11 1:5



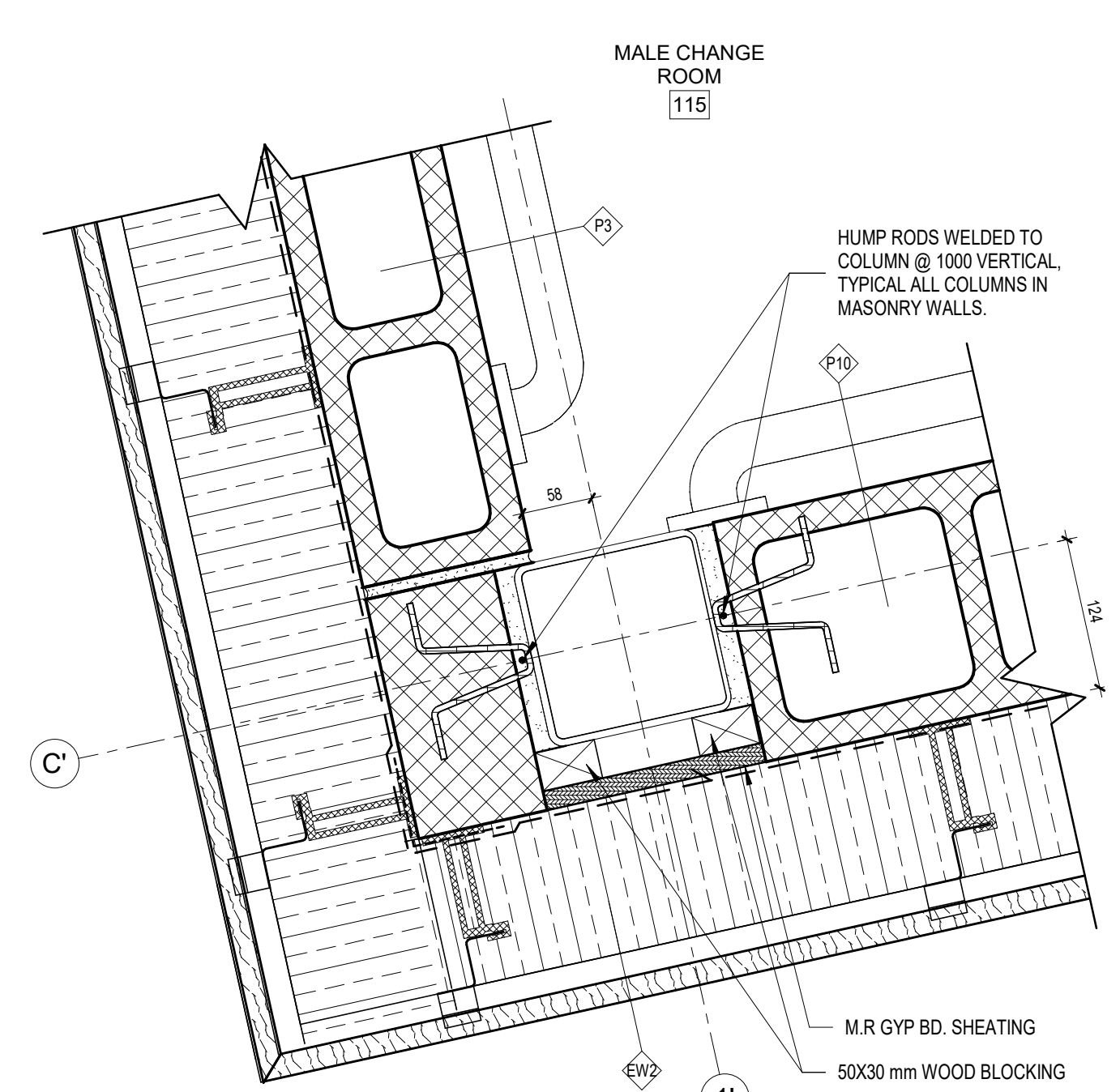
G PLAN DETAIL - MULTI-PURPOSE RM @ CLADDING TRANSITION2
 AT-11 1:5



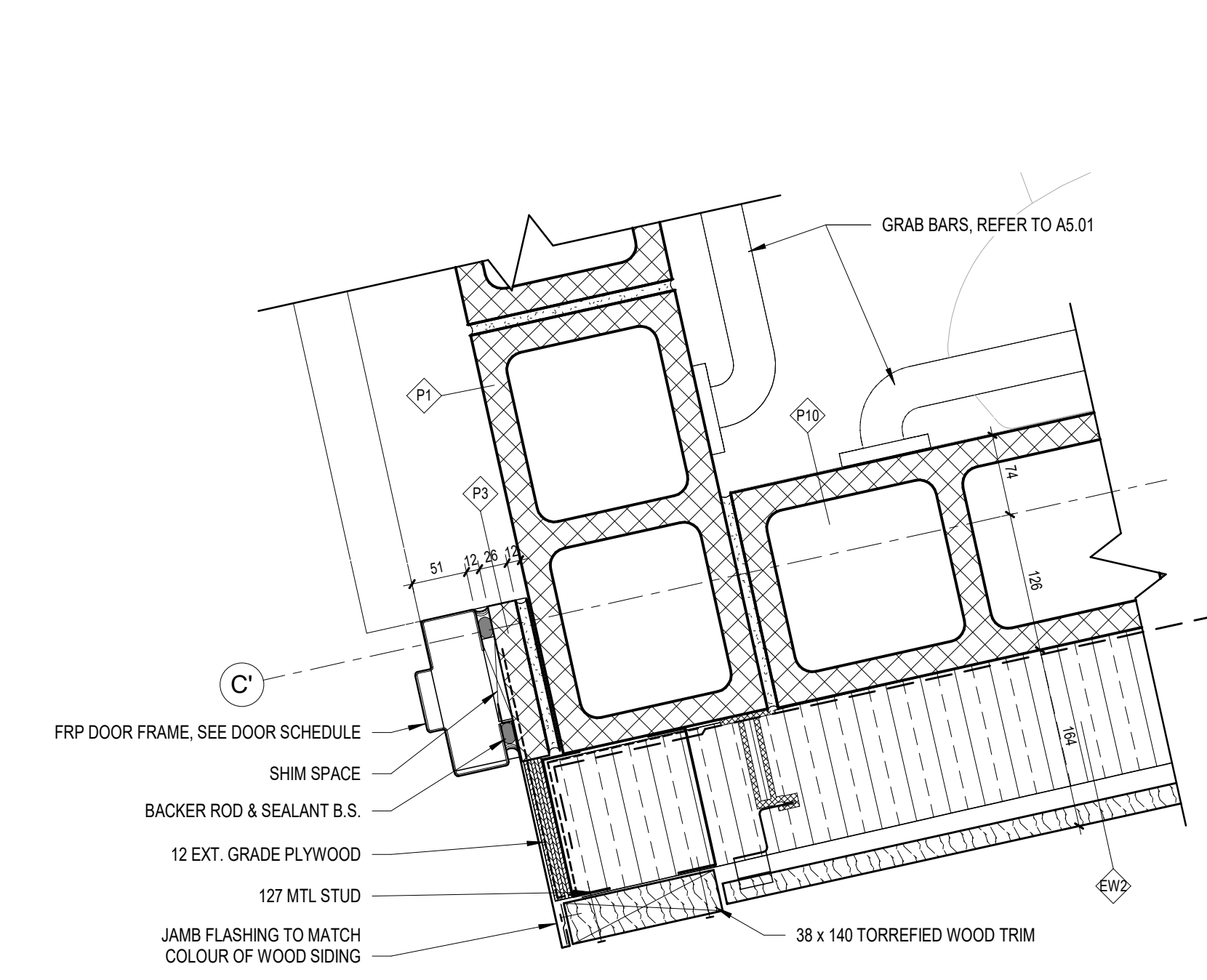
H PLAN DETAIL - MULTI-PURPOSE RM @ GRIDLINE 1'F'
 AT-11 1:5



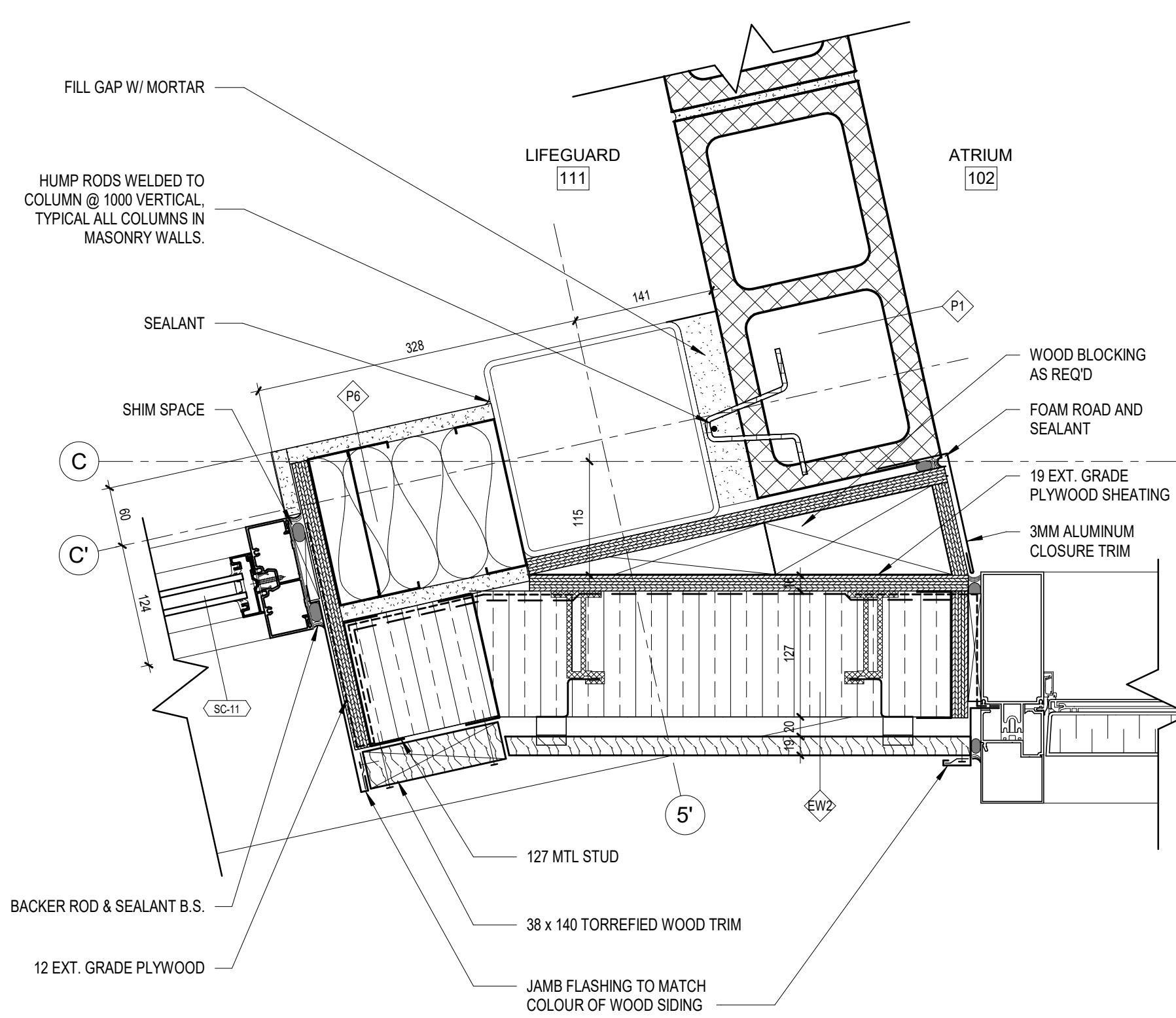
I PLAN DETAIL - MULTI-PURPOSE RM @ CLADDING TRANSITION
 AT-11 1:5



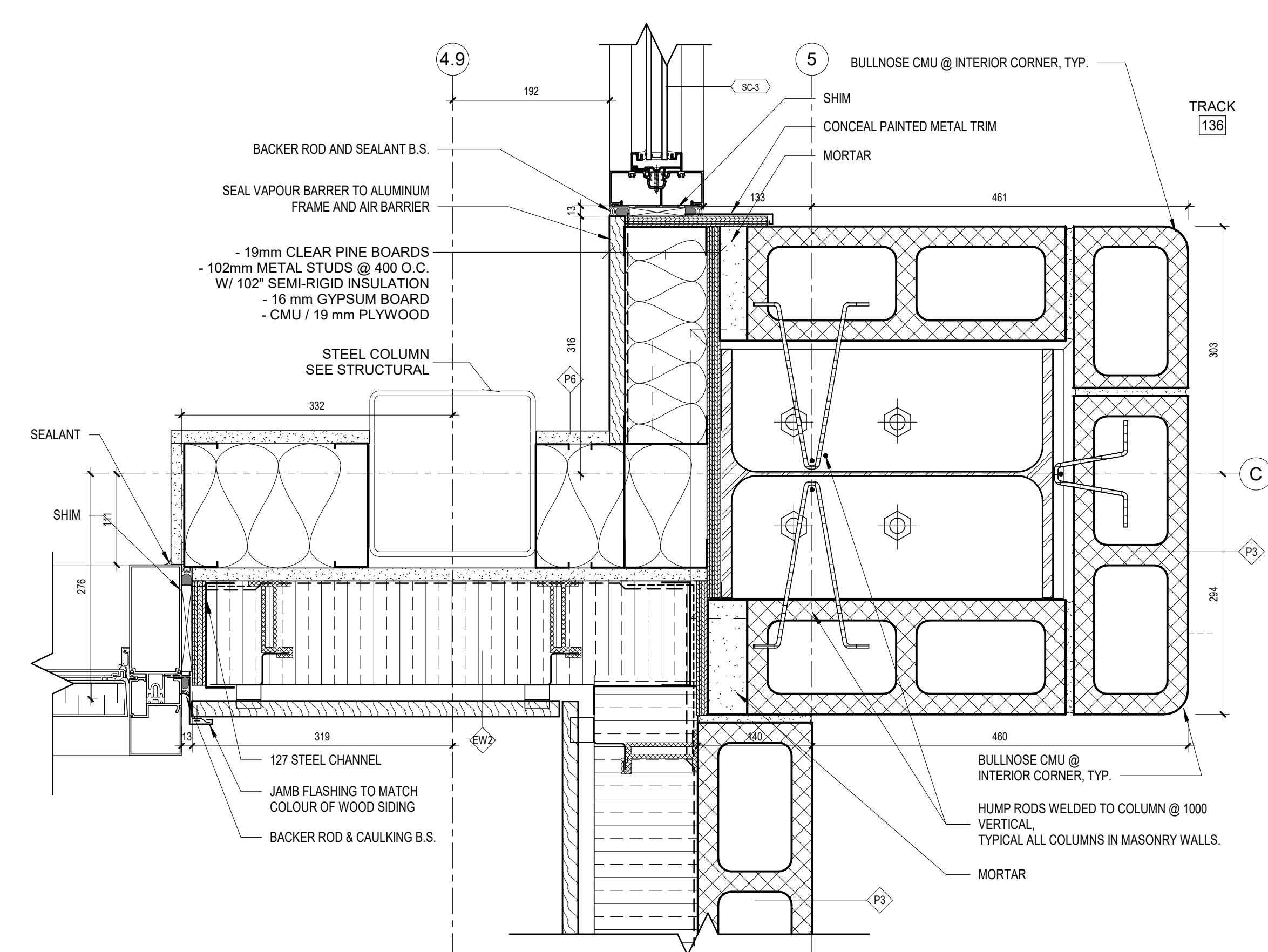
J PLAN DETAIL - MALE CHANGE ROOM @ EXT. CORNER
 AT-11 1:5



K PLAN DETAIL - MALE CHANGE ROOM @ EXT. CORNER1
 AT-11 1:5



L PLAN DETAIL @ GRIDLINE C'D'
 AT-11 1:5



M PLAN DETAIL - INNER CORNER AT GRIDLINE 5/C
 AT-11 1:5

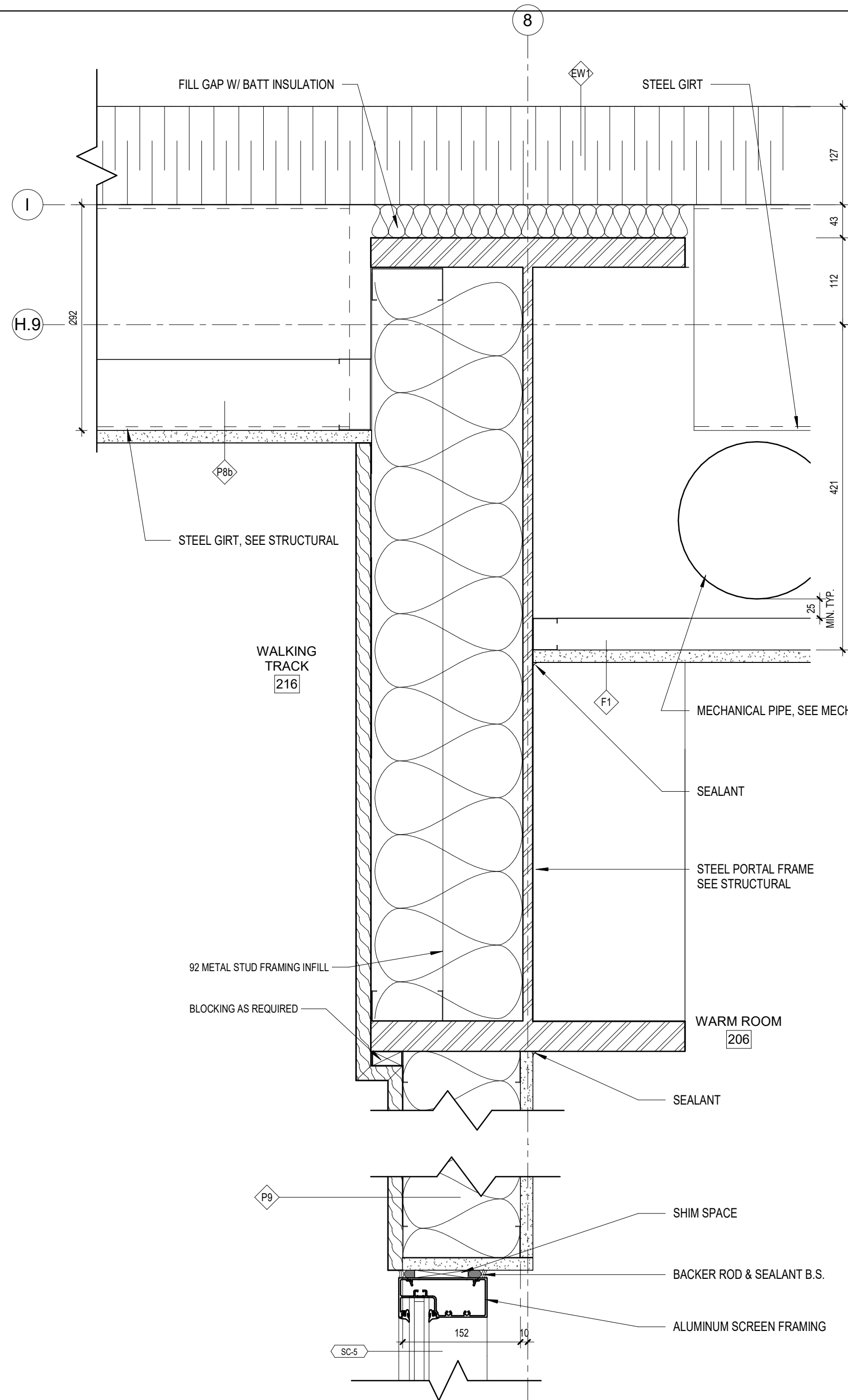
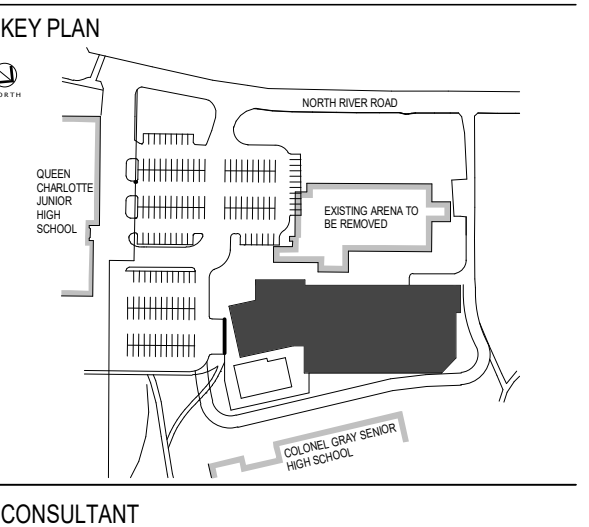
0	TRP - ISSUED FOR TENDER	2023-04-10
NO.	REVISION	DATE



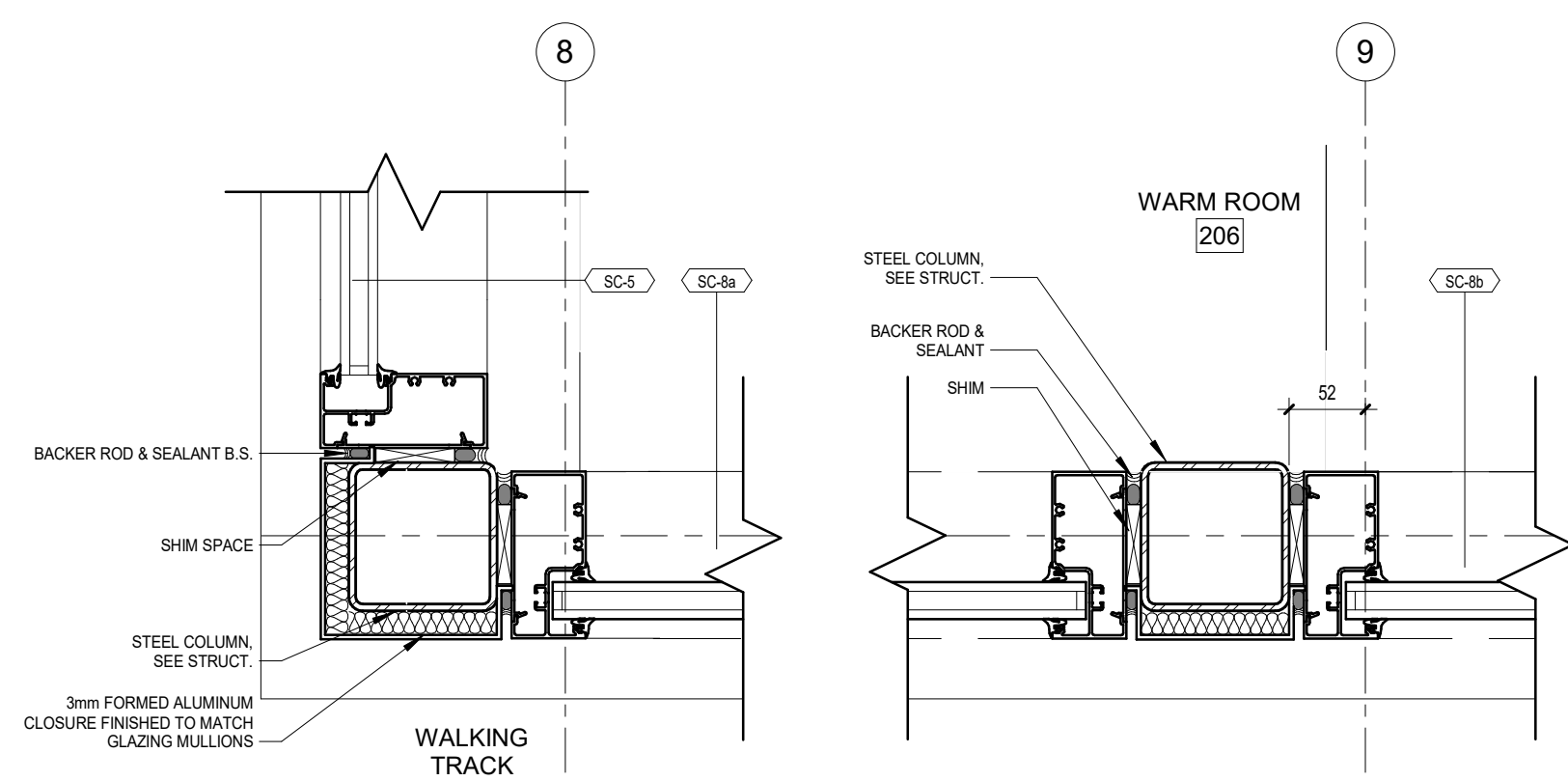
PROJECT NAME:
 SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

PROJECT NO.: 21111
 DRAWN BY: OM / MV / DE
 CHECKED BY: Approver
 SCALE: 1:5

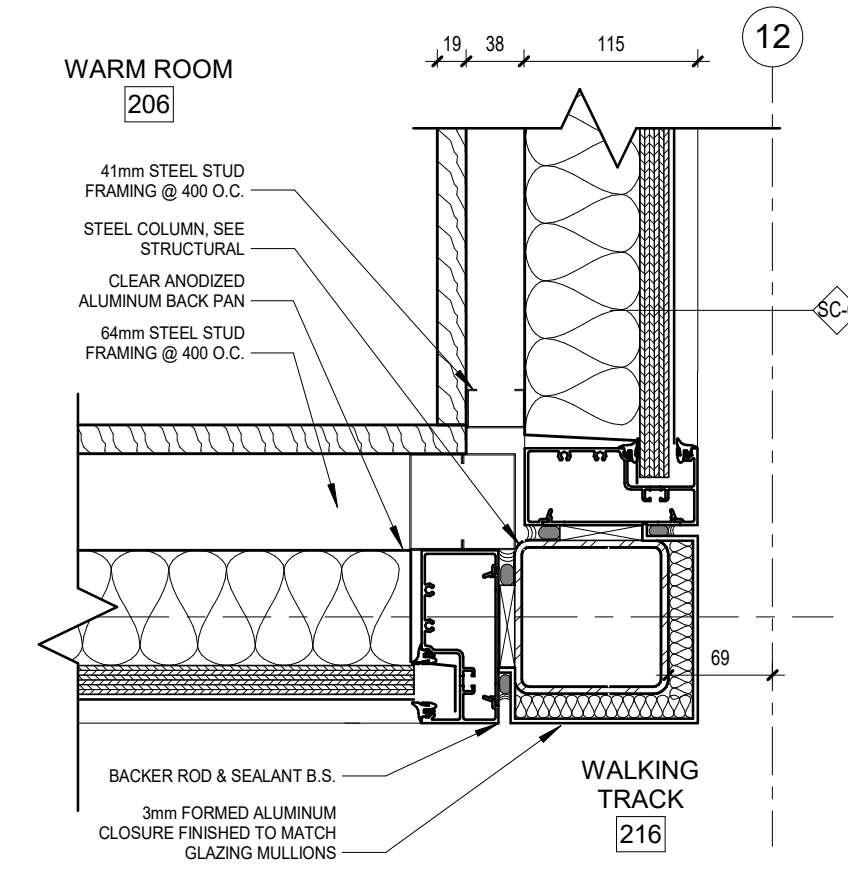
PLAN DETAILS



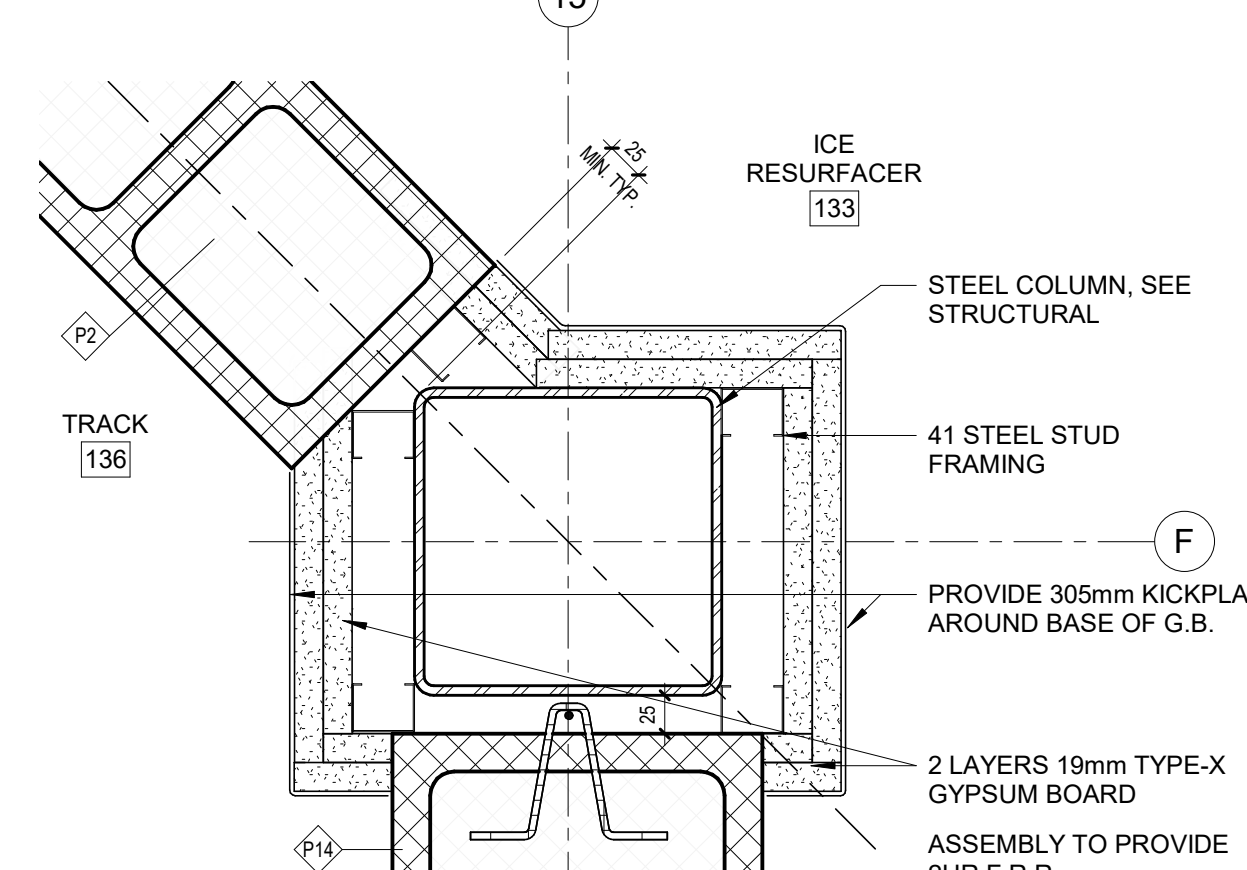
1 PLAN DETAIL @ GRIDLINE 8/I
A7-12 / A1-12 1:5



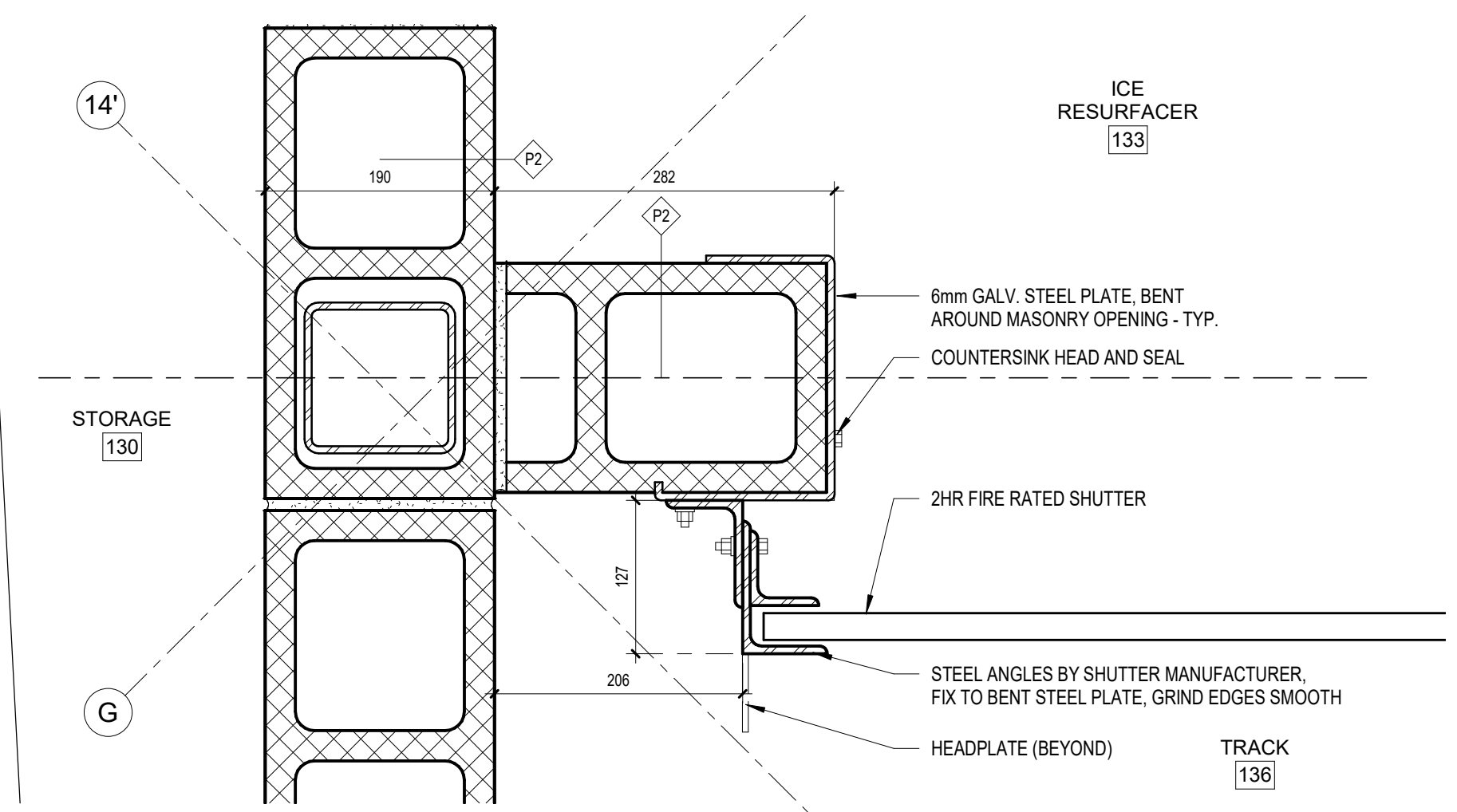
2 PLAN DETAIL - DUCT AND PIPE ENCLOSURE (TYPICAL)
A7-12 / A1-12 1:5



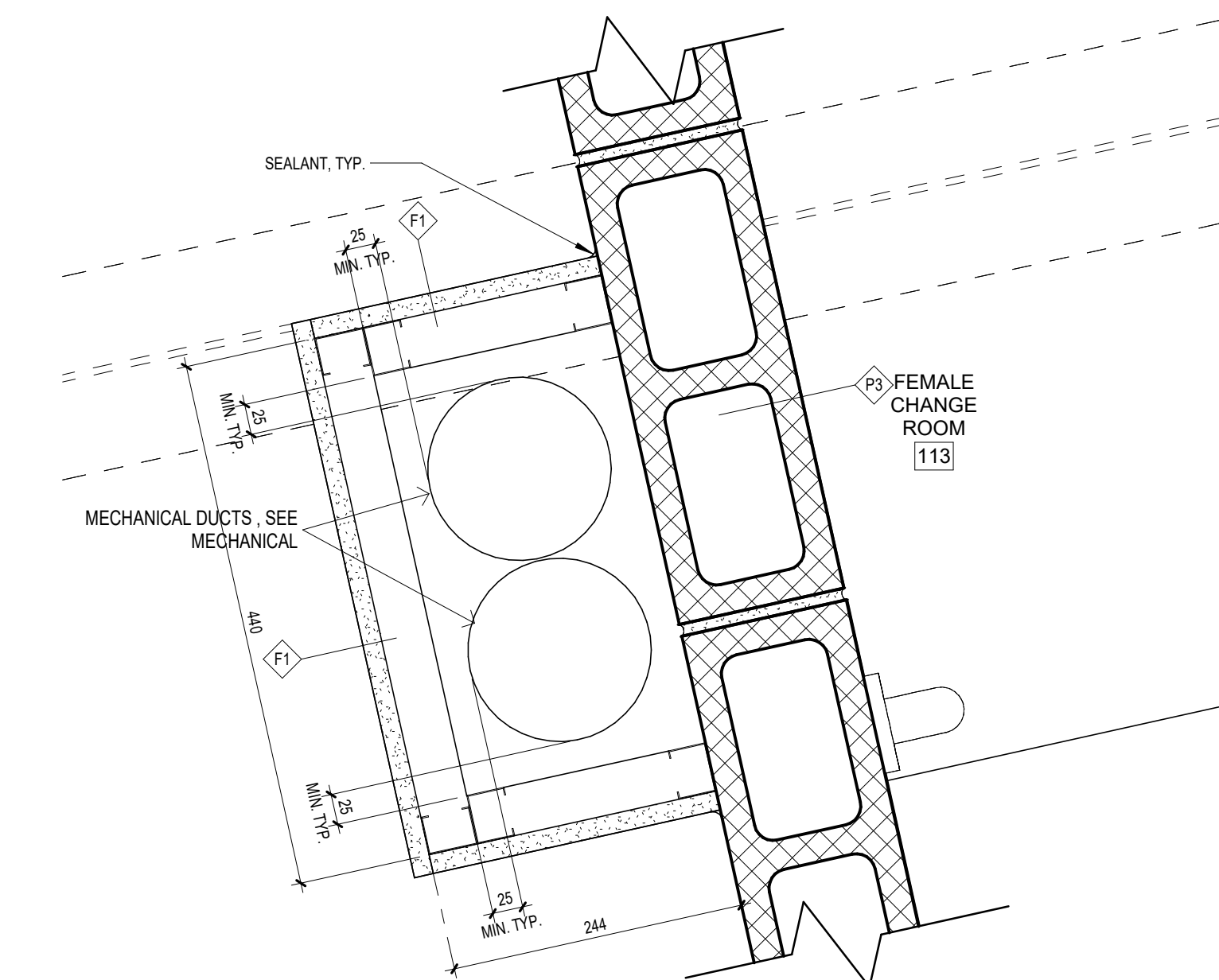
3 PLAN DETAIL - WARM ROOM CORNER BELOW GLAZING
A7-12 / A1-12 1:5



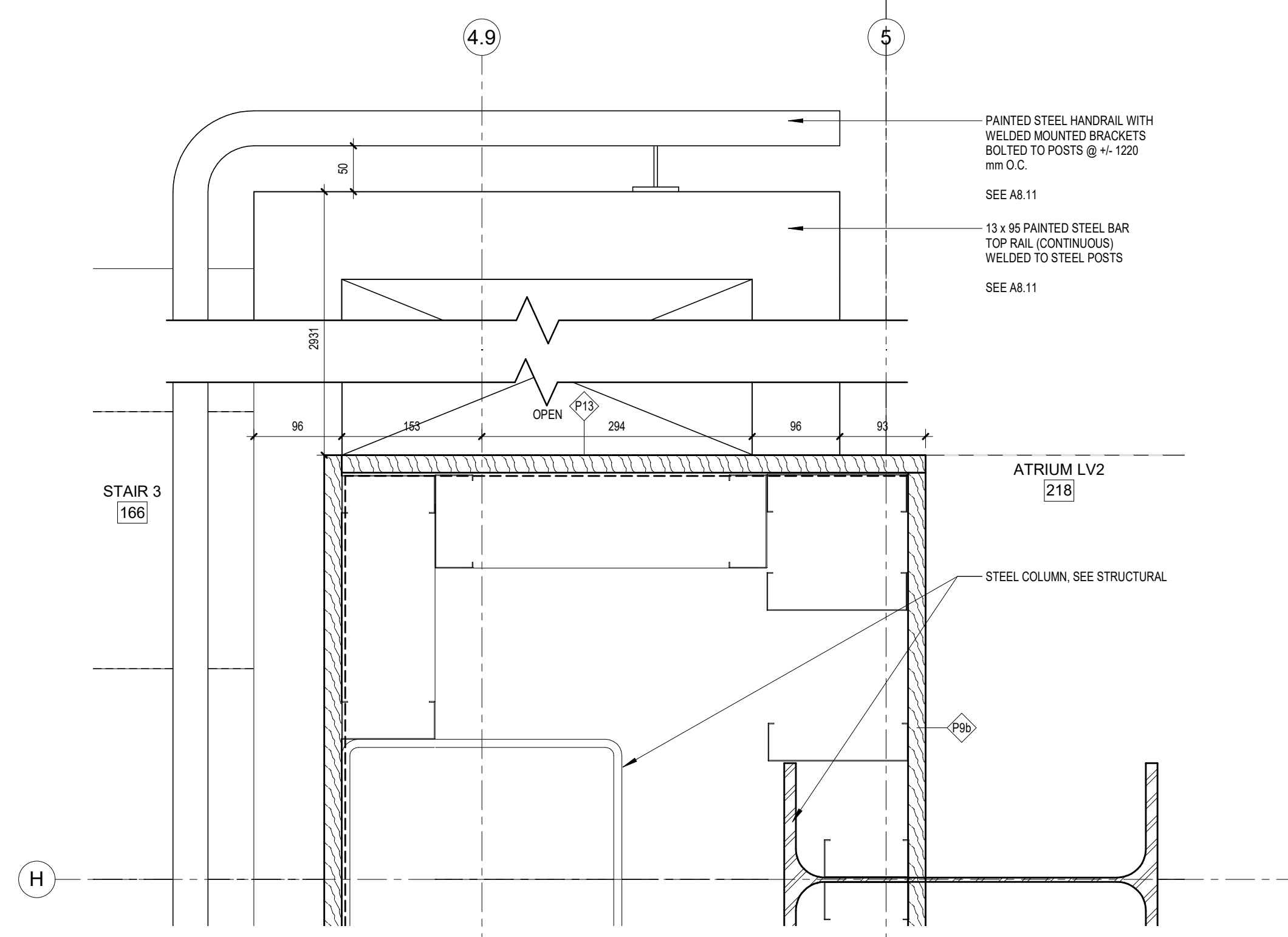
4 PLAN DETAIL - 2HR FIRE PROTECTION @ GRIDLINE 15/F LV1
A7-12 / A1-12 1:5



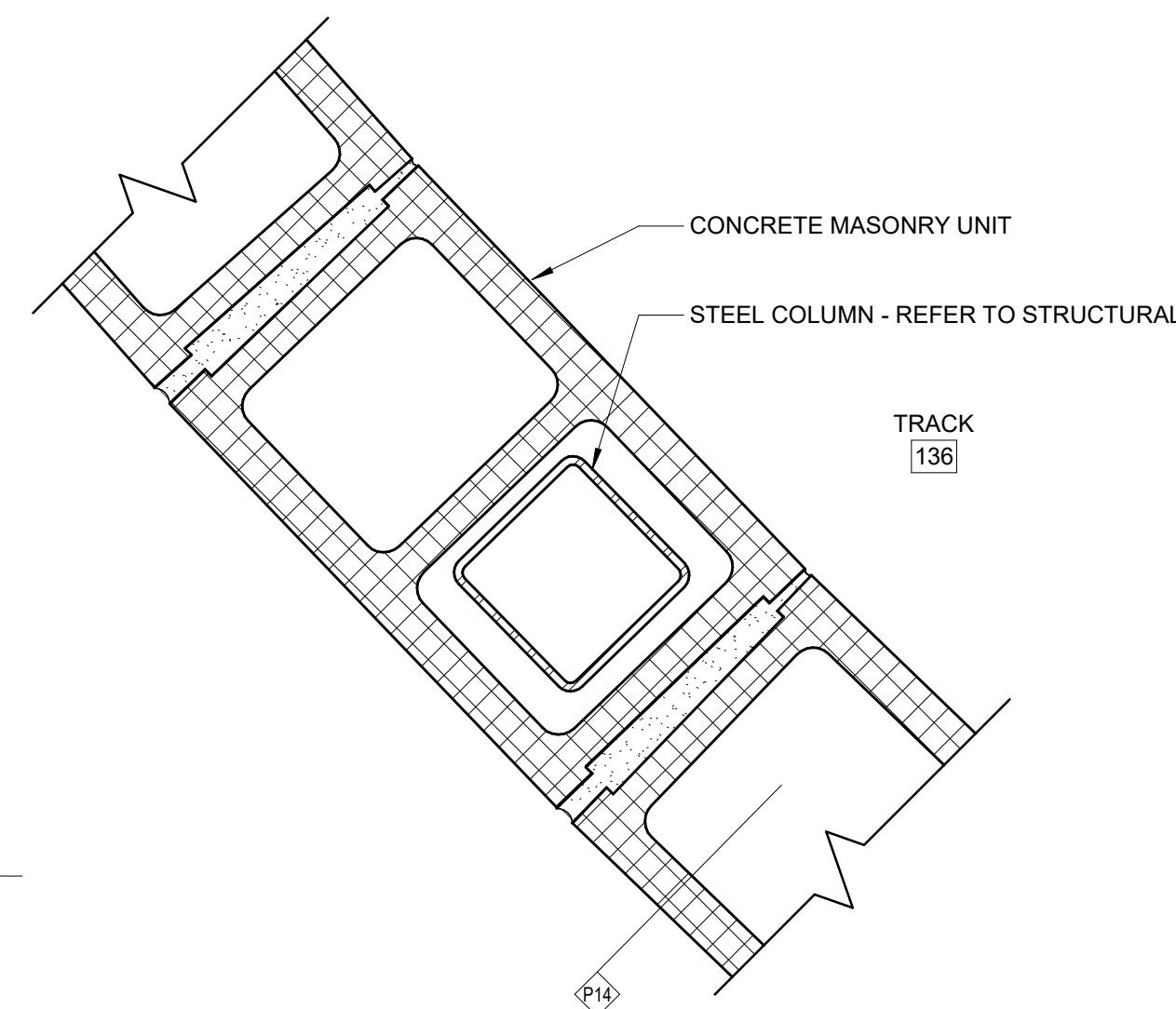
5 PLAN DETAIL - INTERIOR INSULATED O/H DOOR & 2HR F.R. SHUTTER
A7-12 / A1-12 1:5



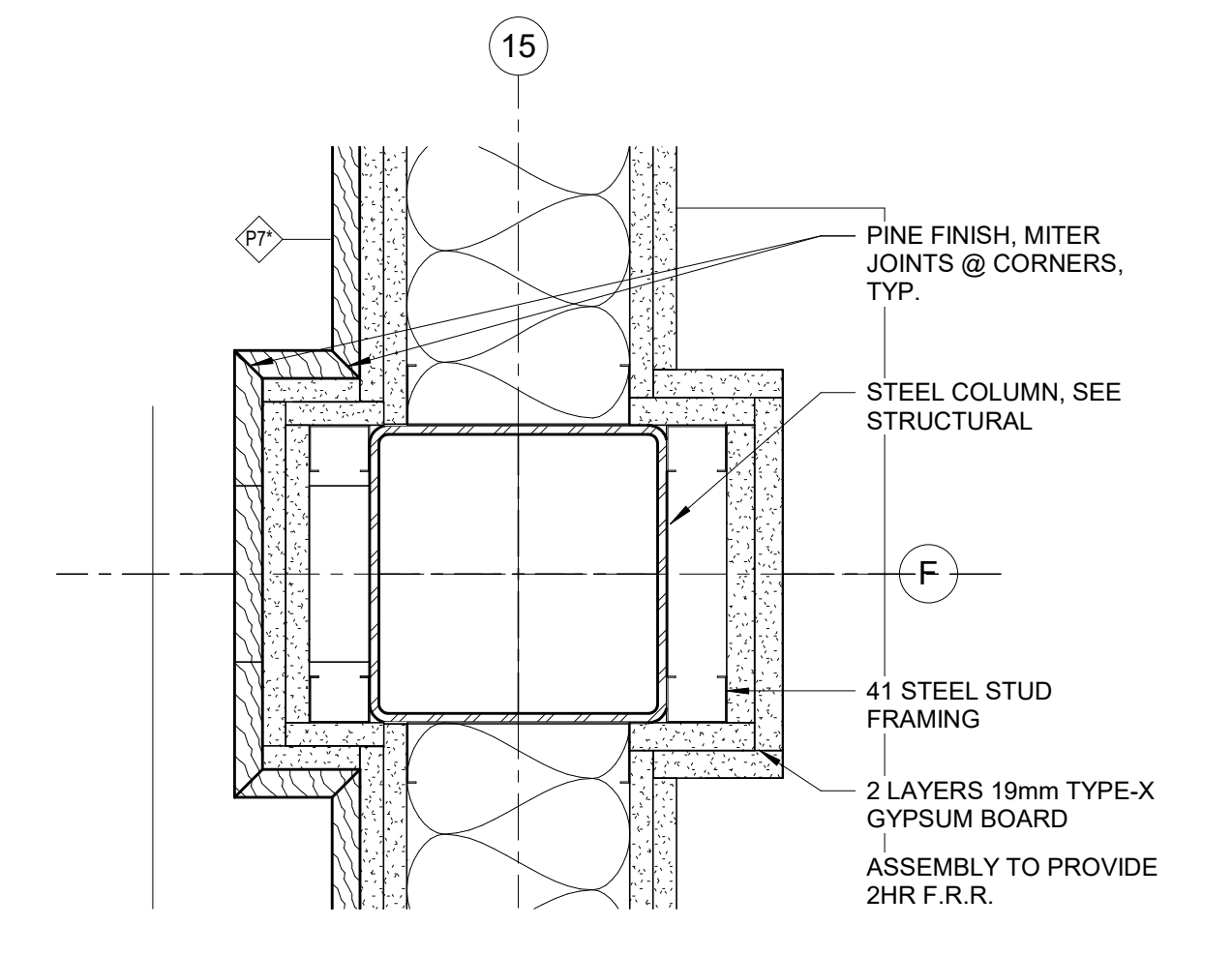
6 PLAN DETAIL - FEMALE CHANGE ROOM (113)
A7-12 / A1-12 1:5



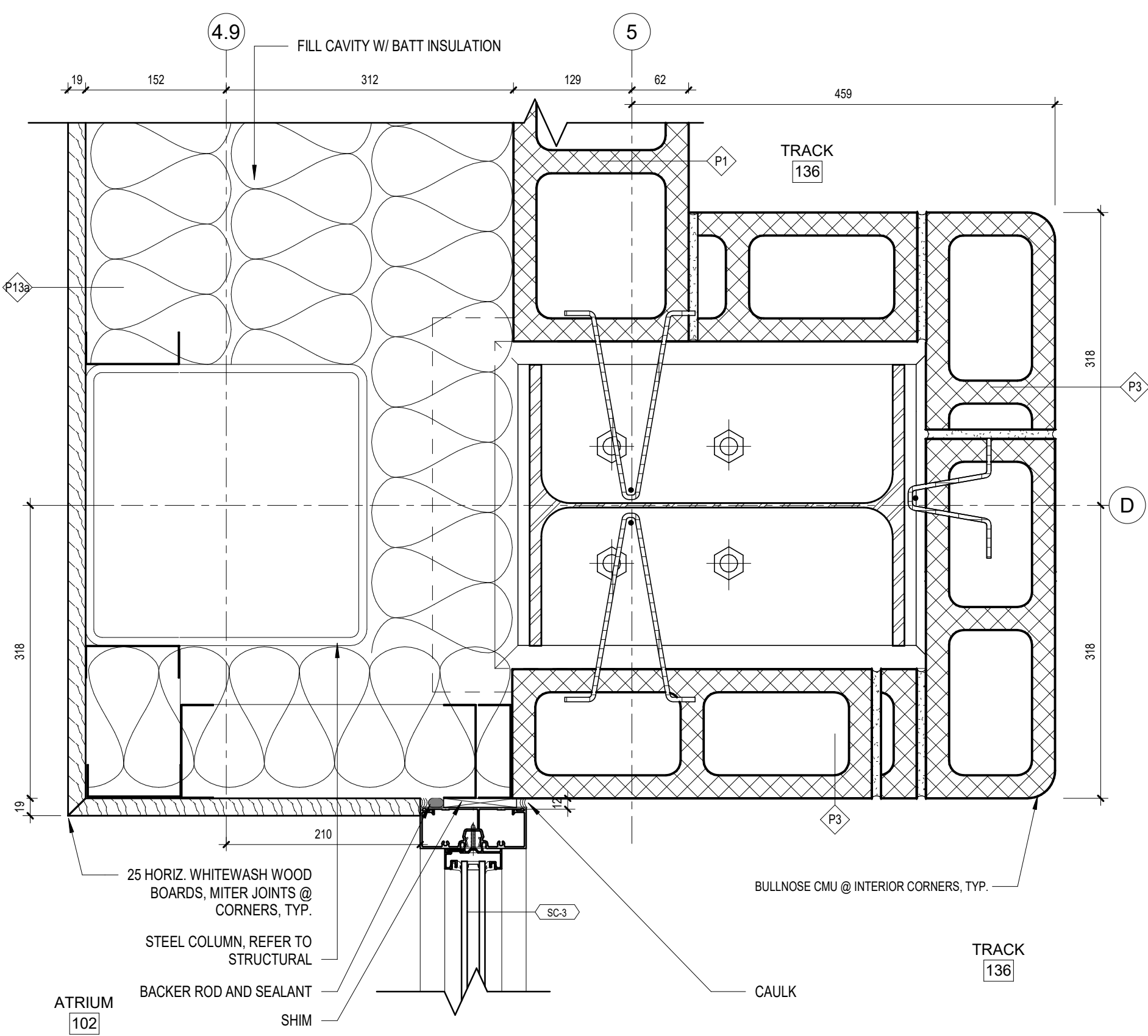
7 PLAN DETAIL @ GRIDLINE 5/H LV2
A7-12 / A1-12 1:5



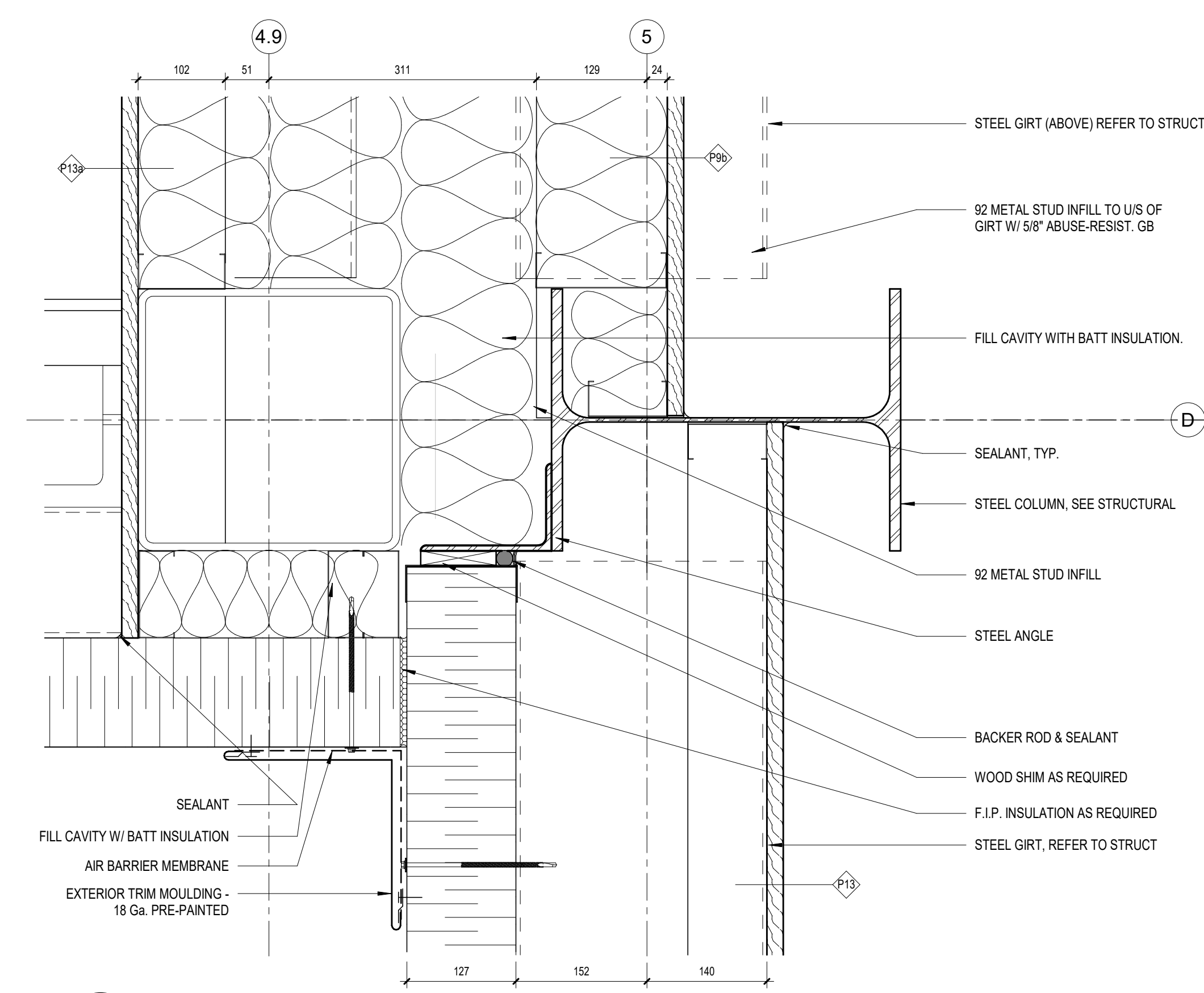
8 PLAN DETAIL - STEEL COLUMN IN CONCRETE MASONRY UNIT
A7-12 / A1-12 1:5



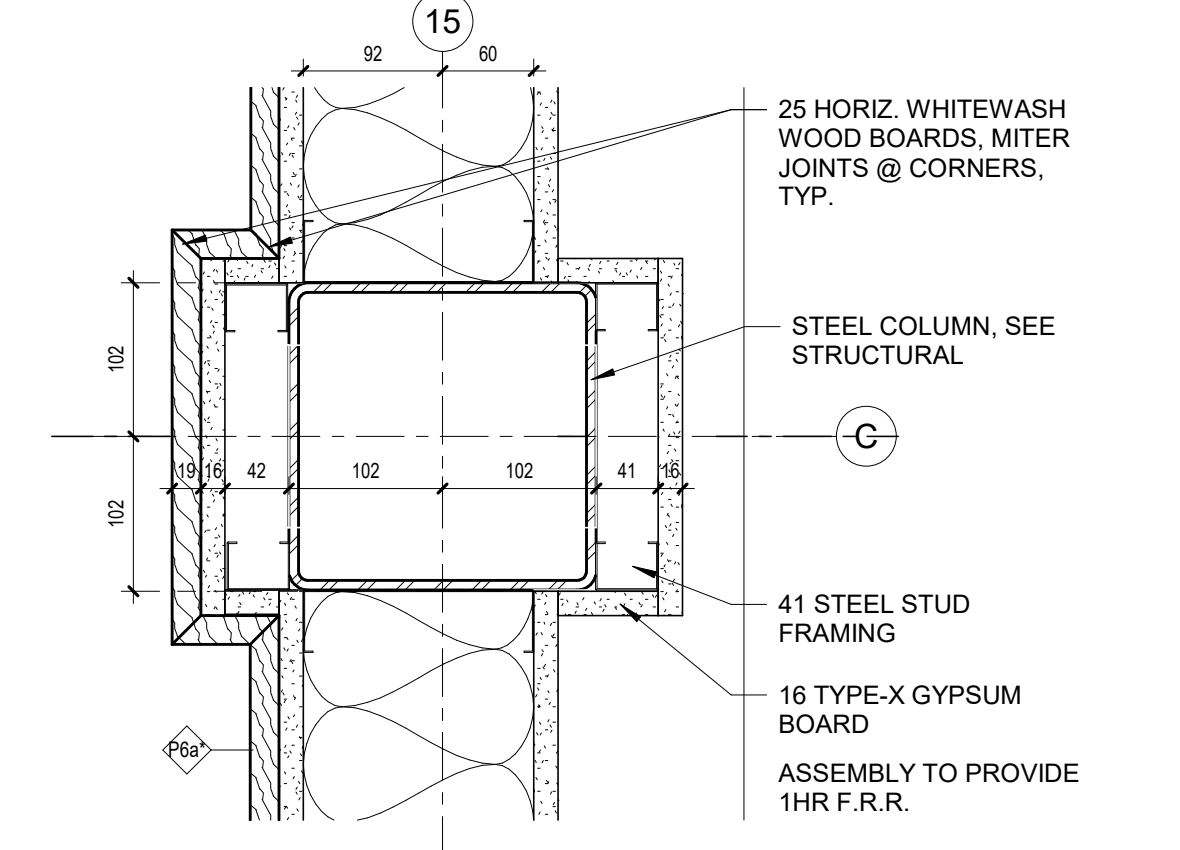
9 PLAN DETAIL - 2HR FIRE PROTECTION @ GRIDLINE 15/F LV2
A7-12 / A1-12 1:5



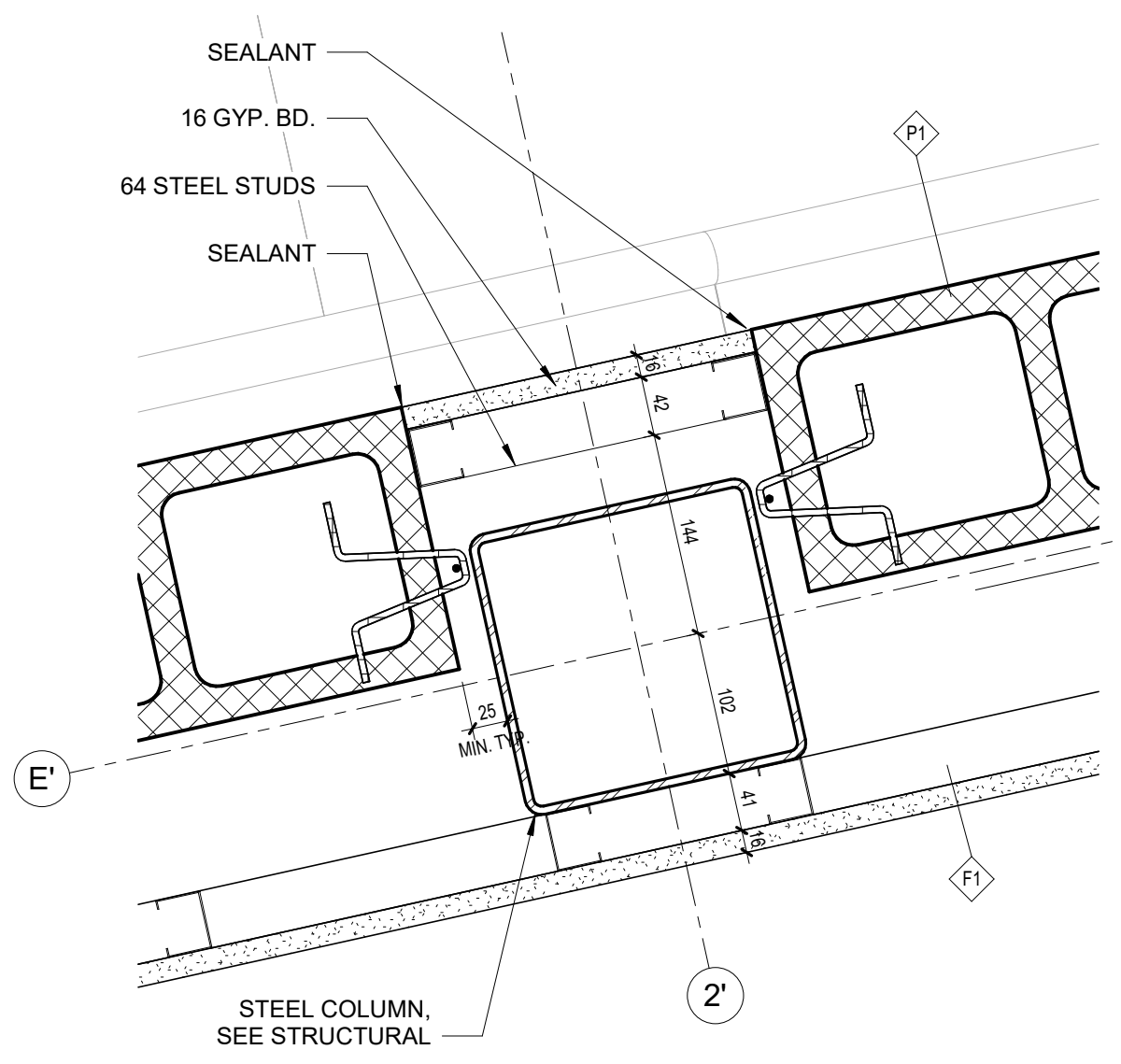
10 PLAN DETAIL @ GRIDLINE 5/D
A7-12 / A1-12 1:5



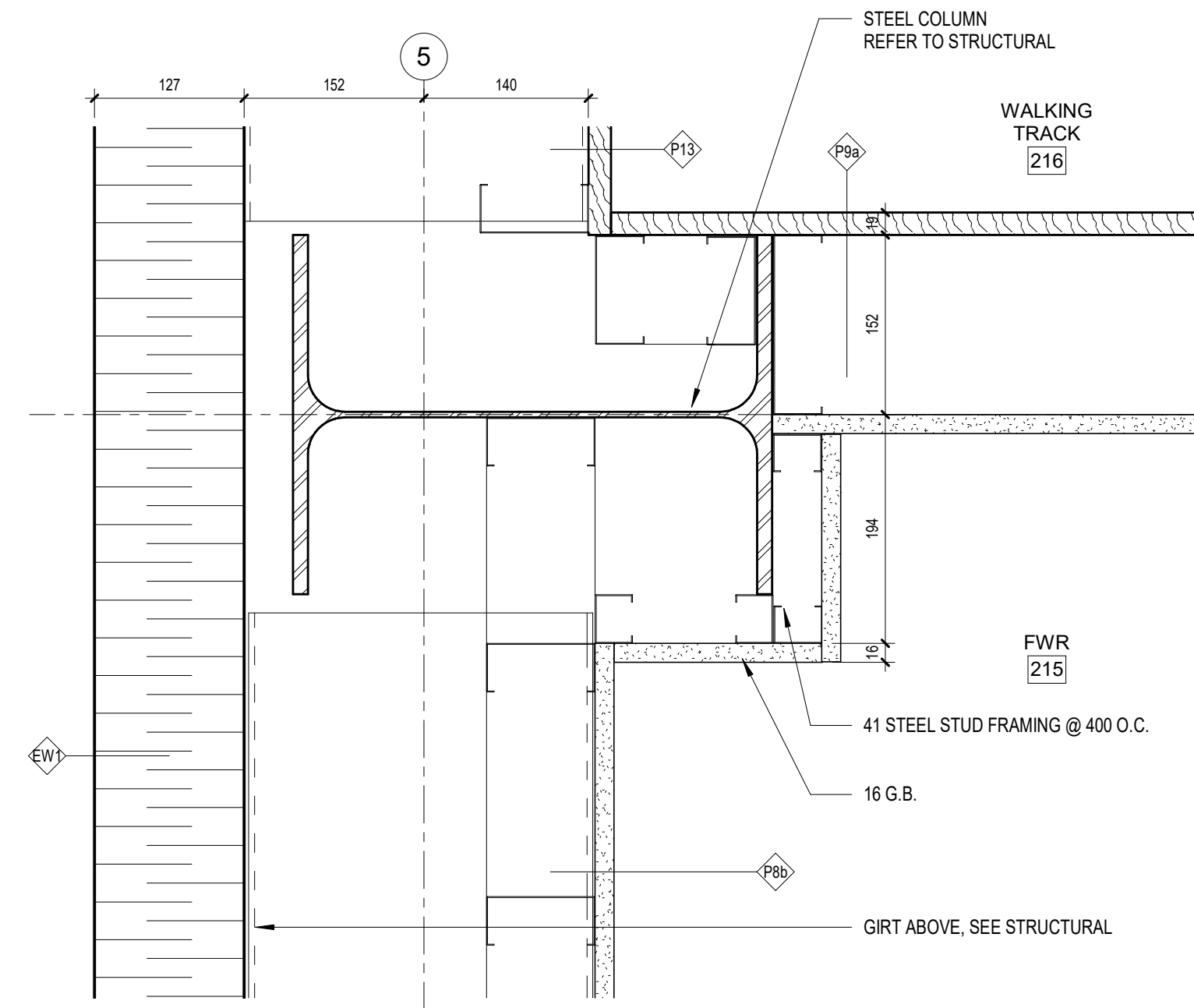
11 PLAN DETAIL @ GRIDLINE 5/D LV2
A7-12 / A1-12 1:5



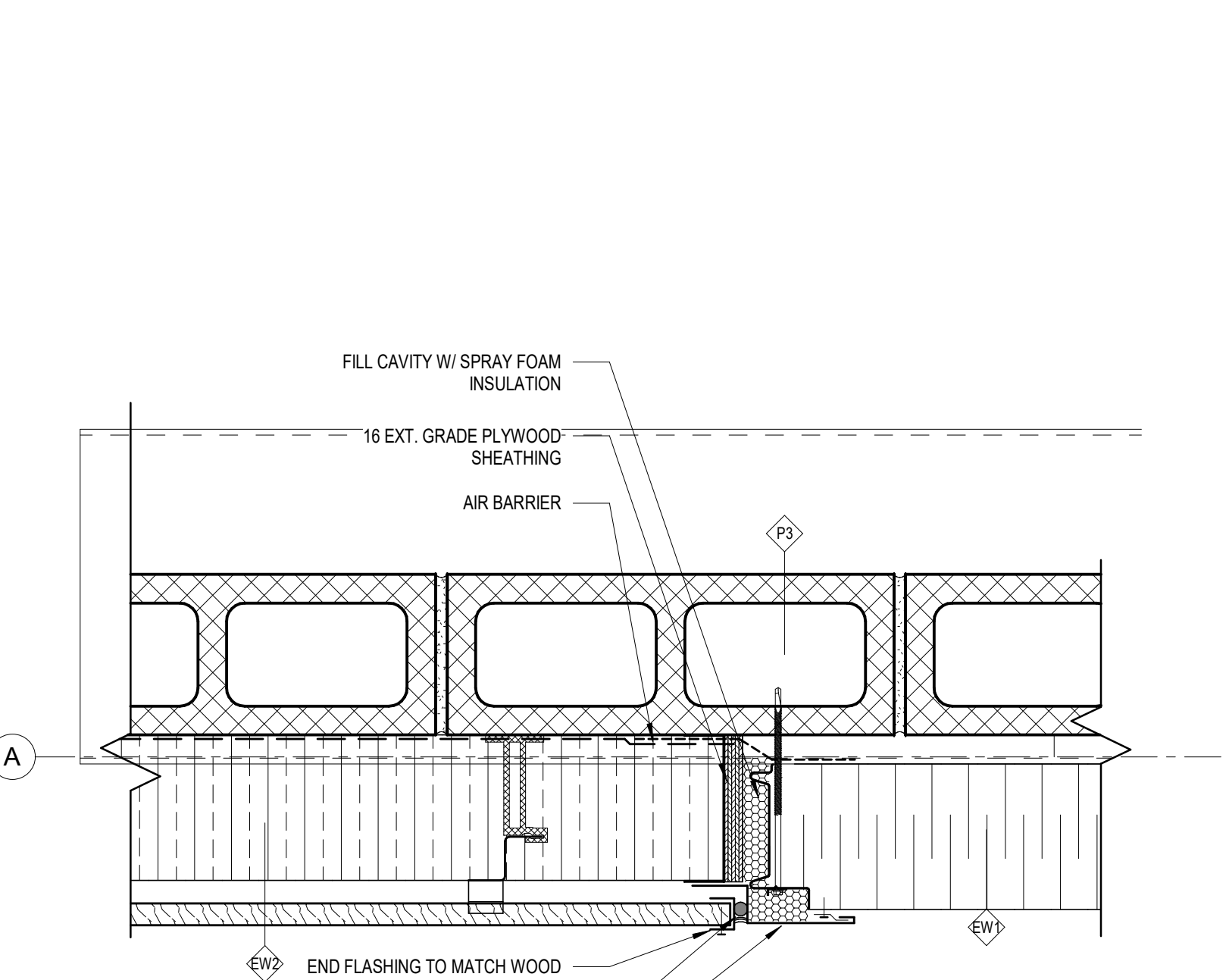
12 PLAN DETAIL - 1HR FIRE PROTECTION @ GRIDLINE 15/C
A7-12 / A1-12 1:5



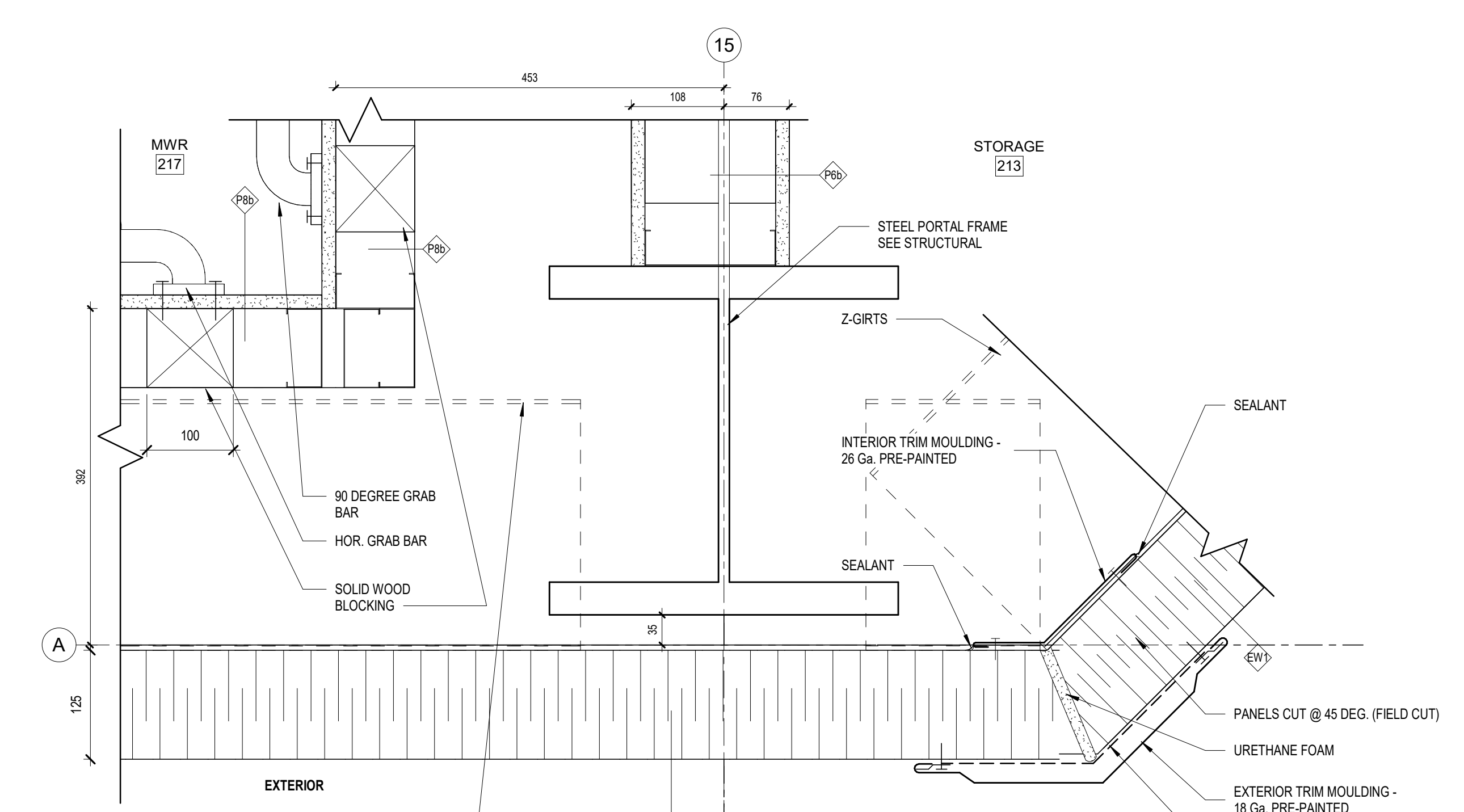
13 PLAN DETAIL @ GRIDLINE 2/I
A7-12 / A1-12 1:5



14 PLAN DETAIL @ GRIDLINE 5/B LV2
A7-12 / A1-12 1:5



15 PLAN DETAIL @ GRIDLINES 5/A/1
A7-12 / A1-12 1:5



16 PLAN DETAIL @ GRIDLINE 15/A
A7-12 / A1-12 1:5

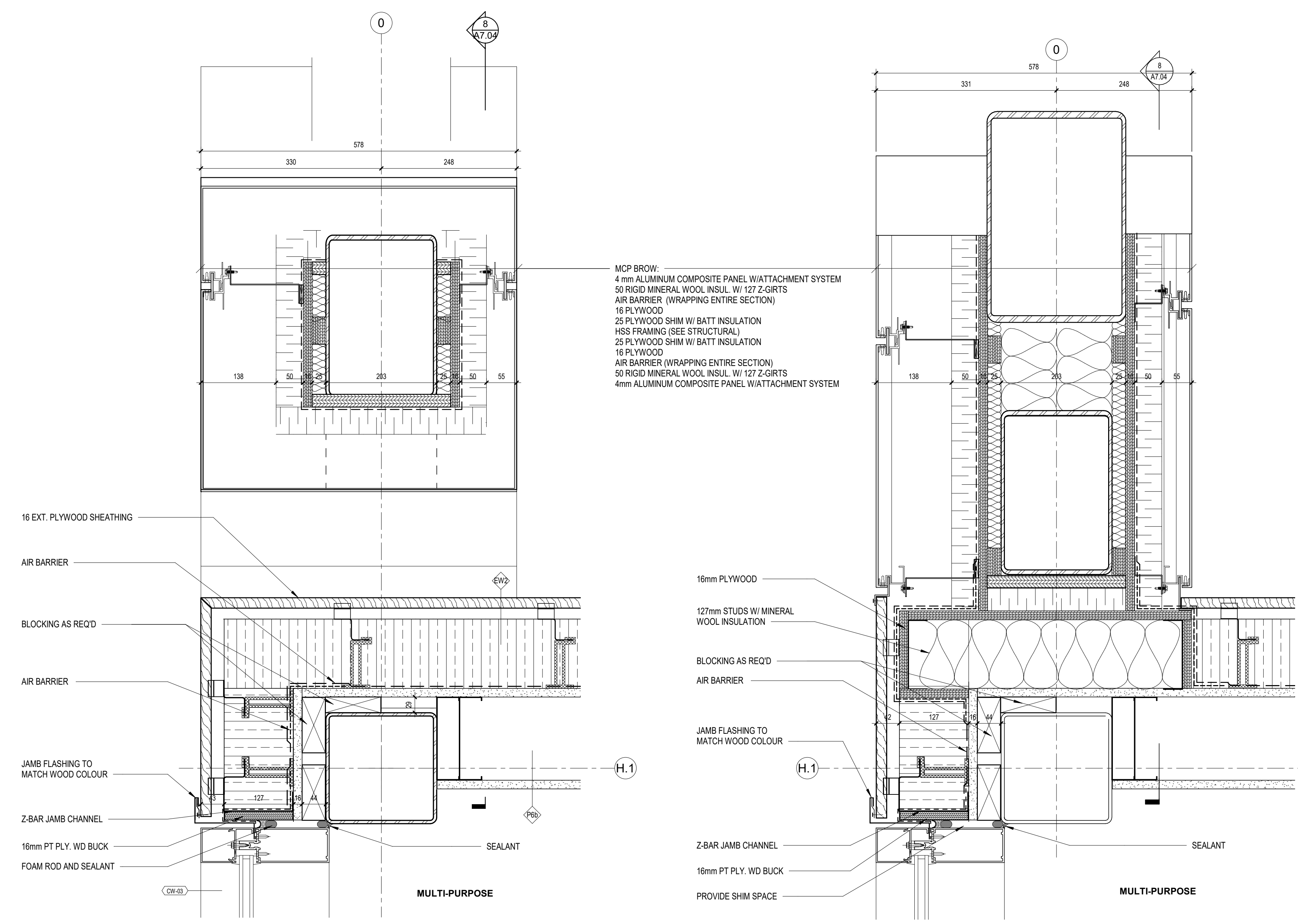
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PROJECT NAME: SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
170 NORTH RIVER ROAD CHARLOTTETOWN, PEI

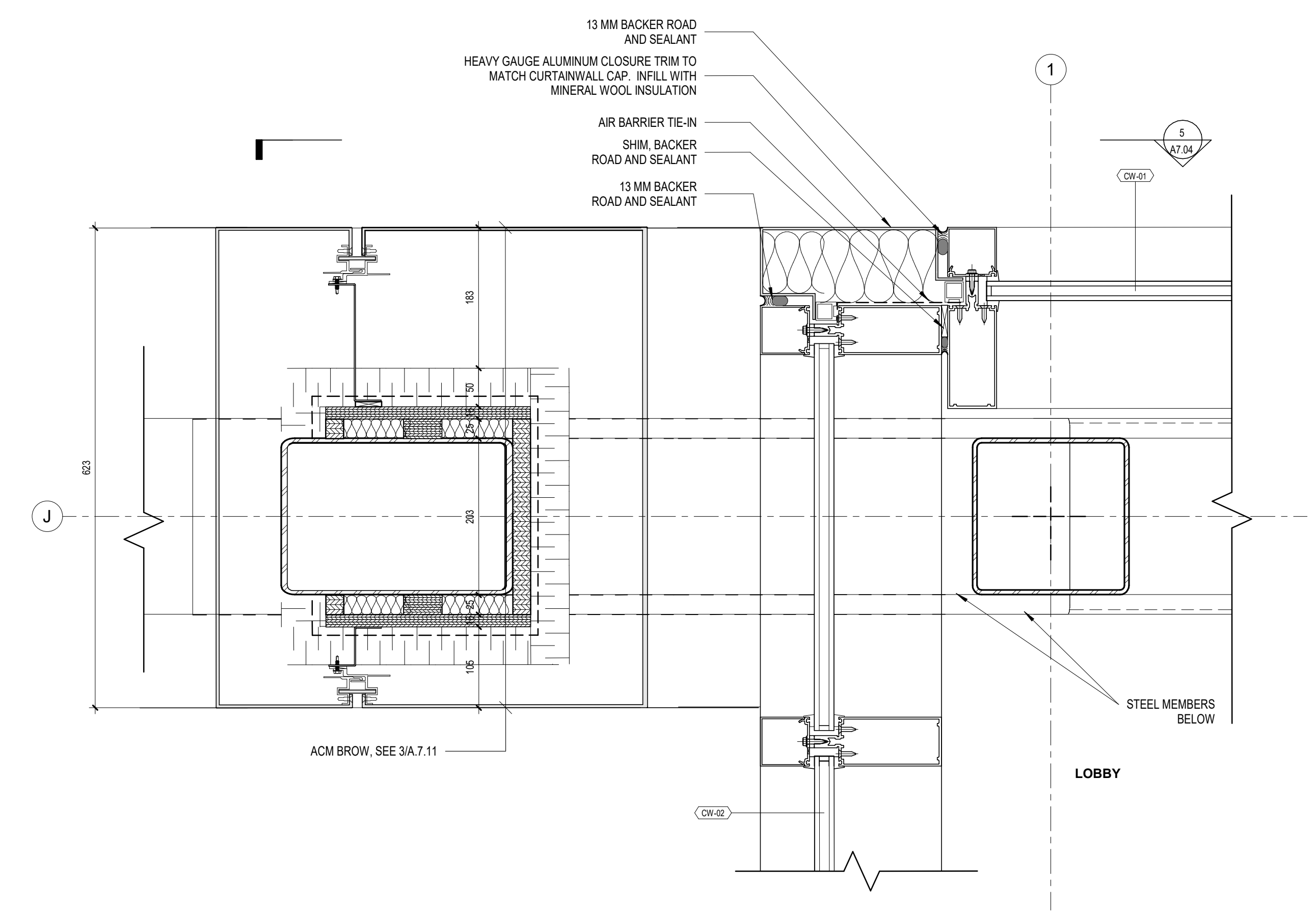
PROJECT NO.: 21111
DRAWN BY: OM / MM / DE
CHECKED BY: MMG / FC
SCALE: 1:5

PLAN DETAILS

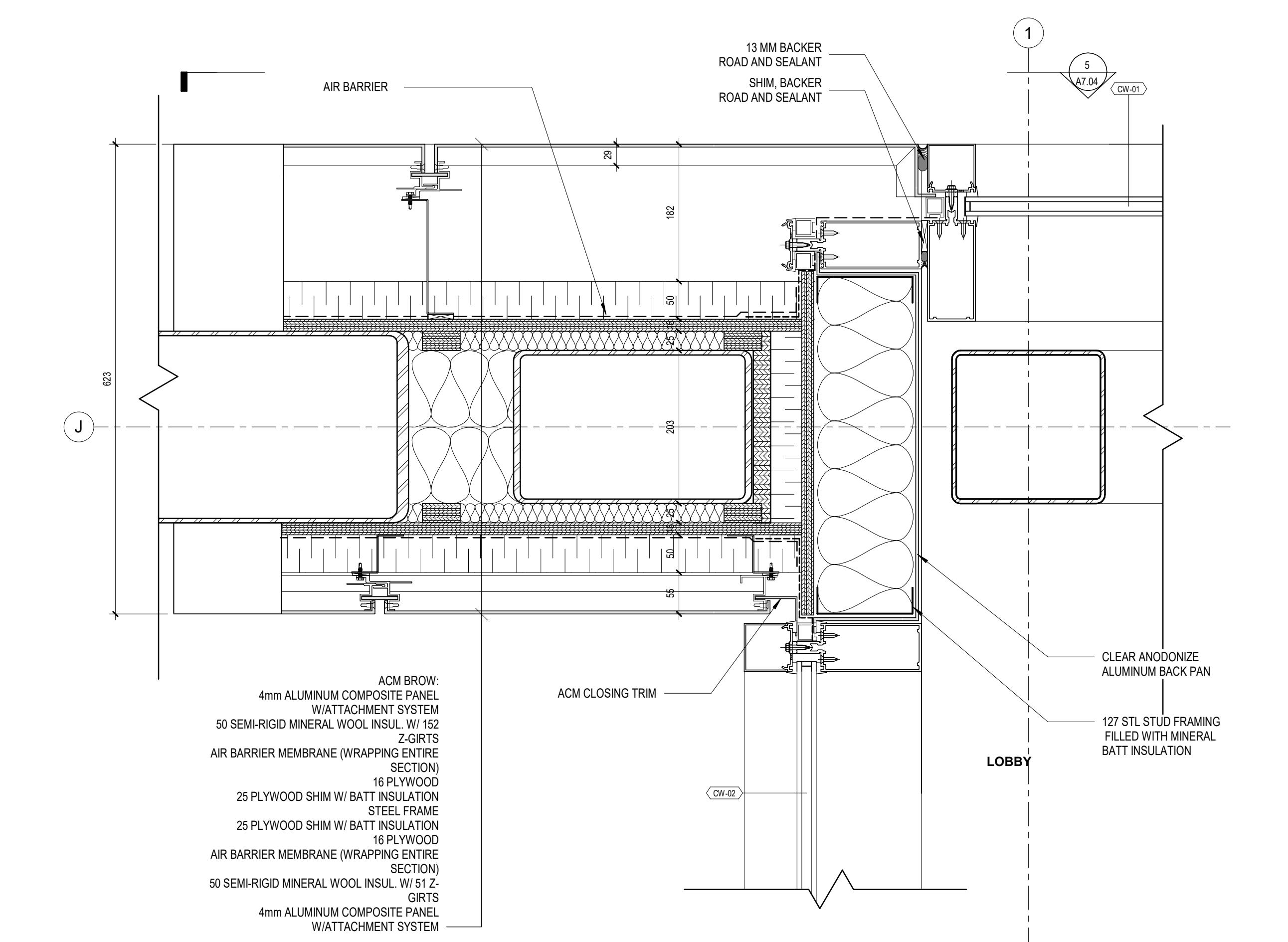


1 PLAN DETAIL - ENTRY VESTIBULE EXTERIOR CORNER @ 1180 A.F.F.
A7.13 1:5

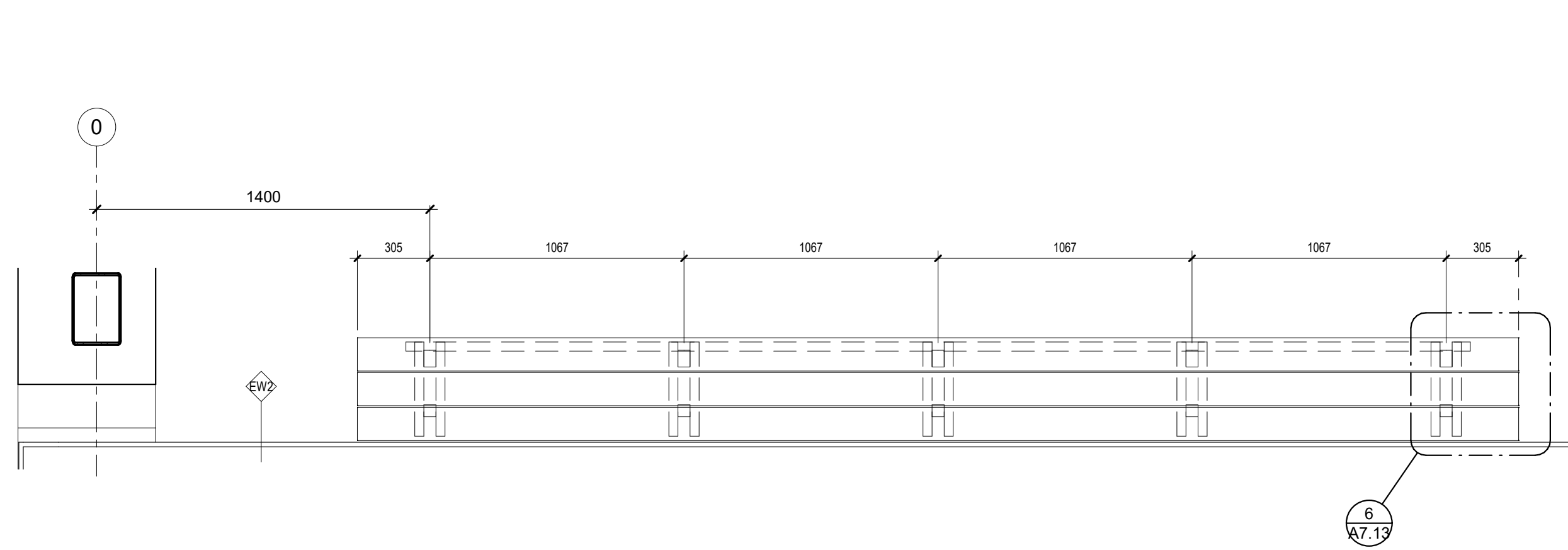
2 PLAN DETAIL - ENTRY VESTIBULE EXTERIOR CORNER SOUTH @ 910 A.F.F.
A7.13 1:5



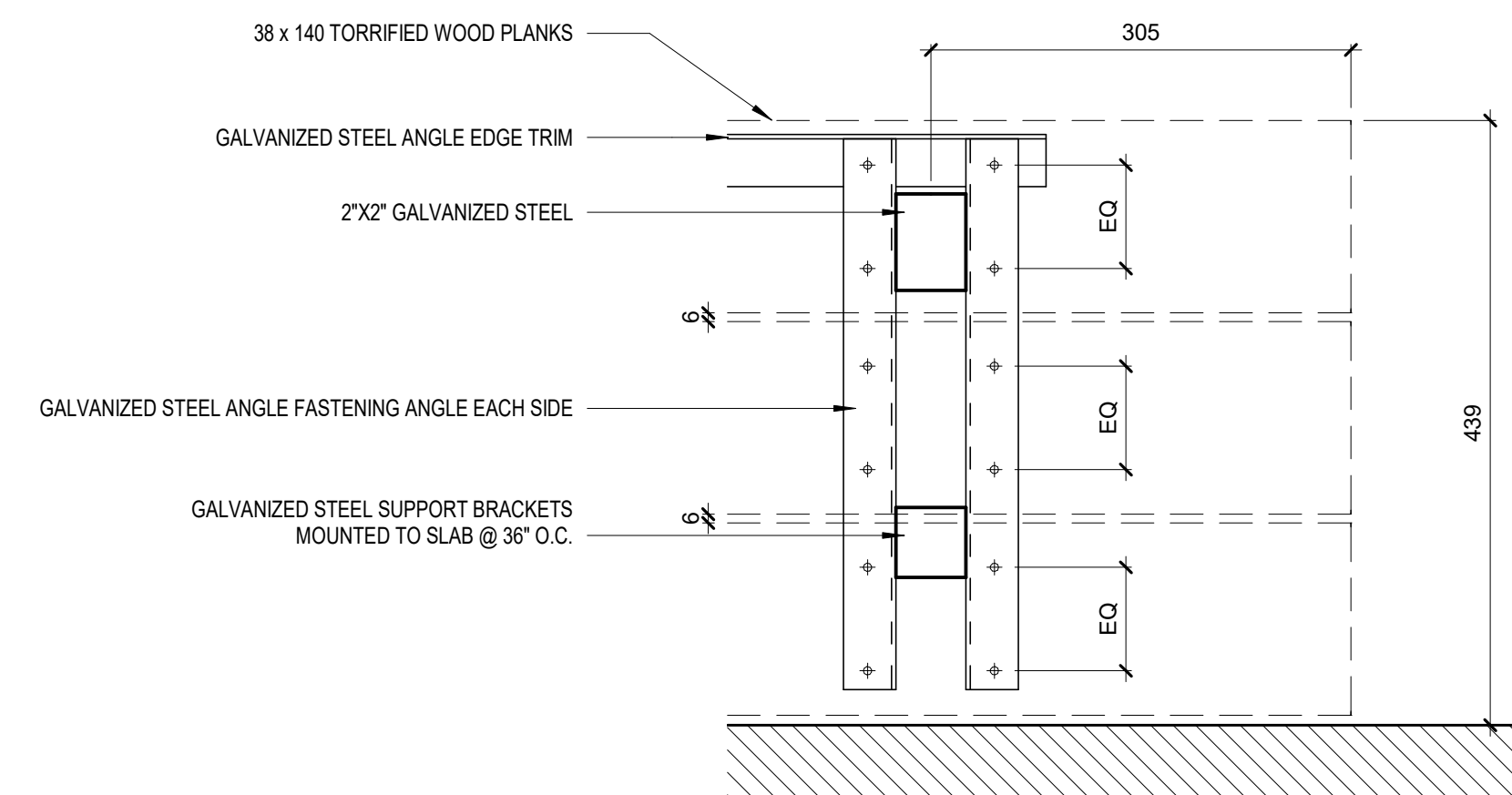
3 PLAN DETAIL @ ENTRY VESTIBULE EXTERIOR CORNER @ 1180 A.F.F.
A7.13 1:5



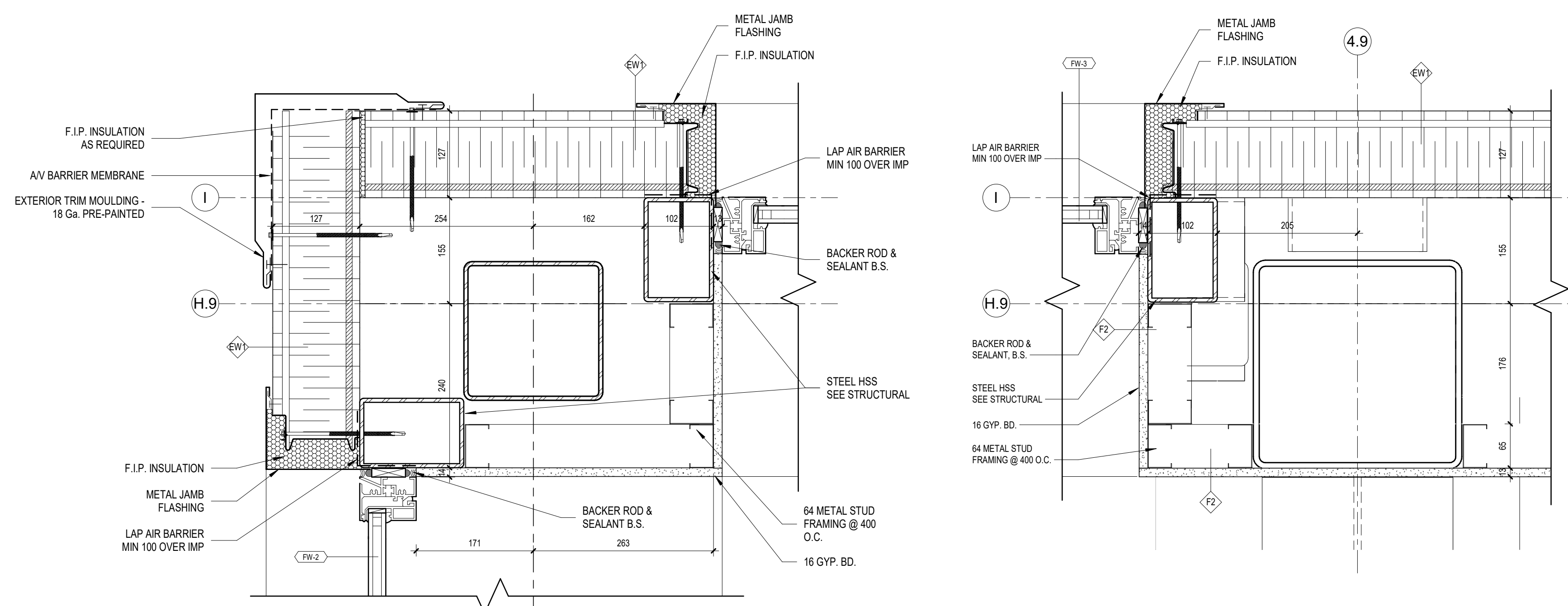
4 PLAN DETAIL @ ENTRY VESTIBULE EXTERIOR CORNER @ 910 A.F.F.
A7.13 1:5



5 PLAN - EXTERIOR BENCH
A7.13 1:20

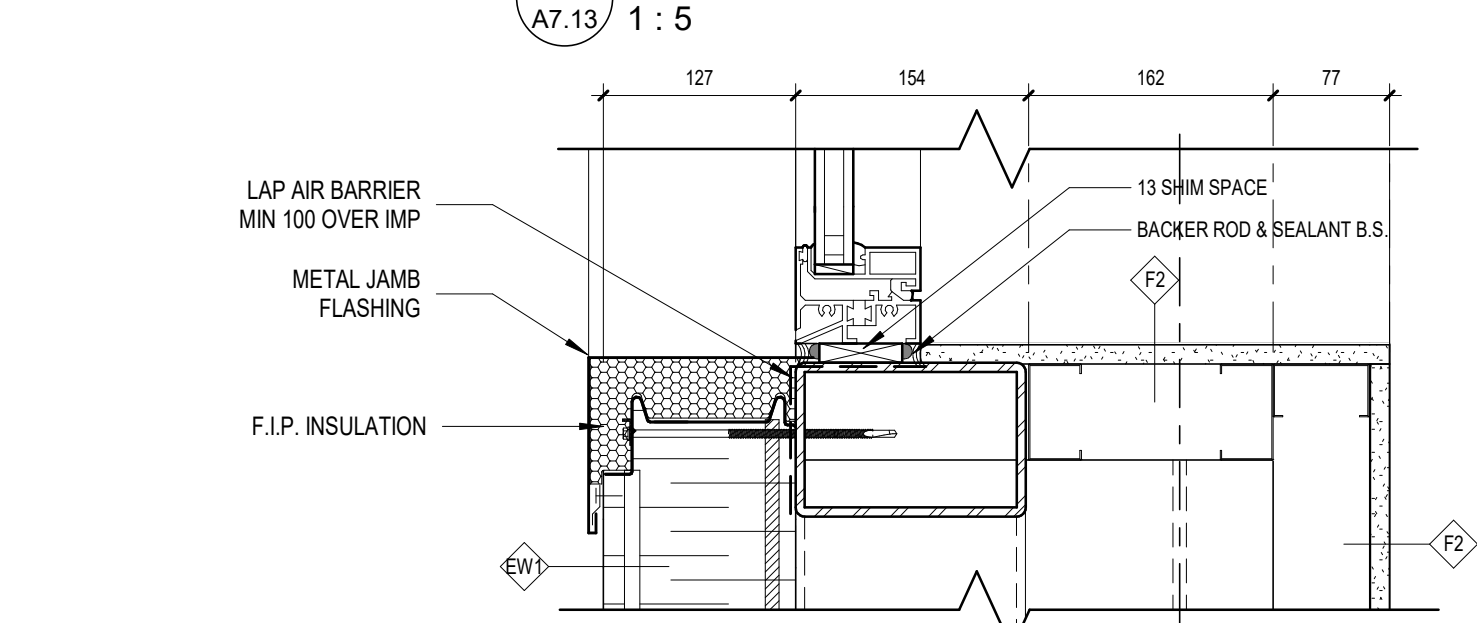


6 PLAN DETAIL - EXTERIOR BENCH
A7.13 1:5

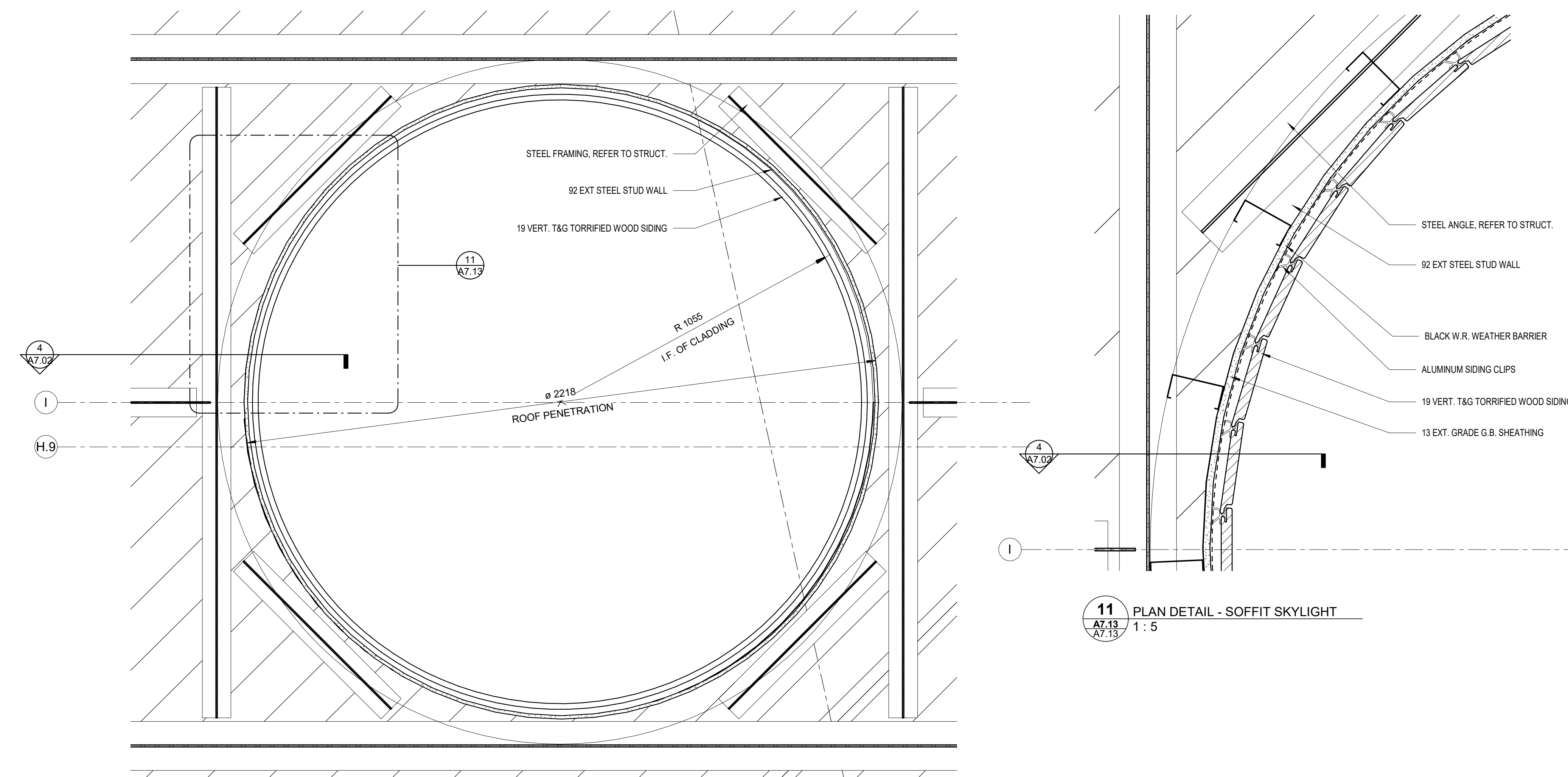


7 PLAN DETAIL @ FW-2 / FW-3 JAMB
A7.13 1:5

8 PLAN DETAIL GRIDLINES H.9/4.9 @ LV2
A7.13 1:5



9 PLAN DETAIL @ FW-2 JAMB
A7.13 1:5



10 PLAN - SOFFIT SKYLIGHT
A7.13 1:10

11 PLAN DETAIL - SOFFIT SKYLIGHT
A7.13 1:5

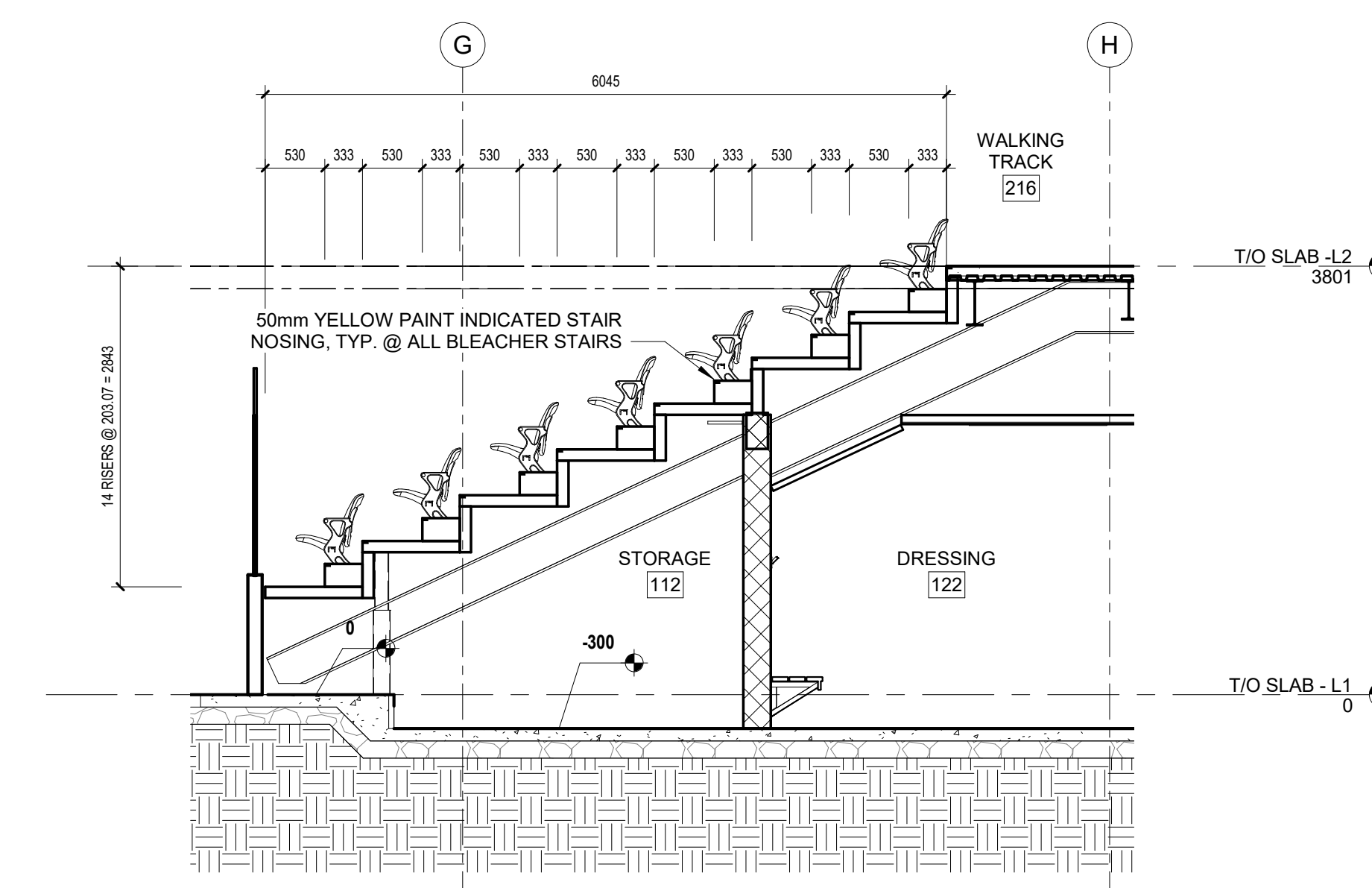
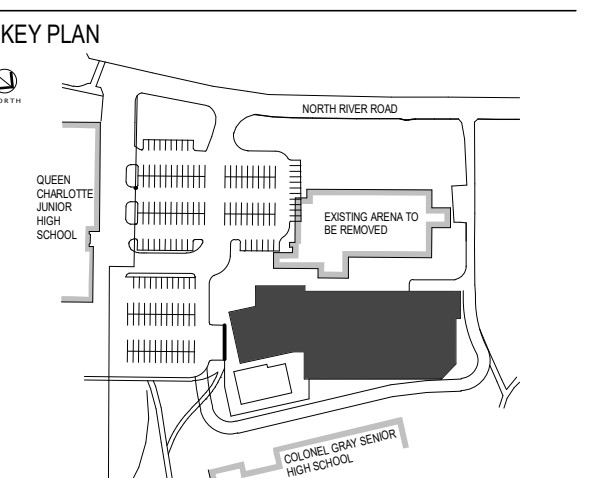
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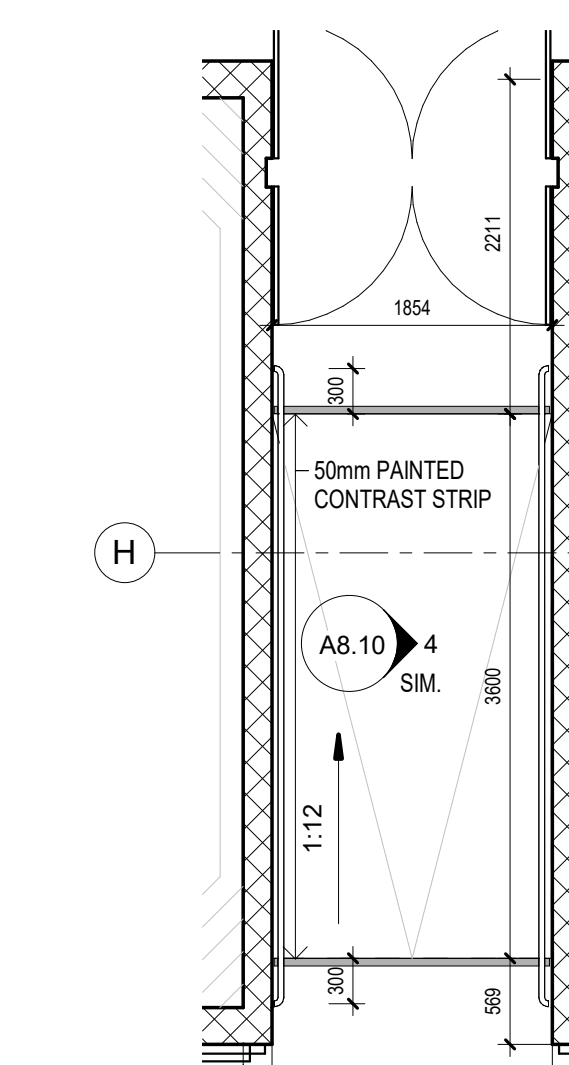
PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

PROJECT NO.: 21111
DRAWN BY: OM / MM / DE
CHECKED BY: MMG / PC
SCALE: As indicated

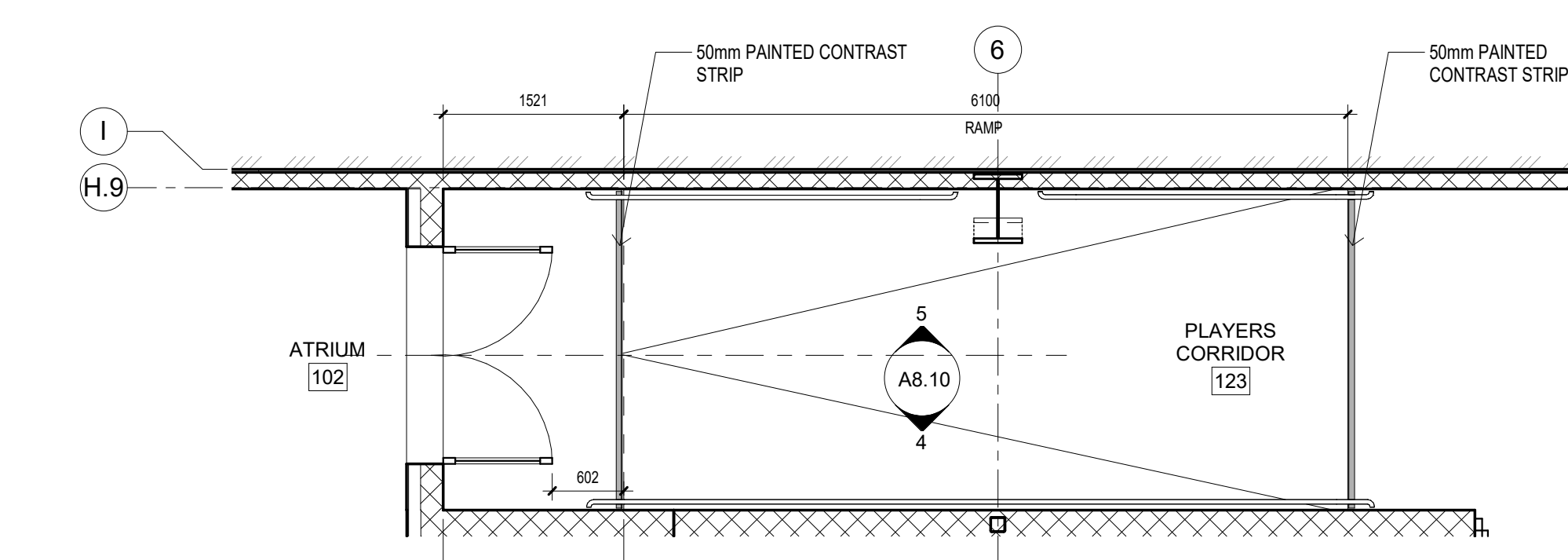
PLAN DETAILS



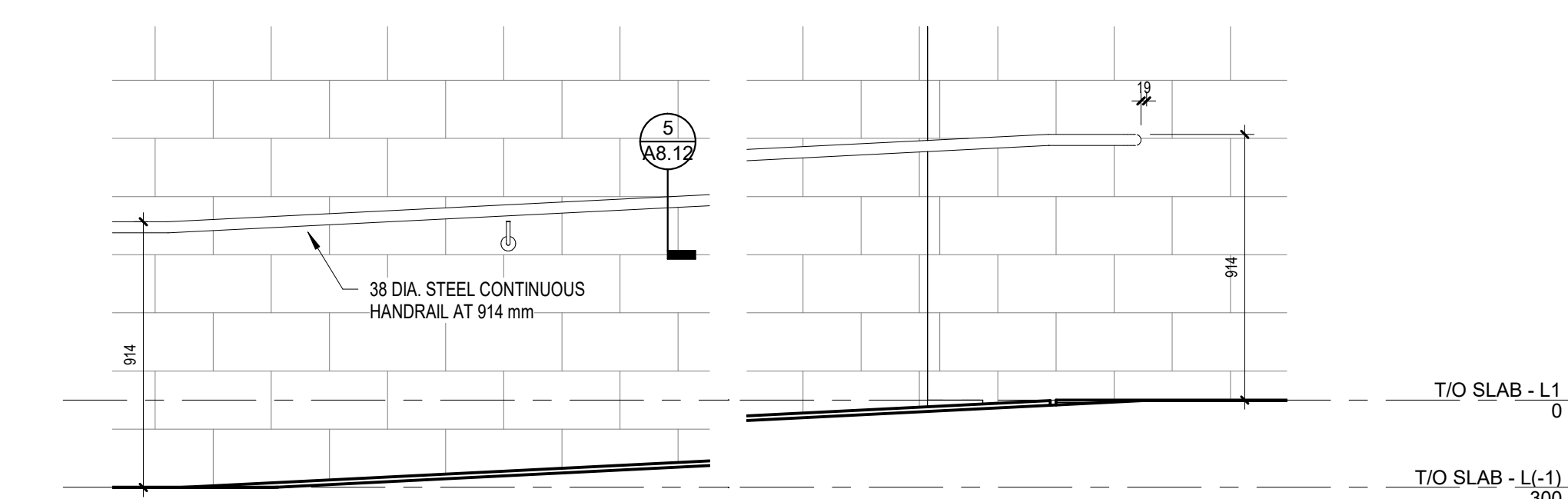
1 SECTION @ BLEACHER STAIRS - TYP.
 A8.10 / 1 : 50



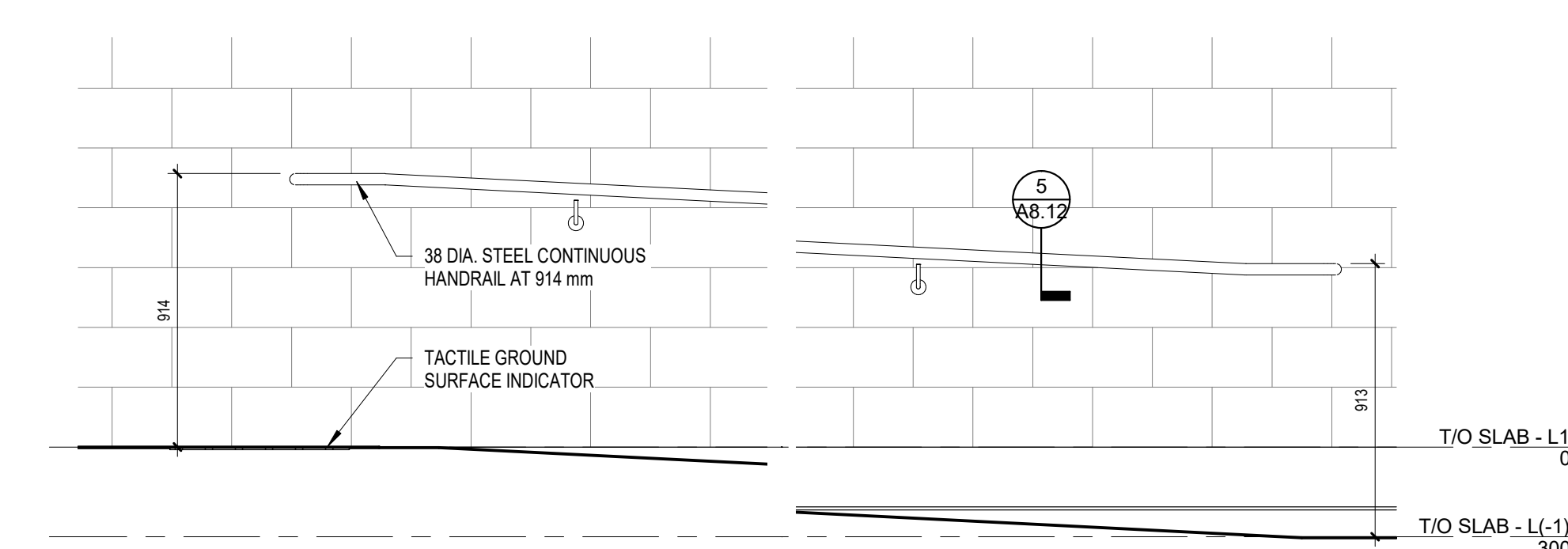
2 RAMP - CORRIDOR TO ICE SURFACE
 A8.10 / 1 : 50



3 RAMP - PLAYERS CORRIDOR
 A8.10 / 1 : 50



4 RAMP RAILING ELEVATION - PLAYERS CORRIDOR 1
 A8.10 / 1 : 20



5 RAMP RAILING ELEVATION - PLAYERS CORRIDOR 2
 A8.10 / 1 : 20

NO.	REVISION	DATE
0	TPS - ISSUED FOR TENDER	2023-04-10

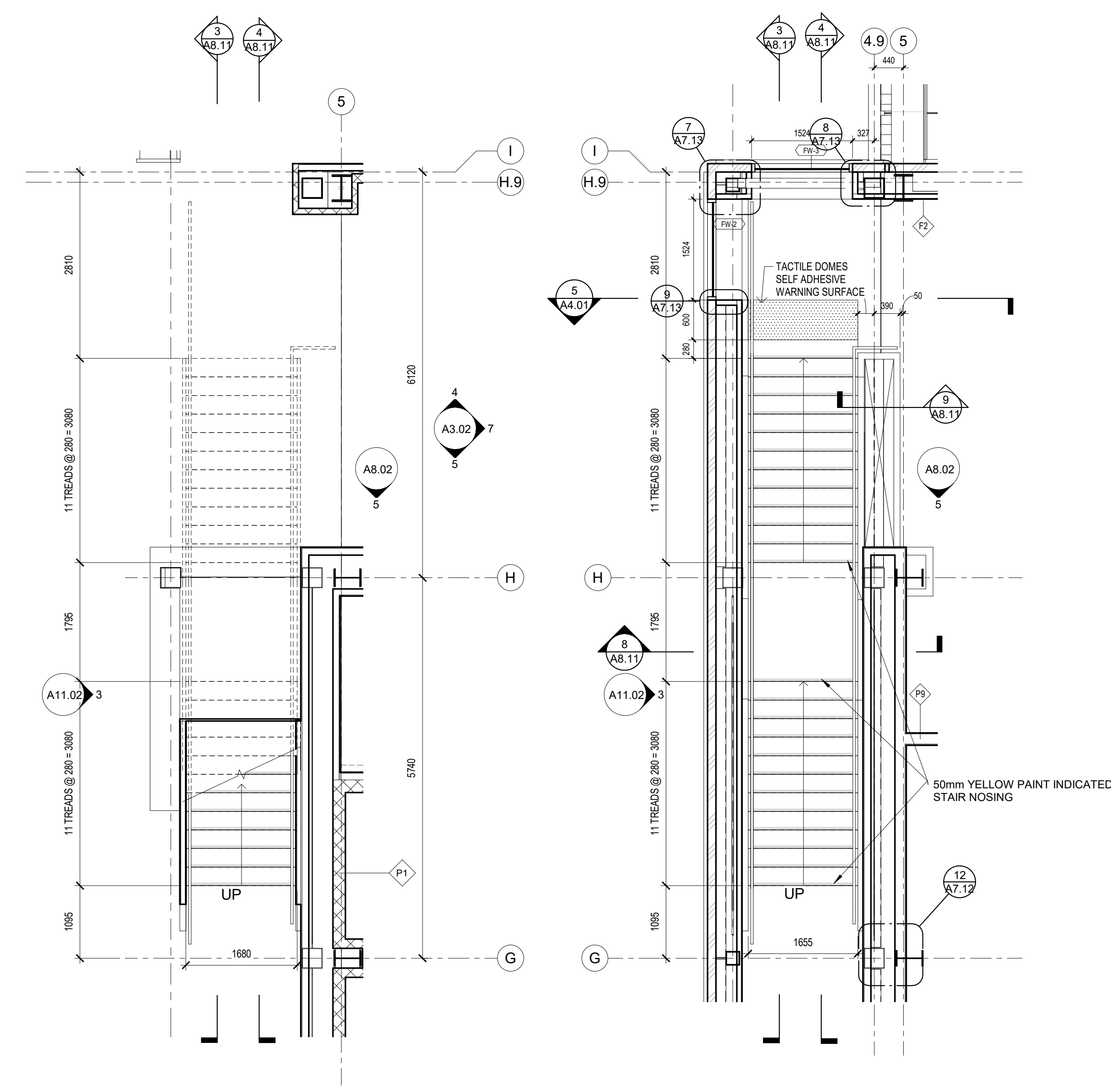
STAMP



PROJECT NAME:
 SIMMONS SPORTS CENTRE ARENA & POOL
 REPLACEMENT
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

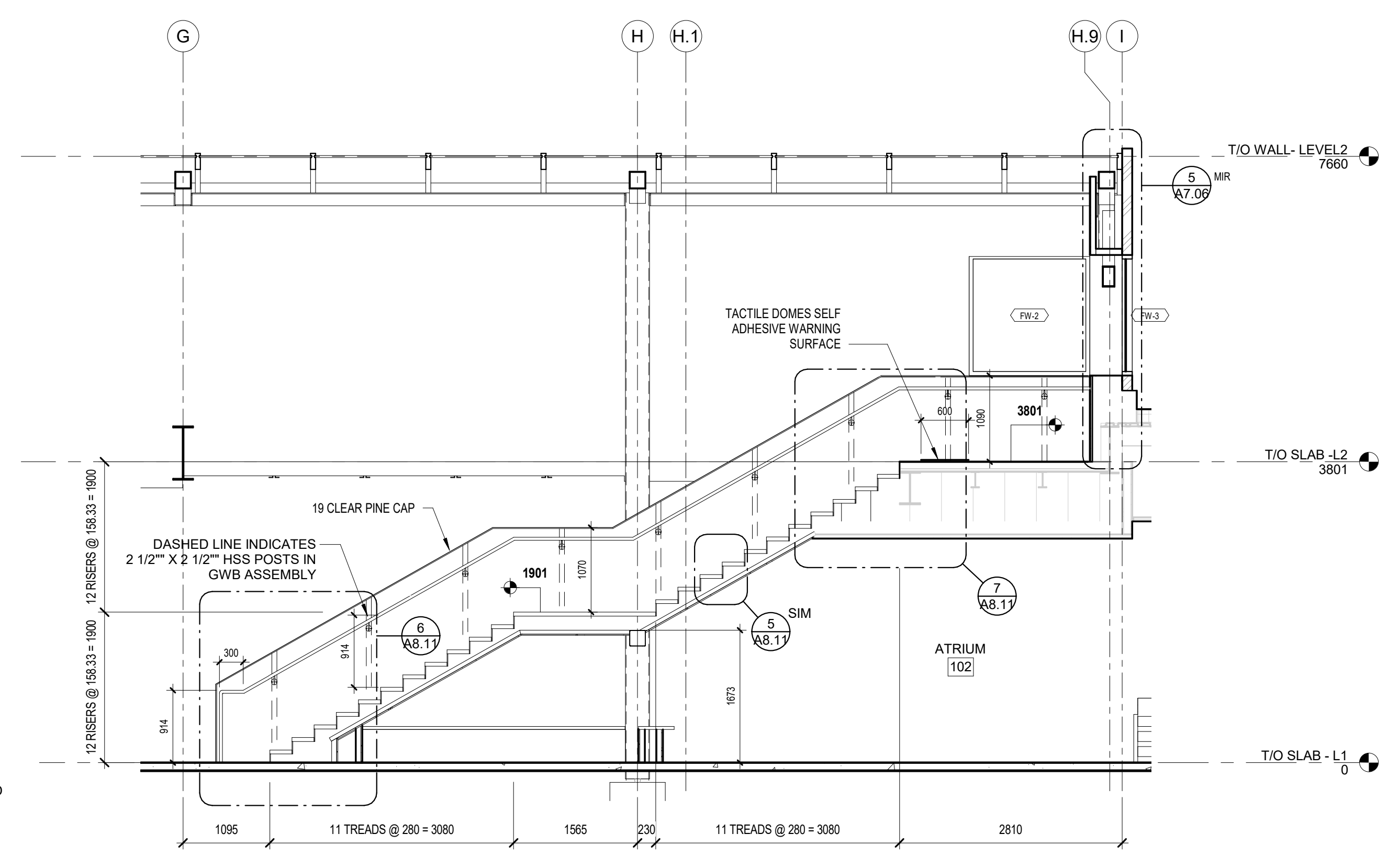
PROJECT NO.: 21111
 DRAWN BY: OM / MV / DE
 CHECKED BY: MMG / PC
 SCALE: As indicated

STAIR & RAMP PLANS,
 SECTIONS, DETAILS

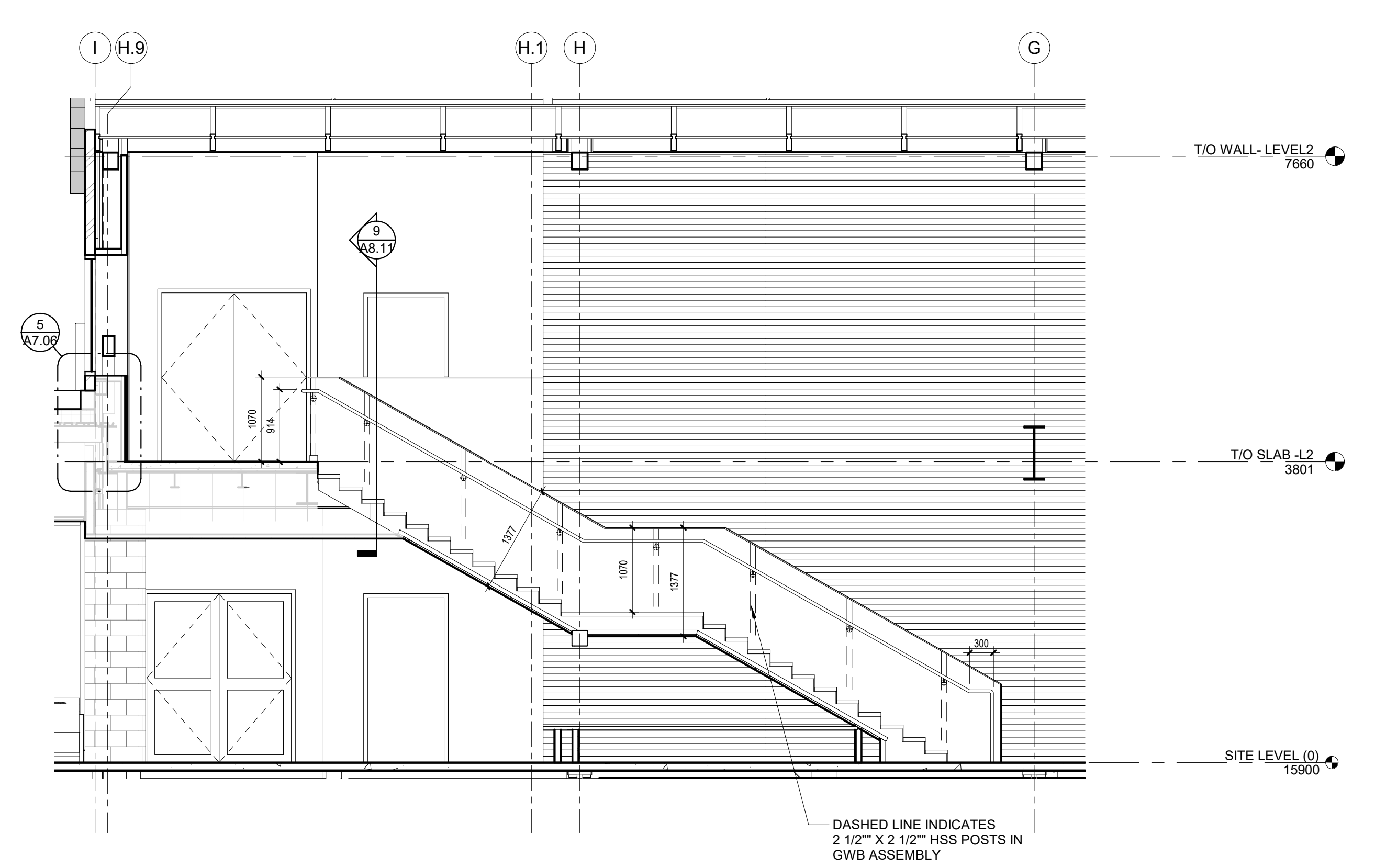


1 STAIR 3 - LEVEL 1
 A8.11 1: 50

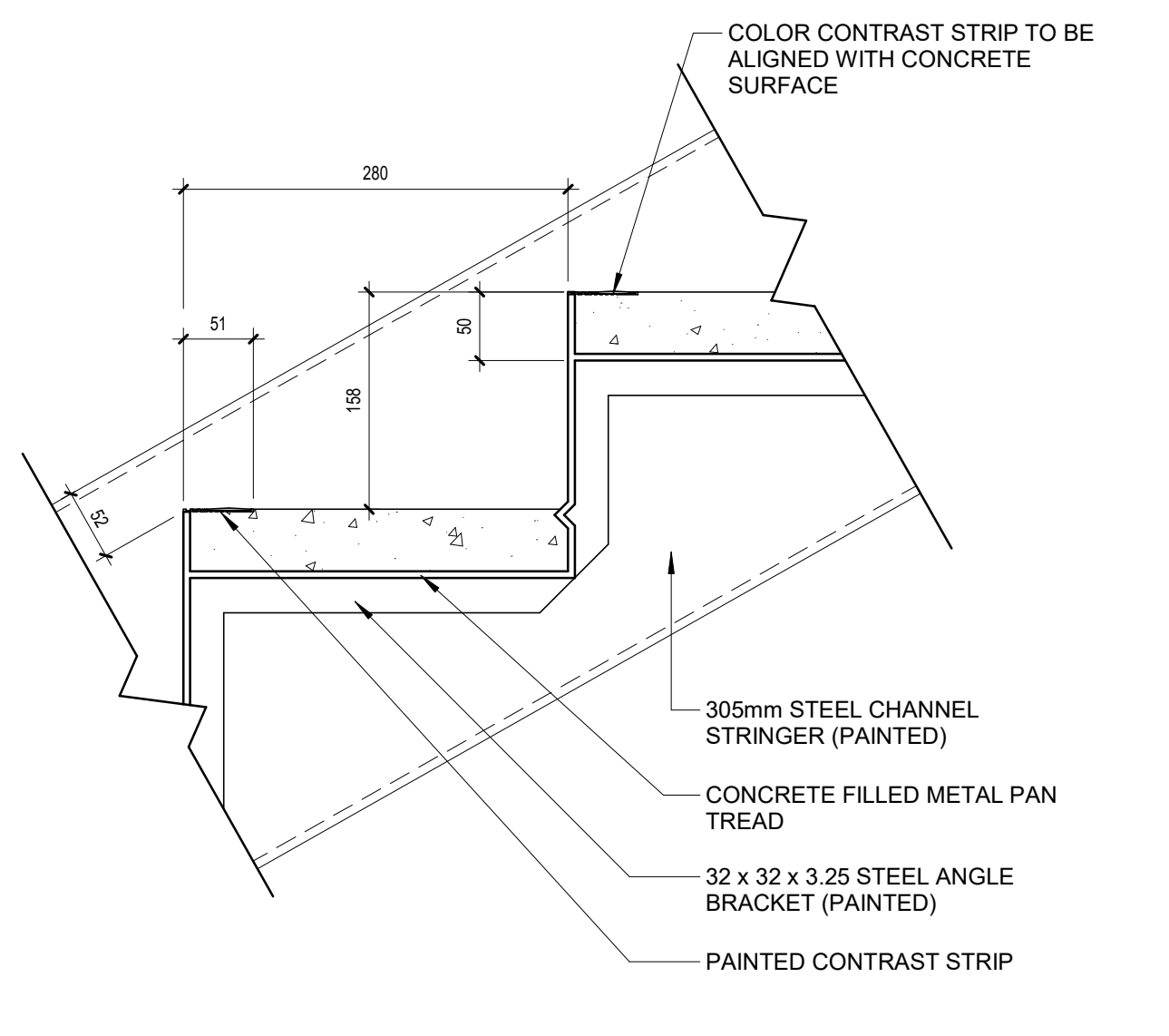
2 STAIR 3 - LEVEL 2
 A8.11 1: 50



3 STAIR 3 - SOUTH SECTION
 A8.11 1: 50

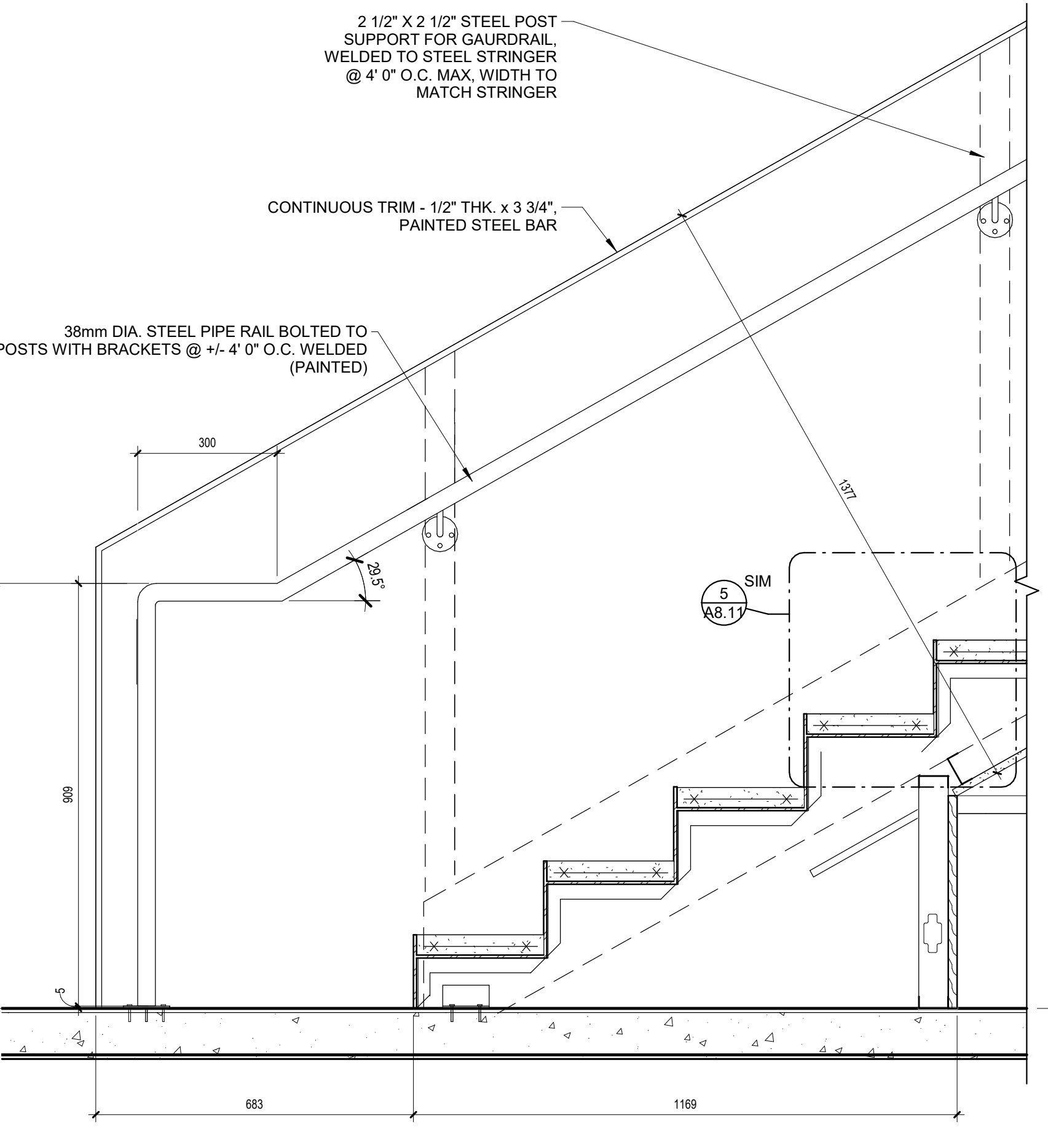


4 STAIR 3 - NORTH SECTION
 A8.11 1: 50

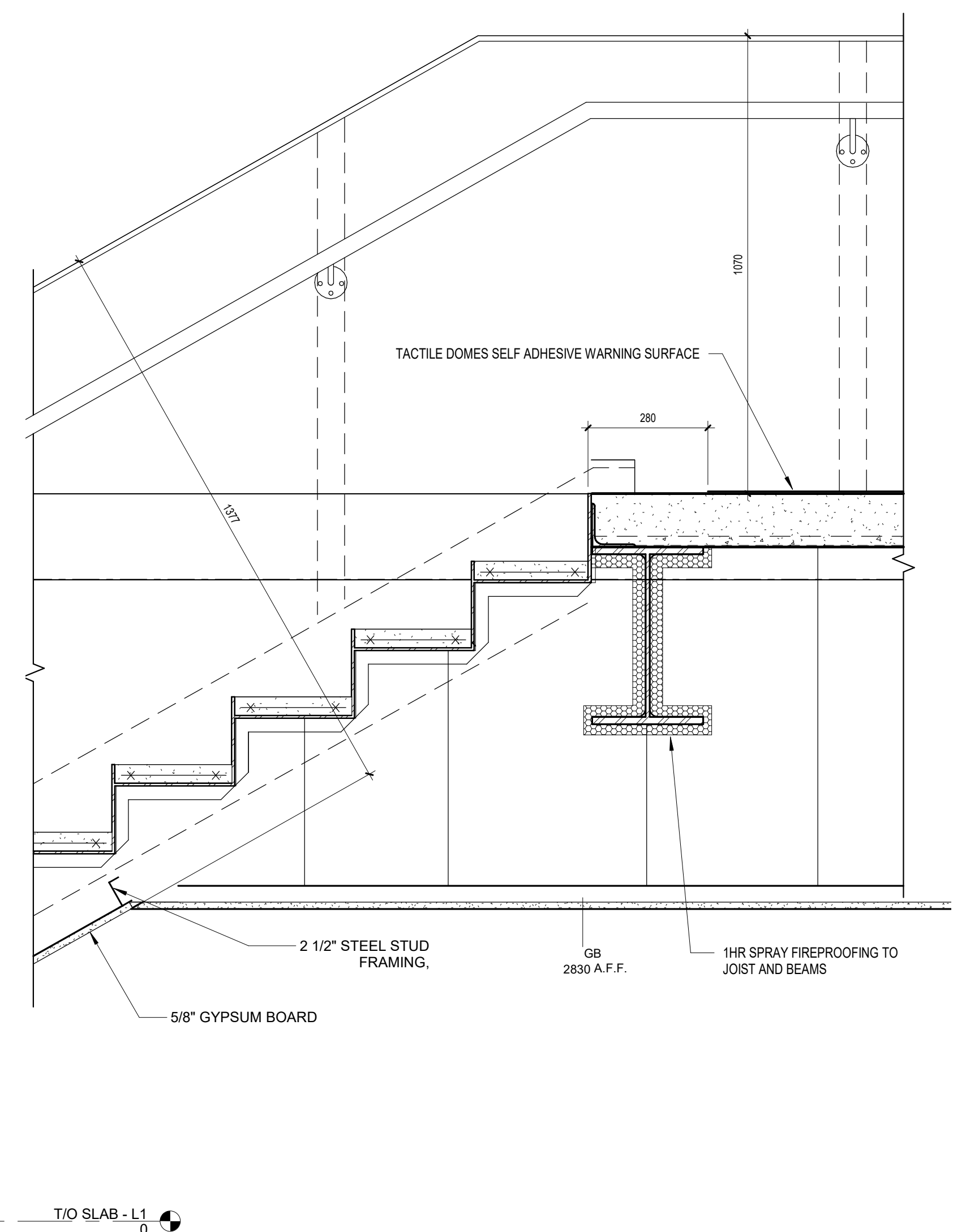


5 STAIR TREAD DETAIL - TYPICAL
 A8.11 1: 5

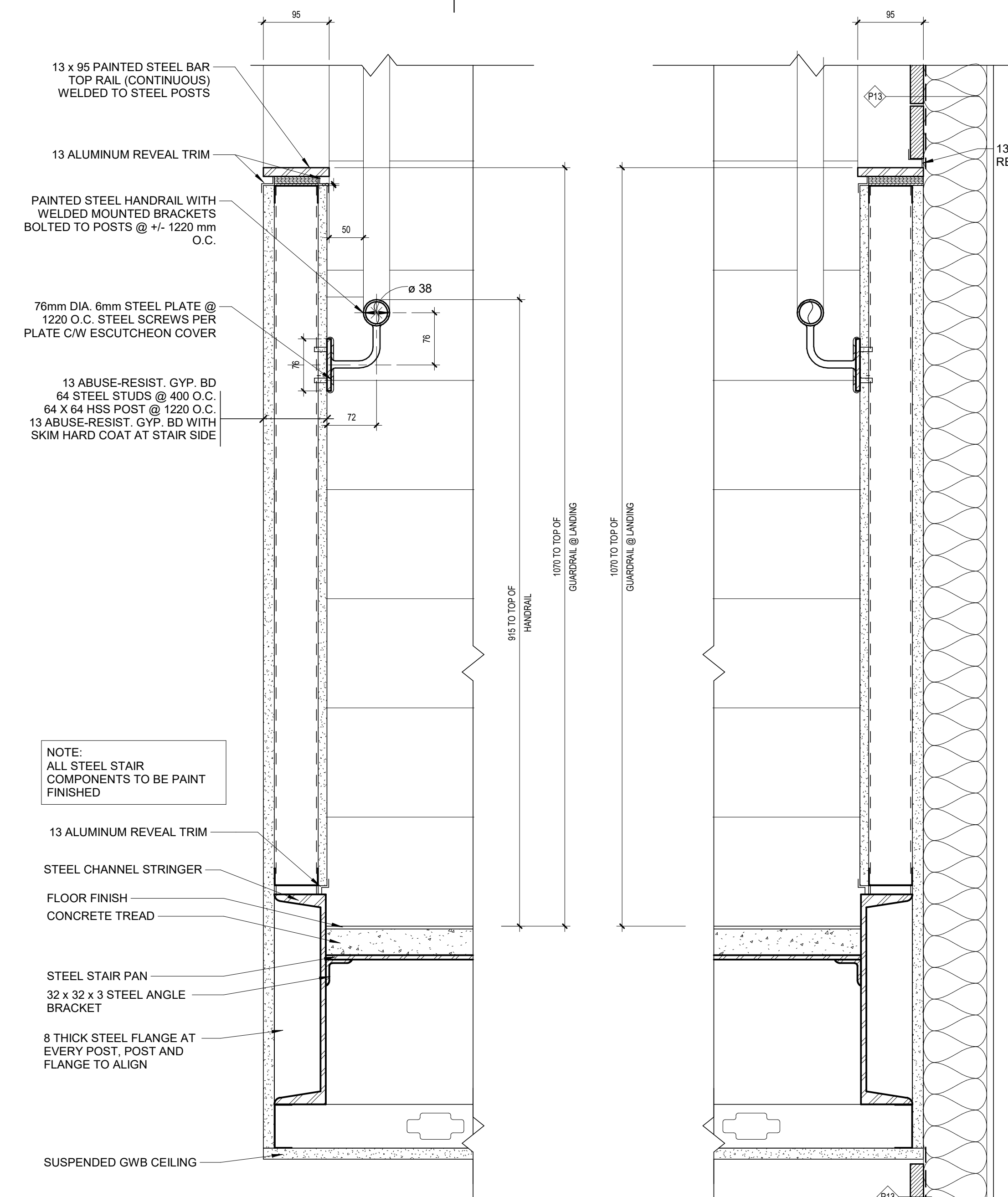
NOTE:
 1. ALL STRINGER CHANNELS TO RECEIVE WELDED
 END AND CORNER CLOSURES
 2. SUBMIT SHOP DRAWINGS OF ALL STAIRS
 3. SEE ROOM FINISH SCHEDULE AND
 ARCHITECTURAL DETAILS FOR CONC. FINISHES
 4. RUBBER STAIR NOSINGS ARE NOT TO BE USED



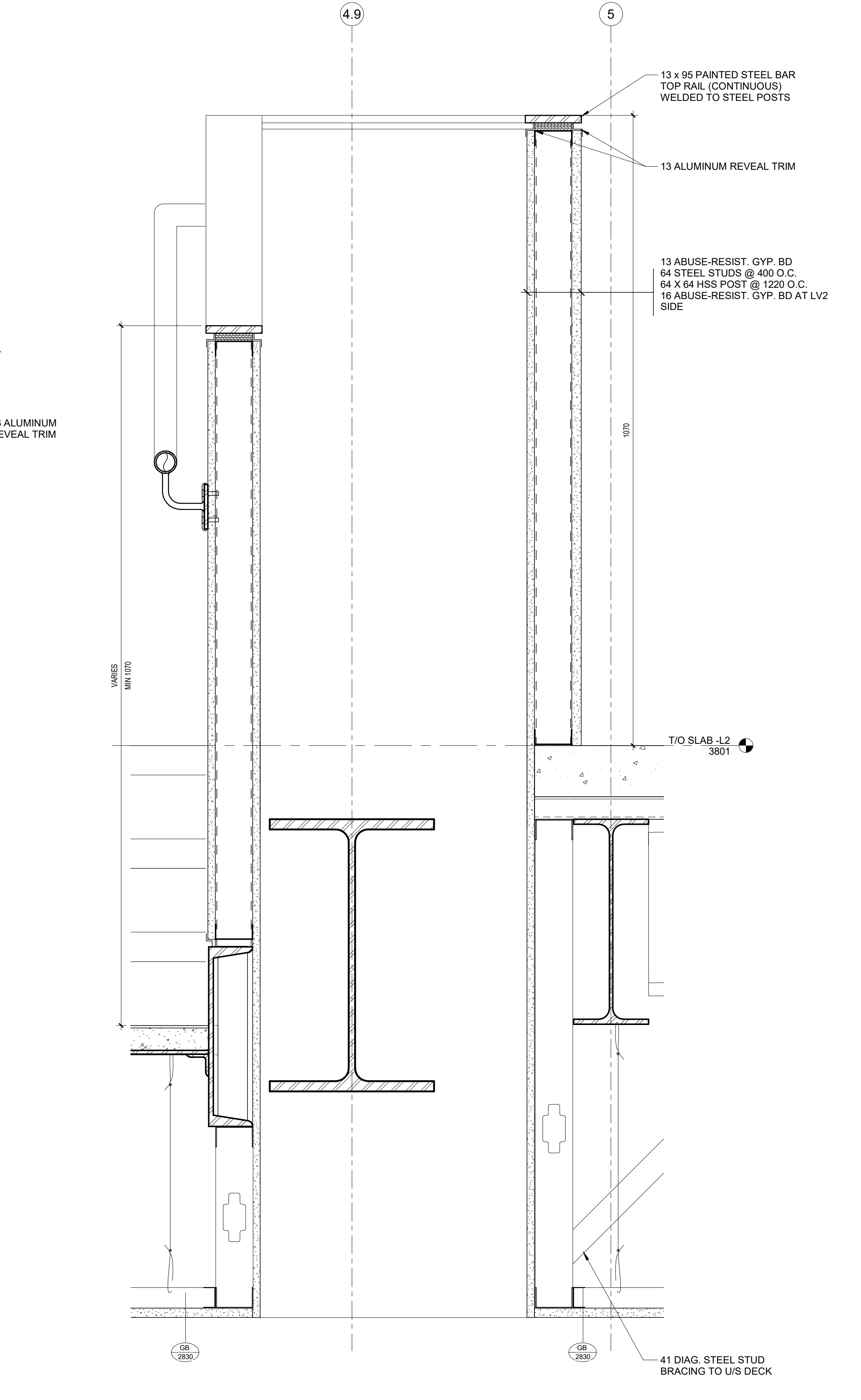
6 STAIR 3 - SECTION - LOWER LANDING
 A8.11 1: 10



7 STAIR 3 - SECTION - UPPER LANDING
 A8.11 1: 10



8 STAIR 3 - SECTION @ LANDING
 A8.11 1: 5



9 STAIR 3 - SECTION @ GUARDRAIL RETURN
 A8.11 1: 5

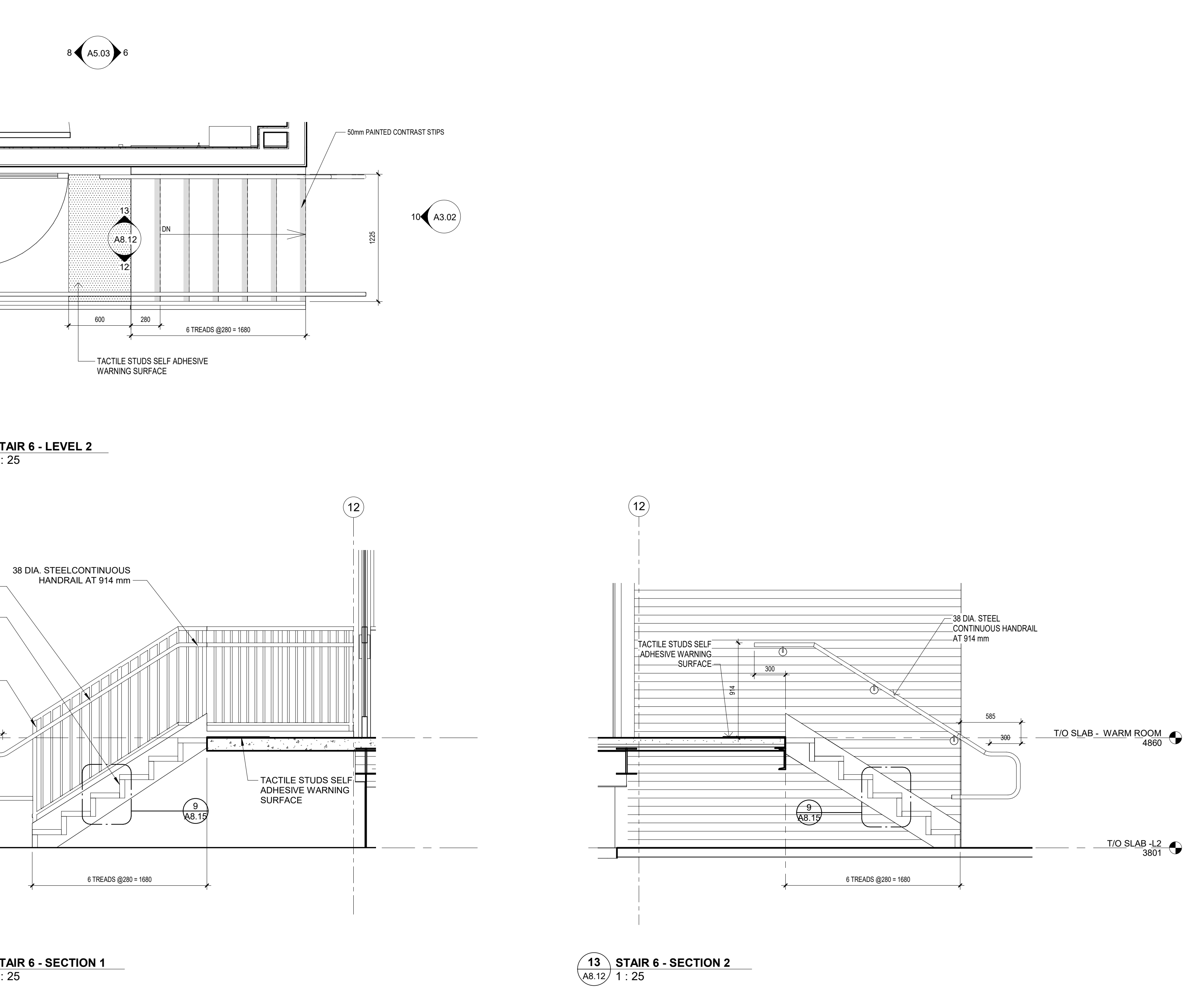
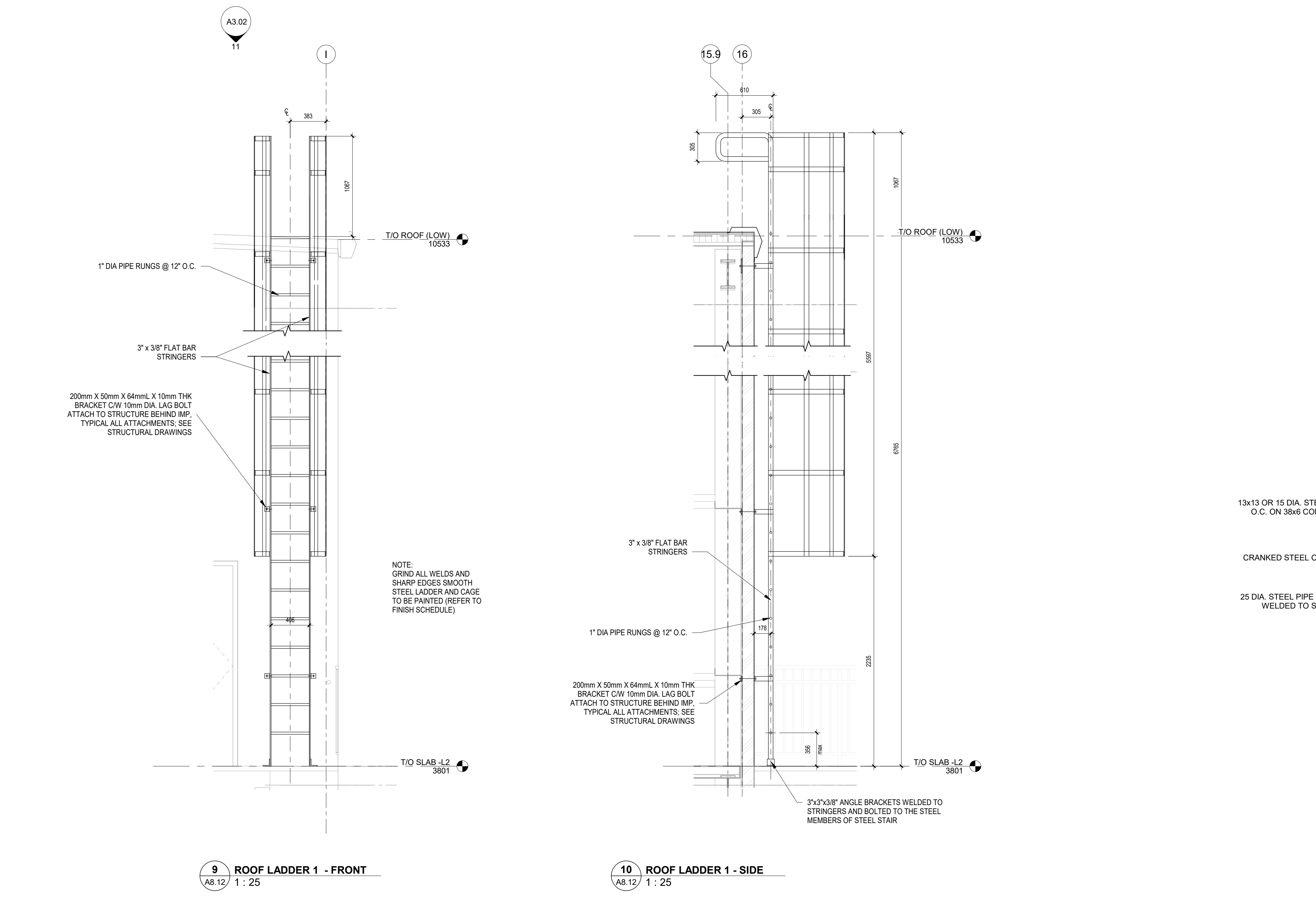
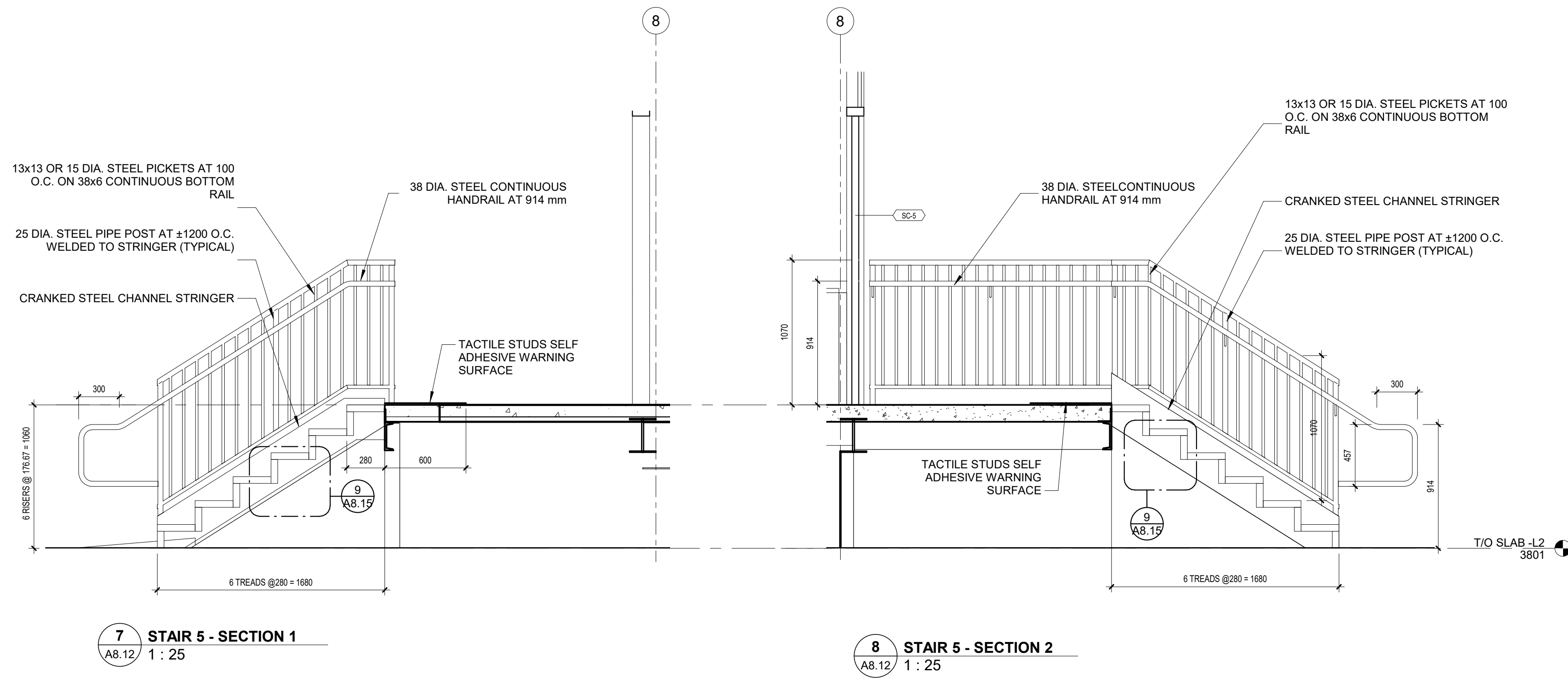
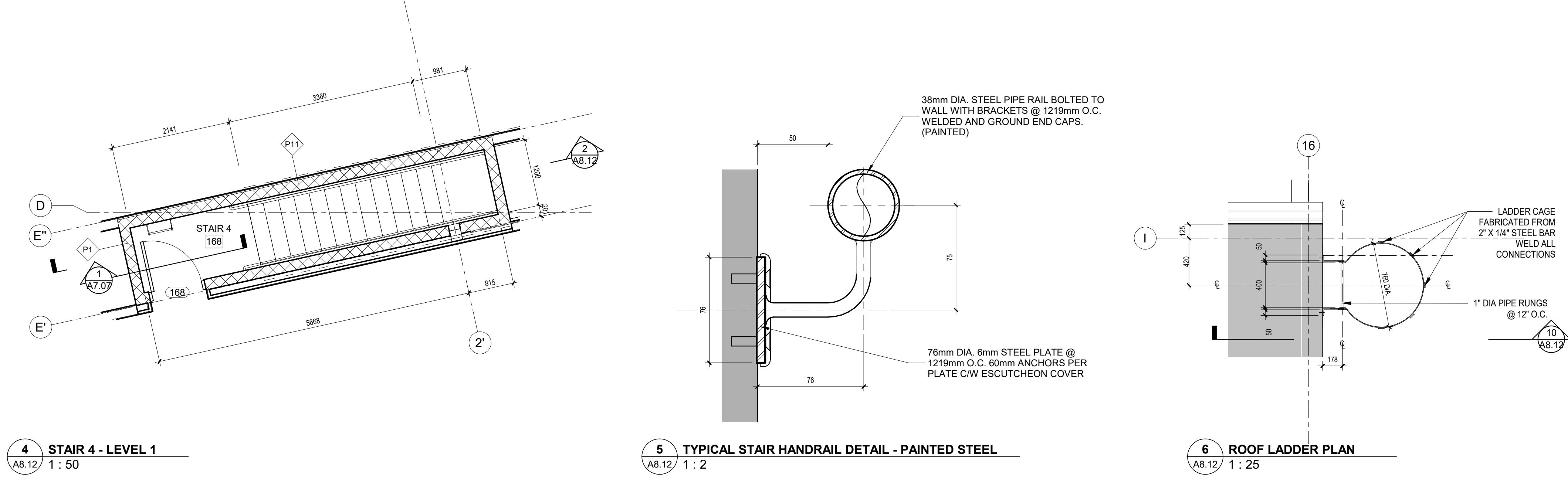
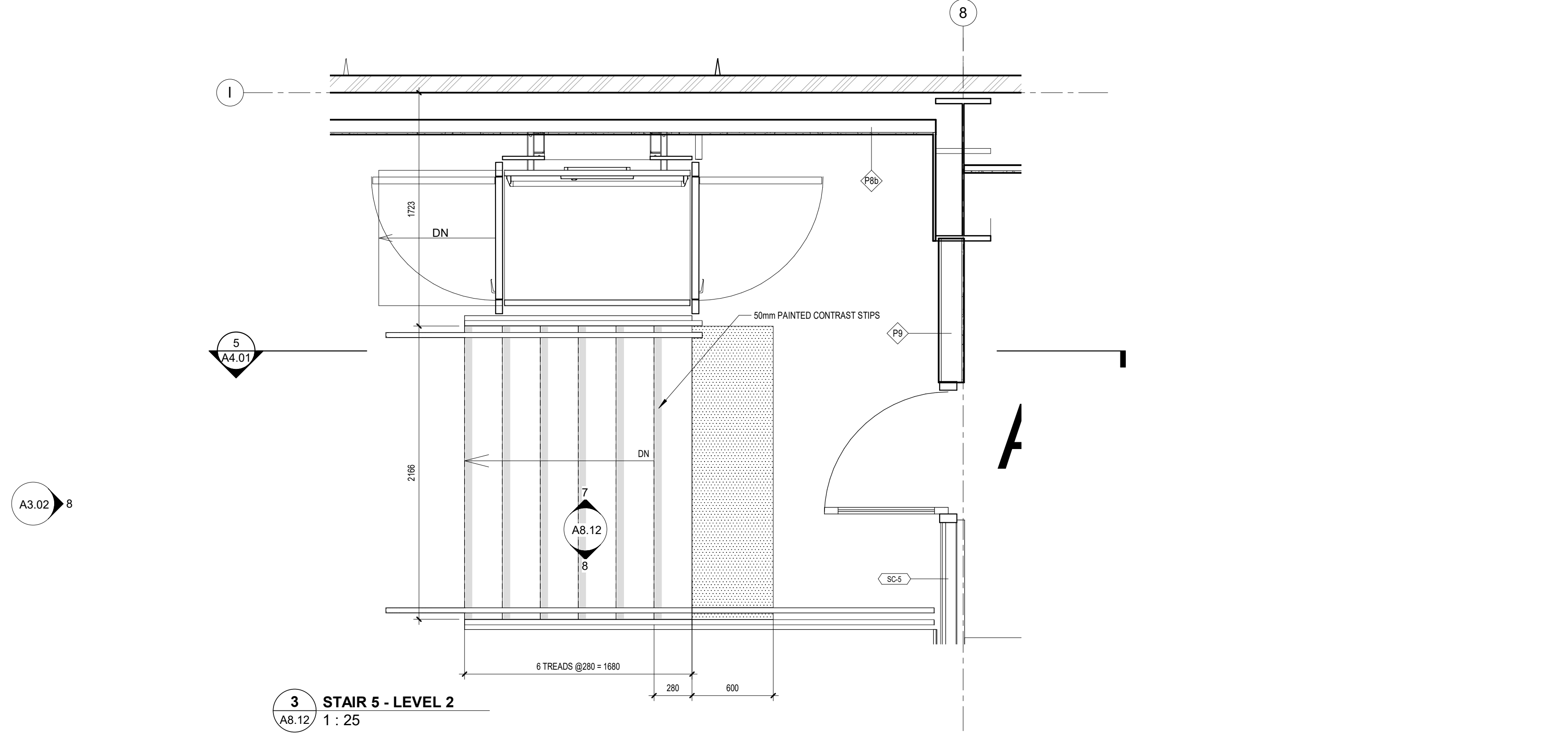
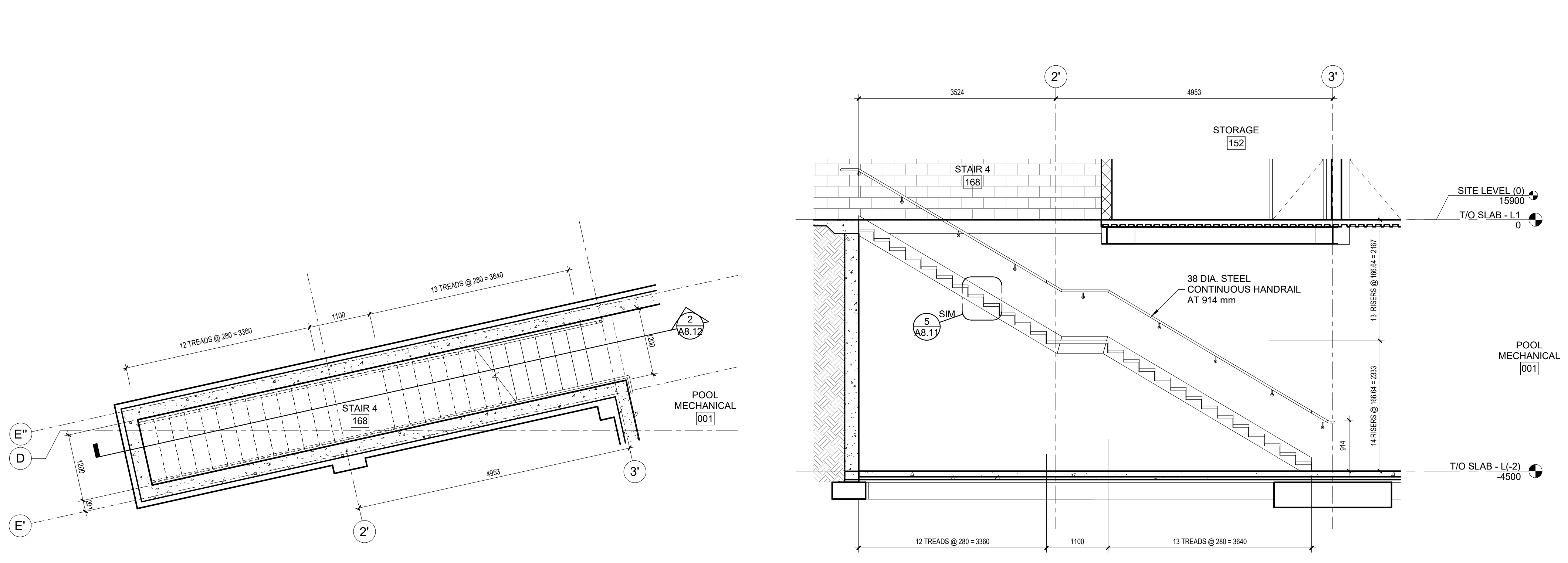
NO.	REVISION	DATE
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STAMP

PROJECT NAME
**SIMMONS SPORTS CENTRE ARENA & POOL
 REPLACEMENT**
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

PROJECT NO.: 21111
 DRAWN BY: OM / MM / DE
 CHECKED BY: MMG / PC
 SCALE: As indicated

STAIR PLANS, SECTIONS
 AND DETAILS



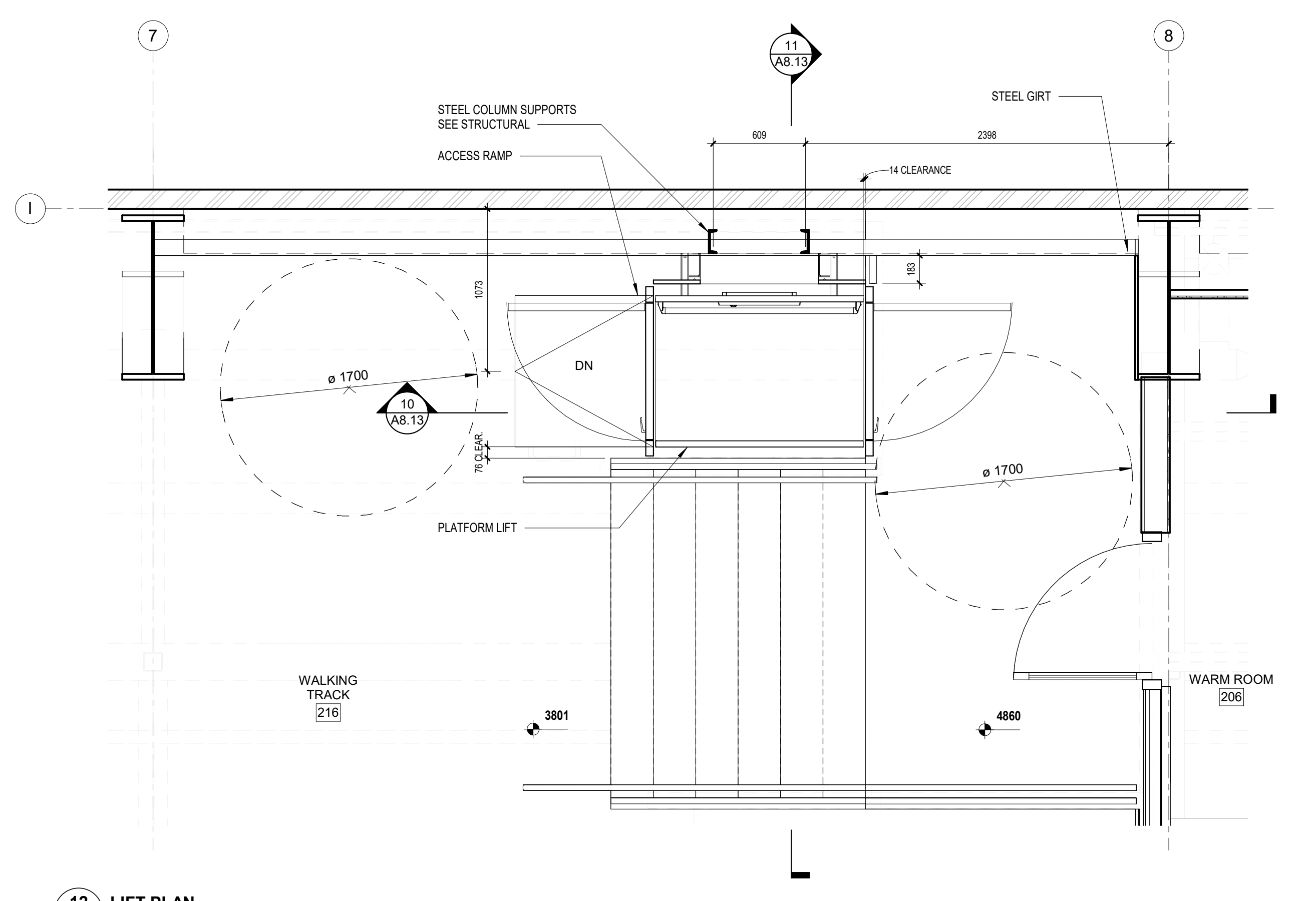
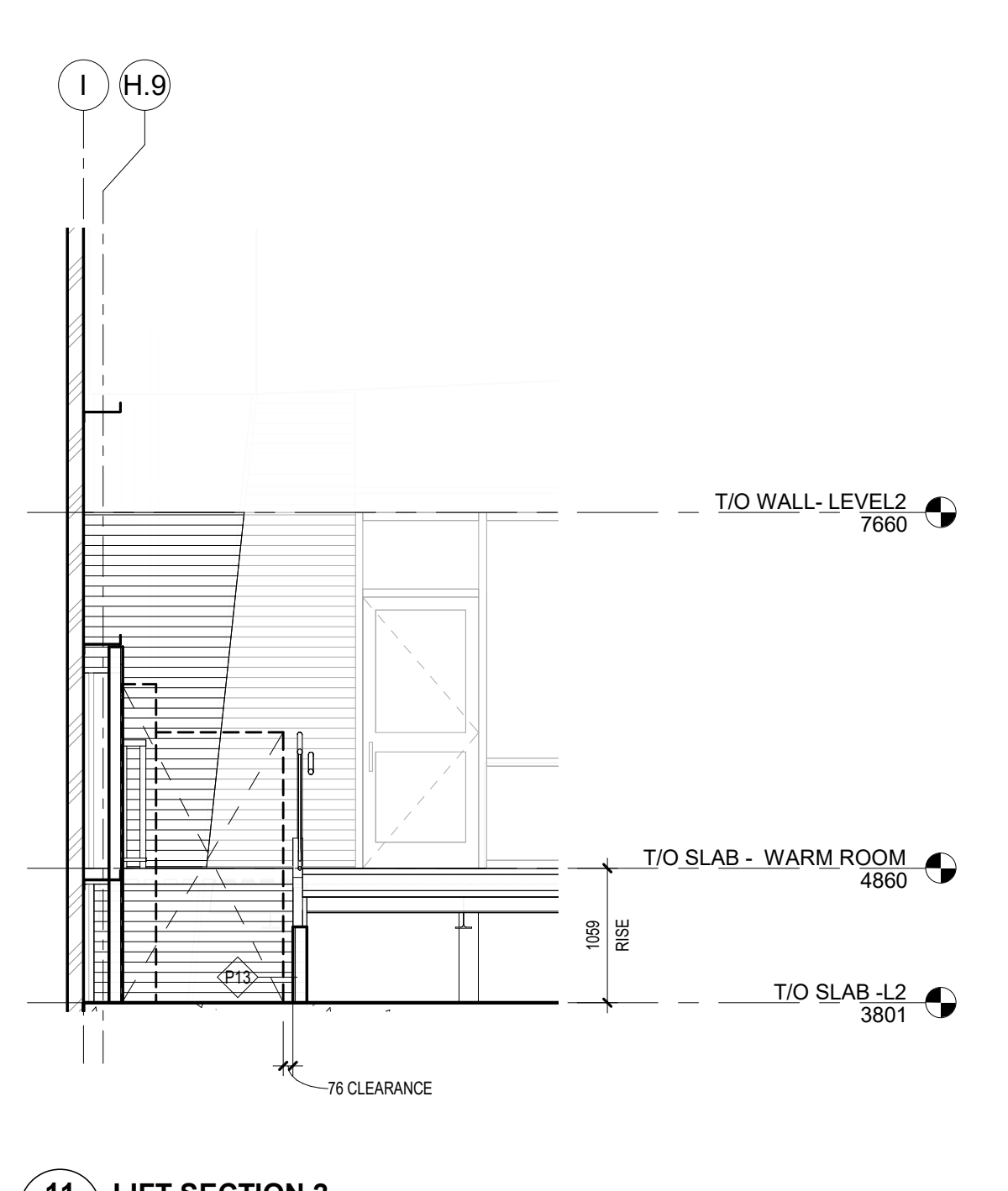
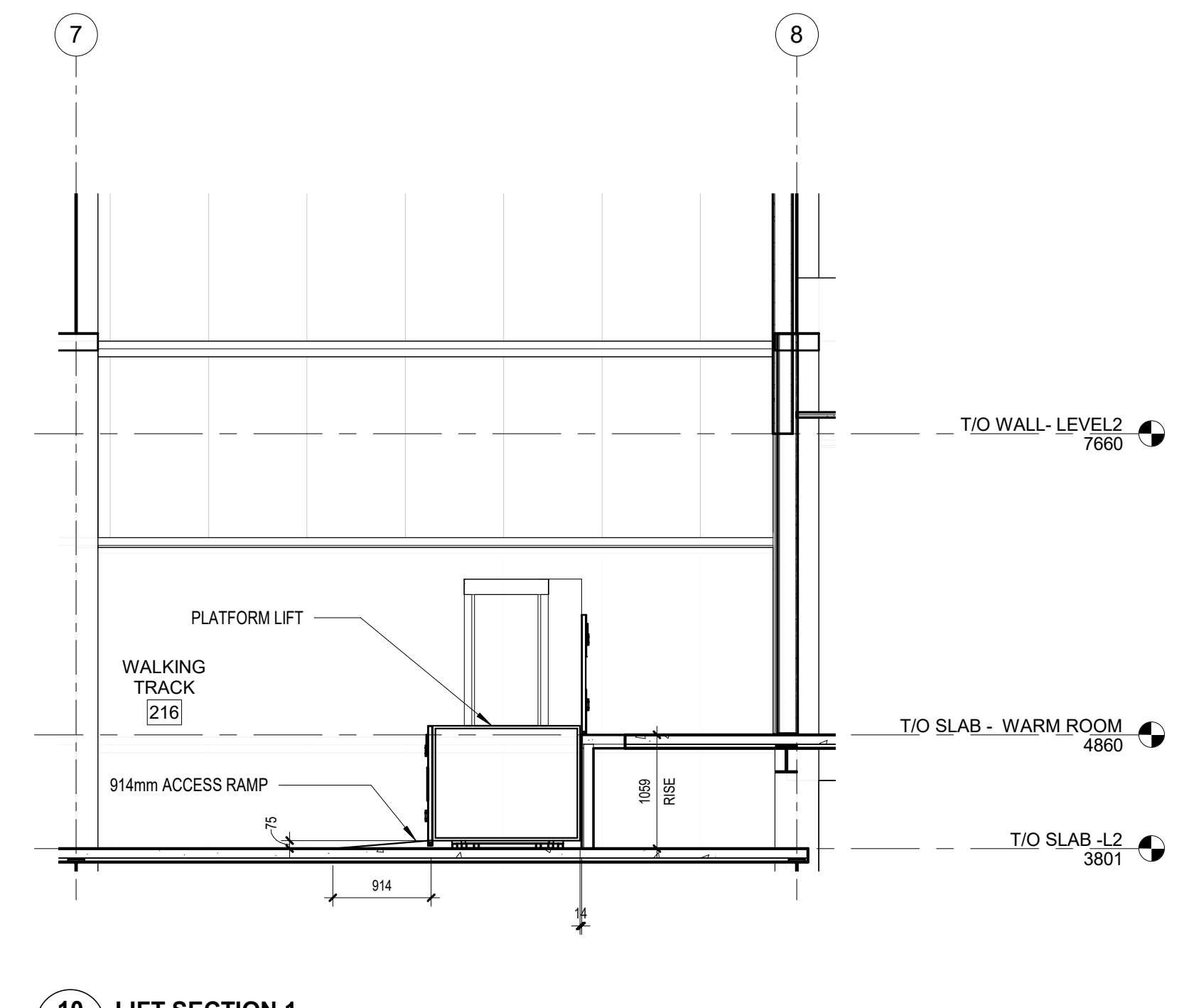
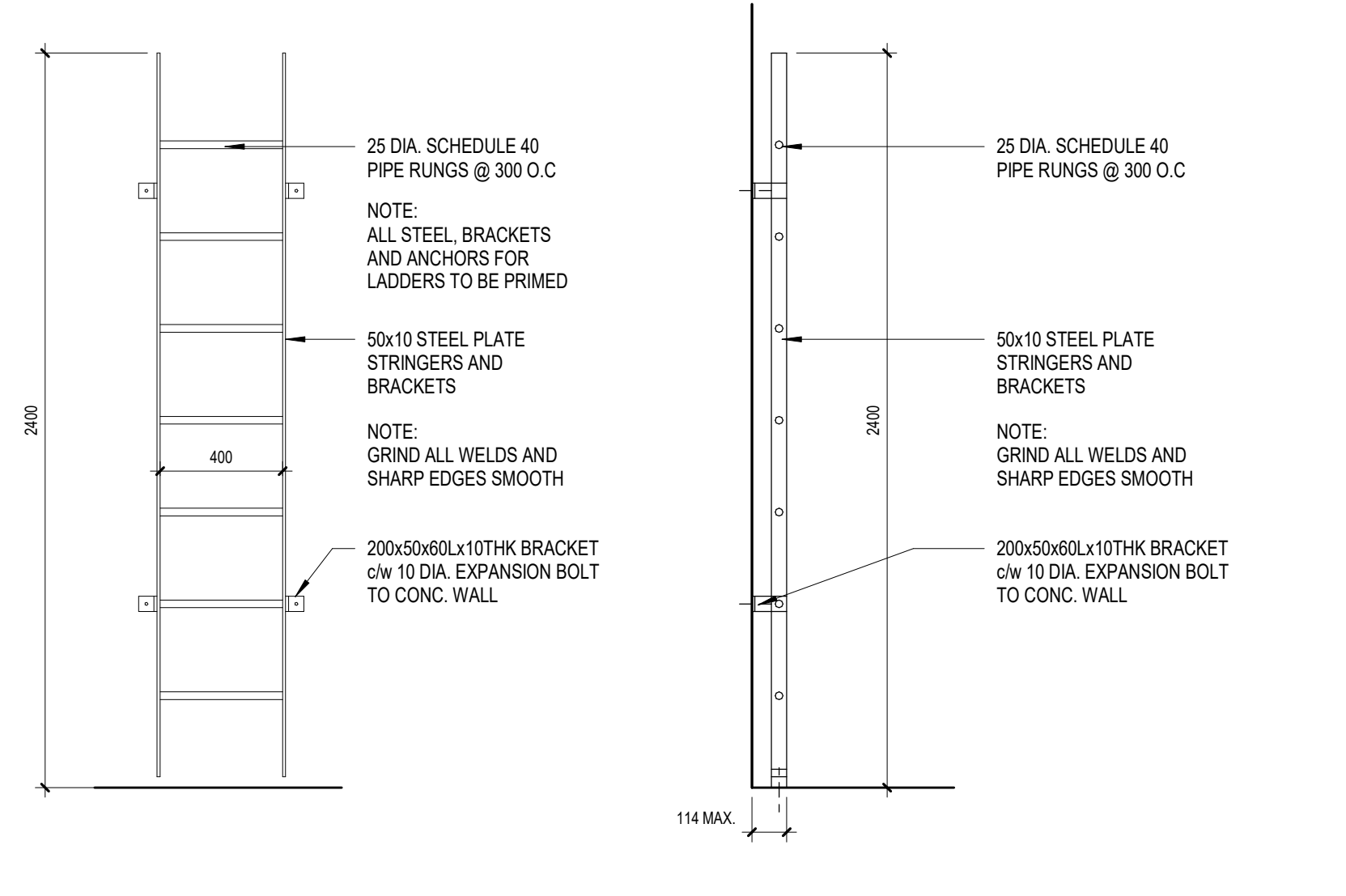
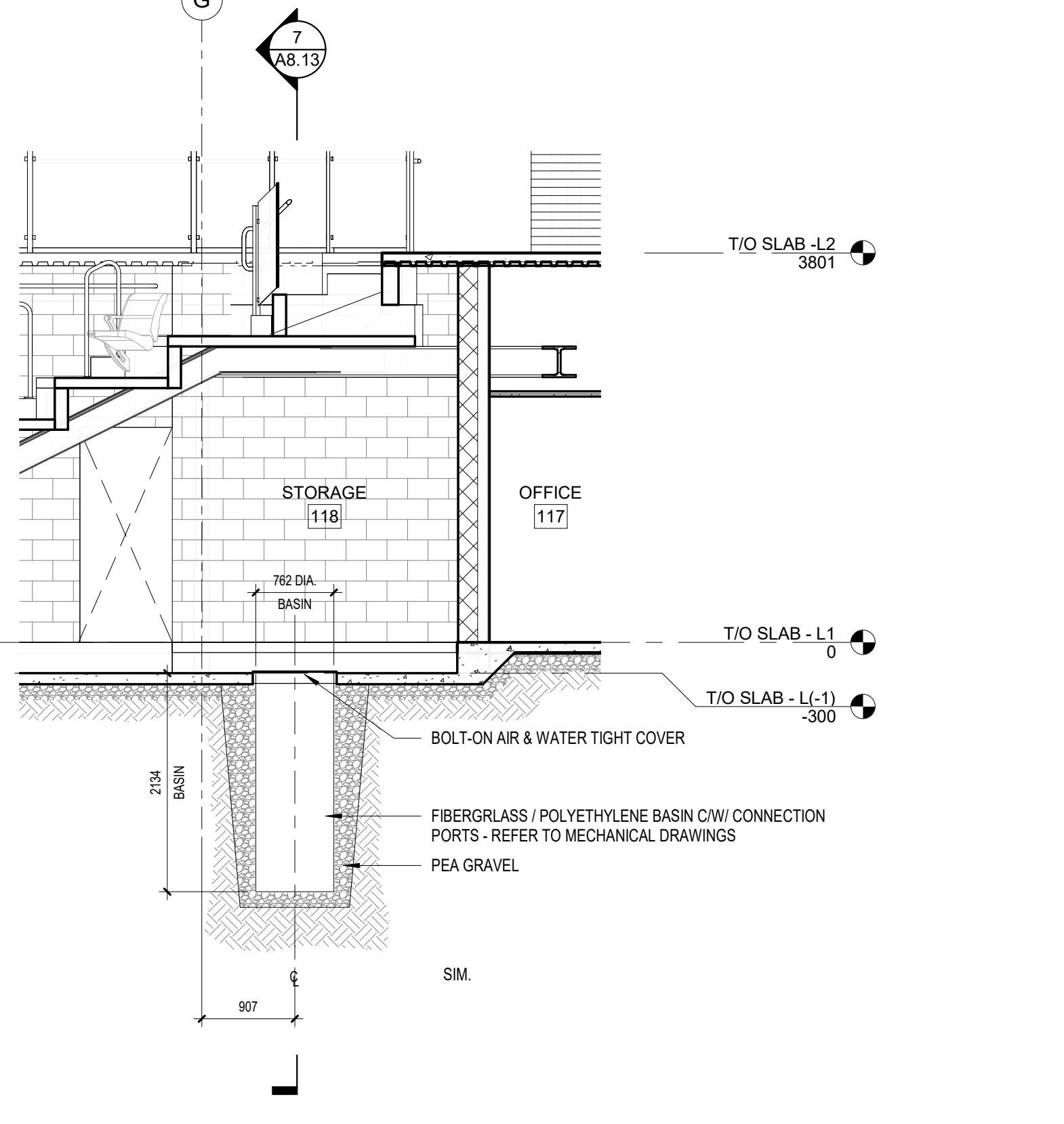
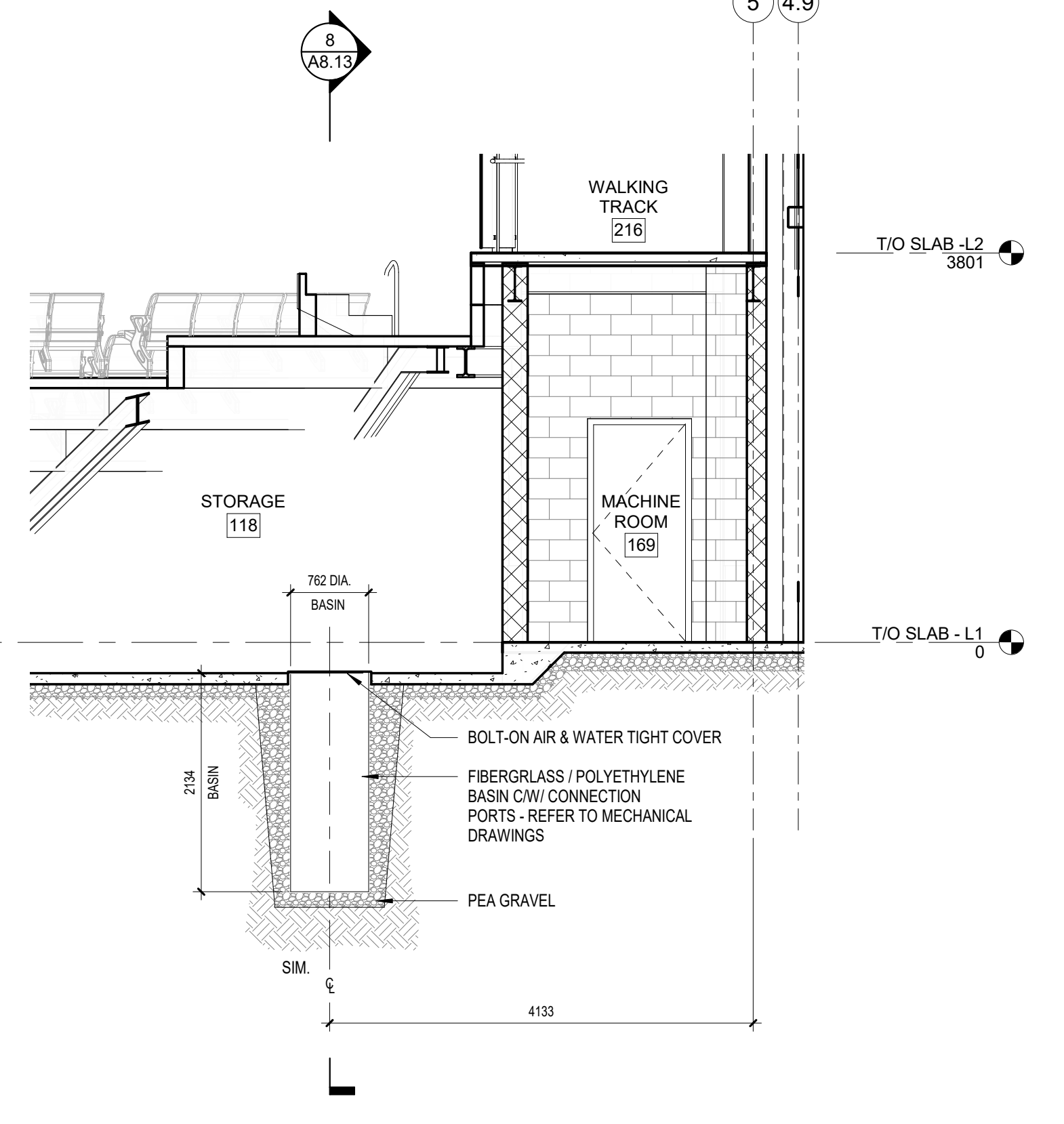
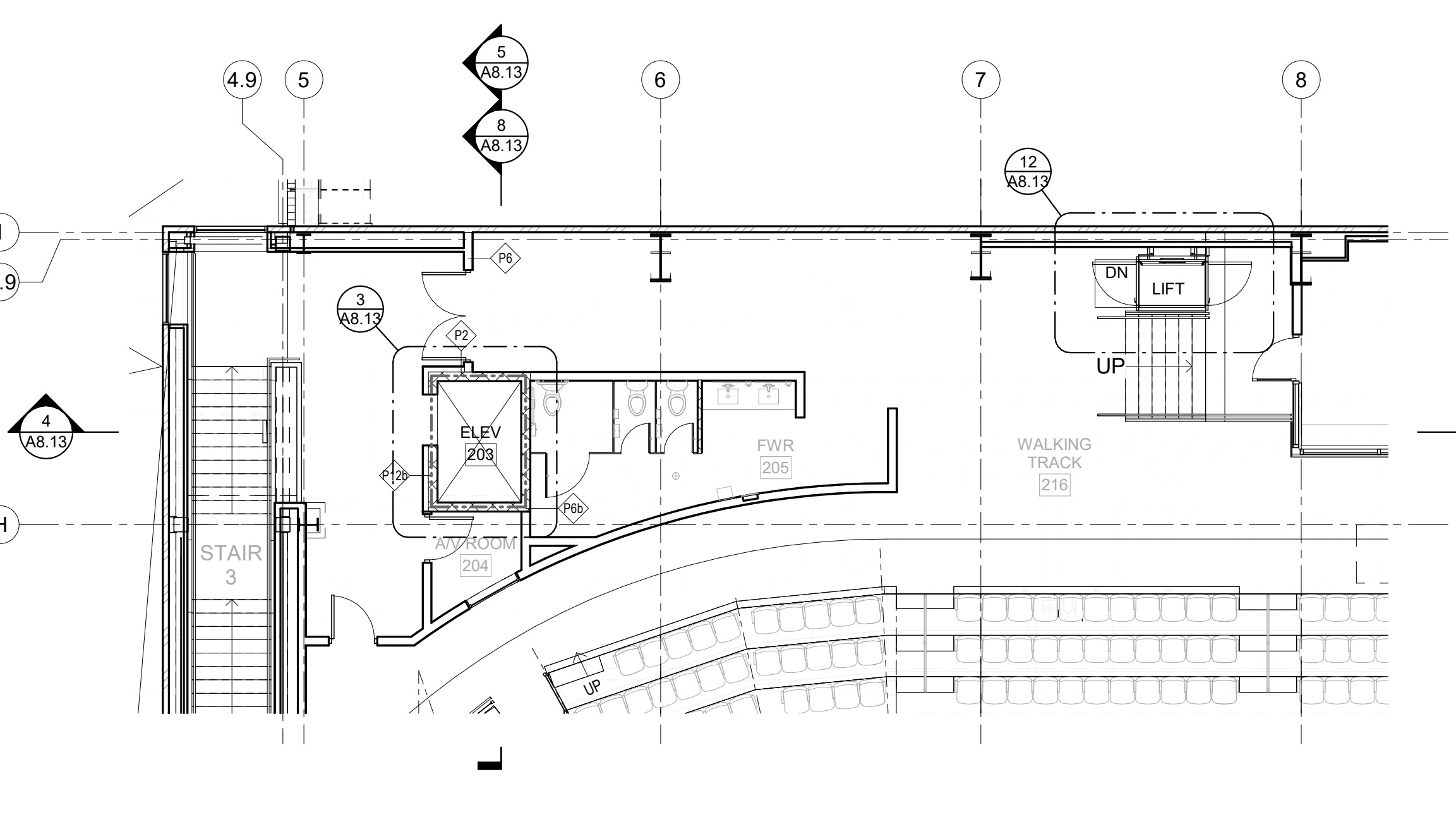
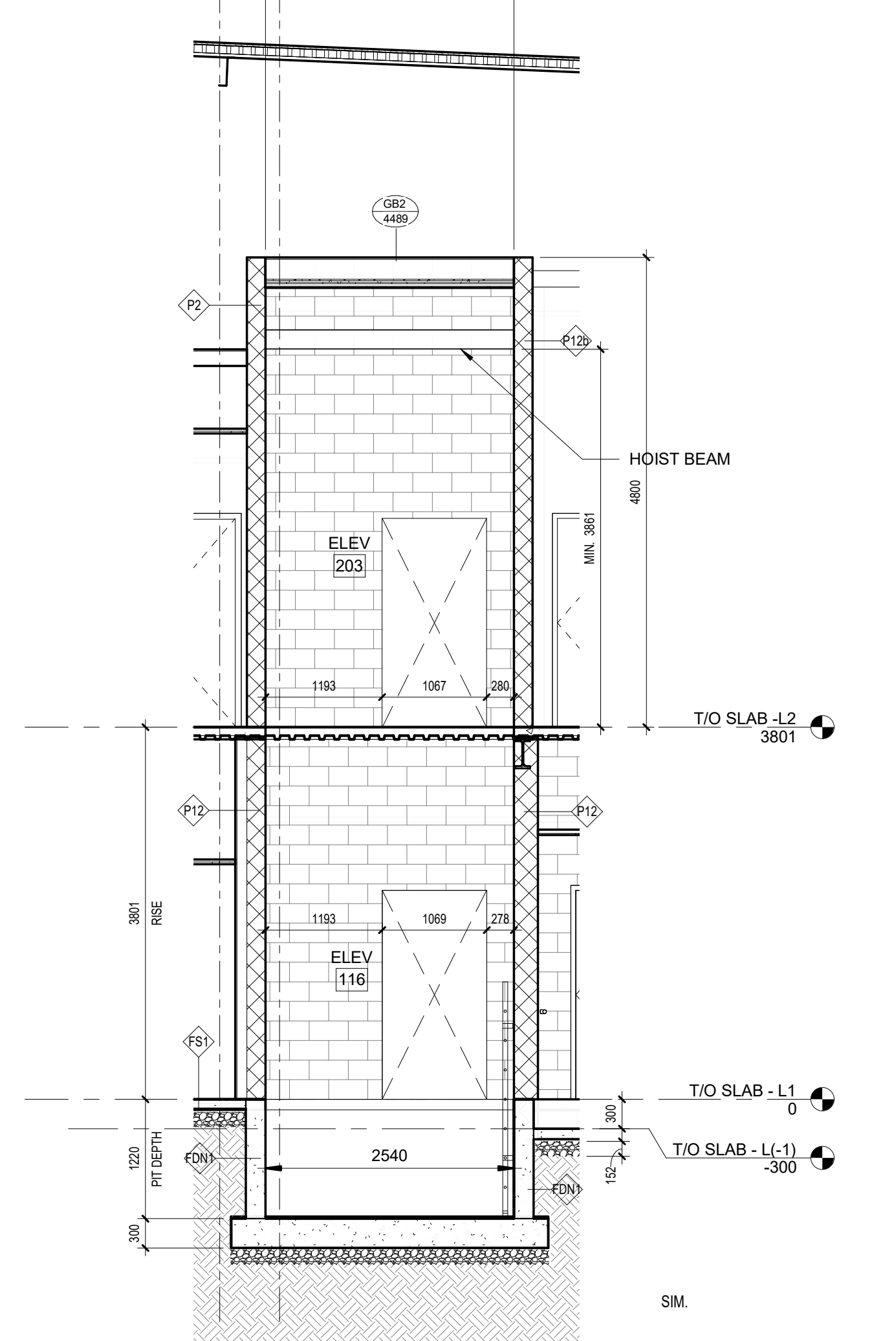
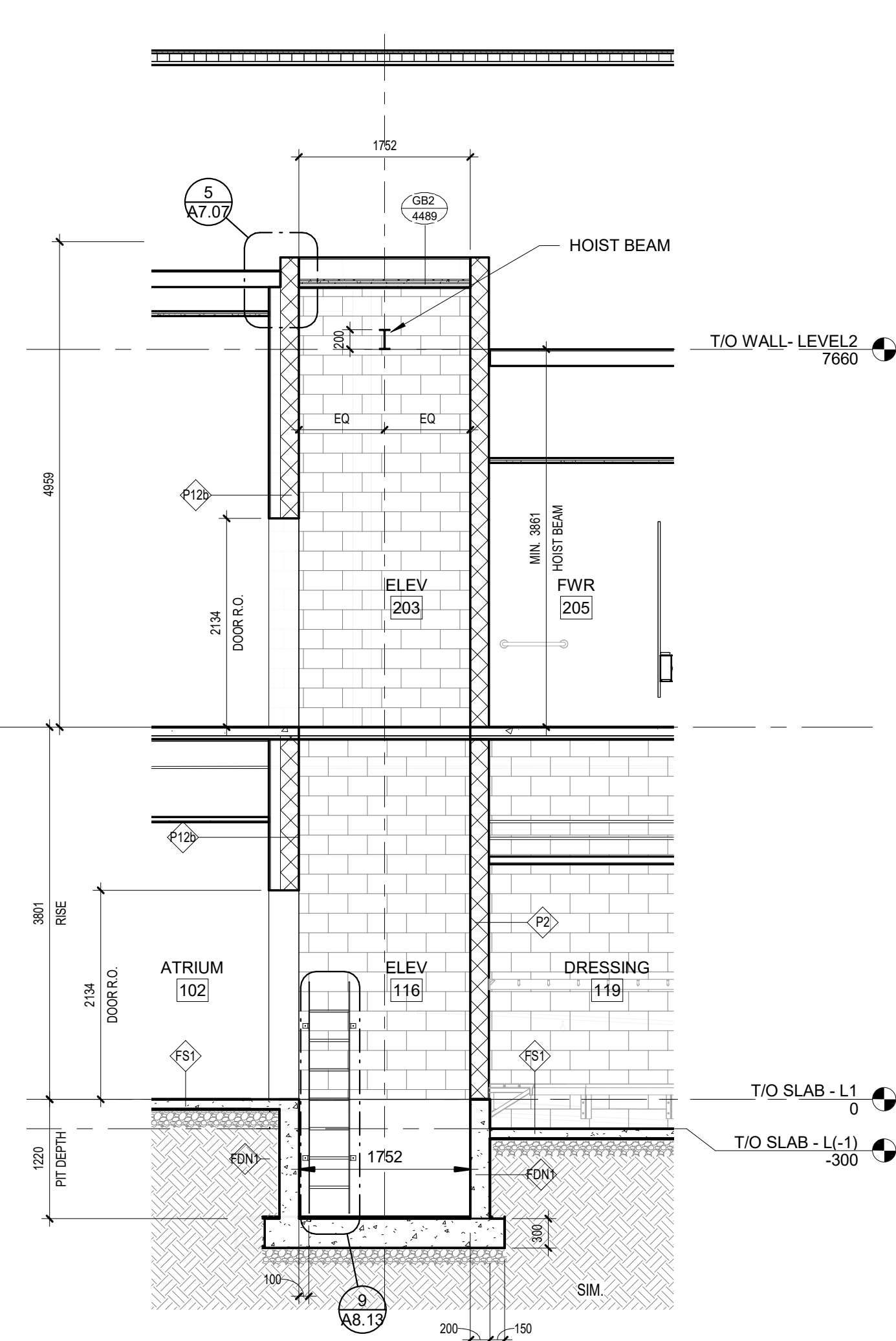
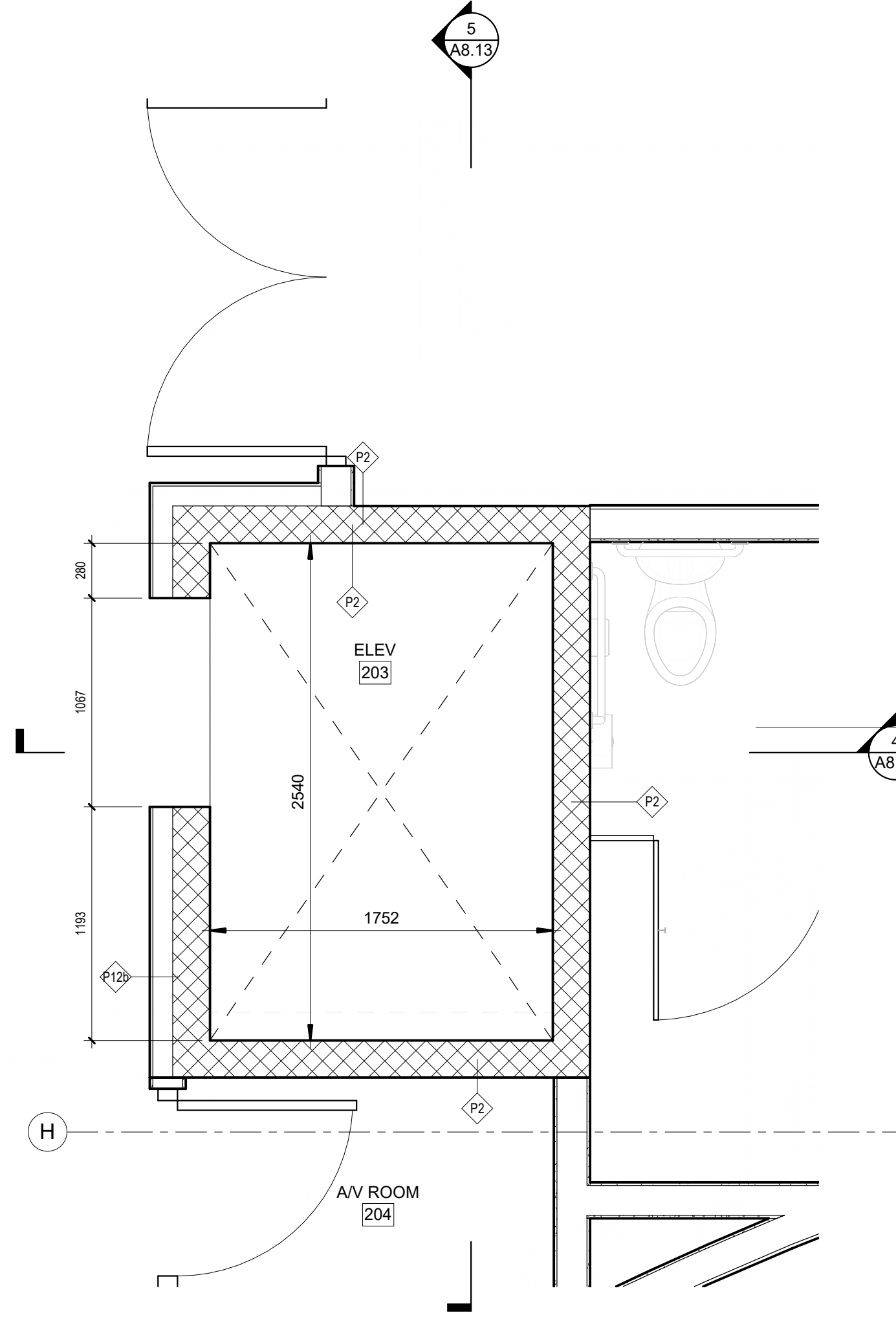
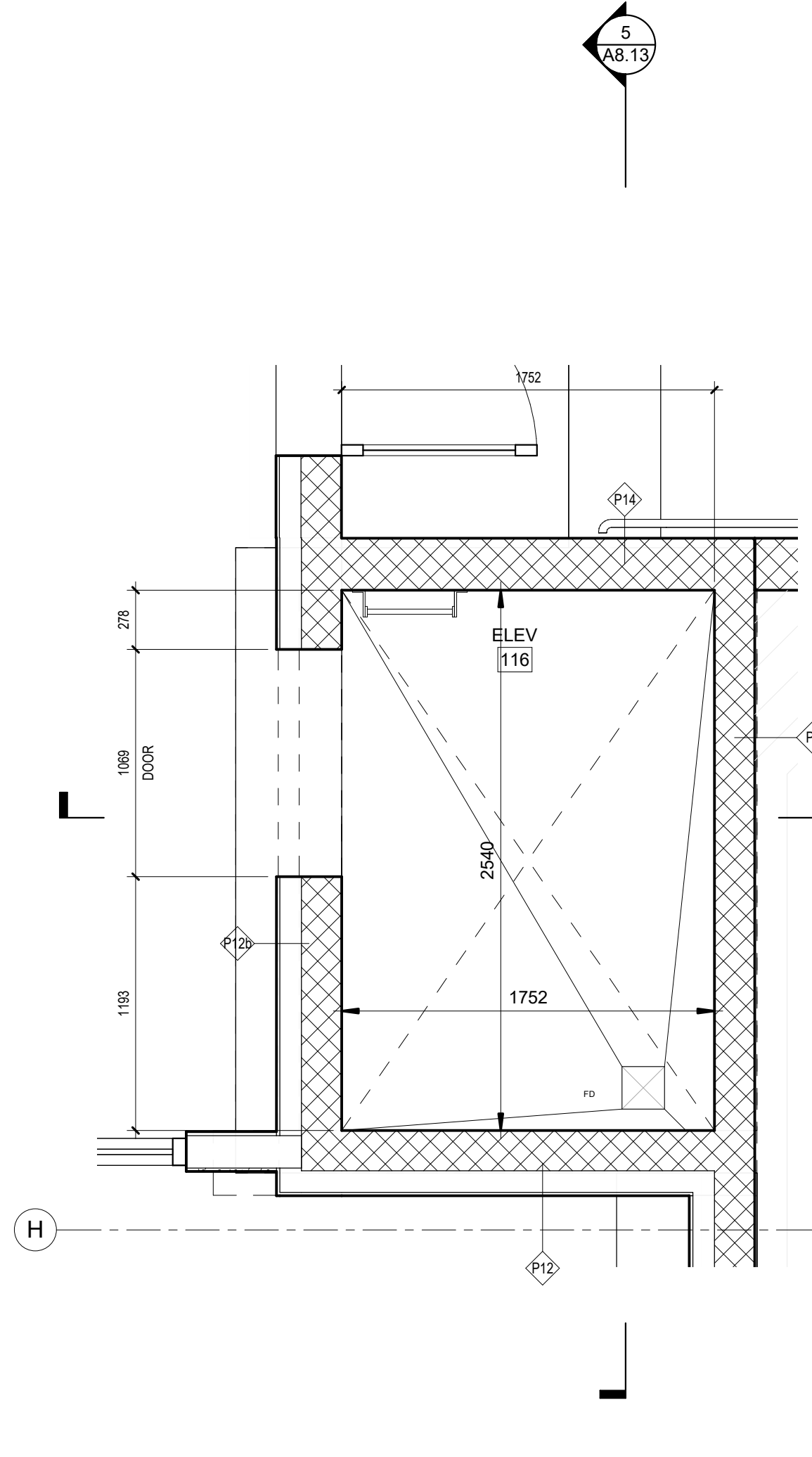
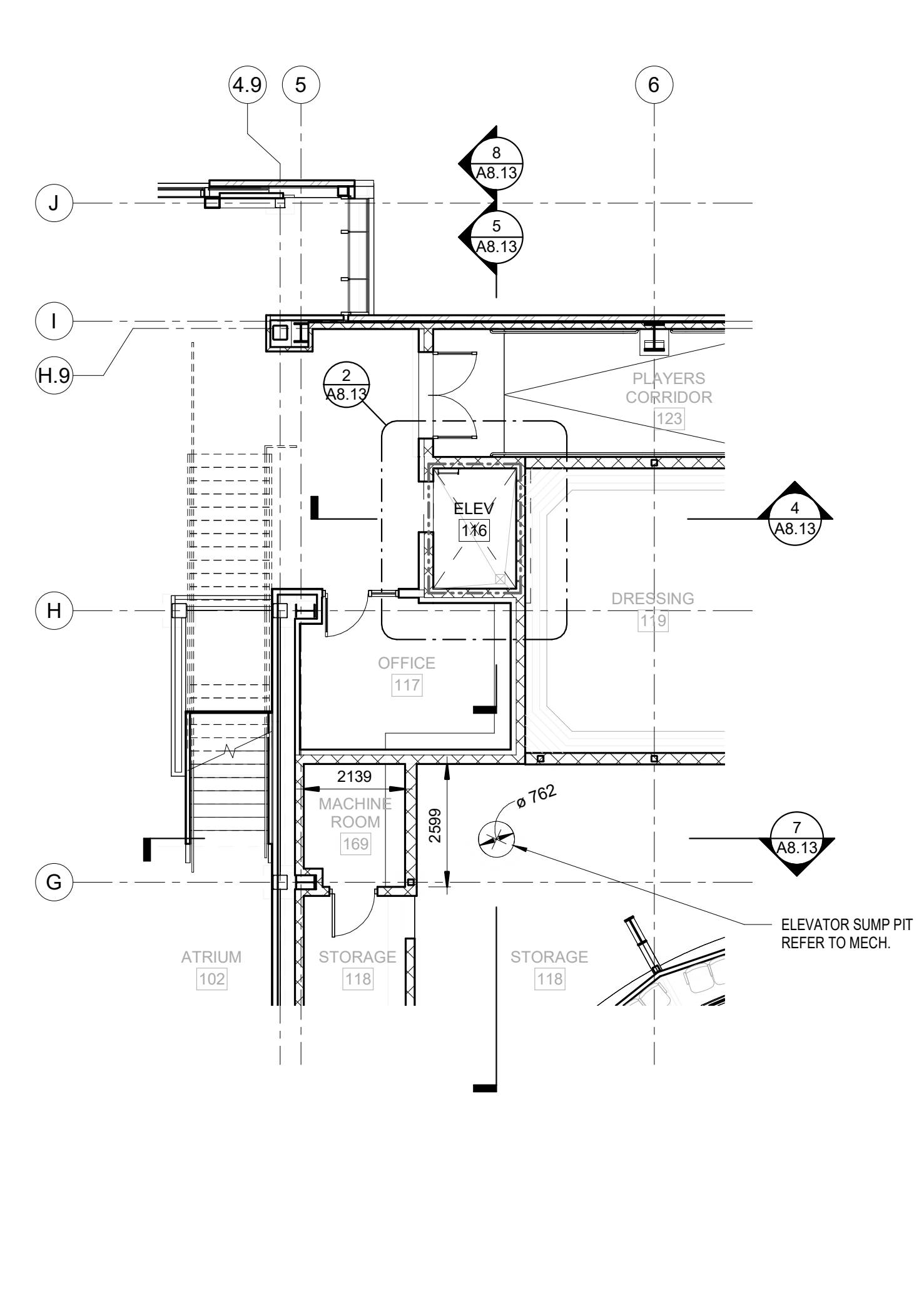
NO.	TRF - ISSUED FOR TENDER	2023-04-10
0	REVISION	DATE

STAMP


CERTIFICATE OF PRACTICE
 Peter Cottrell
 DSRA (Professional) Architecture Inc.
 A.A.P.E.I.
 (Professional Engineer - Ontario)

PROJECT NAME
 SIMMONS SPORTS CENTRE ARENA & POOL
 REPLACEMENT
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

PROJECT NO.: 21111
 DRAWN BY: OM / MV / DE
 CHECKED BY: MMG / PC
 SCALE: As indicated



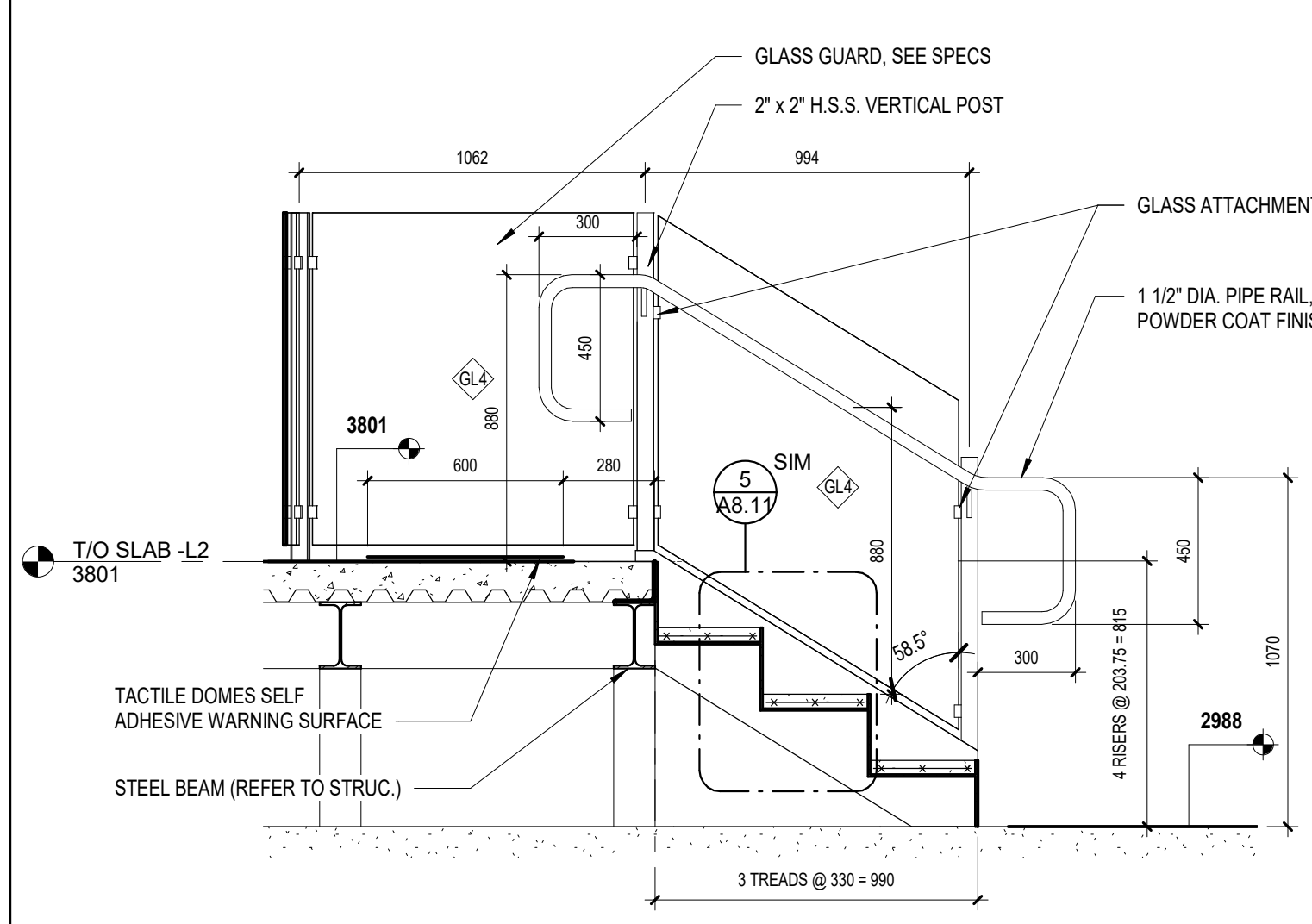
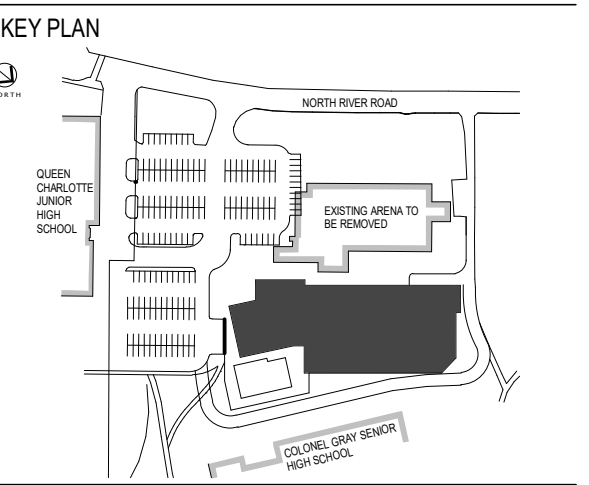
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1	TR - ISSUED FOR TENDER	2022-11-04
0	TR - ISSUED FOR TENDER	2022-11-01
NO.	REVISION	DATE

STAMP


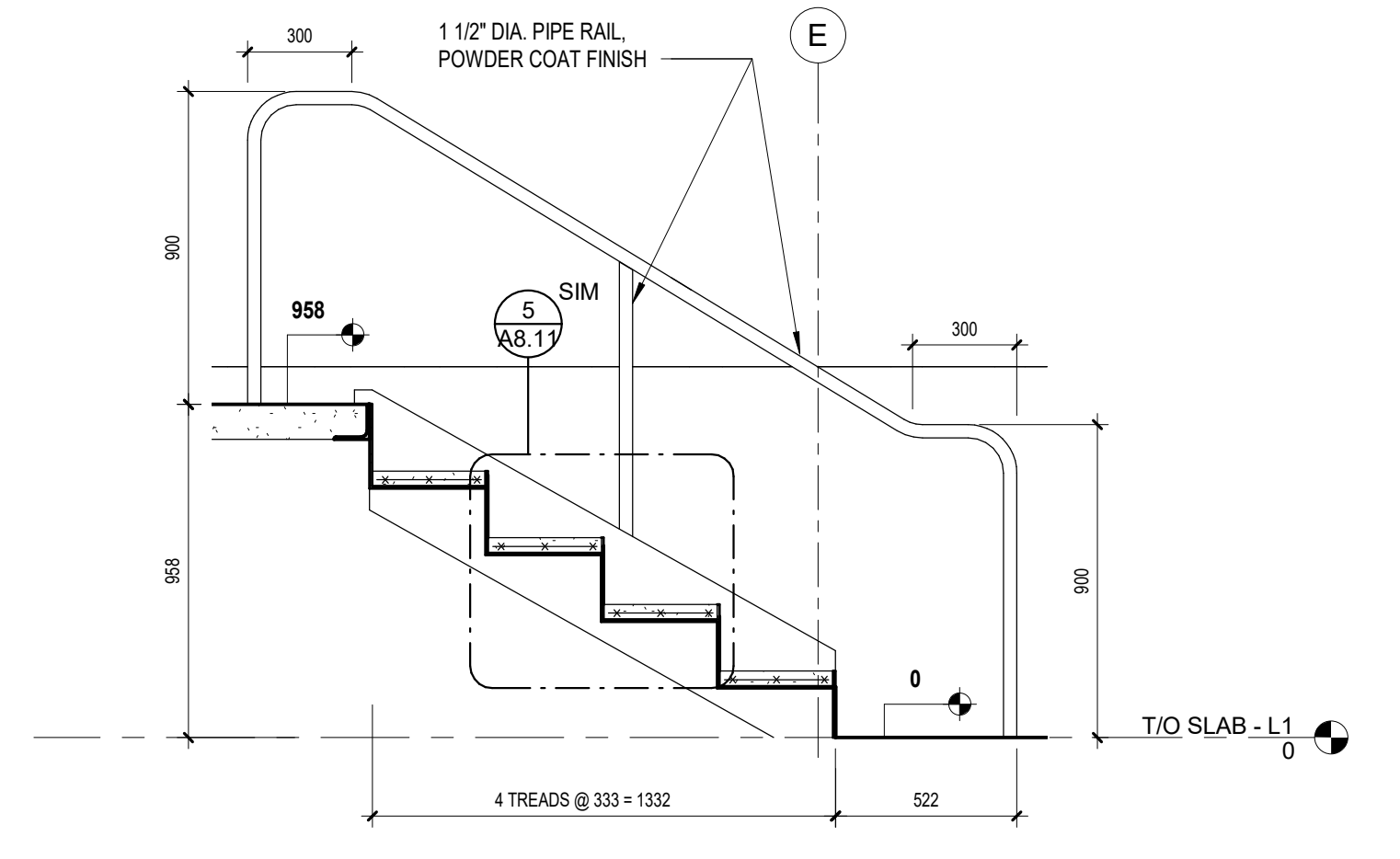
PROJECT NAME
 SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 170 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

PROJECT NO.: 21111
 DRAWN BY: OM / MV / DE
 CHECKED BY: MMG / PC
 SCALE: As indicated

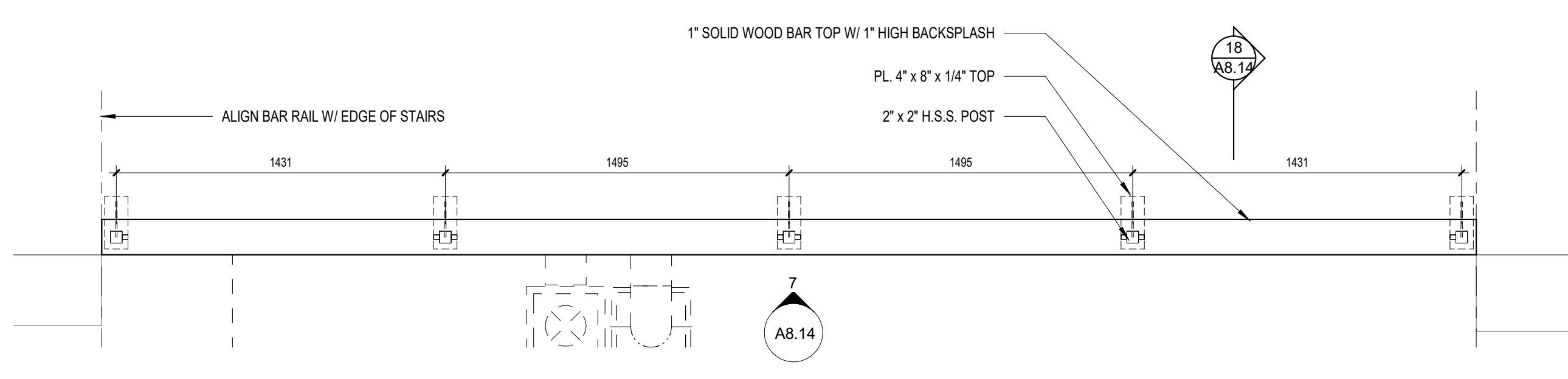
ELEVATOR, LIFT & LADDER



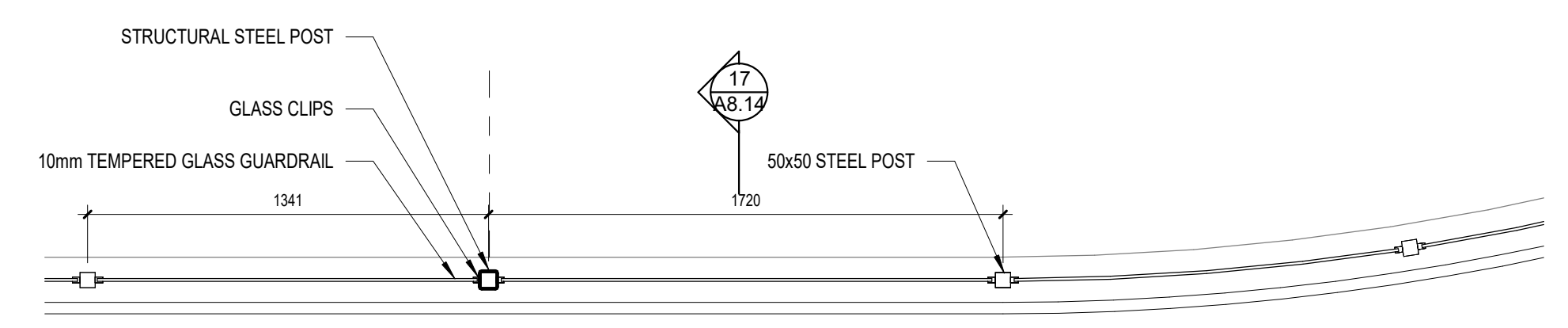
1 ELEVATION - STAIR RAILING @ TRACK CORNER
A8.14/ 1: 20



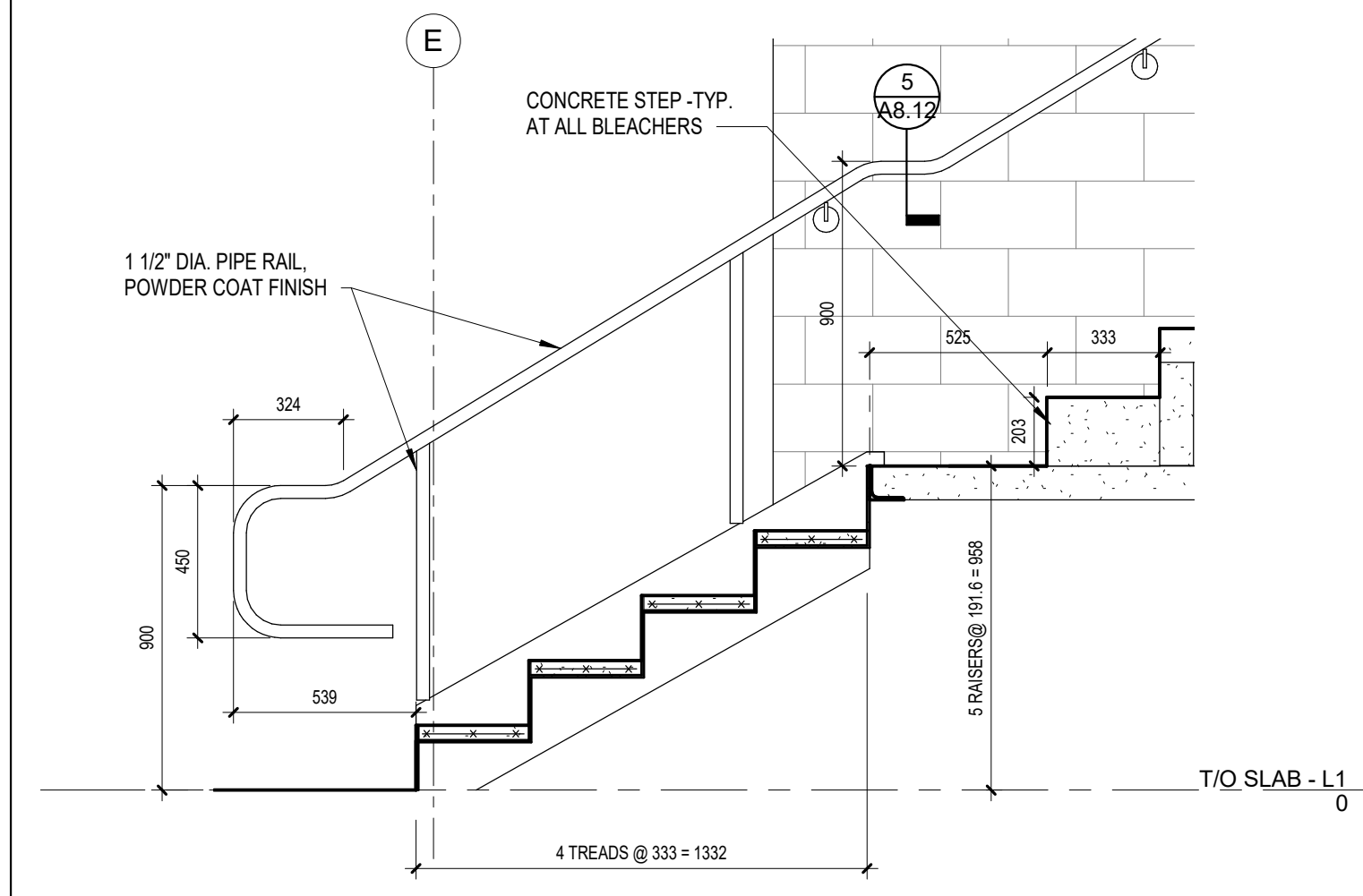
2 RAILING ELEVATION - STAIRS TO SEATING 2
A8.14/ 1: 20



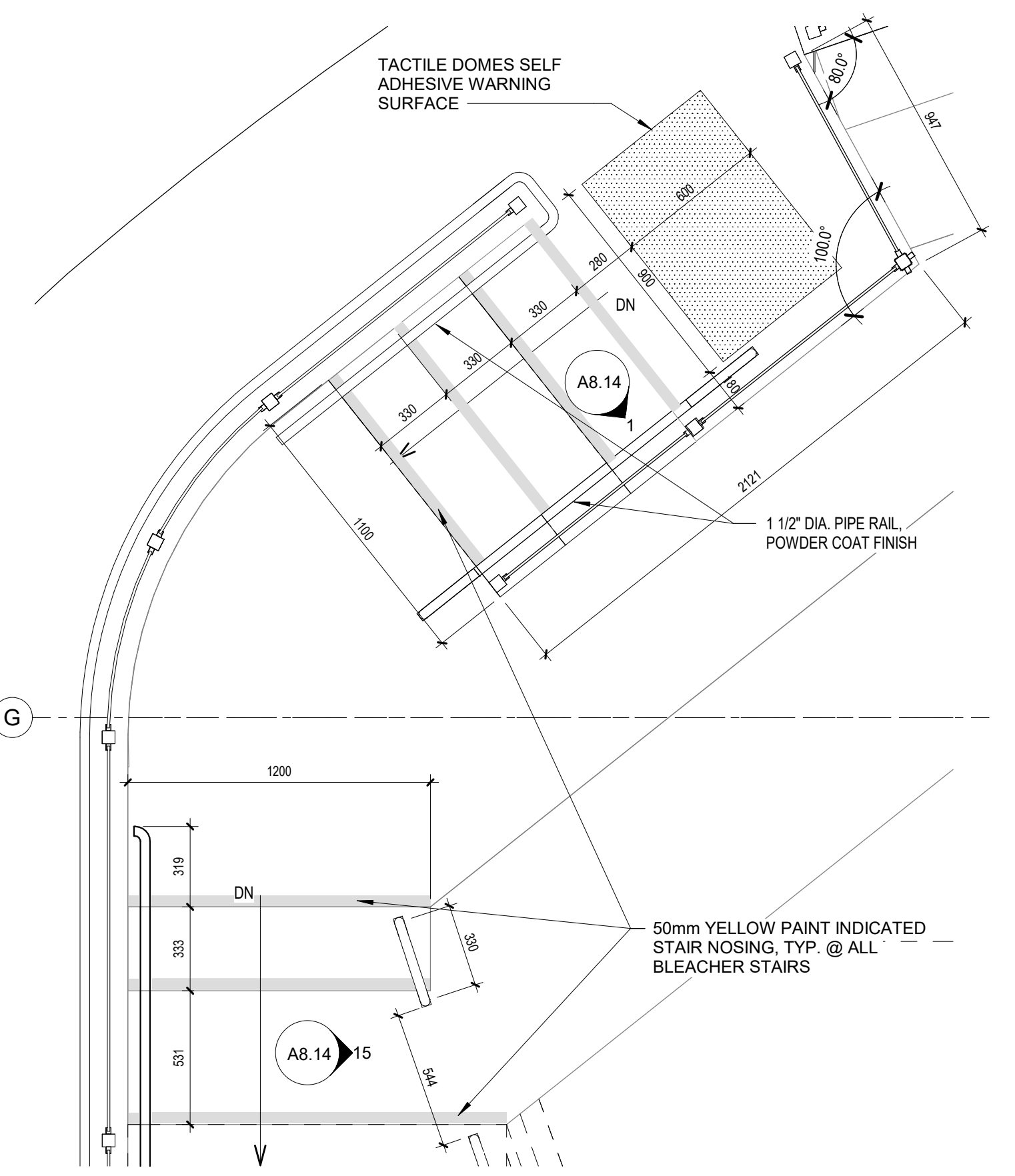
3 PLAN - BAR TOP GUARDRAIL
A8.14/ 1: 20



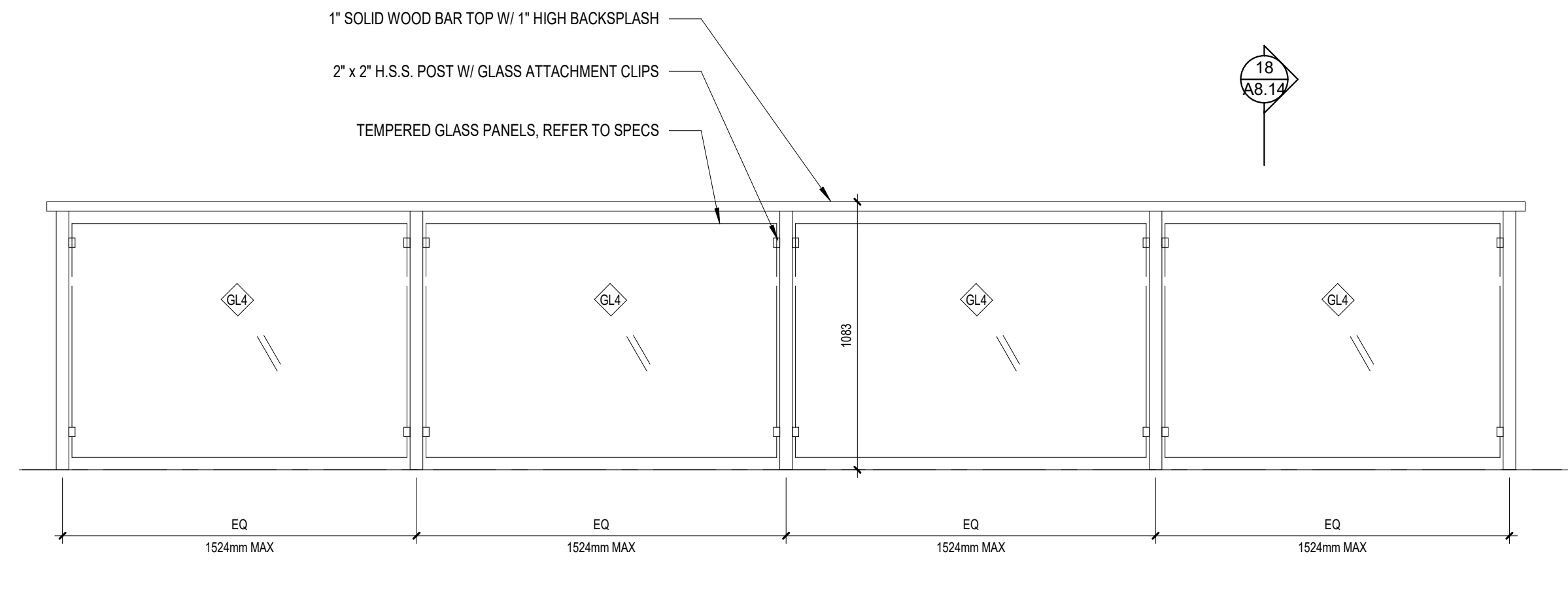
4 PLAN - GUARDRAIL
A8.14/ 1: 20



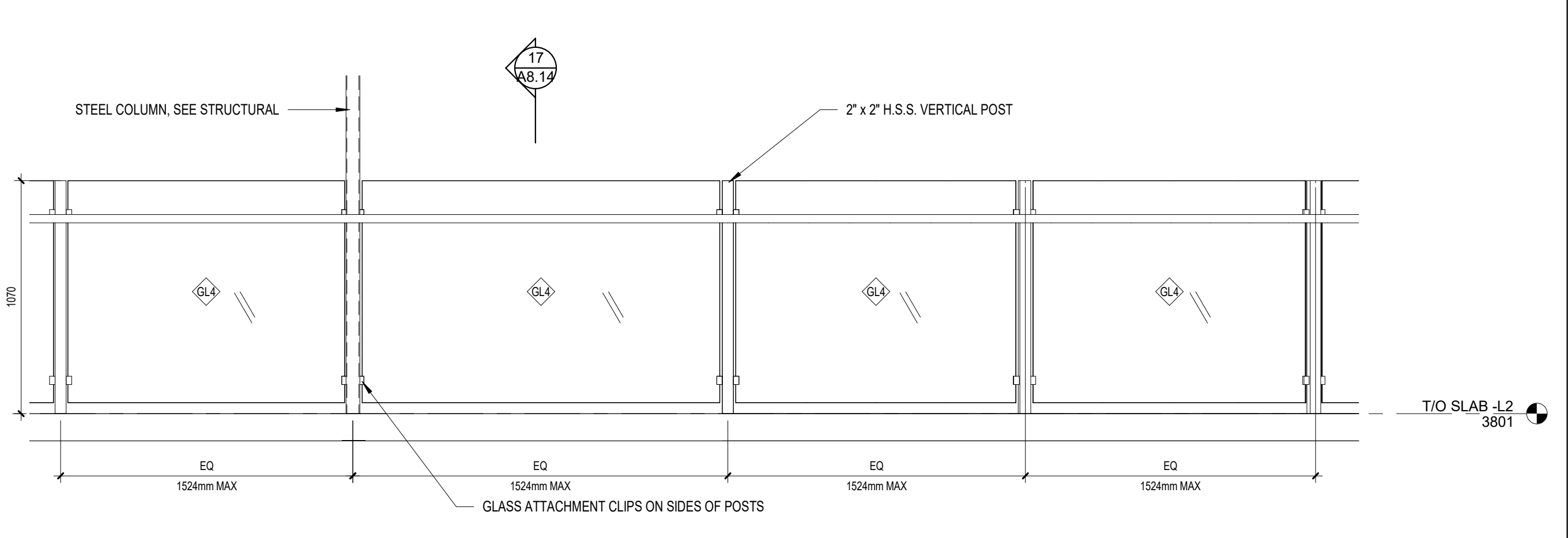
5 RAILING ELEVATION - STAIRS TO SEATING
A8.14/ 1: 20



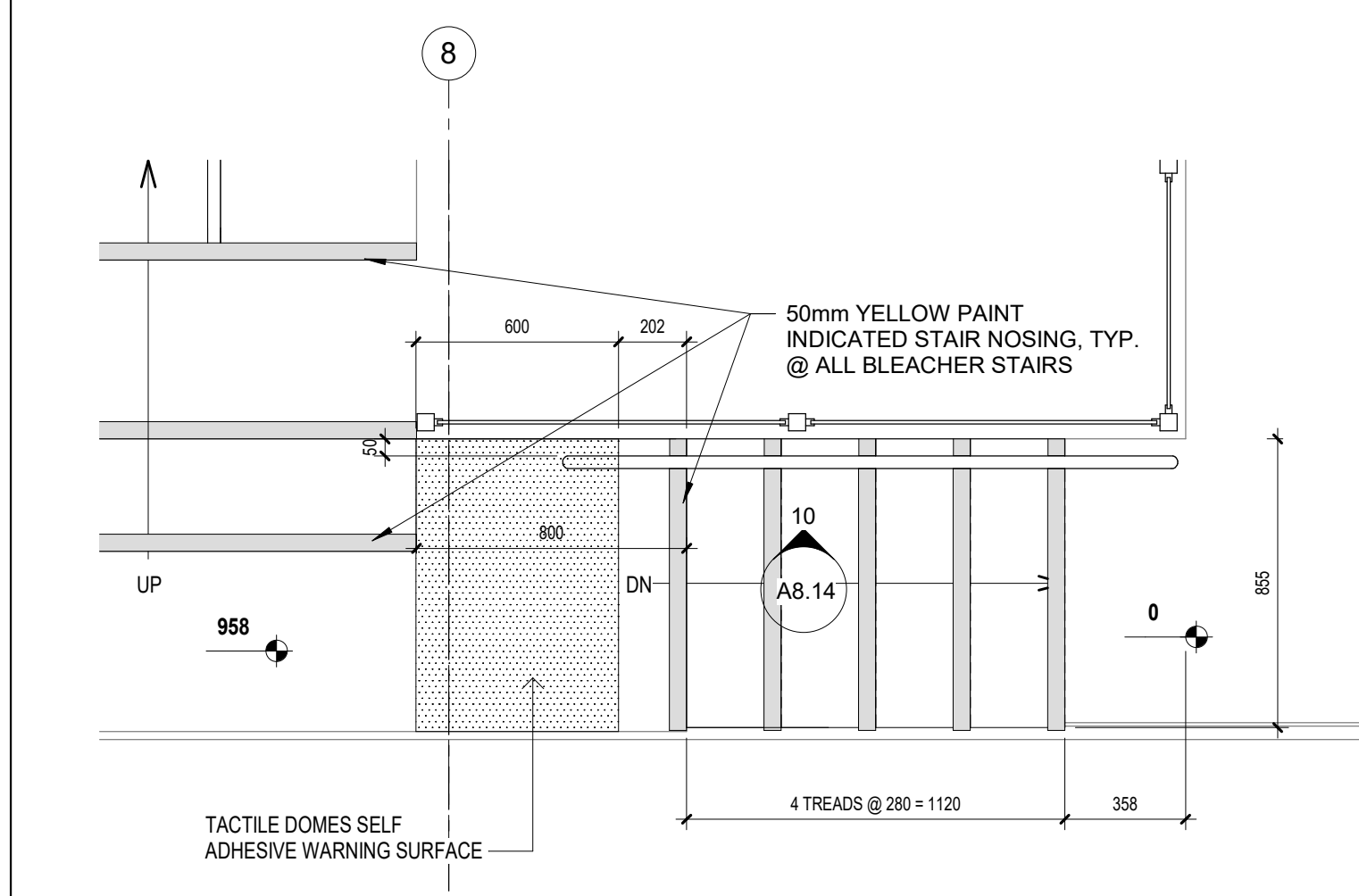
6 STAIRS @ WALKING TRACK CORNER
A8.14/ 1: 20



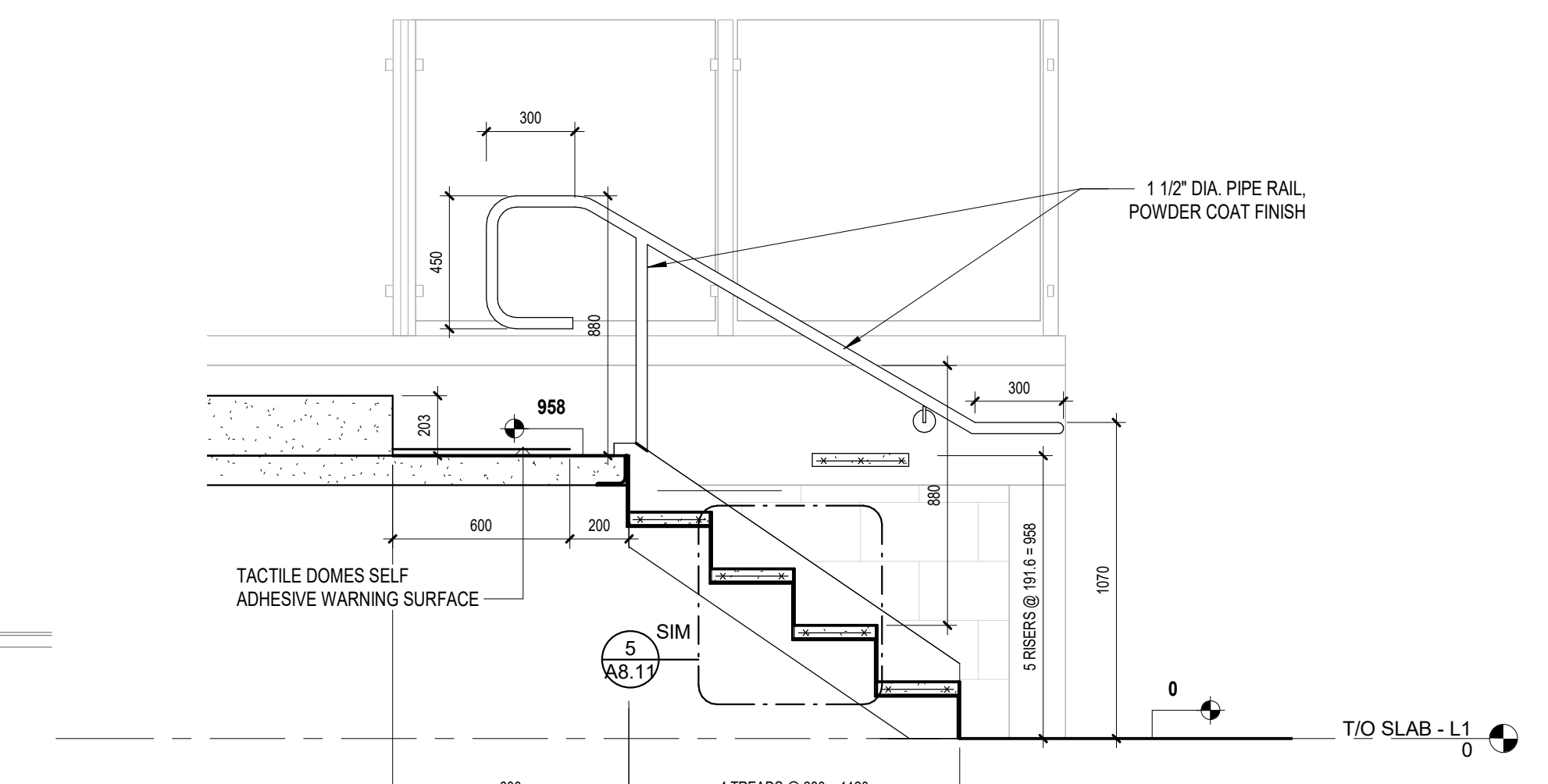
7 ELEVATION - BAR TOP GUARDRAIL
A8.14/ 1: 20



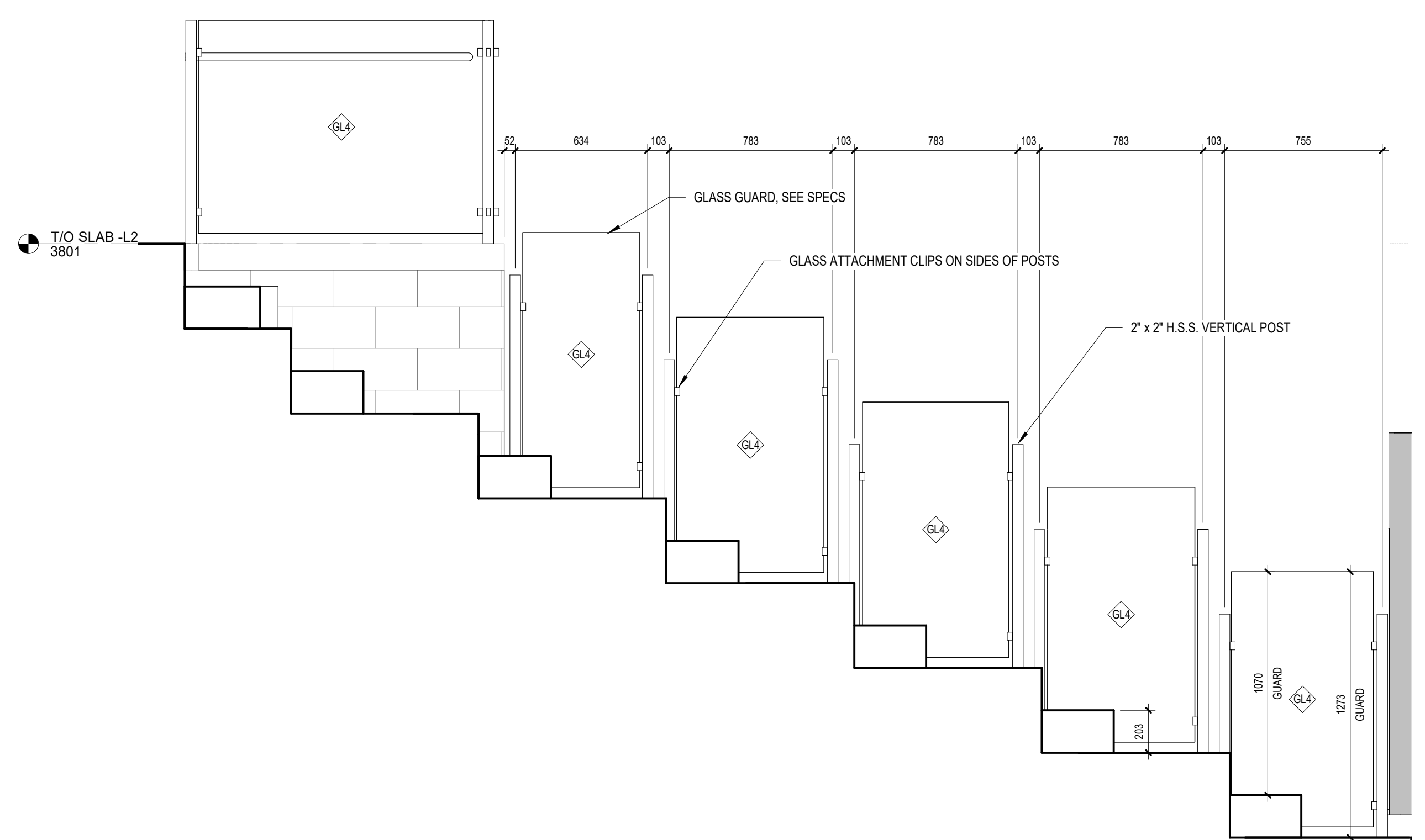
8 ELEVATION - GUARDRAIL
A8.14/ 1: 20



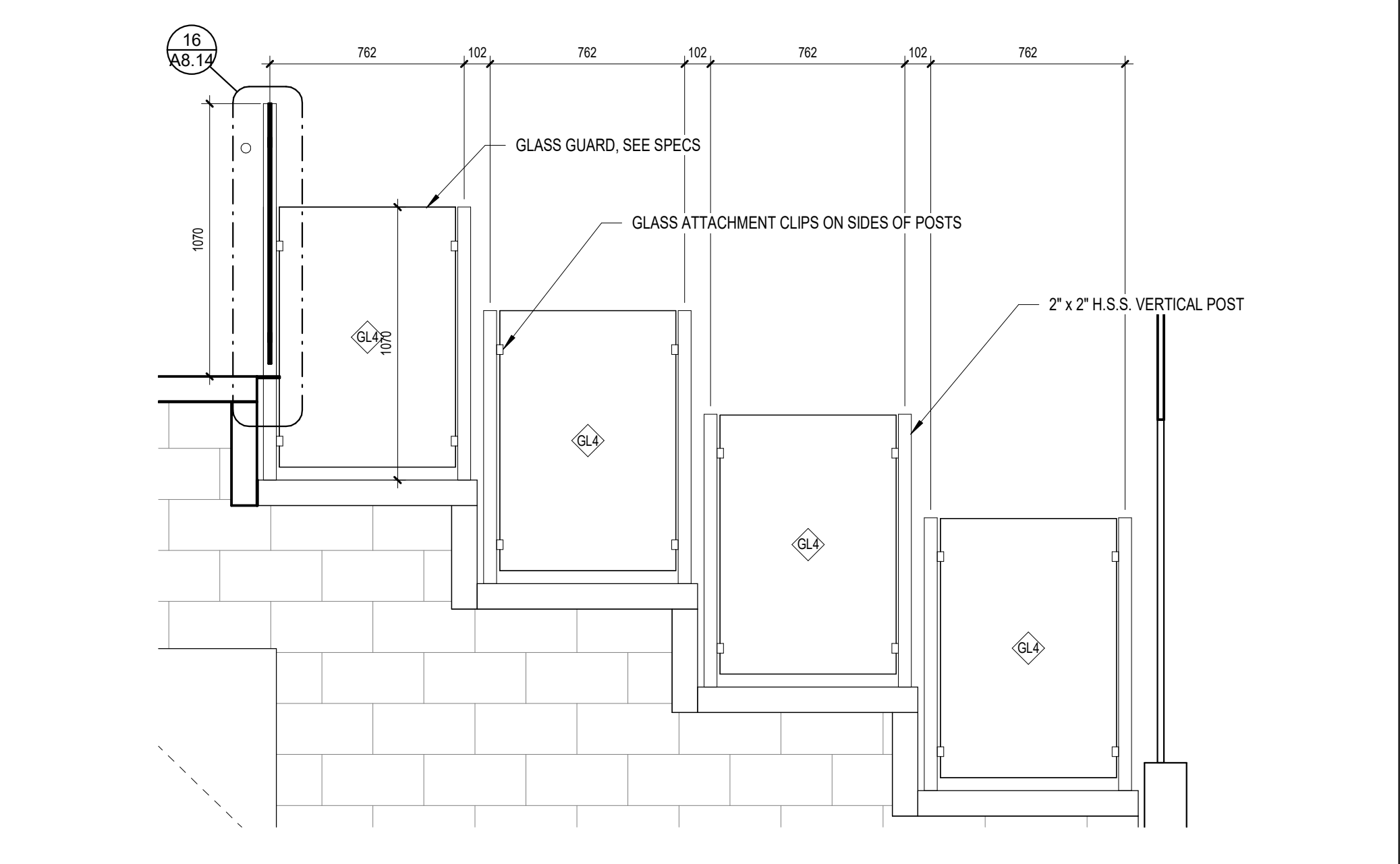
9 STAIRS TO TUNNEL
A8.14/ 1: 20



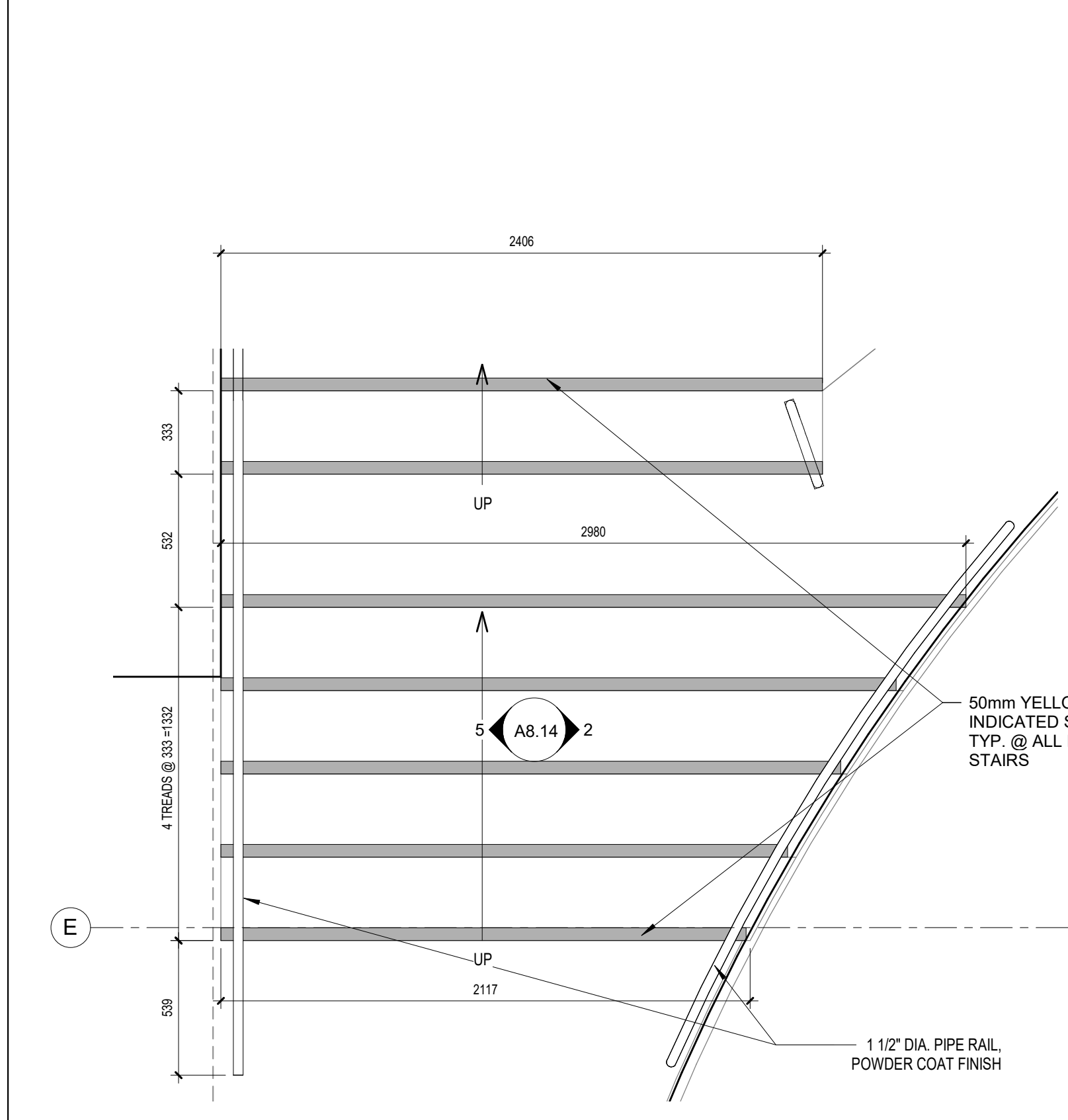
10 ELEVATION - STAIR TO TUNNEL
A8.14/ 1: 20



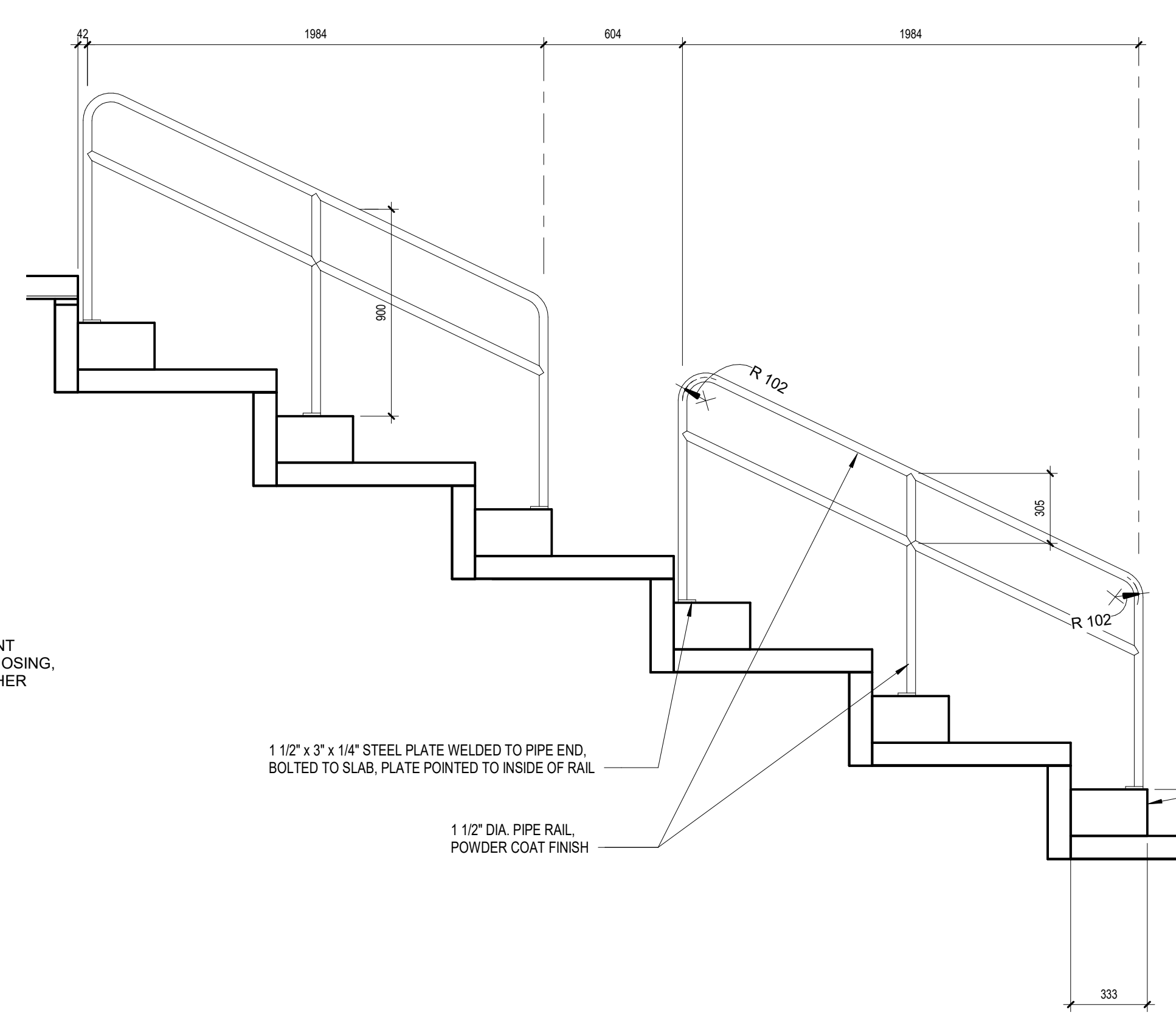
11 ELEVATION - GUARDRAIL @ RESURFACER TUNNEL
A8.14/ 1: 20



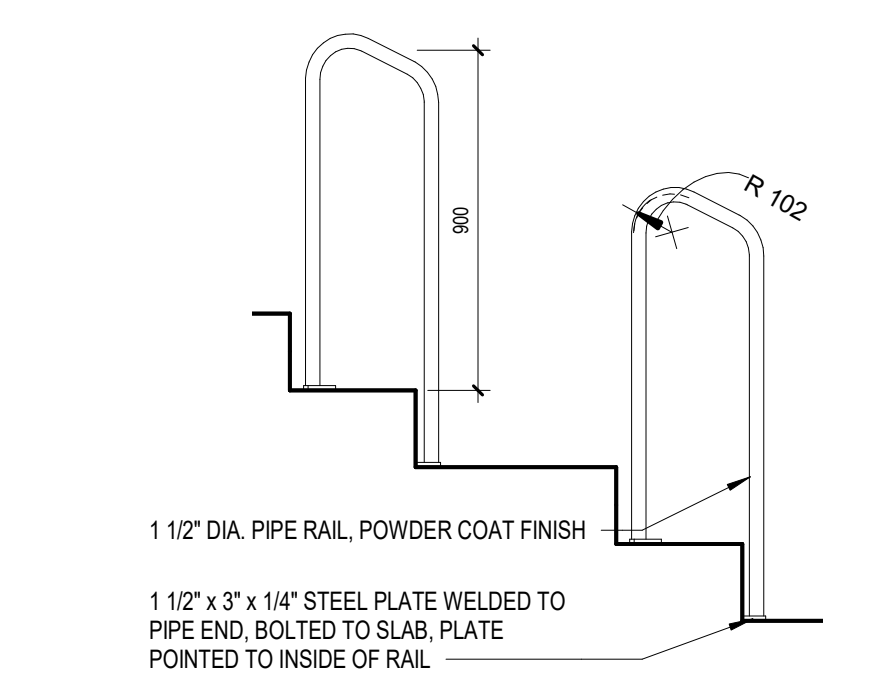
12 ELEVATION - GUARDRAIL @ TUNNEL
A8.14/ 1: 20



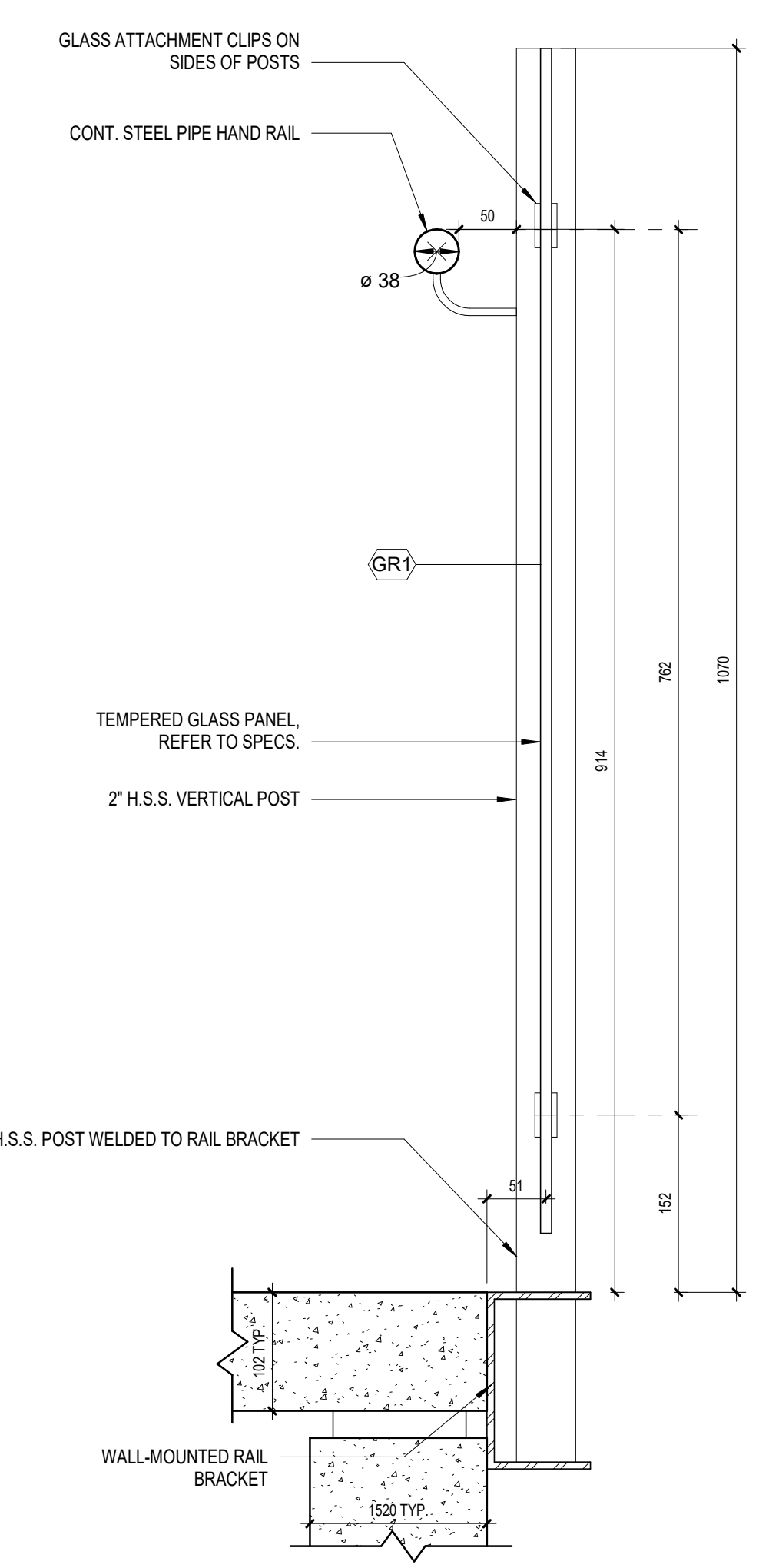
13 RAILINGS AT STAIR TO SEATING
A8.14/ 1: 20



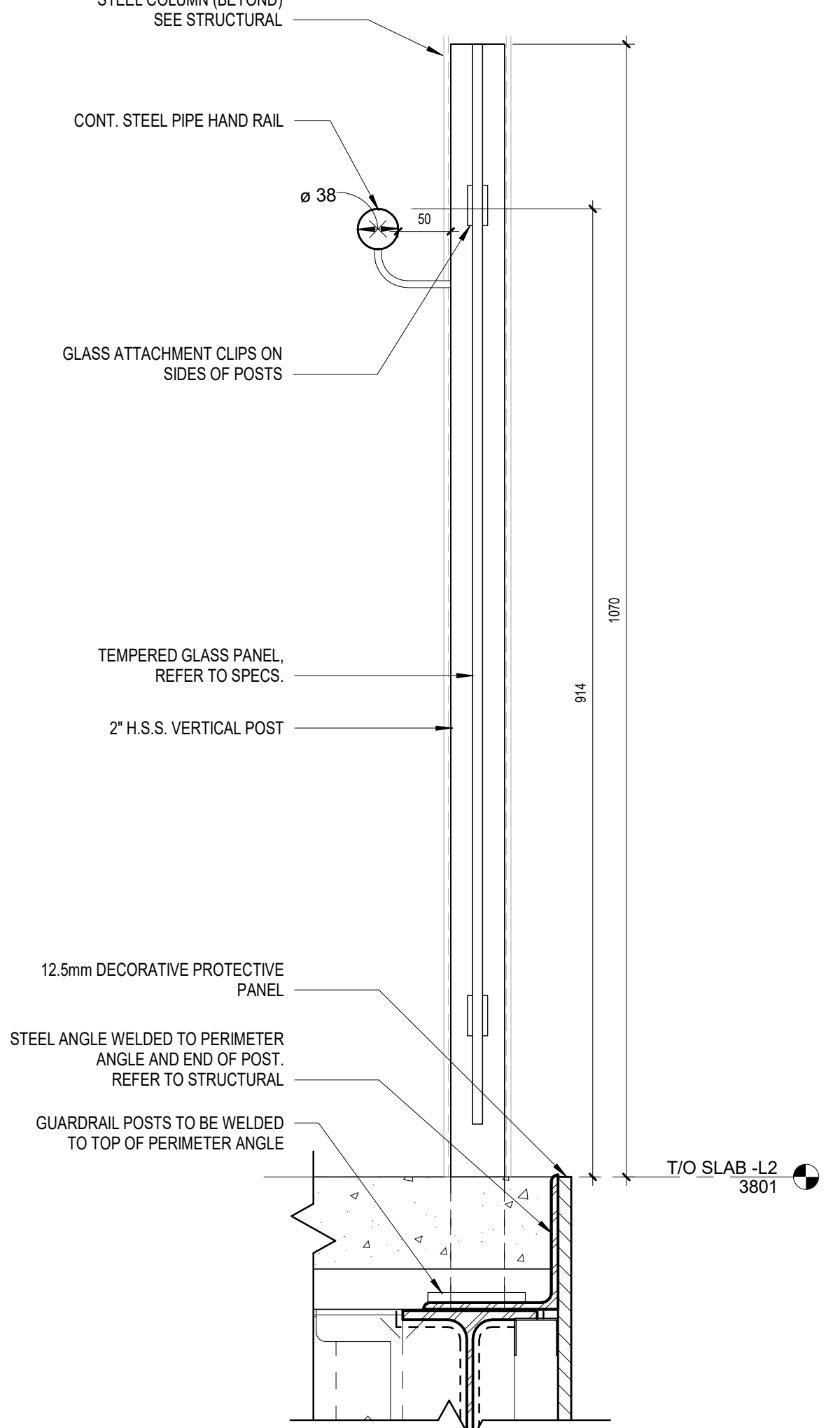
14 ELEVATION - AISLE INTERMEDIATE HANDRAIL
A8.14/ 1: 20



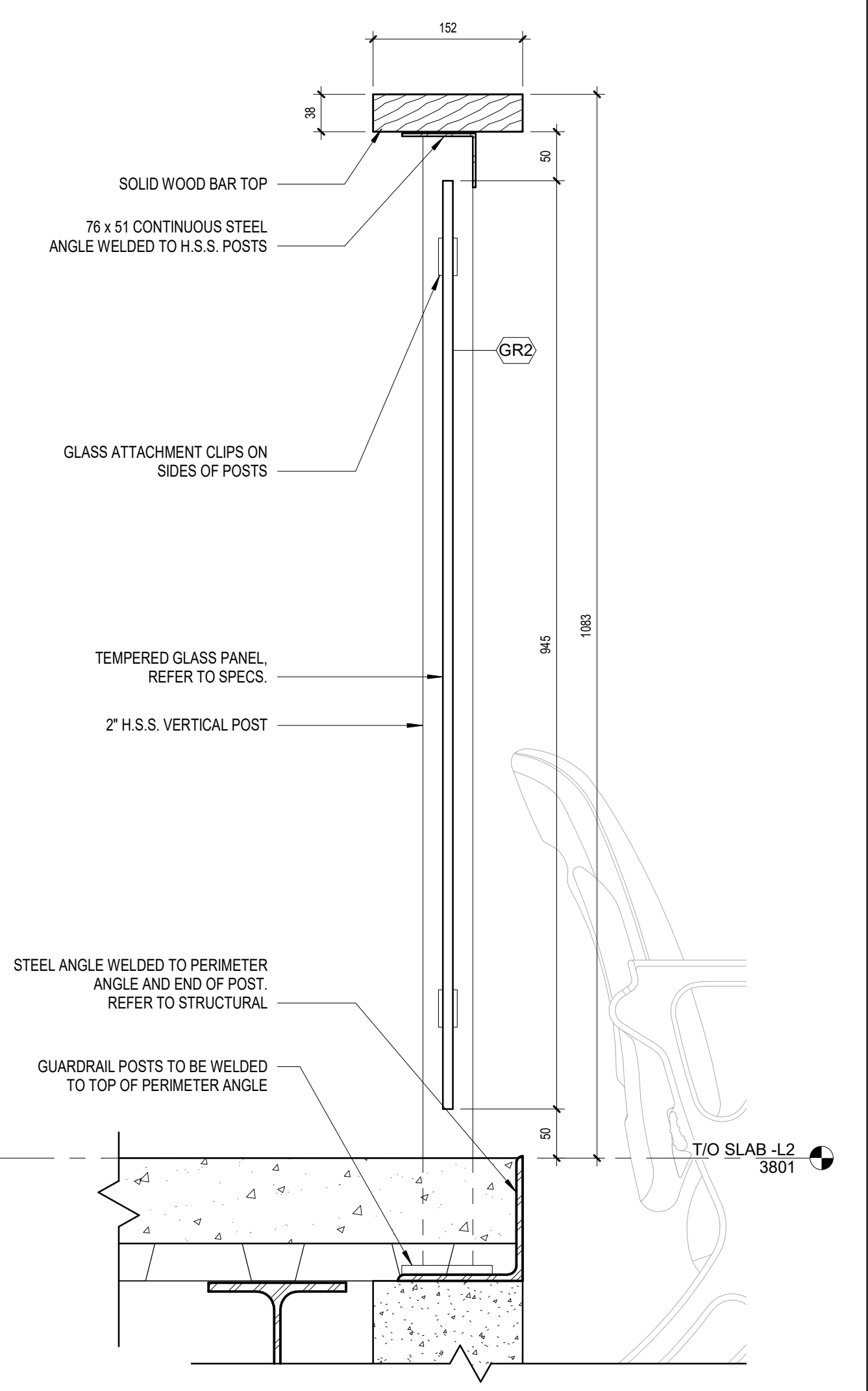
15 ELEVATION - END OF ROW HANDRAIL
A8.14/ 1: 20



16 SECTION DETAIL - GR1 @ BLEACHERS
A8.14/ 1: 5



17 SECTION DETAIL - GR1 @ WALKING TRACK EDGE
A8.14/ 1: 5



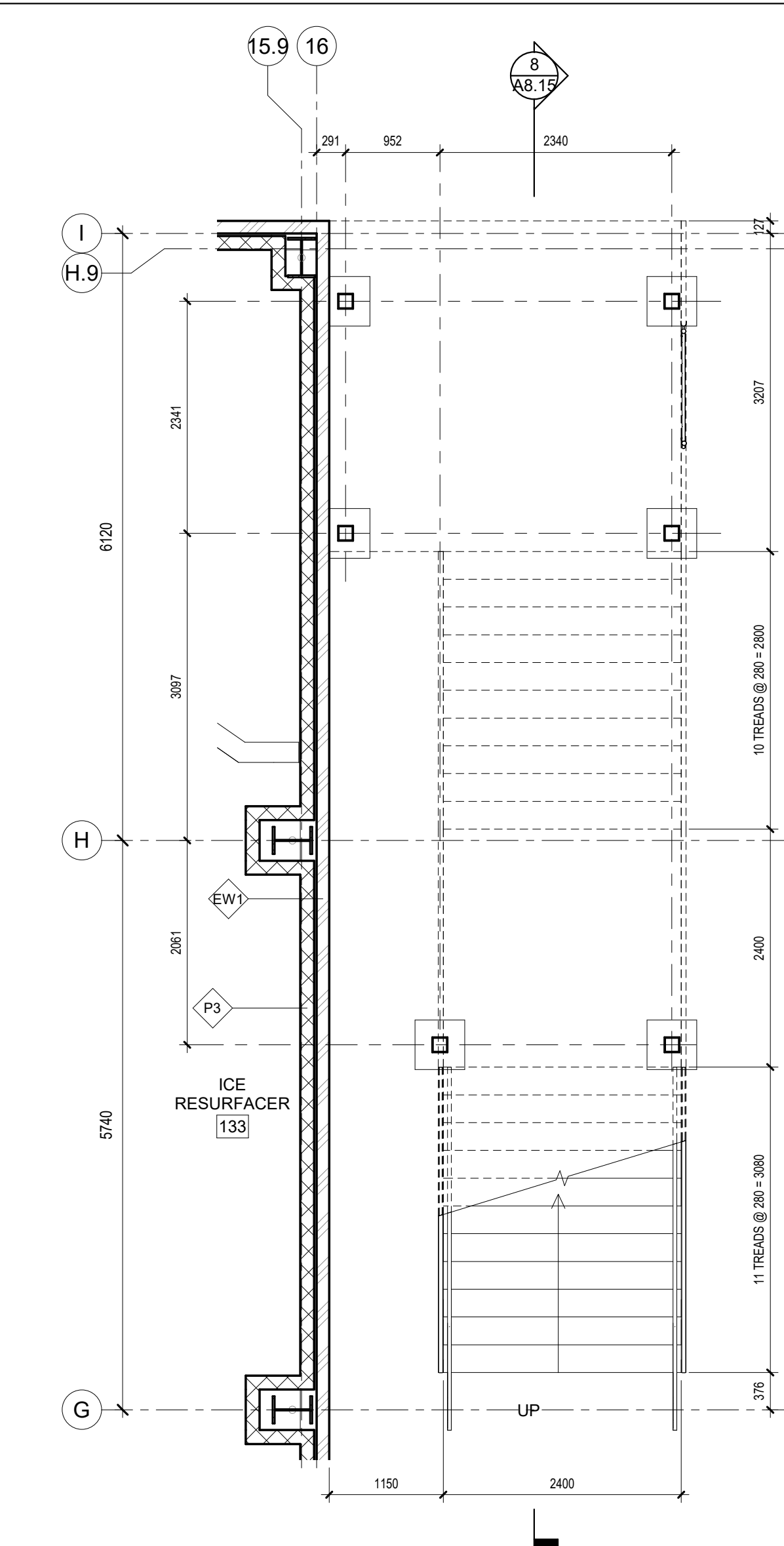
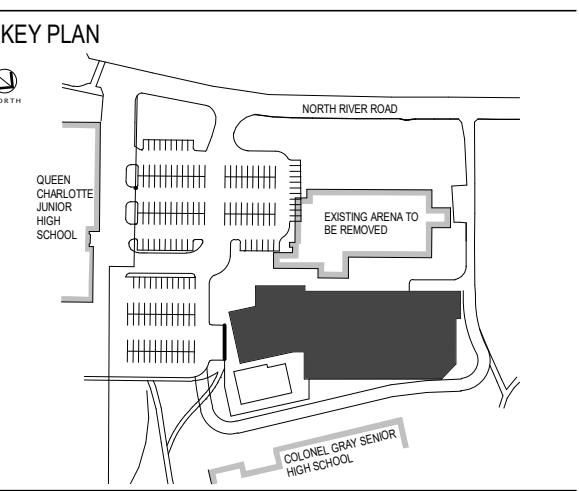
18 SECTION DETAIL - GR2
A8.14/ 1: 5

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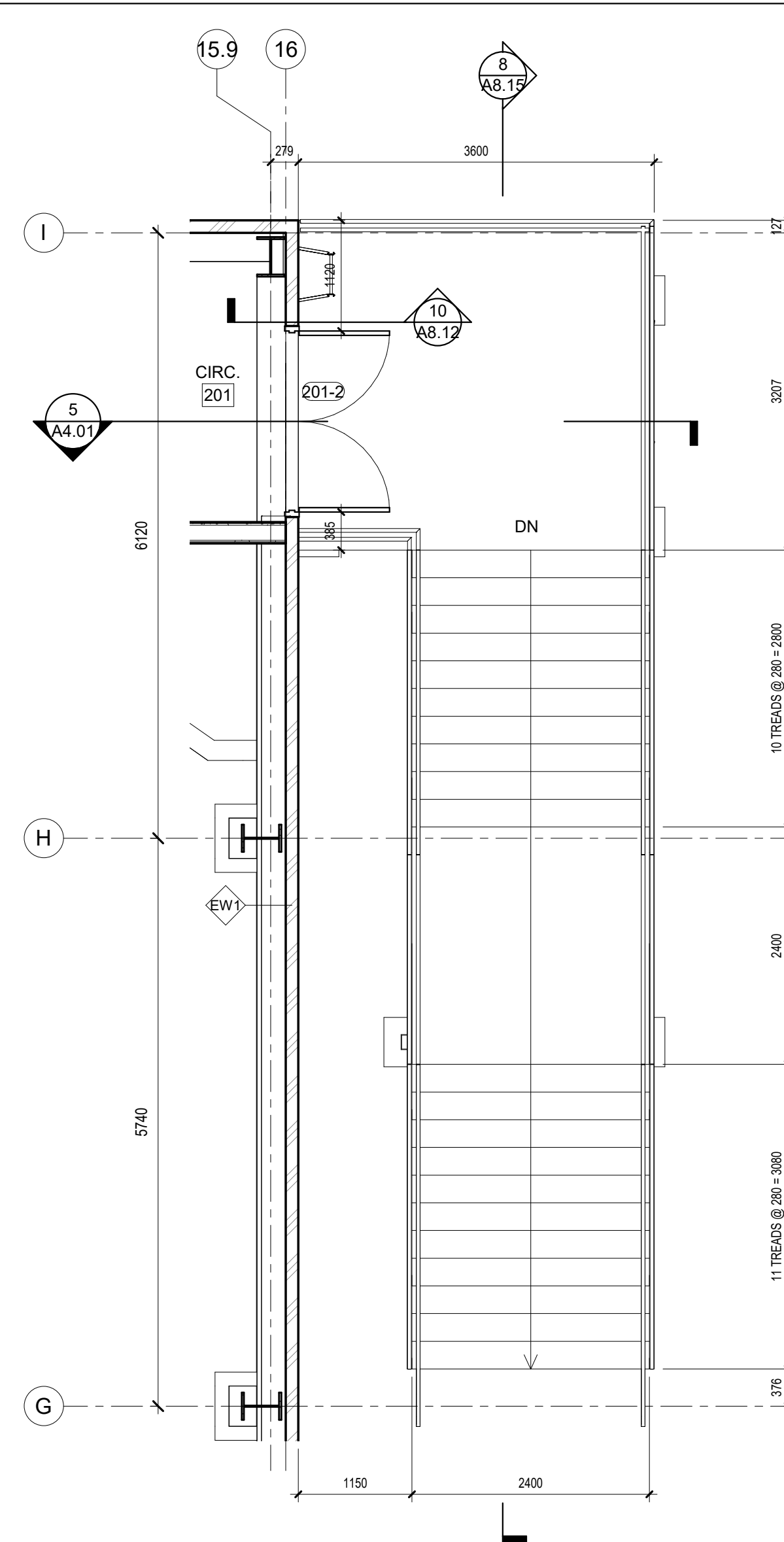


PROJECT NAME: SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT

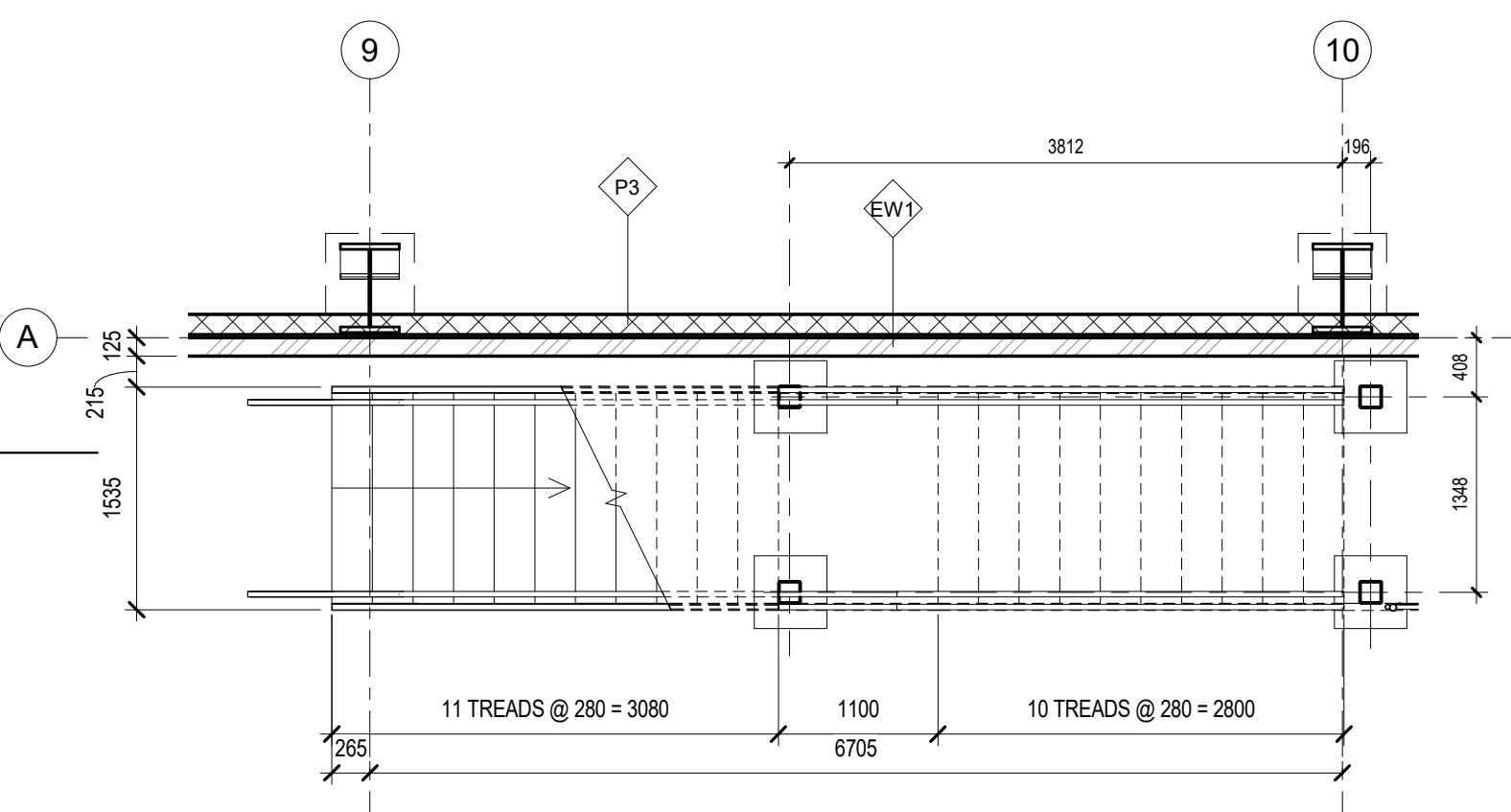
PROJECT NO.: 21111
DRAWN BY: OM / MM / DE
CHECKED BY: MMG / PC
SCALE: As indicated



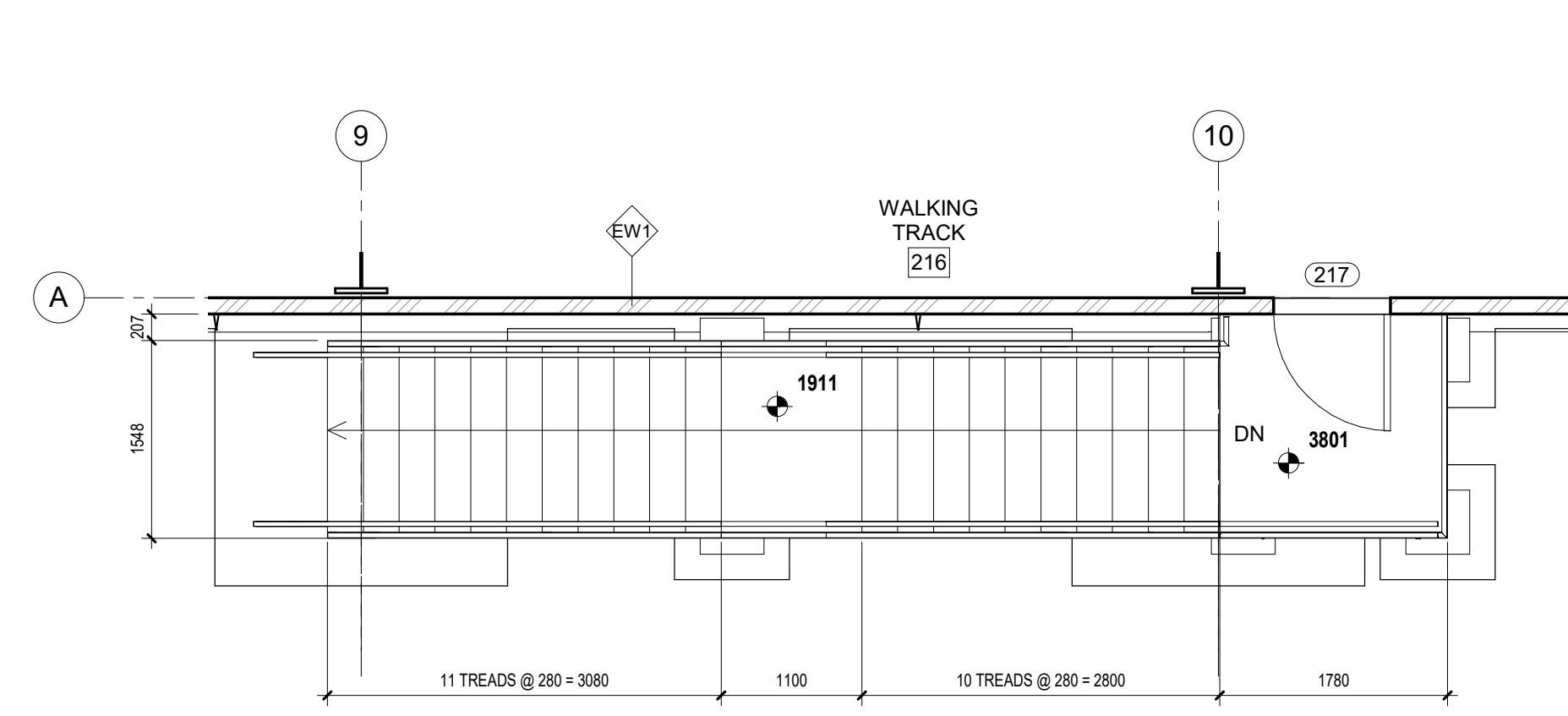
1 EXIT STAIR 1-LEVEL 1
A8.15 1: 50



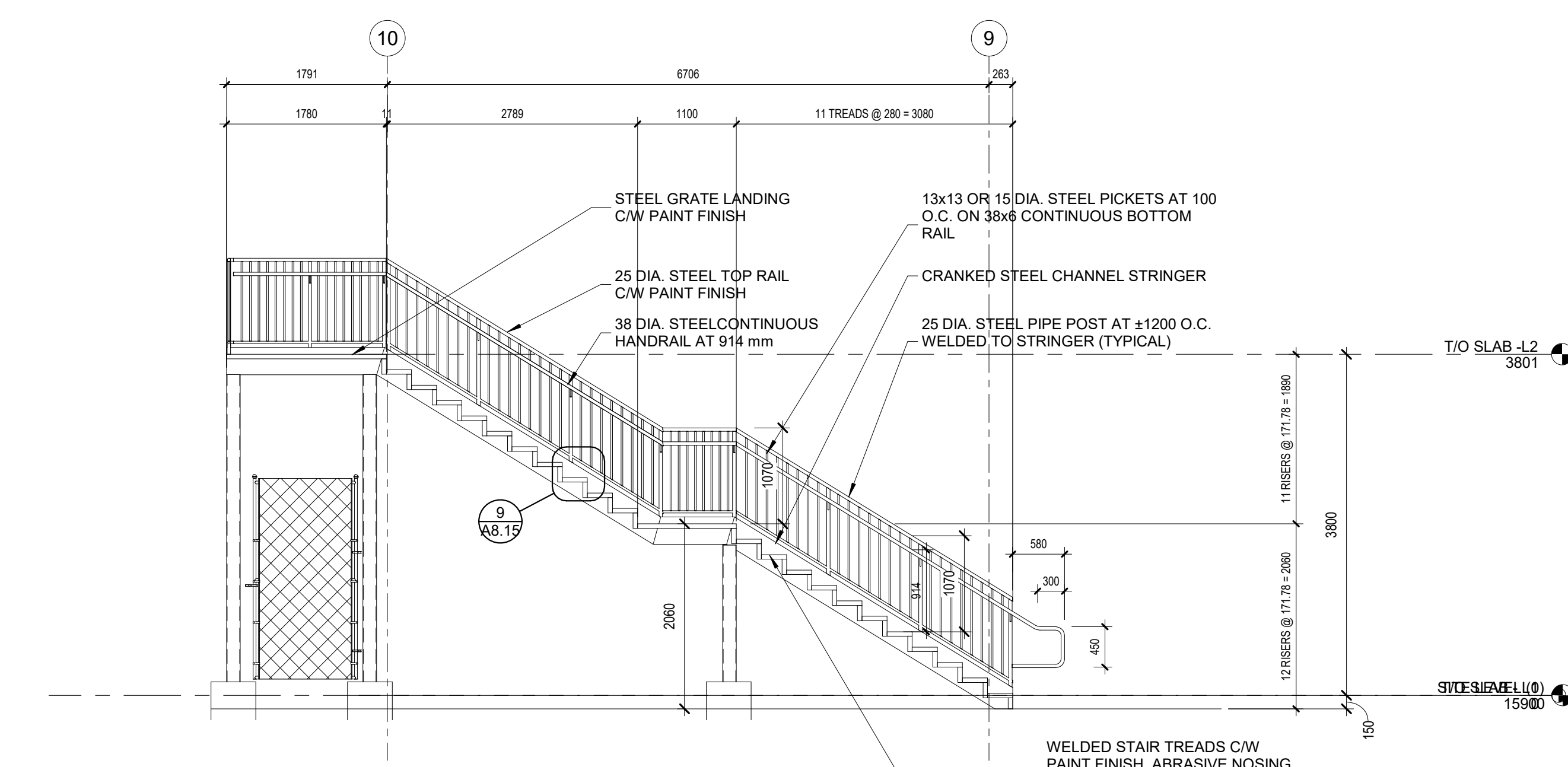
2 EXIT STAIR 1-LEVEL 2
A8.15 1: 50



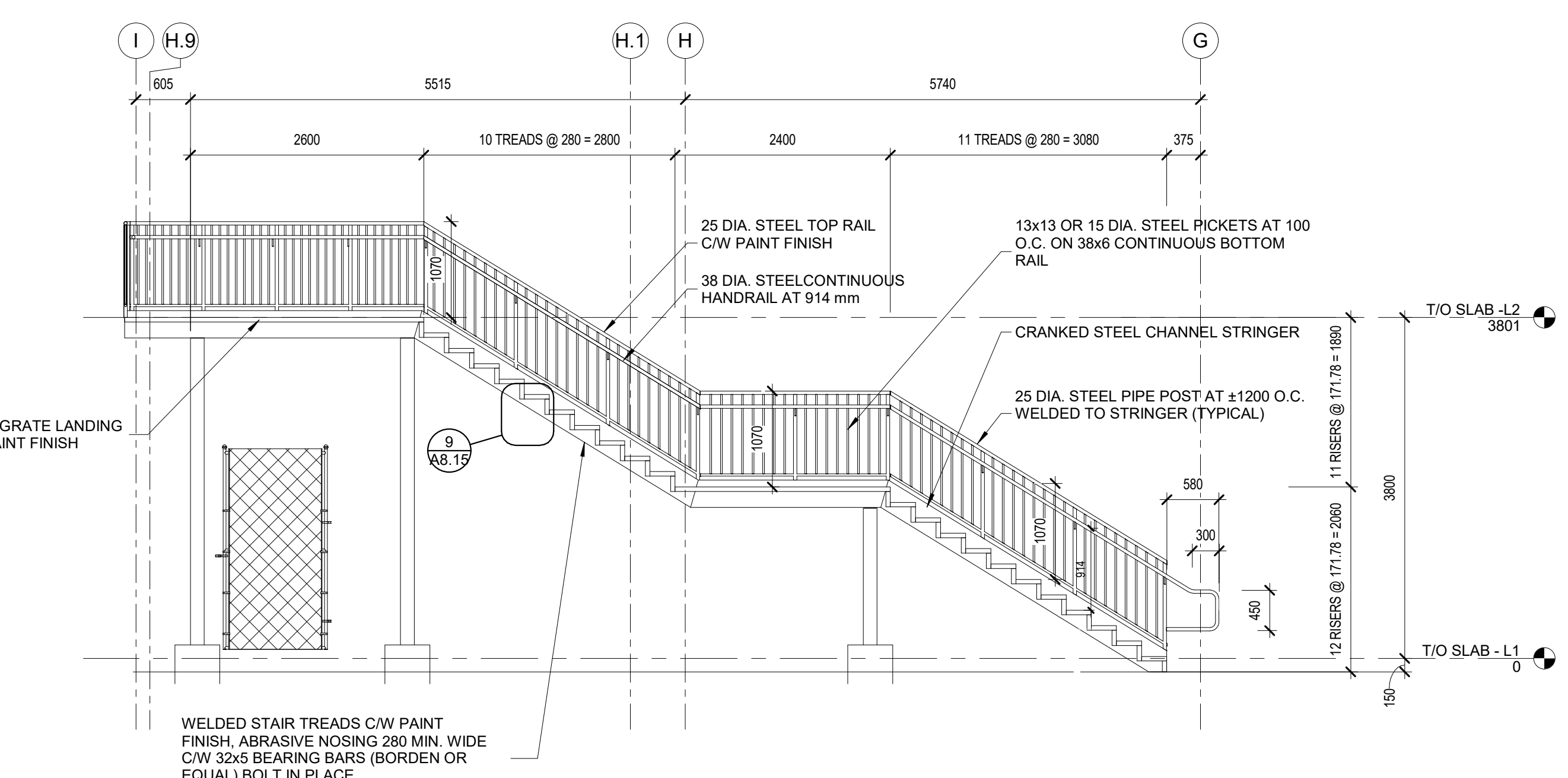
4 EXIT STAIR 2 - LEVEL 1
A8.15 1: 50



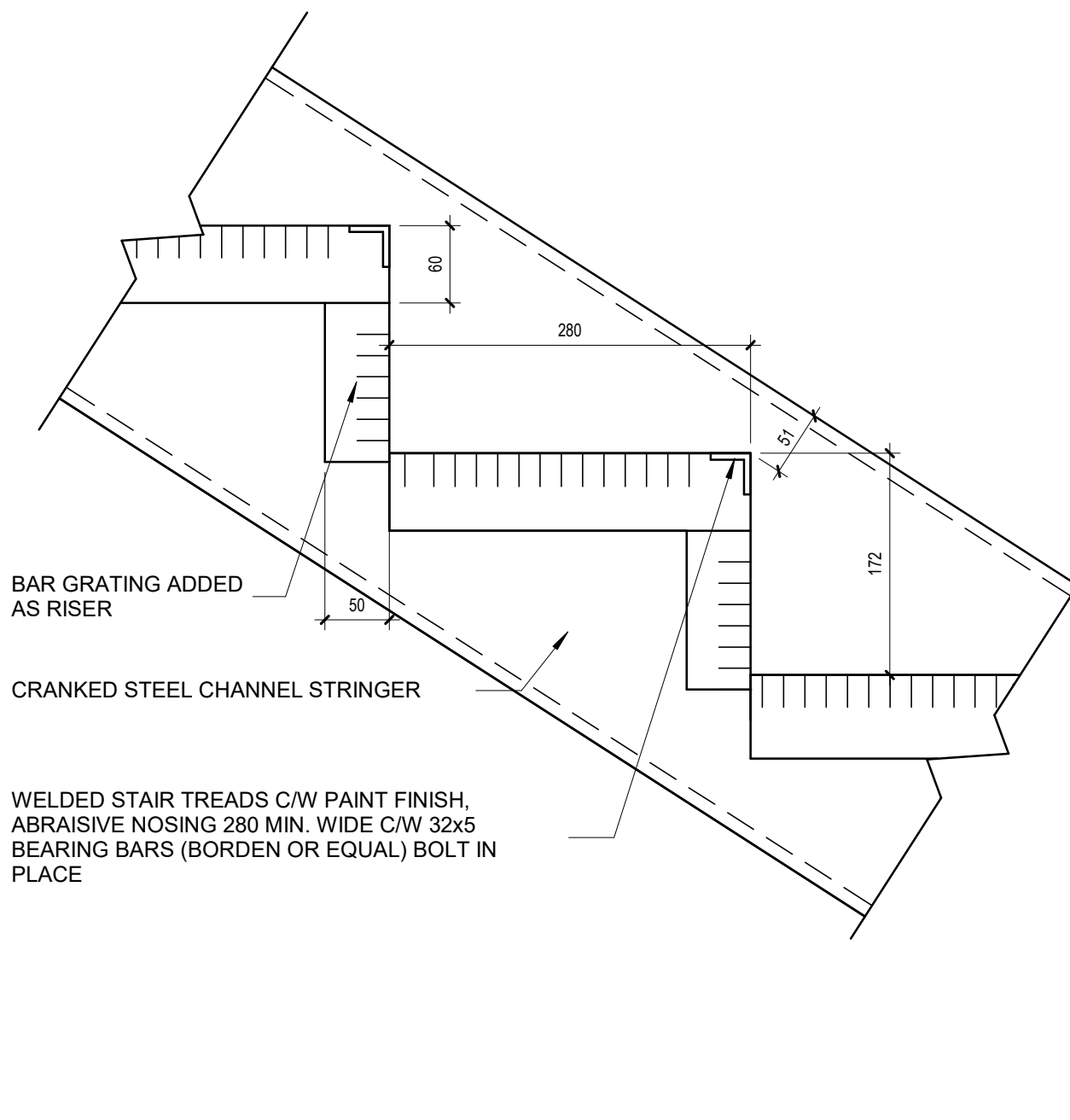
5 EXIT STAIR 2-LEVEL 2
A8.15 1: 50



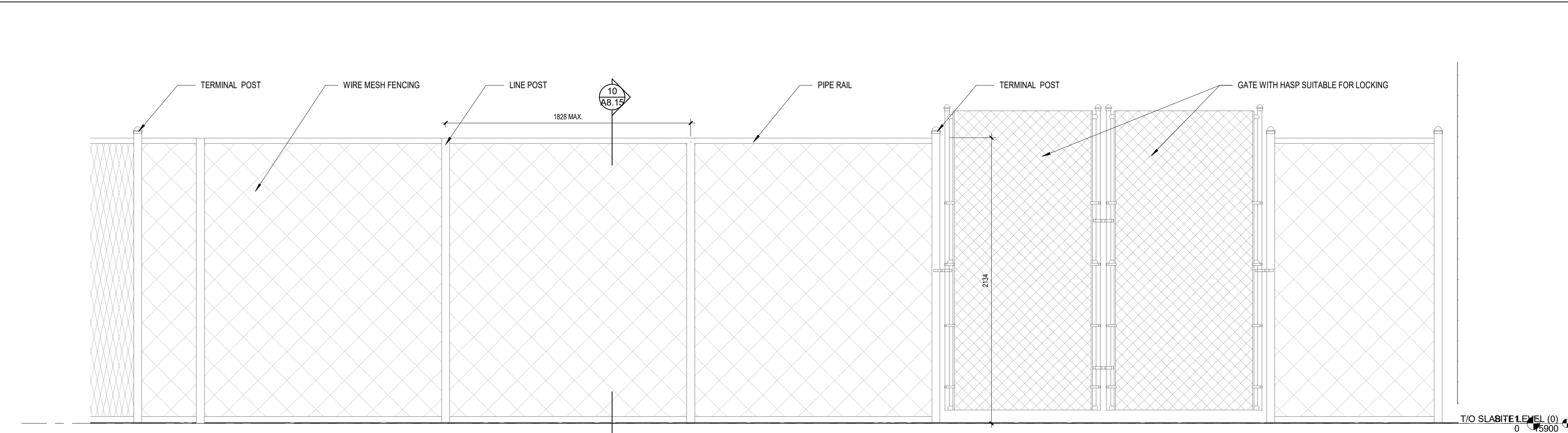
7 EXIT STAIR 2 - SECTION
A8.15 1: 50



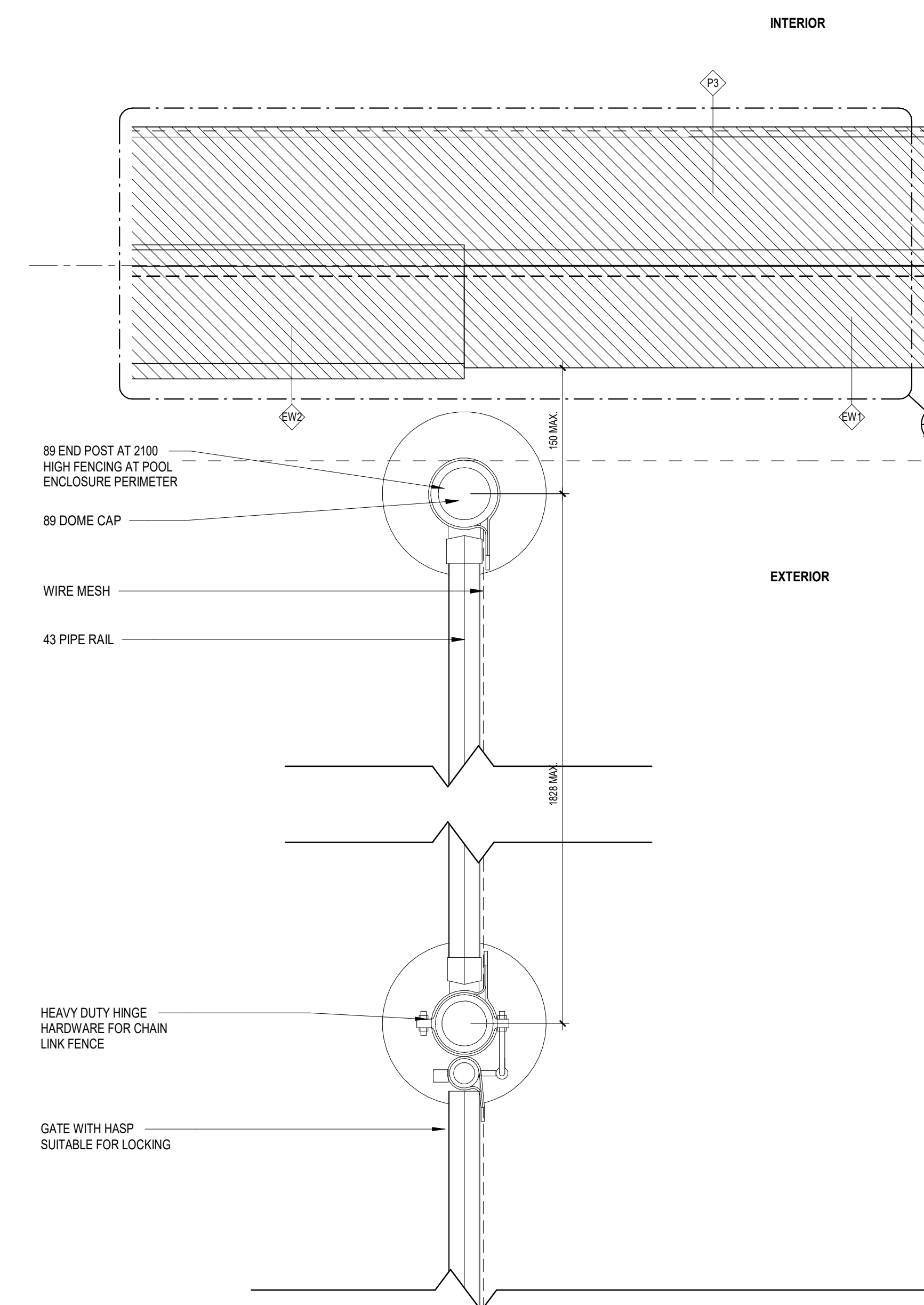
8 EXIT STAIR 1 - SECTION
A8.15 1: 50



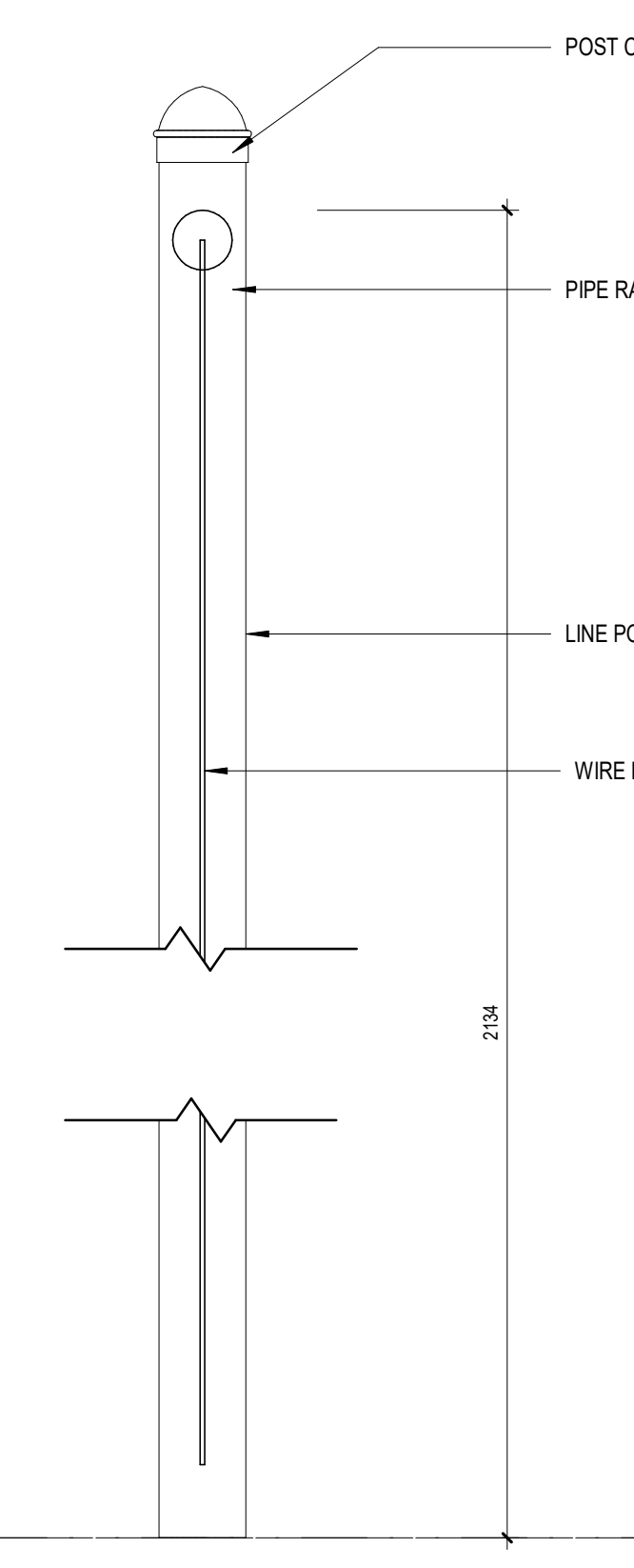
9 EXTERIOR STAIR TREAD - TYPICAL
A8.15 1: 5



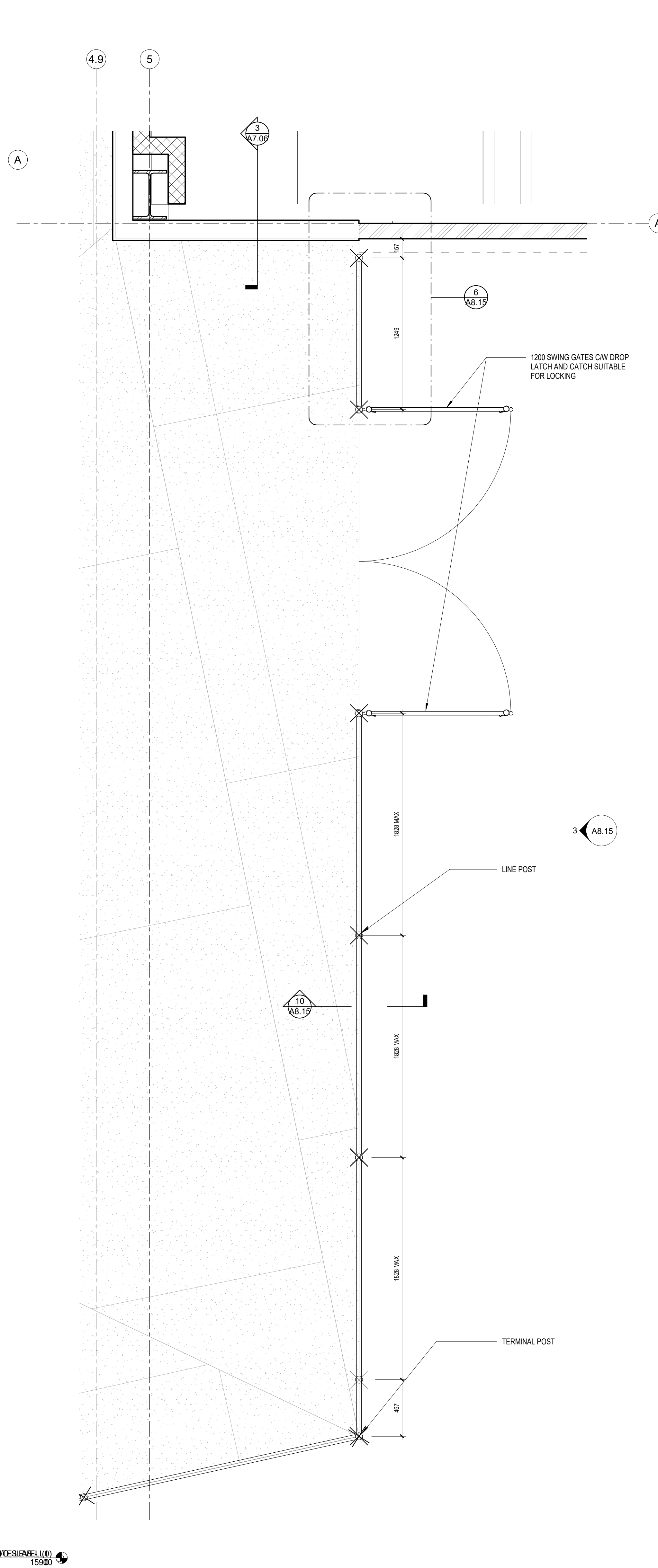
3 ELEVATION - CHAIN LINK FENCE @ EXIT GATE
A8.15 1: 20



6 PLAN DETAIL - EXTERIOR CHAIN LINK FENCE @ EXIT GATE
A8.15 1: 5



10 SECTION DETAIL - EXTERIOR CHAIN LINK FENCE
A8.15 1: 5



11 ENLARGED POOL FLOOR PLAN
A8.15 1: 20

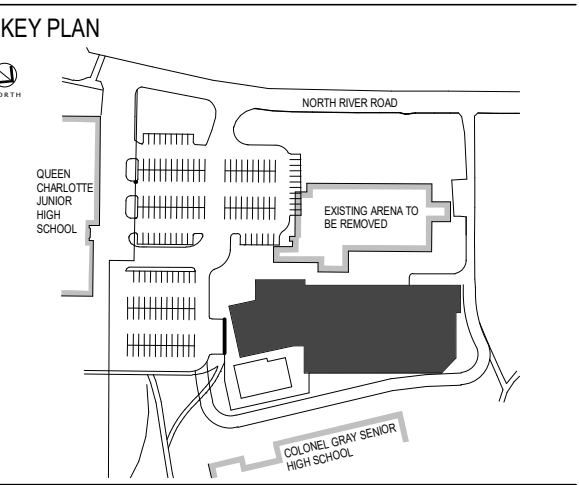
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PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL
REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

PROJECT NO.: 21111
DRAWN BY: OM / MV / DE
CHECKED BY: MMG / PC
SCALE: As indicated

RAILING & EXT. FENCE
DETAILS



CONSULTANT

EXTERIOR VESTIBULE DOOR SCHEDULE-LEVEL 1

Mark	Door			Frame		Fire Rating	Remarks	Hardware Set
	Type	Width	Height	Material/Finish	Type			
100-1	D3 x 2	1829	2438	AL-IP	F1	AL-TB	GLAZING GL-1, REFER TO SPECS	H-1 SEE SPECIFICATIONS
100-2	D3 x 2	1829	2438	AL-IP	F1	AL-TB	GLAZING GL-1, REFER TO SPECS	H-2 SEE SPECIFICATIONS
102-1	D3 x 2	1829	2438	AL-IP	F1	AL-TB	GLAZING GL-1, REFER TO SPECS	H-3 SEE SPECIFICATIONS
102-2	D3 x 2	1829	2438	AL-IP	F1	AL-TB	GLAZING GL-1, REFER TO SPECS	H-4 SEE SPECIFICATIONS
106-2	D3	914	2438	AL-IP	F1	AL-TB	GLAZING GL-1, REFER TO SPECS	H-5 SEE SPECIFICATIONS
111-1	D3	914	2134	AL-IP	F1	AL-TB	GLAZING GL-1, REFER TO SPECS	H-6 SEE SPECIFICATIONS
113-1	D2	914	2134	FRP	F1	FRP-TB	GLAZING GL-1, REFER TO SPECS	H-7 SEE SPECIFICATIONS
114-1	D2	914	2134	FRP	F1	FRP-TB	GLAZING GL-1, REFER TO SPECS	H-7 SEE SPECIFICATIONS
115-1	D2	914	2134	FRP	F1	FRP-TB	GLAZING GL-1, REFER TO SPECS	H-7 SEE SPECIFICATIONS
123-1	D1 x 2	1829	2134	HM-IP	F1	PSF-TB	GLAZING GL-1, REFER TO SPECS	H-8 SEE SPECIFICATIONS
123-2	D1 x 2	1829	2134	HM-IP	F1	PSF-TB	GLAZING GL-1, REFER TO SPECS	H-8 SEE SPECIFICATIONS
133-1	D4	3564	3353	ICH-IP	F1	PSF-TB	WELDED STEEL FRAME - SEE DETAILS	H-9 SEE SPECIFICATIONS
133-5	D1	914	2134	HM-IP	F1	PSF-TB		H-8 SEE SPECIFICATIONS
134-1	D1 x 2	1829	2134	HM-IP	F1	PSF-TB		H-8 SEE SPECIFICATIONS
135-2	D1	914	2134	HM-IP	F1	PSF-TB		H-10 SEE SPECIFICATIONS
136-1	D1 x 2	1829	2134	HM-IP	F1	PSF-TB		H-8 SEE SPECIFICATIONS
136-2	D1 x 2	1829	2134	HM-IP	F1	PSF-TB		H-8 SEE SPECIFICATIONS
138	D1	914	2134	HM-IP	F1	FRP-TB		H-11 SEE SPECIFICATIONS
139	D1	914	2134	FRP-I	F1	FRP-TB		H-11 SEE SPECIFICATIONS
155-1	D3 x 2	1829	2438	FRP-I	F1	AL-TB	GLAZING GL-1, REFER TO SPECS	H-12 SEE SPECIFICATIONS

EXTERIOR DOOR SCHEDULE-LEVEL 2

Mark	Door			Frame		Fire Rating	Remarks	Hardware
	Type	Width	Height	Material/Finish	Type			
201-2	D1 x 2	1829	2134	HM-IP	F1	PSF-TB		H-8 SEE SPECIFICATIONS
217	D1	914	2134	HM-IP	F1	PSF-TB		H-13 SEE SPECIFICATIONS

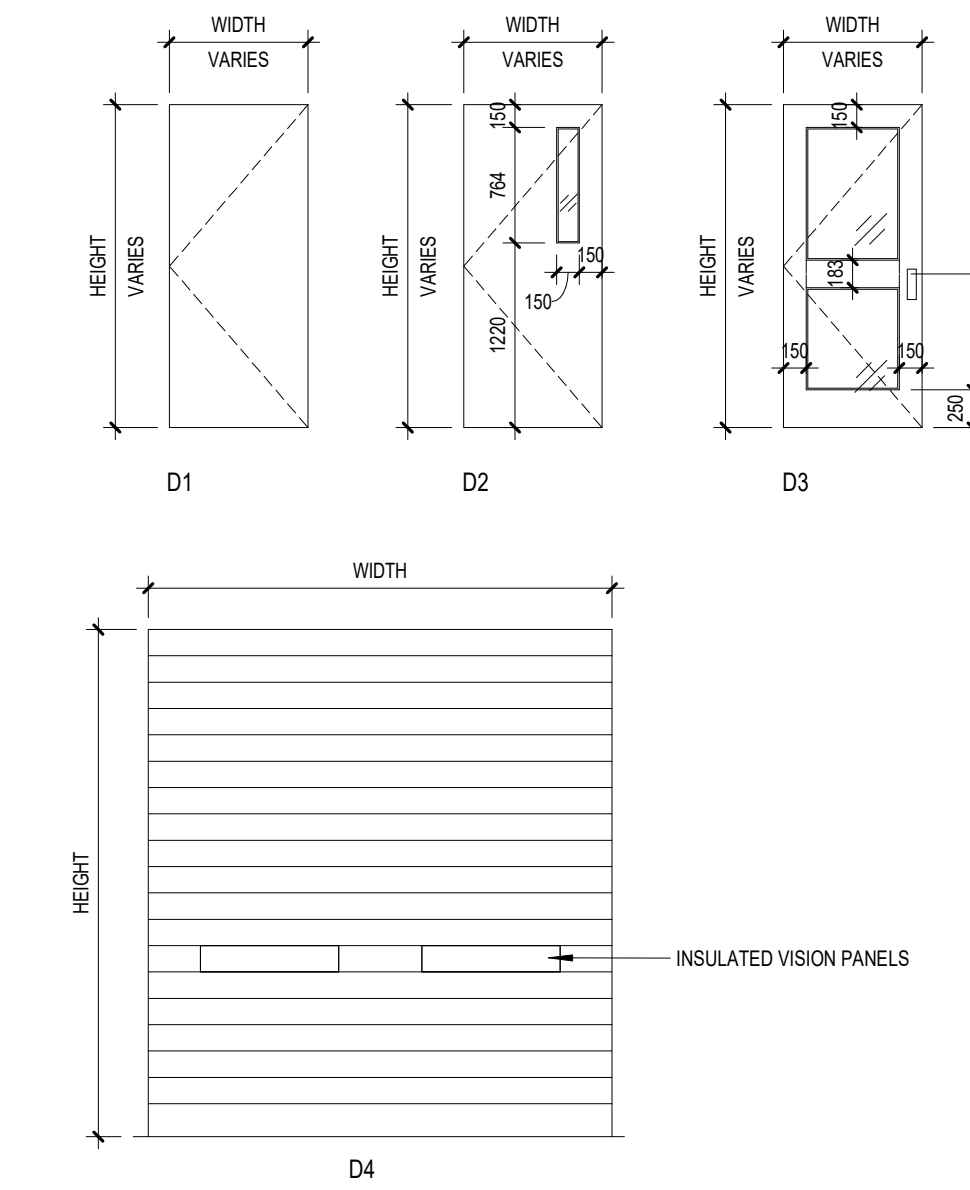
INTERIOR DOOR SCHEDULE-LEVEL 1

Mark	Door			Frame		Fire Rating	Remarks	Hardware
	Type	Width	Height	Material/Finish	Type			
100-3	D3 x 2	1829	2438	AL-IP	F1	AL-TB	GLAZING TP, REFER TO SPECS	H-14 SEE SPECIFICATIONS
100-4	D3 x 2	1829	2438	AL-IP	F1	AL-TB	GLAZING TP, REFER TO SPECS	H-15 SEE SPECIFICATIONS
102-3	D3 x 2	1829	2134	AL-IP	F1	AL-TB	GLAZING GL-1, REFER TO SPECS	H-16 SEE SPECIFICATIONS
102-4	D3 x 2	1829	2134	AL-IP	F1	AL-TB	GLAZING GL-1, REFER TO SPECS	H-17 SEE SPECIFICATIONS
102-5	D2 x 2	1829	2134	HM-IP	F1	PSF	GLAZING TP, REFER TO SPECS	H-18 SEE SPECIFICATIONS
103-1	D2	914	2134	HM-IP	F1	PSF	GLAZING TP, REFER TO SPECS	H-19 SEE SPECIFICATIONS
103-2	D2	914	2134	HM-IP	F1	PSF	GLAZING TP, REFER TO SPECS	H-19 SEE SPECIFICATIONS
104	D2	914	2134	HM-IP	F1	PSF	GLAZING TP, REFER TO SPECS	H-19 SEE SPECIFICATIONS
104-2	D4	2089	1320	AL-IP	F1	AL-TB	REFER TO SPECIFICATIONS	H-21 SEE SPECIFICATIONS
105	D3	914	2438	AL-IP	F1	AL-TB	GLAZING GL-1, REFER TO SPECS	H-21 SEE SPECIFICATIONS
106-1	D3 x 2	1829	2134	HM-IP	F1	PSF	GLAZING TP, REFER TO SPECS	H-22 SEE SPECIFICATIONS
107	D1 x 2	1829	2134	HM-IP	F1	PSF	45 MIN	H-23 SEE SPECIFICATIONS
108	D1	914	2134	HM-IP	F1	PSF		H-24 SEE SPECIFICATIONS
109	D1	914	2134	HM-IP	F1	PSF		H-25 SEE SPECIFICATIONS
110	D1	914	2134	HM-IP	F1	PSF		H-19 SEE SPECIFICATIONS
111-2	D2	914	2134	HM-IP	F1	PSF	GLAZING TP, REFER TO SPECS	H-26 SEE SPECIFICATIONS
112-1	D1	762	1464	HM-IP	F1	PSF		H-27 SEE SPECIFICATIONS
112-2	D1	762	1464	HM-IP	F1	PSF		H-27 SEE SPECIFICATIONS
113-2	D1	914	2134	HM-IP	F1	PSF		H-28 SEE SPECIFICATIONS
113-3	D1	914	2134	HM-IP	F1	PSF		H-29 SEE SPECIFICATIONS
114-2	D1	914	2134	HM-IP	F1	PSF		H-28 SEE SPECIFICATIONS
114-3	D1	914	2134	HM-IP	F1	PSF		H-29 SEE SPECIFICATIONS
115-2	D1	914	2134	HM-IP	F1	PSF		H-28 SEE SPECIFICATIONS
115-3	D1	914	2134	HM-IP	F1	PSF		H-29 SEE SPECIFICATIONS
117	D3	914	2134	AL-IP	F1	AL-TB	GLAZING TP, REFER TO SPECS	H-21 SEE SPECIFICATIONS
118-1	D1	914	2134	HM-IP	F1	PSF		H-30 SEE SPECIFICATIONS
118-2	D1	762	1464	HM-IP	F1	PSF		H-27 SEE SPECIFICATIONS
119	D1	1067	2134	HM-IP	F1	PSF		H-31 SEE SPECIFICATIONS
122	D1	1067	2134	HM-IP	F1	PSF		H-31 SEE SPECIFICATIONS
126	D1	1067	2134	HM-IP	F1	PSF		H-31 SEE SPECIFICATIONS
127	D1 x 2	1829	2134	FRP	F1	PSF		H-32 SEE SPECIFICATIONS
128-1	D1	914	2134	HM-IP	F1	PSF		H-30 SEE SPECIFICATIONS
128-2	D1	914	2134	HM-IP	F1	PSF	1.5 HR	H-30 SEE SPECIFICATIONS
129	D1	1067	2134	HM-IP	F1	PSF		H-31 SEE SPECIFICATIONS
130-1	D1	762	1464	HM-IP	F1	PSF		H-27 SEE SPECIFICATIONS
131	D1	1067	2134	HM-IP	F1	PSF		H-31 SEE SPECIFICATIONS
132	D1	1067	2134	HM-IP	F1	PSF		H-31 SEE SPECIFICATIONS
133-2	D1 x 2	1829	2134	HM-IP	F1	PSF	1.5 HR	H-33 SEE SPECIFICATIONS
133-3	D1	914	2134	HM-IP	F1	PSF	1.5 HR	H-34 SEE SPECIFICATIONS
133-4	D4	3568	3375	ICH-IP	F1	PSF	FIRE SHUTTER	H-35 SEE SPECIFICATIONS
135-1	D1	914	2134	HM-IP	F1	PSF		H-36 SEE SPECIFICATIONS
137	D1	914	2134	HM-IP	F1	PSF		H-30 SEE SPECIFICATIONS
140	D1	914	2134	HM-IP	F1	PSF		H-30 SEE SPECIFICATIONS
141	D1	914	2134	HM-IP	F1	PSF		H-37 SEE SPECIFICATIONS
142	D1	914	2134	HM-IP	F1	PSF		H-37 SEE SPECIFICATIONS
146	D1	914	2134	HM-IP	F1	PSF		H-39 SEE SPECIFICATIONS
148	D1	914	2134	HM-IP	F1	PSF		H-37 SEE SPECIFICATIONS
149	D1	914	2134	HM-IP	F1	PSF		H-37 SEE SPECIFICATIONS
150	D1	914	2134	HM-IP	F1	PSF		H-38 SEE SPECIFICATIONS
151	D1	914	2134	HM-IP	F1	PSF		H-38 SEE SPECIFICATIONS
152	D1	914	2134	HM-IP	F1	PSF		H-39 SEE SPECIFICATIONS
154	D1	914	2134	HM-IP	F1	PSF		H-34 SEE SPECIFICATIONS
155-2	D3 x 2	1829	2134	HM-IP	F1	PSF	GLAZING TP, REFER TO SPECS	H-22 SEE SPECIFICATIONS
158	D1 x 2	1829	2134	FRP	F1	PSF	1.5 HR	H-32 SEE SPECIFICATIONS
159	D1	914	2134	HM-IP	F1	PSF	45 MIN	H-25 SEE SPECIFICATIONS
163	D1	914	2134	HM-IP	F1	PSF		H-36 SEE SPECIFICATIONS
168	D2	914	2134	HM-IP	F1	PSF	GLAZING GL-6, REFER TO SPECS	H-40 SEE SPECIFICATIONS
169	D1	914	2134	HM-IP	F1	PSF	45 MIN	H-36 SEE SPECIFICATIONS

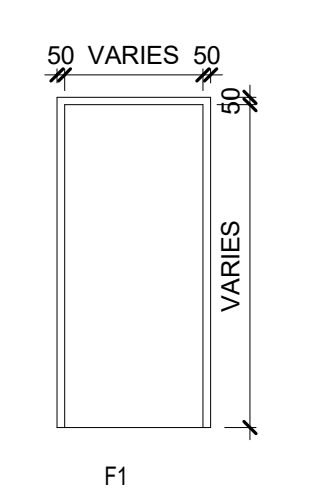
INTERIOR DOOR SCHEDULE-LEVEL 2

Mark	Door			Frame		Fire Rating	Remarks	Hardware
	Type	Width	Height	Material/Finish	Type			
201-1	D1 x 2	1829	2134	HM-IP	F1	PSF		H-41 SEE SPECIFICATIONS
202-2	D3 x 2	1829	2134	HM-IP	F1	PSF	GLAZING GL-1, REFER TO SPECS	H-42 SEE SPECIFICATIONS
204	D1	914	2134	HM-IP	F1	PSF		H-39 SEE SPECIFICATIONS
206-1	D3	914	2134	AL-IP	F1	AL-IP		H-26 SEE SPECIFICATIONS
206-2	D3	914	2134	AL-IP	F1	AL-IP	GLAZING GL-1, REFER TO SPECS	H-26 SEE SPECIFICATIONS
207	D1	914	2134	HM-IP	F1	PSF		H-24 SEE SPECIFICATIONS
210	D1	914	2134	HM-IP	F1	PSF		H-19 SEE SPECIFICATIONS
212-1	D1 x 2	1829	2032	HM-IP	F1	PSF	45 MIN	H-43 SEE SPECIFICATIONS
213	D1 x 2	1829	2134	HM-IP	F1	PSF		H-44 SEE SPECIFICATIONS
216-1	D2	914	2134	HM-IP	F1	PSF	GLAZING GL-1, REFER TO SPECS	H-28 SEE SPECIFICATIONS

DOOR TYPES



FRAME TYPES

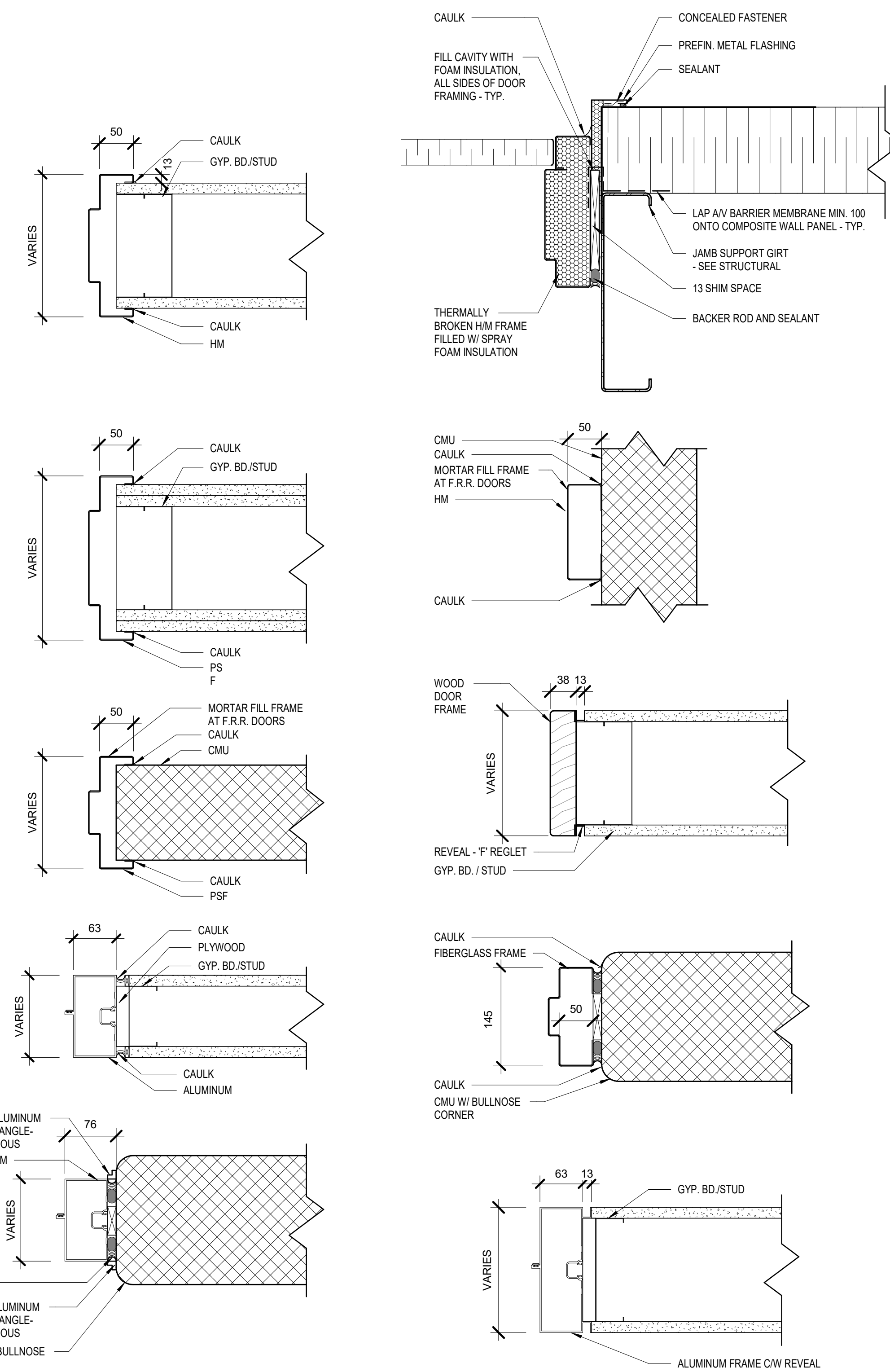


DOOR TYPES LEGEND

- AL ALUMINUM EXTERIOR DOORS
- AL-1 ALUMINUM EXTERIOR DOORS INSULATED
- AL-TB ALUMINUM FRAMES - THERMALLY BROKEN
- ANOD ANODIZED
- BF BARRIER FREE OPERATOR
- CR CARD READER
- HM HOLLOW METAL DOOR
- HM-1 HOLLOW METAL INSULATED DOOR
- IOH INSULATED OVERHEAD DOOR
- FRP FIBREGLASS REINFORCED PLASTIC
- P PAINT OR STAIN
- PSF PRESSED STEEL FRAME
- PSF-TB PRESSED STEEL FRAME - THERMALLY BROKEN

- NOTES:
- SEE PLAN TO VERIFY WALL THICKNESS AND WALL TYPE FOR EACH INDIVIDUAL DOOR AND FRAME.
 - ALL DOOR OPENINGS TO BE CONFIRMED ON SITE PRIOR TO ORDERING AND ISSUANCE OF SHOP DRAWINGS.

DOOR FRAME TYPES



1	TP1 - ISSUED FOR TENDER	2023-04-10
0	TP1 - ADDENDUM 1	2022-04-19
	NO. REVISION	DATE



PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

PROJECT NO.: 21111
DRAWN BY: OM / MV / DE
CHECKED BY: MMG / PC
SCALE: As indicated

DOOR SCHEDULE

A10.01

ROOM SCHEDULE			
Number	Name	Area	Area (SF)
001	POOL MECHANICAL	85 m²	918 SF
002	SWIMMING POOL	353 m²	3800 SF
100	VESTIBULE	12 m²	134 SF
101	LOBBY	56 m²	605 SF
102	ATRIUM	262 m²	2823 SF
103	KITCHEN	19 m²	208 SF
104	CANTEEN	11 m²	116 SF
105	OFFICE	27 m²	292 SF
105-1	RECEP.	10 m²	103 SF
106	MULTI-PURPOSE	234 m²	2524 SF
107	MECHANICAL	64 m²	688 SF
108	UWR	6 m²	60 SF
109	WR	3 m²	33 SF
110	FIRST AID	7 m²	79 SF
111	LIFEGUARD	7 m²	71 SF
112	STORAGE	57 m²	617 SF
113	FEMALE CHANGE ROOM	68 m²	729 SF
114	COMMUN CHANGE	64 m²	687 SF
115	MALE CHANGE ROOM	67 m²	722 SF
116	ELEV	5 m²	52 SF
117	OFFICE	13 m²	143 SF
118	STORAGE	91 m²	982 SF
119	DRESSING	43 m²	460 SF
120	WR	10 m²	112 SF
121	WR	10 m²	112 SF
122	DRESSING	42 m²	452 SF
123	PLAYERS CORRIDOR	150 m²	1619 SF
124	WR	10 m²	112 SF
125	WR	10 m²	112 SF
126	DRESSING	42 m²	452 SF
127	VEST.	17 m²	179 SF
128	STORAGE	10 m²	106 SF
129	DRESSING	43 m²	462 SF
130	STORAGE	64 m²	686 SF
131	DRESSING	42 m²	452 SF
132	DRESSING	42 m²	455 SF
133	ICE RESURFACER	162 m²	1748 SF
134	ICE PLANT	78 m²	841 SF
135	WATER & SPRINKLER	14 m²	149 SF
136	TRACK	236 m²	2536 SF
137	STORAGE	28 m²	297 SF
138	FIELD UWR2	5 m²	49 SF
139	FIELD UWR1	4 m²	47 SF
140	PANEL STORAGE	27 m²	294 SF
141	STORAGE	11 m²	114 SF
142	STORAGE	5 m²	49 SF
143	PLAYERS BOX	16 m²	174 SF
144	PEN.	4 m²	47 SF
145	PEN.	4 m²	47 SF
146	STORAGE	5 m²	57 SF
147	PLAYERS BOX	16 m²	174 SF
148	STORAGE	5 m²	51 SF
149	STORAGE	7 m²	72 SF
150	REFS	17 m²	188 SF
151	REFS	27 m²	293 SF
152	STORAGE	6 m²	60 SF
153	ICE RINK	1517 m²	16327 SF
154	OFFICE	7 m²	72 SF
155	CORRIDOR	58 m²	629 SF
155-1	CORRIDOR	14 m²	153 SF
156	SWIMMING POOL	377 m²	4057 SF
157	TIME	3 m²	35 SF
158	VEST.	17 m²	179 SF
159	WR	3 m²	32 SF
161	WR	10 m²	112 SF
162	WR	11 m²	113 SF
163	ELEC	27 m²	293 SF
165	EXIT STAIR 1	Not Enclosed	
166	STAIR 3	5 m²	55 SF
167	STAIR 2	Not Enclosed	
168	STAIR 4	8 m²	84 SF
169	MACHINE ROOM	5 m²	56 SF
201	CIRC.	27 m²	291 SF
203	ELEV	4 m²	48 SF
204	AV ROOM	3 m²	35 SF
205	FWR	18 m²	198 SF
206	WARM ROOM	113 m²	1219 SF
207	UWR	6 m²	66 SF
208	FWR	25 m²	272 SF
209	SEATING	369 m²	3968 SF
210	MAINTENANCE	6 m²	61 SF
212	MECHANICAL	116 m²	1245 SF
213	STORAGE	48 m²	518 SF
215	FWR	28 m²	298 SF
216	WALKING TRACK	645 m²	6947 SF
217	MWR	24 m²	262 SF
218	ATRIUM LV2	29 m²	316 SF

ROOM FINISHES													
Number	Name	Floor Finish	Base	Walls	Wall Finish				Ceilings		Comments		
					Material	N Wall	E Wall	S Wall	W Wall	Material		Finish	
001	POOL MECHANICAL	EC	-	EC	-	-	-	-	-	MD	-		
002	SWIMMING POOL	-	-	EC	-	-	-	-	-	-	-		
100	VESTIBULE	PC/FG	RB-1	CW/WD-1	-	WD-2	-	-	-	LMP-1	-	WALL BASE ON GB WALLS ONLY	
101	LOBBY	PC	RB-1	CW/GB	-	PT-2	-	-	-	LMP-1	-	WALL BASE ON GB WALLS ONLY	
102	ATRIUM	PC/RF-1	-	CW/CMU/GB	WD-1	PT-1	PT-2	PT-1	EXP/LMP	PT-1	-		
103	KITCHEN	RF-4	RB-1	GB/CMU	WT-1	WT-1	WT-1	WT-1	GB/MD	PT-1	-		
104	CANTEEN	RF-4	RB-1	GB/CMU	WT-1	WT-1	WT-1	WT-1	GB	PT-1	-		
105	OFFICE	RF-5	RB-2	GB	PT-1	PT-1	PT-1	PT-1	ACT 2	-	-		
105-1	RECEP.	PC	RB-1	GB	-	PT-2	WD-2	-	GB	PT-1	-		
106	MULTI-PURPOSE	RF-3	WB	GB/CMU/CW	PT-1	PT-1	PT-1	PT-1	BAF	-	-	REFER TO RCP FOR EXTENT & LAYOUT OF CEILING	
107	MECHANICAL	EC	-	GB/CMU	PT-1	PT-1	-	-	MD	PT-1	-	PAINT FINISH ON GB WALLS ONLY. CMU UNFINISHED.	
108	UWR	FT-1	RB-1	GB/CMU	PT-1	PT-1	PT-1	PT-1	ACT 2	-	-		
109	WR	FT-1	RB-1	GB/CMU	PT-1	PT-1	PT-1	PT-1	GB	PT-1	-		
110	FIRST AID	FT-1	RB-1	GB/CMU	PT-1	PT-1	PT-1	PT-1	ACT 2	-	-		
111	LIFEGUARD	FT-1	RB-1	GB/CMU	PT-1	PT-1	PT-1	PT-1	ACT 2	-	-		
112	STORAGE	EC	-	CMU	-	-	-	-	EXP	-	-		
113	FEMALE CHANGE ROOM	FT-1	FT	GB/CMU/WT-1	PT-1	PT-1	PT-1	PT-1	ACT 1	-	-	REFER TO ELEVATIONS/PLANS FOR EXTENT OF WALL/FLOOR TILE	
114	COMMUN CHANGE	FT-1	FT	CMU/WT-1	PT-1	PT-1	PT-1	PT-1	ACT 1	-	-	REFER TO ELEVATIONS/PLANS FOR EXTENT OF WALL/FLOOR TILE	
115	MALE CHANGE ROOM	FT-1	FT	CMU/WT-1	PT-1	PT-1	PT-1	PT-1	ACT 1	-	-	REFER TO ELEVATIONS/PLANS FOR EXTENT OF WALL/FLOOR TILE	
116	ELEV	FT-2	-	EC	-	-	-	-	-	-	-		
117	OFFICE	RF-5	WB	WD-1	WD-1	WD-1	WD-1	WD-1	ACT 2	-	-	PAINT FINISH ON GB WALLS ONLY.	
118	STORAGE	EC	-	CMU	-	-	-	-	EXP	-	-		
119	DRESSING	RF-2	-	CMU	PT-2	PT-2	PT-2	PT-2	TCP/GB	-	-	SLOPE GB CEILING AS PER RCP	
120	WR	RF-2/FT-1	-	CMU/WT-1	PT-2WT-1	PT-2WT-1	PT-2	PT-2WT-1	GB/ACT1	PT-1 (GB)	-	REFER TO ELEVATIONS/PLANS FOR EXTENT OF WALL/FLOOR TILE. SLOPE GB CEILING PER RCP.	
121	WR	RF-2/FT-1	-	CMU/WT-1	PT-2	PT-2WT-1	PT-2WT-1	PT-2WT-1	GB/ACT1	PT-1 (GB)	-	REFER TO ELEVATIONS/PLANS FOR EXTENT OF WALL/FLOOR TILE. SLOPE GB CEILING PER RCP.	
122	DRESSING	RF-2	-	CMU	PT-2	PT-2	PT-2	PT-2	TCP/GB	-	-		
123	PLAYERS CORRIDOR	RF-1	VRB-2	CMU	PT-4	PT-4	PT-4	PT-4	MD	PT-1	-		
124	WR	RF-2/FT-1	-	CMU/WT-1	PT-2WT-1	PT-2WT-1	PT-2	PT-2WT-1	GB/ACT1	PT-1 (GB)	-	REFER TO ELEVATIONS/PLANS FOR EXTENT OF WALL/FLOOR TILE. SLOPE GB CEILING PER RCP.	
125	WR	RF-2/FT-1	-	CMU/WT-1	PT-2	PT-2WT-1	PT-2WT-1	PT-2WT-1	GB/ACT1	PT-1 (GB)	-	REFER TO ELEVATIONS/PLANS FOR EXTENT OF WALL/FLOOR TILE. SLOPE GB CEILING PER RCP.	
126	DRESSING	RF-2	-	CMU	PT-2	PT-2	PT-2	PT-2	TCP/GB	-	-		
127	VEST.	RF-1	VRB-2	CMU	PT-1	-	PT-1	MD	PT-1	-	-		
128	STORAGE	EC	-	CMU	-	-	-	-	EXP	PT-1	-		
129	DRESSING	RF-2	-	CMU	PT-2	PT-2	PT-2	PT-2	TCP	-	-		
130	STORAGE	EC	-	CMU	-	-	-	-	EXP	PT-1	-		
131	DRESSING	RF-2	-	CMU	PT-2	PT-2	PT-2	PT-2	TCP/GB	-	-	SLOPE GB CEILING AS PER RCP	
132	DRESSING	RF-2	-	CMU	PT-2	PT-2	PT-2	PT-2	TCP/GB	-	-	SLOPE GB CEILING AS PER RCP	
133	ICE RESURFACER	EC	-	CMU	PT-1	PT-1	PT-1	PT-1	MD	PT-1	-		
134	ICE PLANT	EC	-	CMU	-	-	-	-	MG	-	-		
135	WATER & SPRINKLER	EC	-	CMU	-	-	-	-	MD	PT-1	-		
136	TRACK	EC/RF-1	-	CMU	PT-1	PT-1	PT-1	PT-1	MD	PT-1	-	REFER TO PLAN FOR EXTENT OF RUBBER FLOORING	
137	STORAGE	EC	-	CMU	-	-	-	-	MD	PT-1	-		
138	FIELD UWR2	FT-1	RB-1	GB/CMU	PT-1	PT-1	PT-1	PT-1	ACT 1	-	-		
139	FIELD UWR1	FT-1	RB-1	GB/CMU	PT-1	PT-1	PT-1	PT-1	ACT 1	-	-		
140	PANEL STORAGE	RF-1	-	CMU	PT-1	PT-1	PT-1	PT-1	MD	PT-1	-		
141	STORAGE	EC	-	CMU	-	-	-	-	MD	PT-1	-		
142	STORAGE	EC	-	CMU	-	-	-	-	MD	PT-1	-		
143	PLAYERS BOX	RF-1	-	-	-	-	-	-	MD	PT-1	-		
144	PEN.	RF-1	-	-	-	-	-	-	MD	PT-1	-		
145	PEN.	RF-1	-	-	-	-	-	-	MD	PT-1	-		
146	STORAGE	MD	-	GB/CMU	-	-	-	-	MD	PT-1	-	PAINT FINISH ON GB WALLS ONLY. CMU UNFINISHED.	
147	PLAYERS BOX	RF-1	-	-	-	-	-	-	MD	PT-1	-		
148	STORAGE	EC	-	CMU	-	-	-	-	MD	PT-1	-		
149	STORAGE	EC	-	CMU	-	-	-	-	MD	PT-1	-		
150	REFS	RF-2	-	CMU/WT-1	PT-2	PT-2WT-1	PT-2WT-1	PT-2WT-1	TCP	-	-	REFER TO ELEVATIONS/PLANS FOR EXTENT OF WALL/FLOOR TILE	
151	REFS	RF-2	-	CMU/WT-1	PT-2WT-1	PT-2WT-1	PT-2WT-1	PT-2	TCP	-	-	REFER TO ELEVATIONS/PLANS FOR EXTENT OF WALL/FLOOR TILE	
152	STORAGE	EC	-	CMU	-	-	-	-	MD	PT-1	-		
153	ICE RINK	EC	-	-	-	-	-	-	SLP	-	-		
154	OFFICE	RF-2	-	CMU	PT-1	PT-1	PT-1	PT-1	GB	PT-1	-		
155	CORRIDOR	PC	RB-1	GB/CMU	PT-2	PT-3	PT-2	PT-2	ACT 2	-	-	NO WALL BASE ON EAST WALL	
155-1	CORRIDOR	PC	RB-1	GB/CMU	-	PT-3	PT-2	PT-2	ACT 2	-	-	WALL BASE ON GB WALLS ONLY	
156	SWIMMING POOL	-	-	-	-	-	-	-	-	-	-		
157	TIME	RF-1	-	-	-	-	-	-	MD	PT-1	-		
158	VEST.	RF-1	VRB-2	CMU	PT-1	-	PT-1	PT-1	MD	PT-1	-		
159	WR	FT-1	-	CMU	PT-1	PT-1	PT-1	PT-1	ACT 1	-	-		
161	WR	RF-2/FT-1	-	CTS-W	PT-2WT-1	PT-2WT-1	PT-2WT-1	PT-2WT-1	GB/ACT1	PT-1 (GB)	-		
162	WR	RF-2/FT-1	-	CTS-W	PT-2	PT-2WT-1	PT-2WT-1	PT-2WT-1	GB/ACT1	PT-1 (GB)	-		
163	ELEC	EC	-	CMU	-	-	-	-	MD	PT-1	-		
166	STAIR 3	EC-2	-	-	-	-	-	-	SKL	-	-		
169	MACHINE ROOM	EC	-	-	-	-	-	-	MD	PT-1	-		
201	CIRC.	EC	-	GB	-	PT-1	PT-1	PT-1	SLP	-	-		
203	ELEV	FT-2	-	EC	-	-	-	-	-	-	-		
204	AV ROOM	EC	-	CMU	PT-1	PT-1	PT-1	PT-1	SLP	-	-		
205	FWR	FT-1	RB-1	CMU	PT-1	PT-1	PT-1	PT-1	ACT 1	-	-	REFER TO ELEVATIONS/PLANS FOR EXTENT OF WALL/FLOOR TILE	
206	WARM ROOM	RF-5	RB-2	GB/WD-1	PT-1	PT-1	PT-1	PT-1	ACT 4	-	-	REFER TO ELEVATIONS/SECTIONS FOR EXTENT OF WD-1.	
207	UWR	FT-1	RB-1	GB	PT-1	PT-1	PT-1	PT-1	ACT 1	-	-		
208	FWR	FT-1	RB-1	GB	PT-1	PT-1	PT-1	PT-1	ACT 1	-	-		
209	SEATING	EC	-	EC	-	-	-	-	SLP	-	-		
210	MAINTENANCE	EC	-	GB	PT-1	PT-1	PT-1	PT-1	SLP	-	-		
212	MECHANICAL	MG	-	GB	-	PT-1	PT-1	PT-1	SLP	-	-	GALVANIZED STEEL STRINGERS, TREADS AND HANDRAILS	
213	STORAGE	EC	-	GB	-	-	PT-1	PT-1	SLP	-	-		
215	FWR	FT-1	RB-1	GB	PT-1	PT-1	PT-1	PT-1	ACT 1	-	-		
216	WALKING TRACK	EC	RB-2	GB/CMU/WD-1	PT-1	PT-1	PT-1	PT-1	SLP	-	-	REFER TO ELEVATIONS/SECTIONS FOR EXTENT OF GB/CMU/TP. RB ON GB/CMU WALLS ONLY. WARM ROOM EXTERIOR PT-5	
217	MWR	FT-1	RB-1	GB	PT-1	PT-1	PT-1	PT-1	ACT 1	-	-		
218	ATRIUM LV2	PC	-	CMU	PT-	PT-	-	-	ACT 4	-	-		

WALL FINISH LEGEND

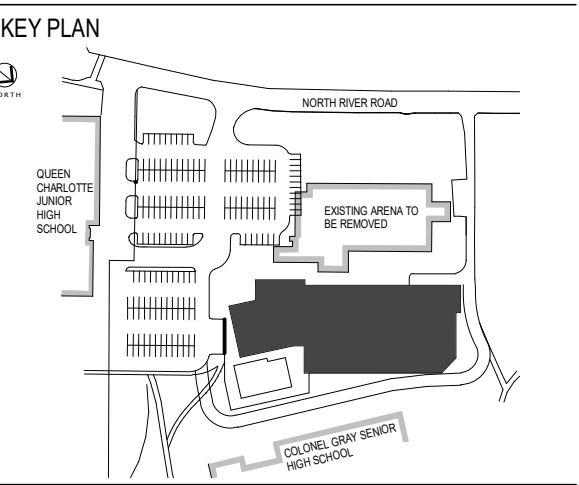
EC	EXPOSED CONCRETE
CMU	CONCRETE MASONRY UNIT
CMU-S	SHOULDER ARCHITECTURAL BLOCK
CW	CURTAIN WALL - REFER TO GLAZING ELEVATIONS
GB	GYPSUM BOARD ON CMU OR SS STUD WALL
PB	CLEAR PINE BOARDS
PT	PAINTED
TP	TECTUM PANEL
WD	WOOD
WD-1	PINE WOOD BOARDS
WD-2	TORRIED WOOD SING
WT	WALL TILE
WT-1	WALL TILE. SEE SPECIFICATIONS

PAINT FINISH LEGEND

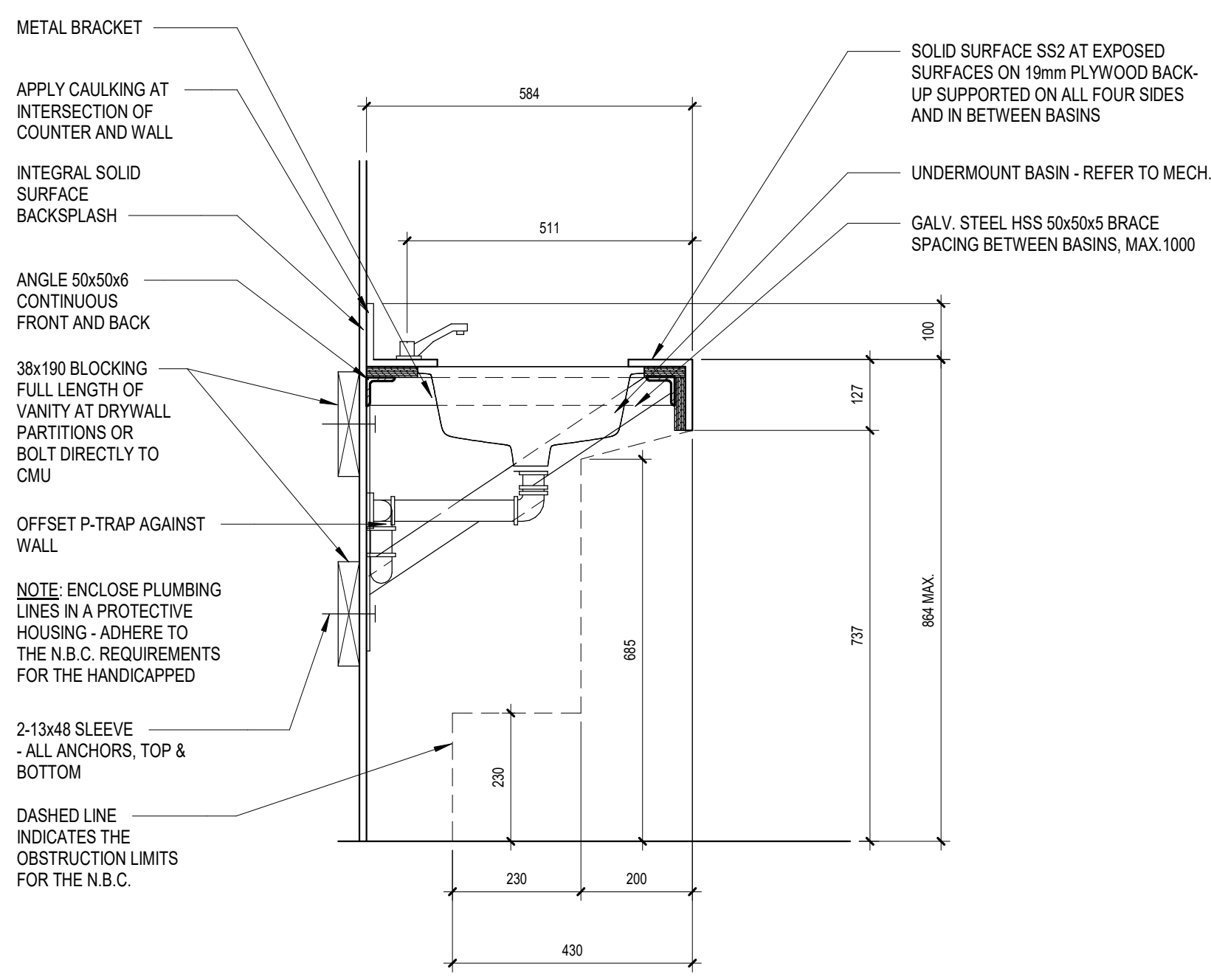
PT-#	FIELD PAINT COLOUR T.B.D.
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WALL BASE LEGEND

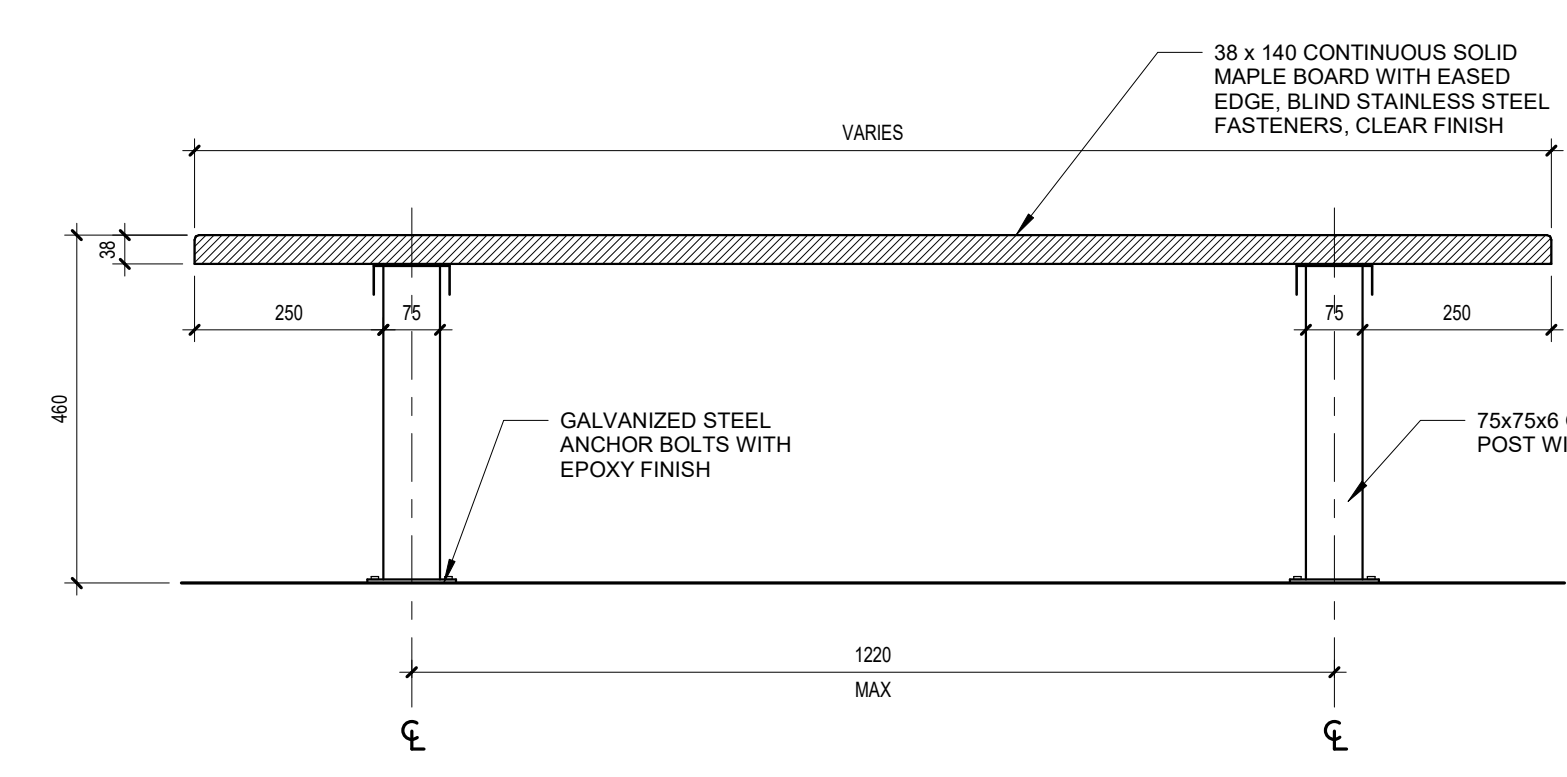
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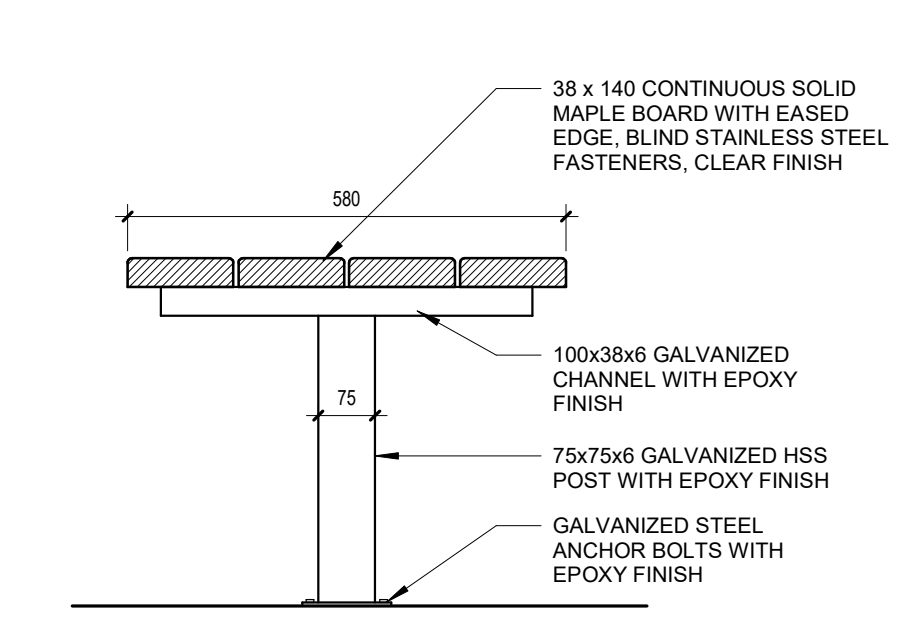
CONSULTANT



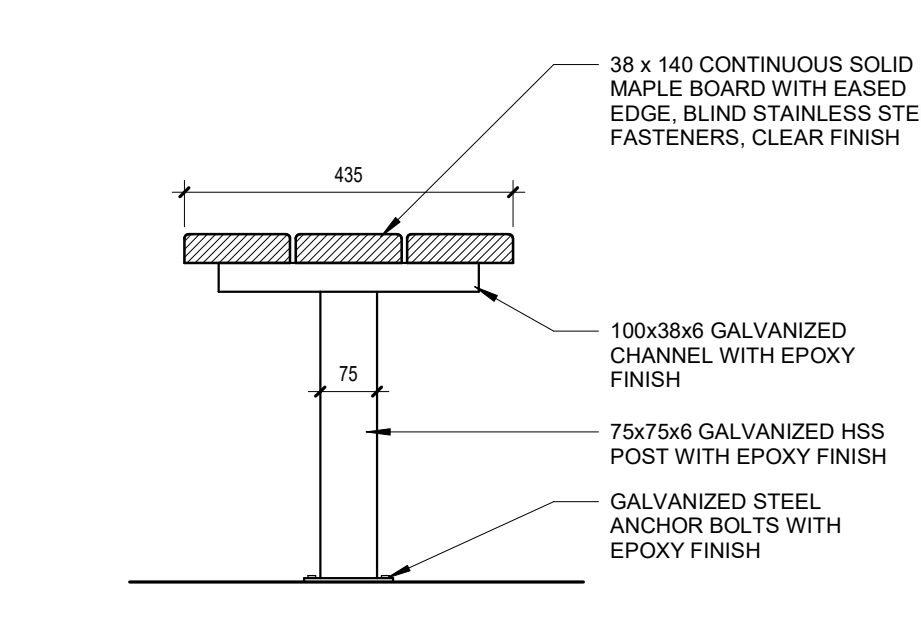
1 VANITY SECTION DETAIL
A11.01 1:10



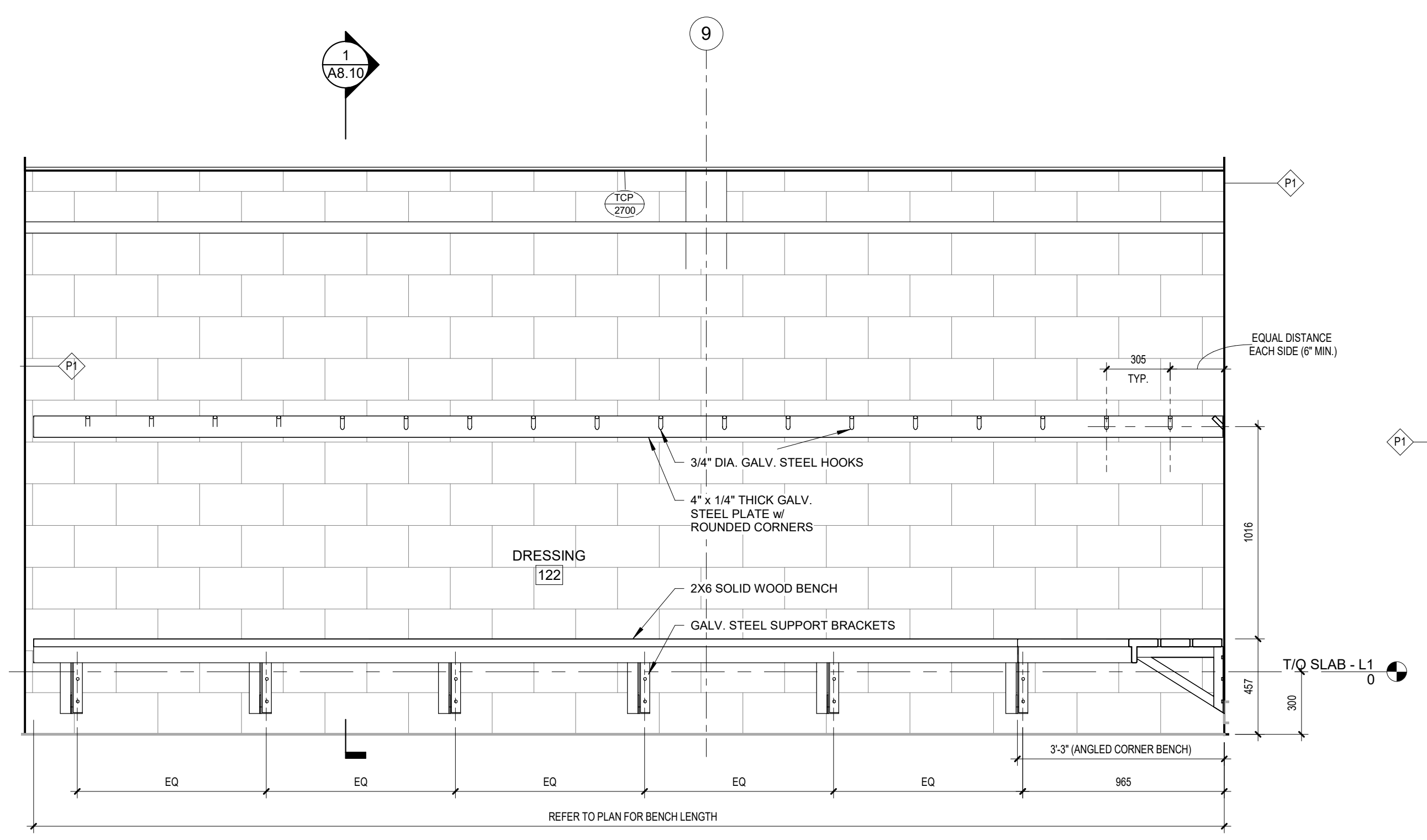
2 ELEVATION DETAIL @ M1 - CHANGE ROOM BENCH
A11.01 1:10



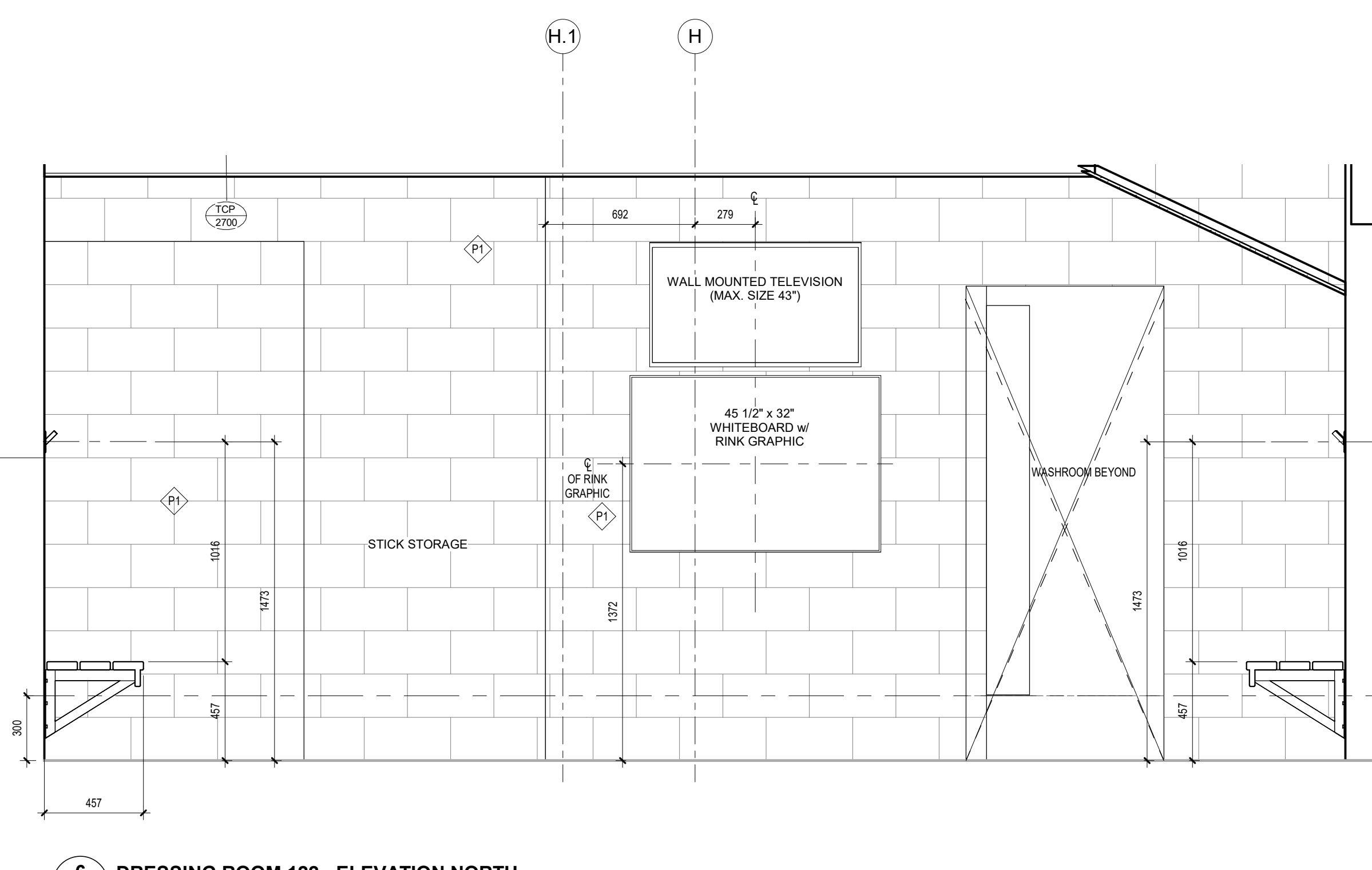
3 SECTION DETAIL @ M1 - CHANGE ROOM BENCH
A11.01 1:10



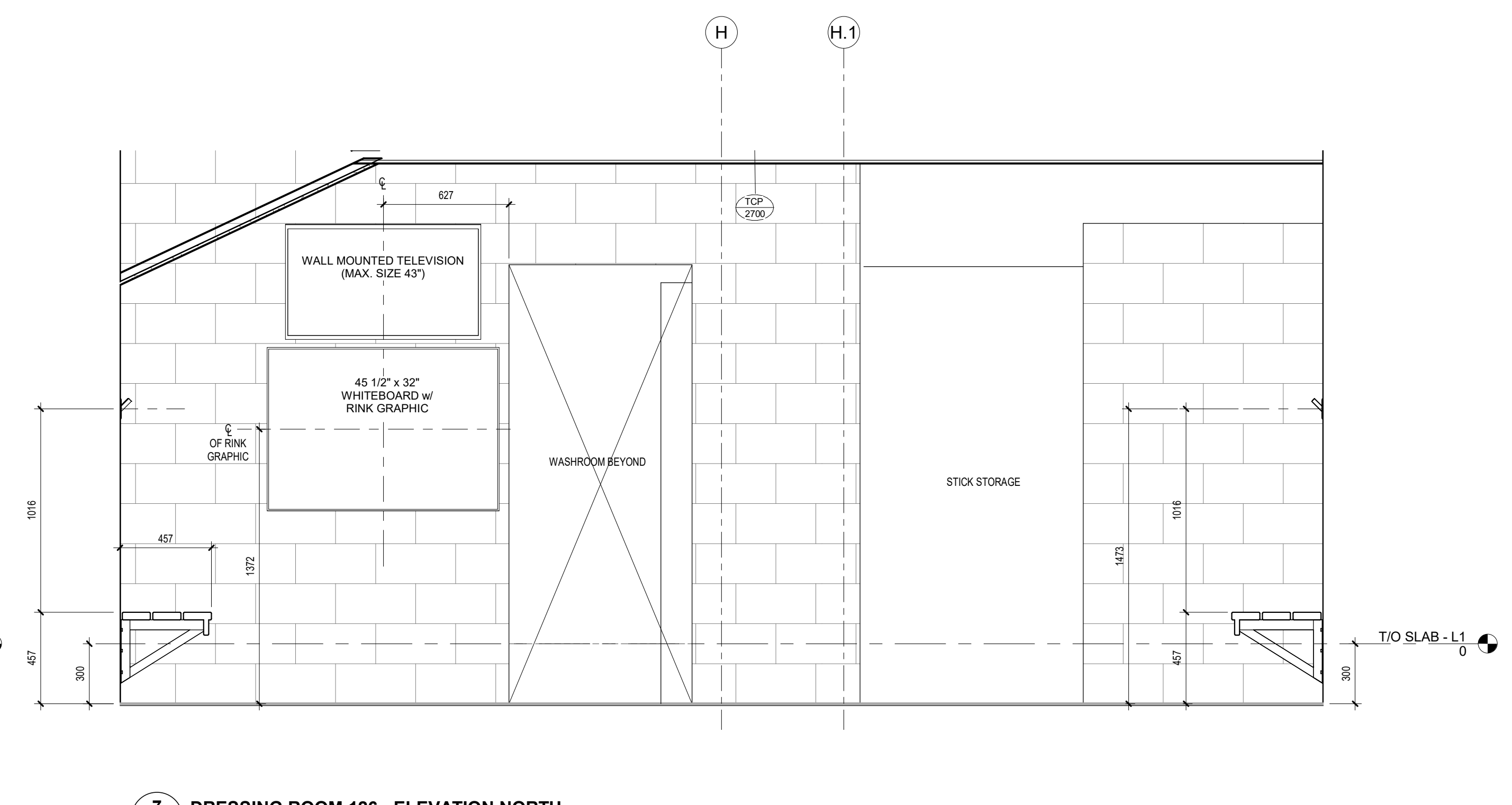
4 SECTION DETAIL @ M2 - CHANGE ROOM BENCH
A11.01 1:10



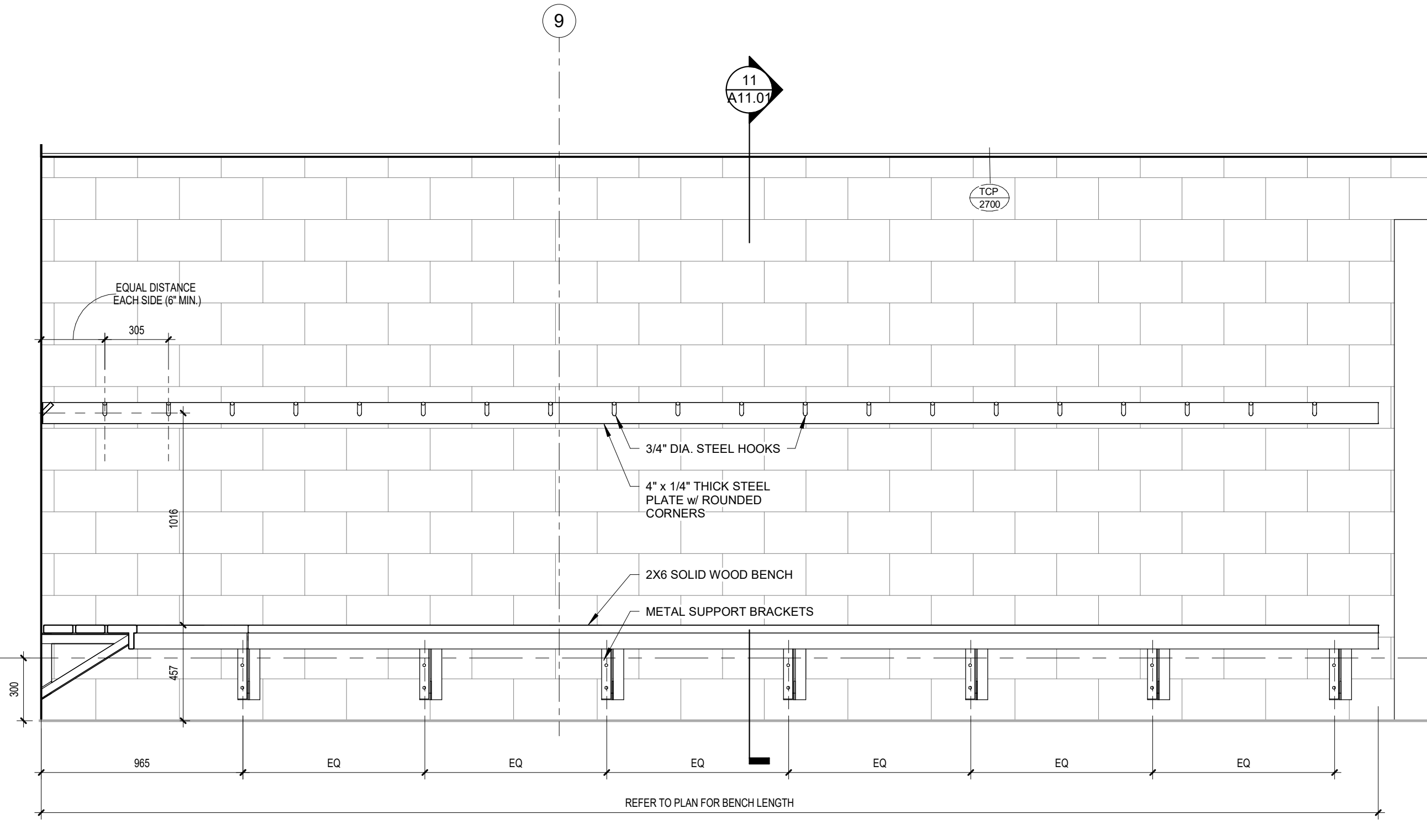
5 DRESSING ROOM - ELEVATION EAST
A11.01 1:20



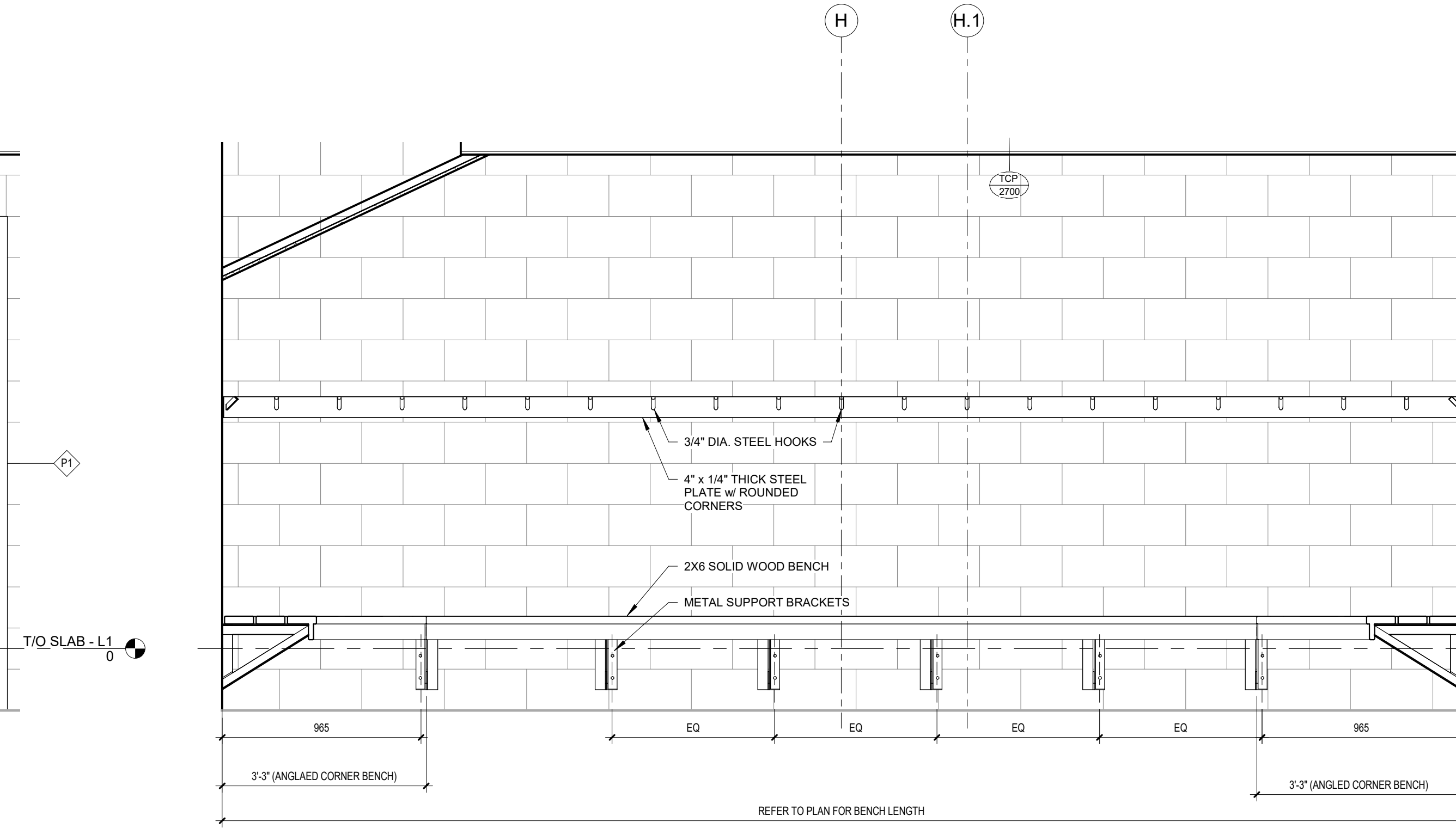
6 DRESSING ROOM 122 - ELEVATION NORTH
A11.01 1:20



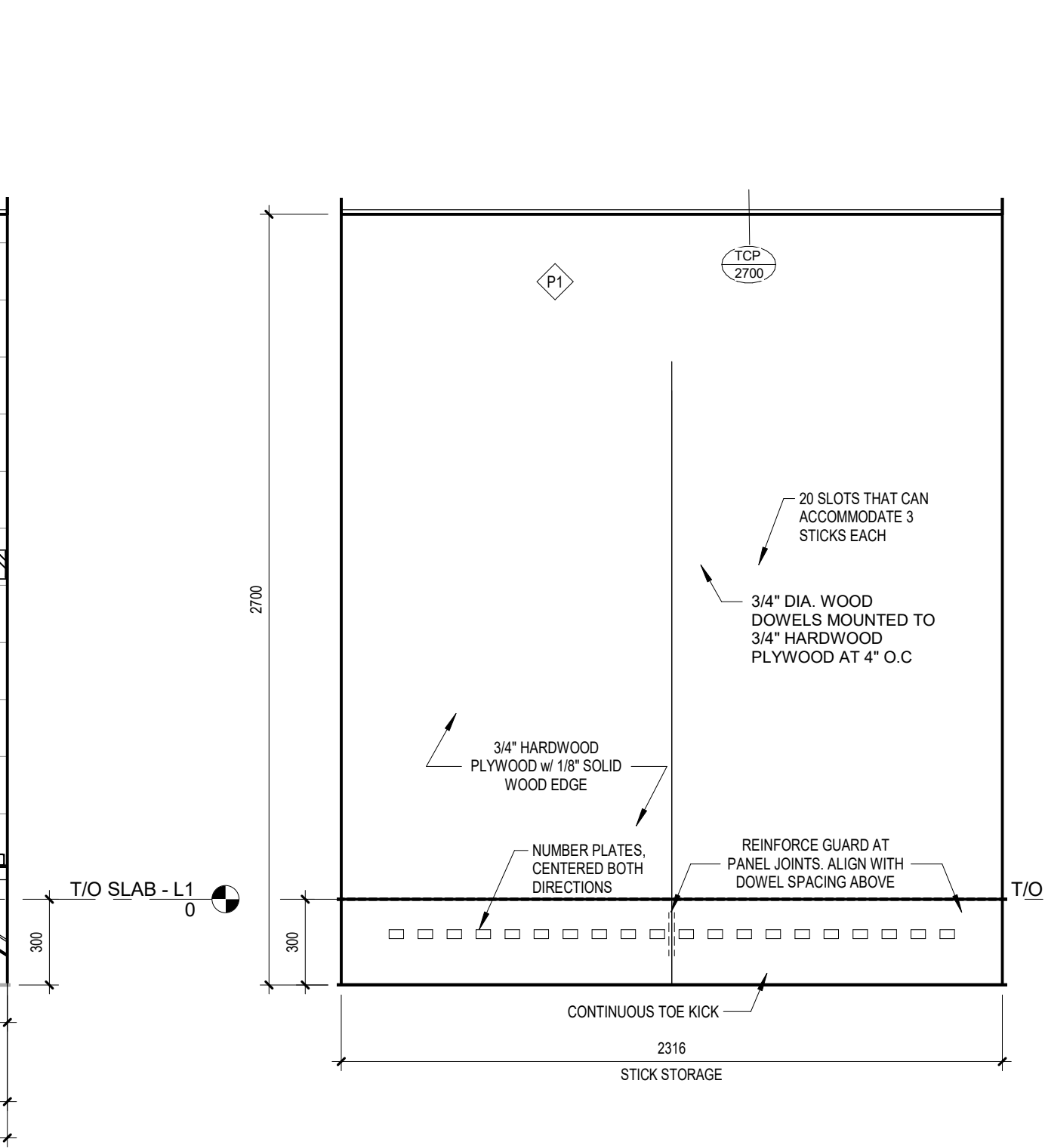
7 DRESSING ROOM 126 - ELEVATION NORTH
A11.01 1:20



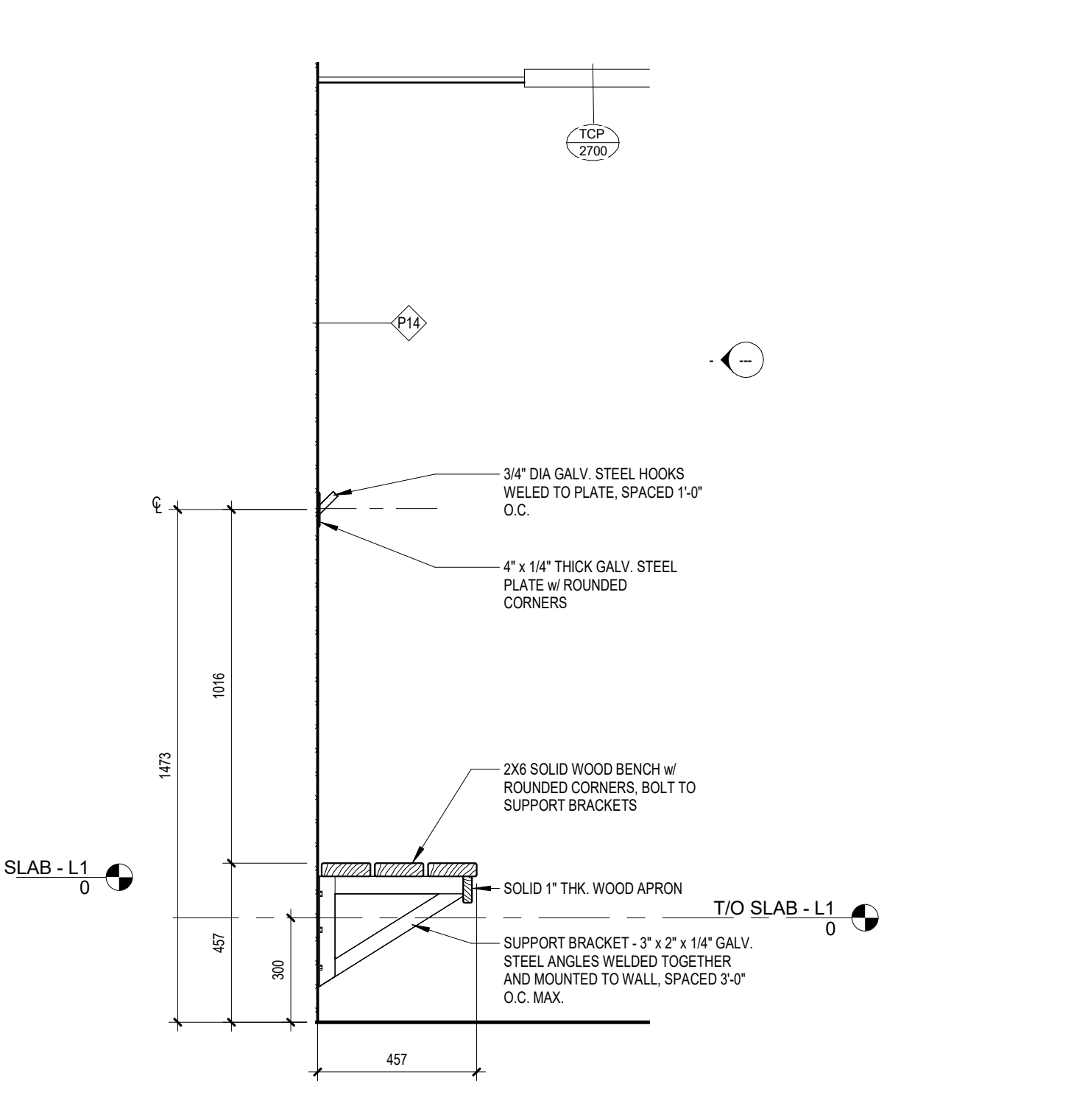
8 DRESSING ROOM @ M3 - ELEVATION WEST
A11.01 1:20



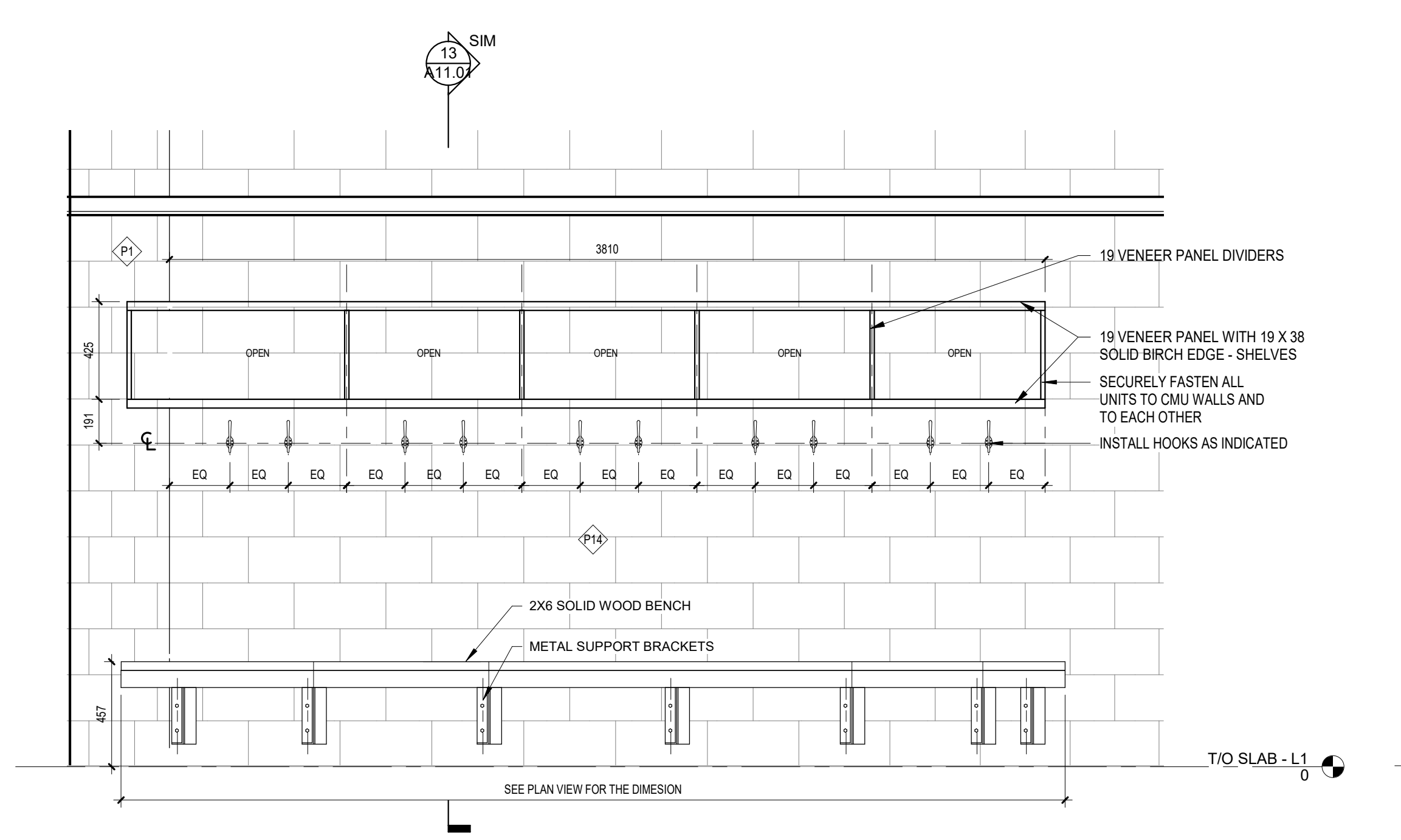
9 DRESSING ROOM @ M3 - ELEVATION SOUTH
A11.01 1:20



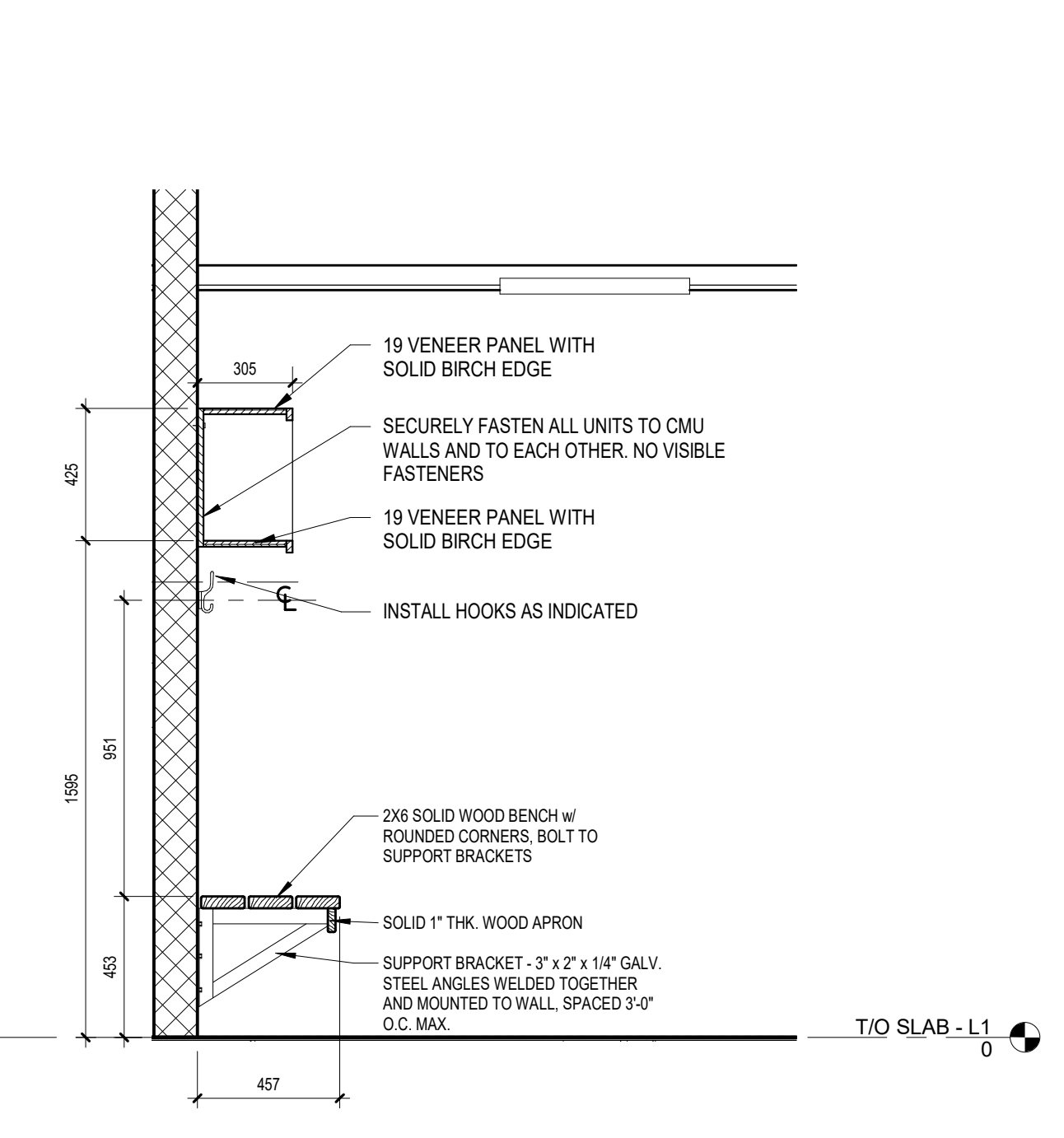
10 STICK STORAGE - ELEVATION
A11.01 1:20



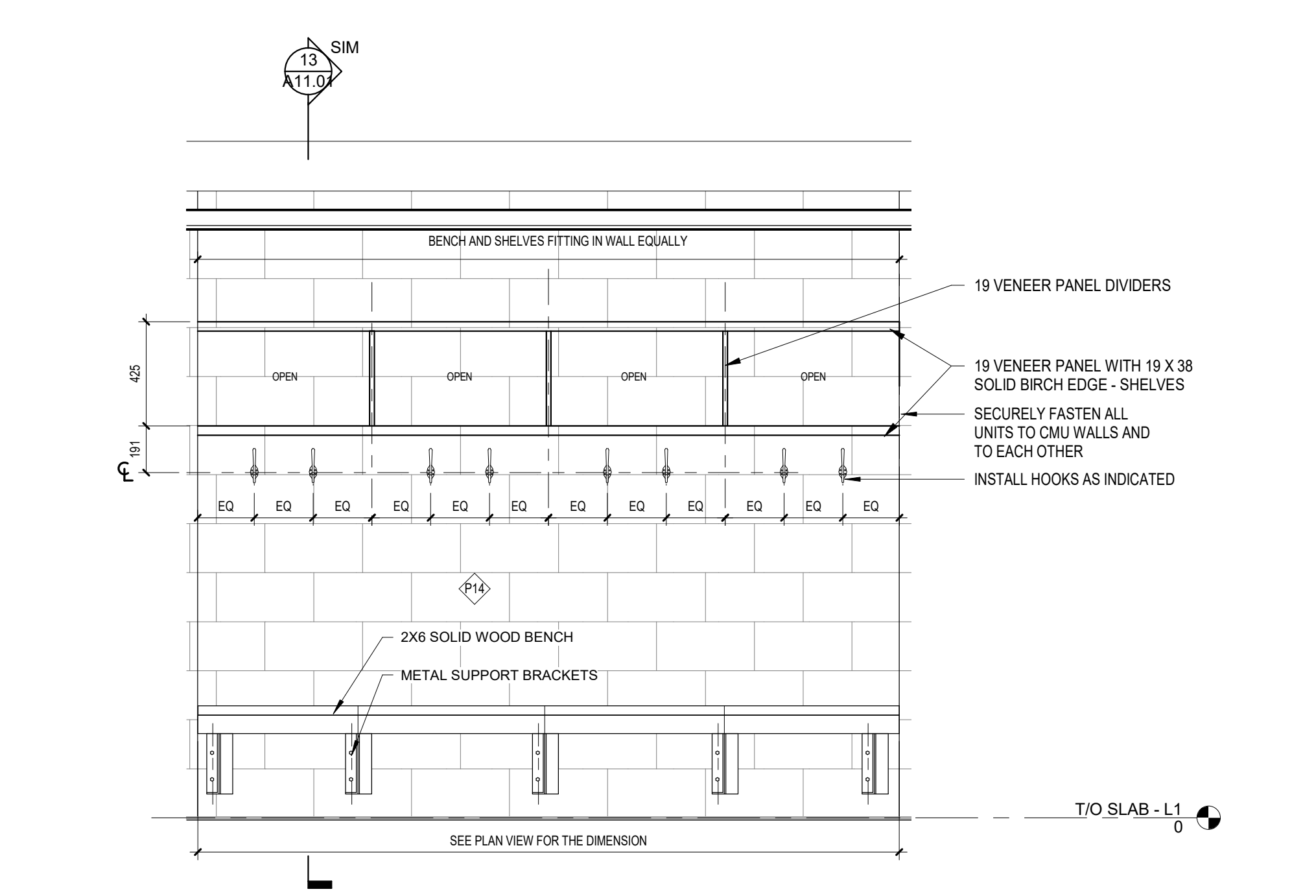
11 SECTION 1 @ M3 - DRESSING ROOM BENCH (TYPICAL)
A11.01 1:10



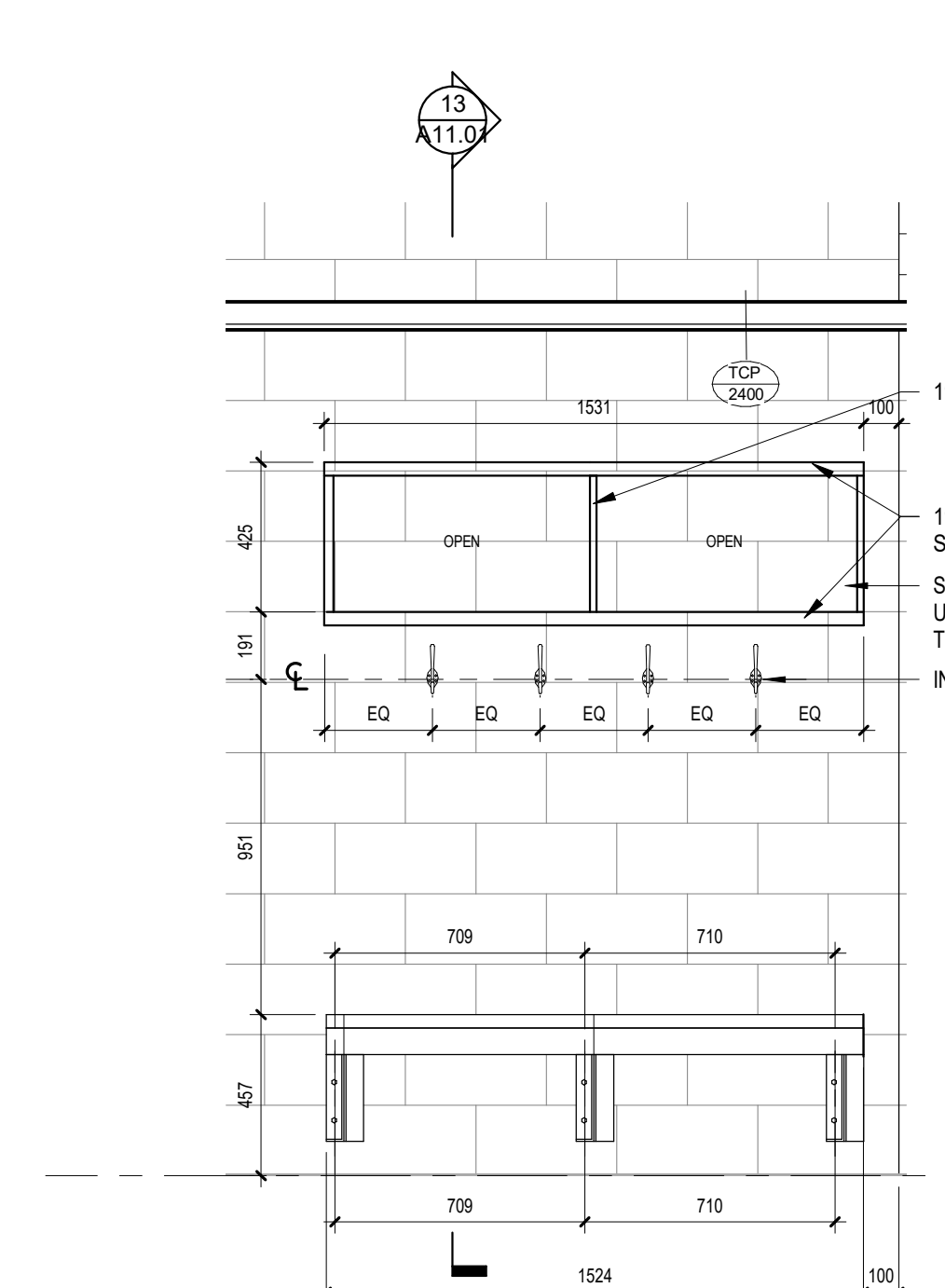
12 ELEVATION 2 @ M4 - REFS BENCH
A11.01 1:20



13 SECTION @ M4 - REFS BENCH
A11.01 1:20



14 ELEVATION 3 @ M4 - REFS BENCH
A11.01 1:20



15 ELEVATION 1 @ M4 - REFS BENCH
A11.01 1:20

0 TRS - ISSUED FOR TENDER 2023-04-10
NO. REVISION DATE



PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL
REPLACEMENT
170 NORTH RIVER ROAD
CHARLOTTETOWN, PEI

PROJECT NO.: 21111
DRAWN BY: OM / MM / DE
CHECKED BY: MMG / PC
SCALE: As indicated

MILLWORK

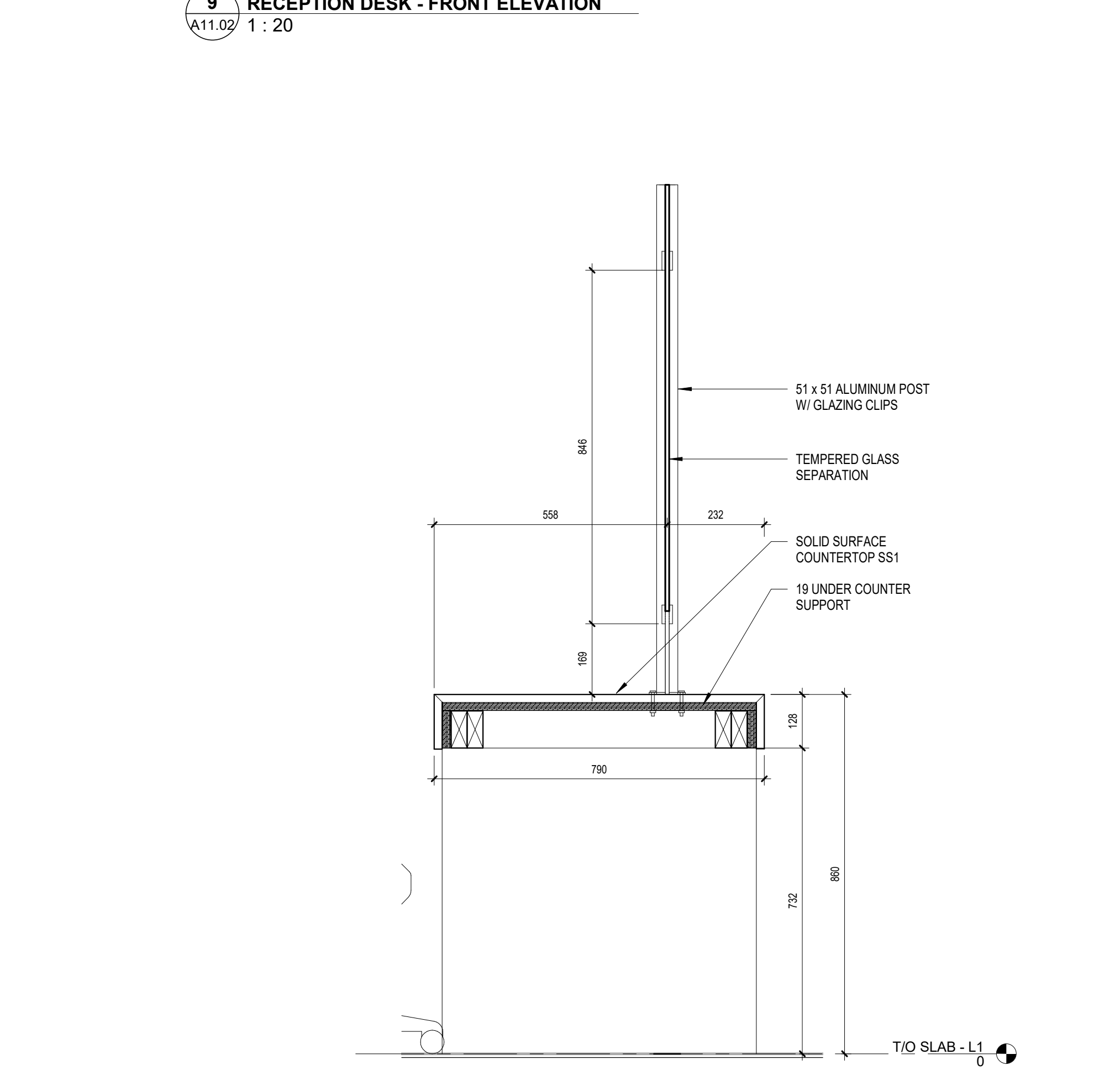
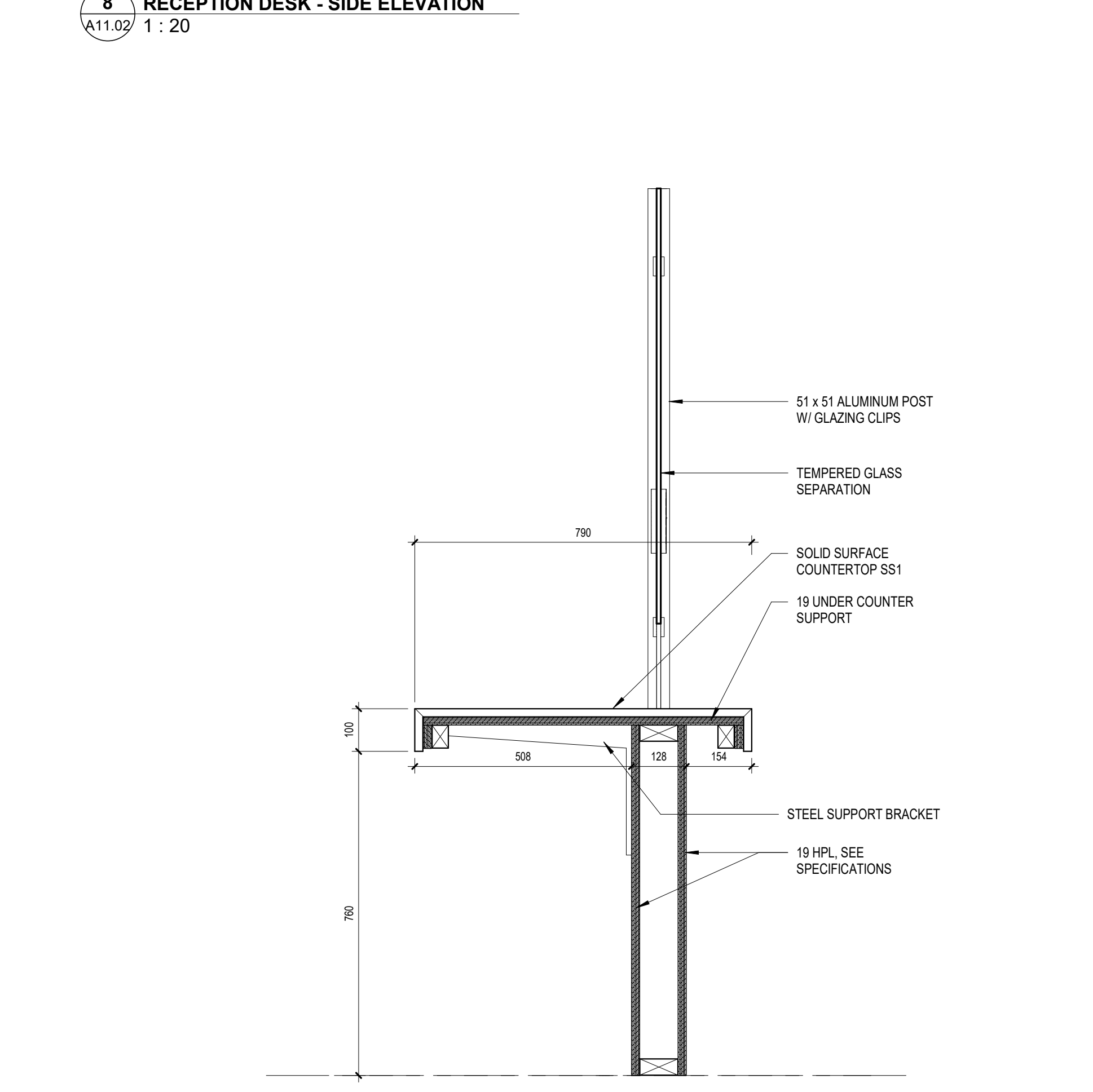
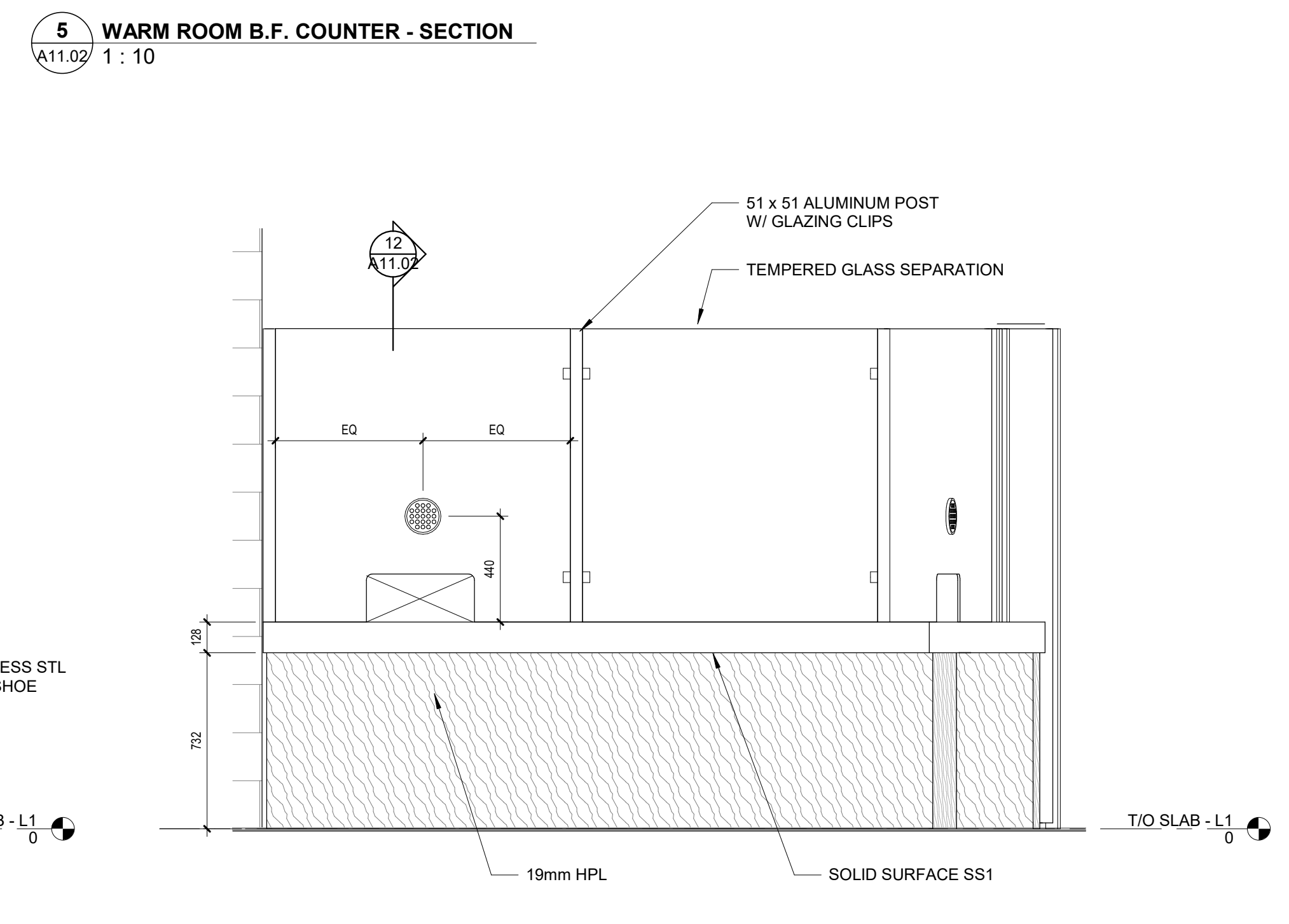
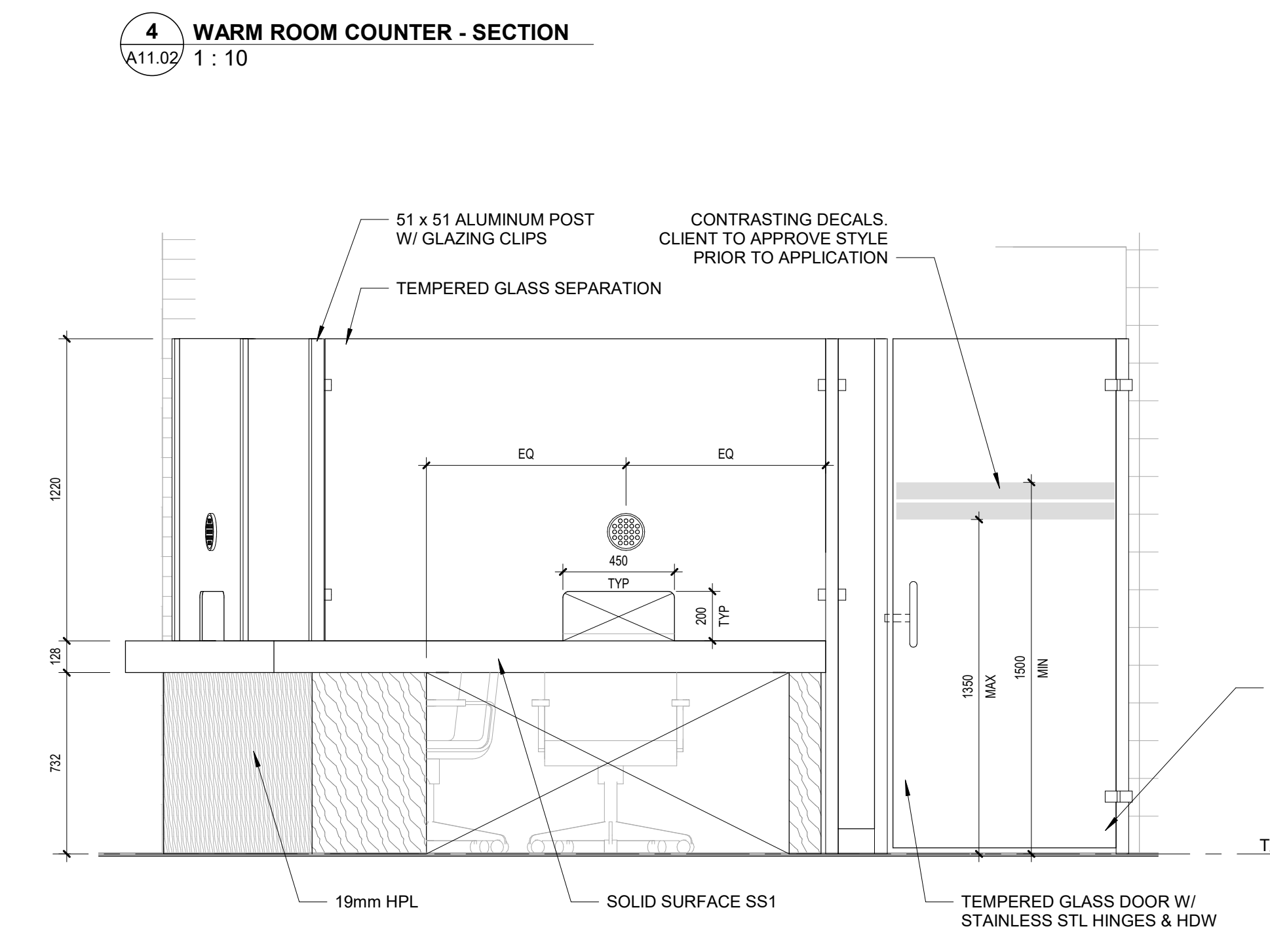
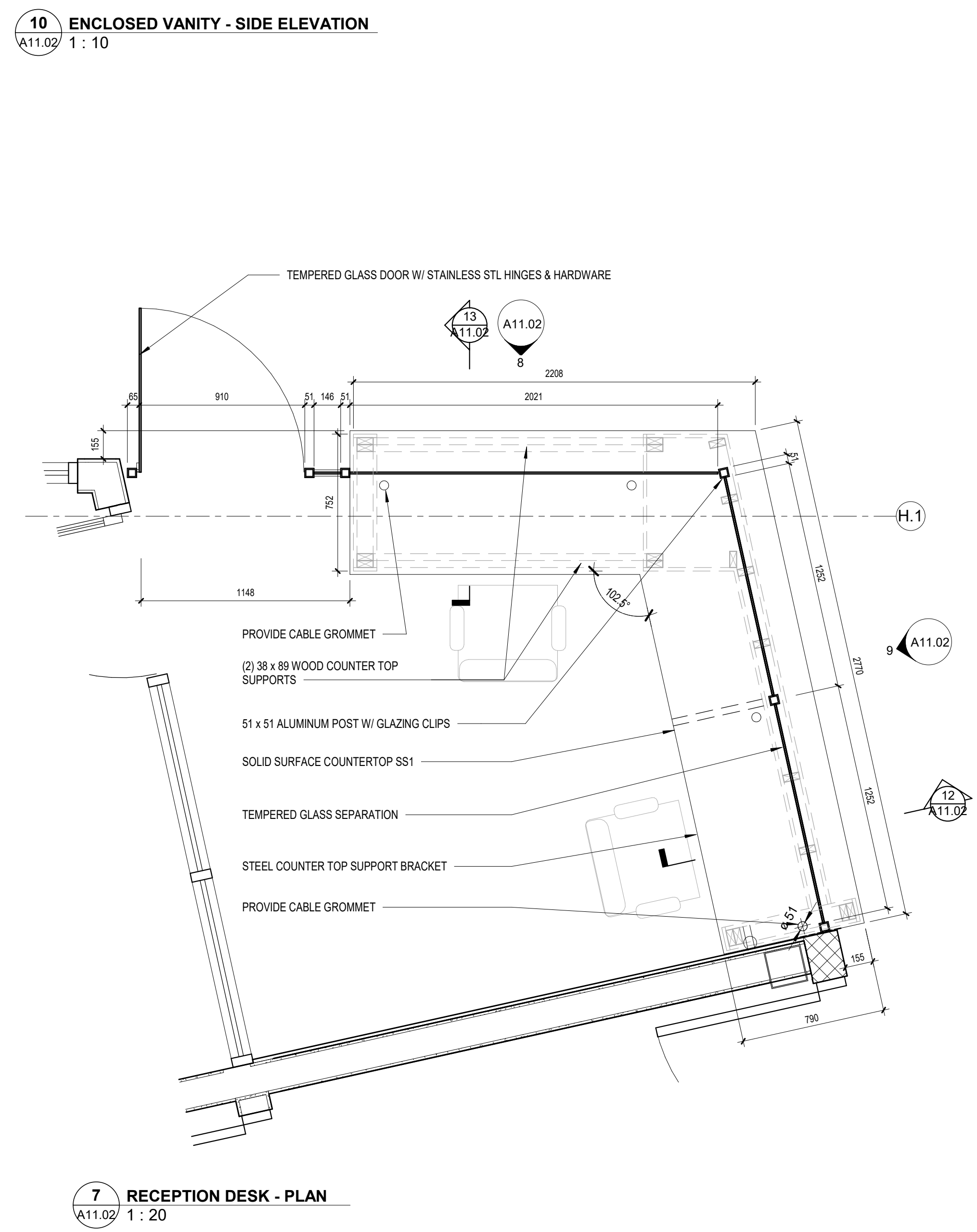
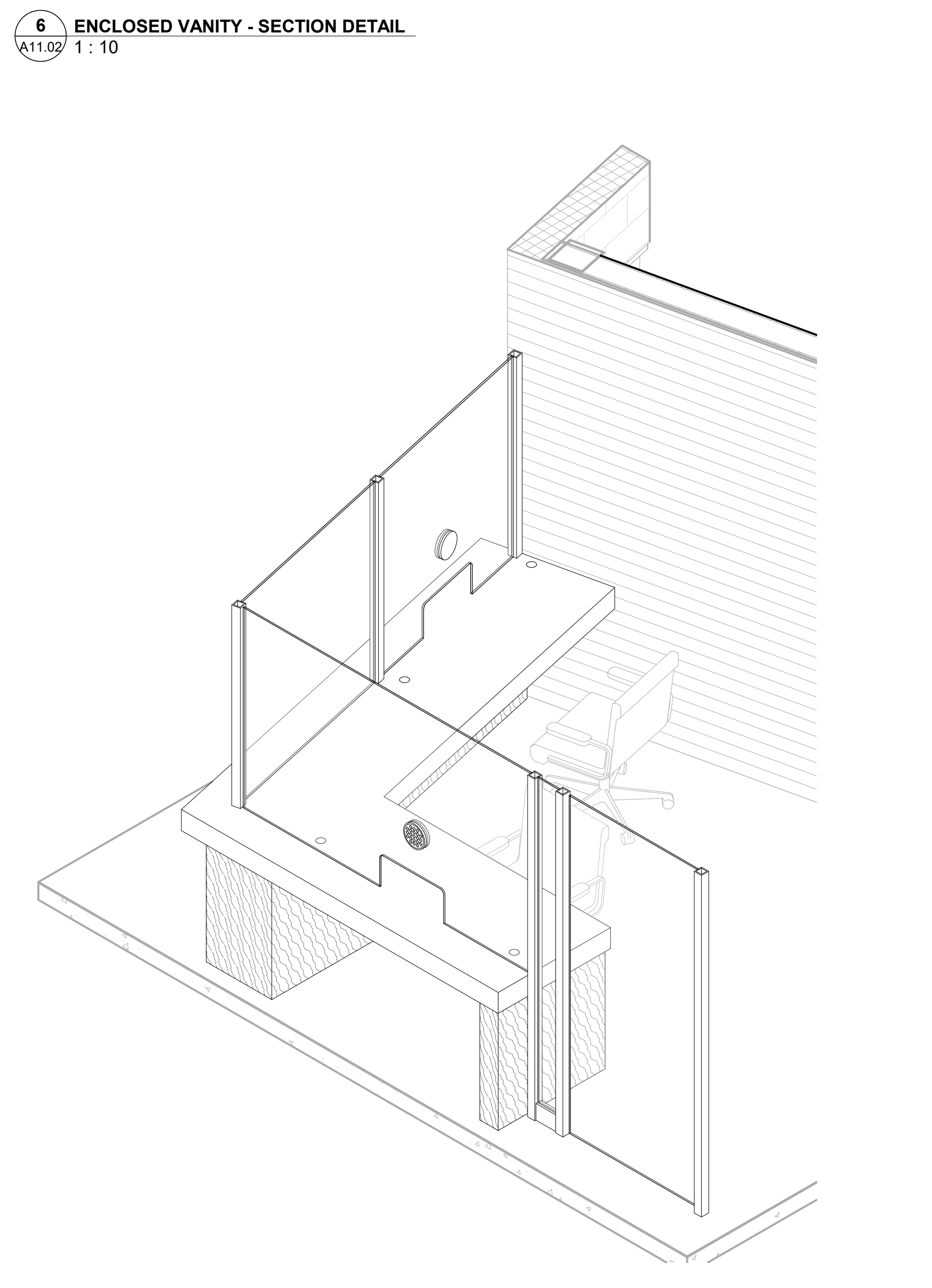
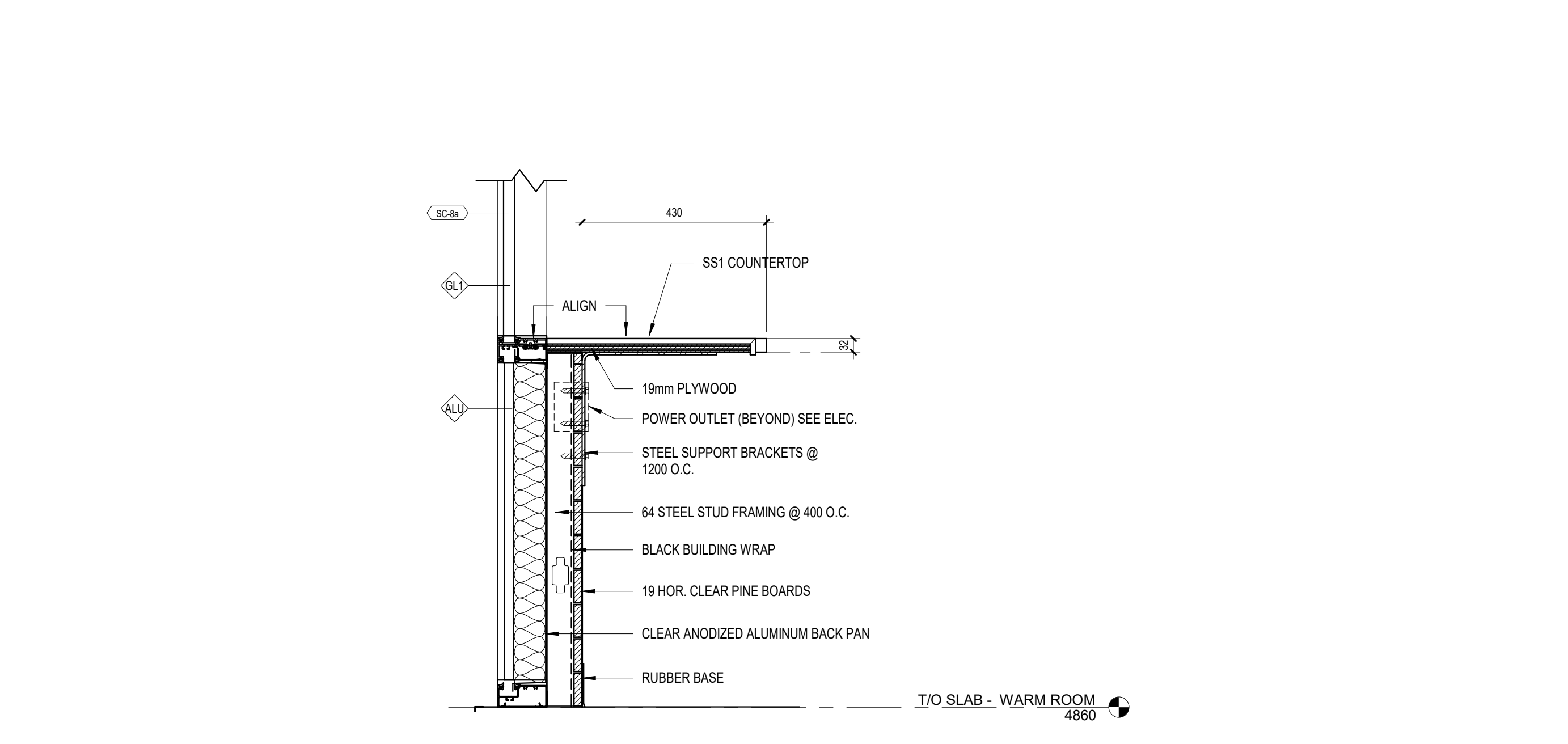
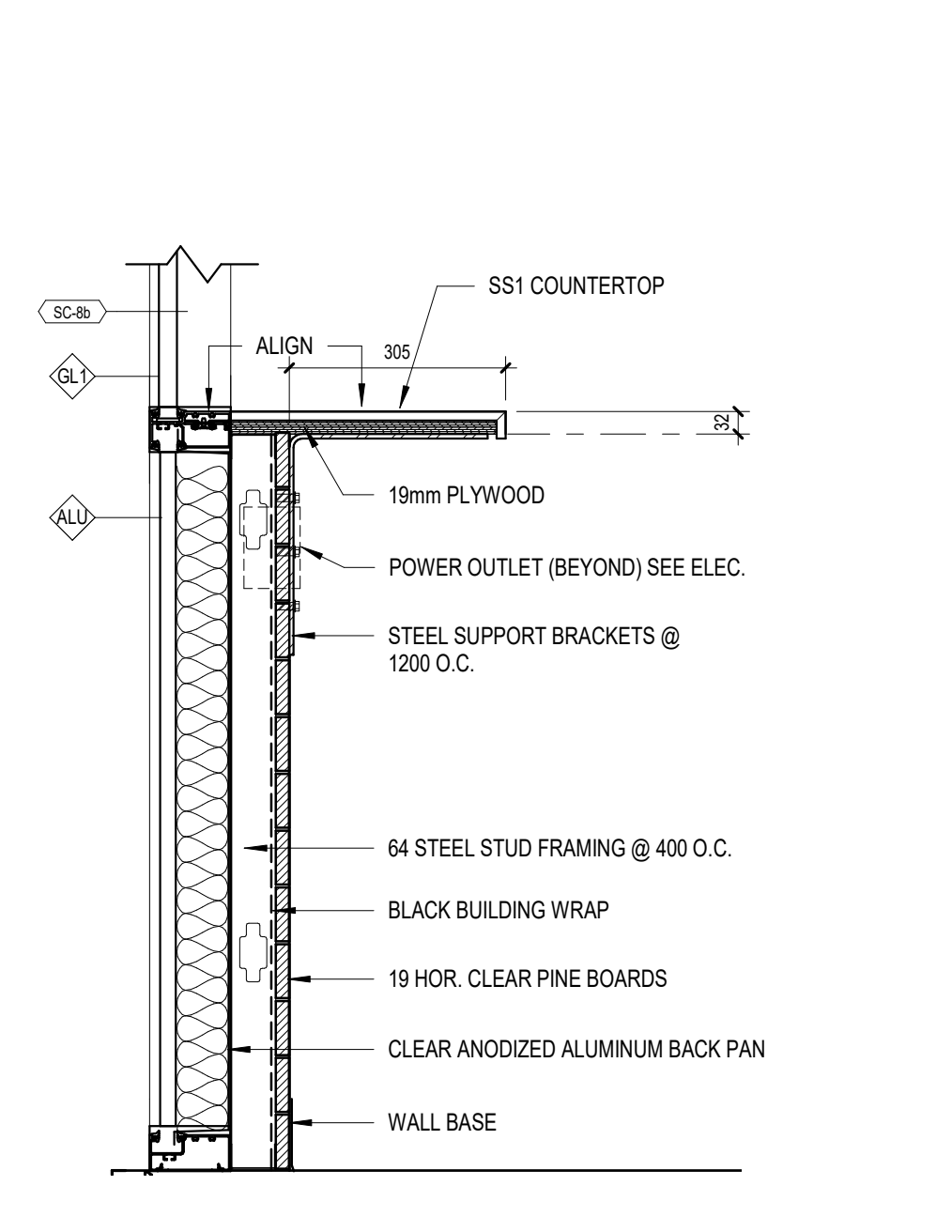
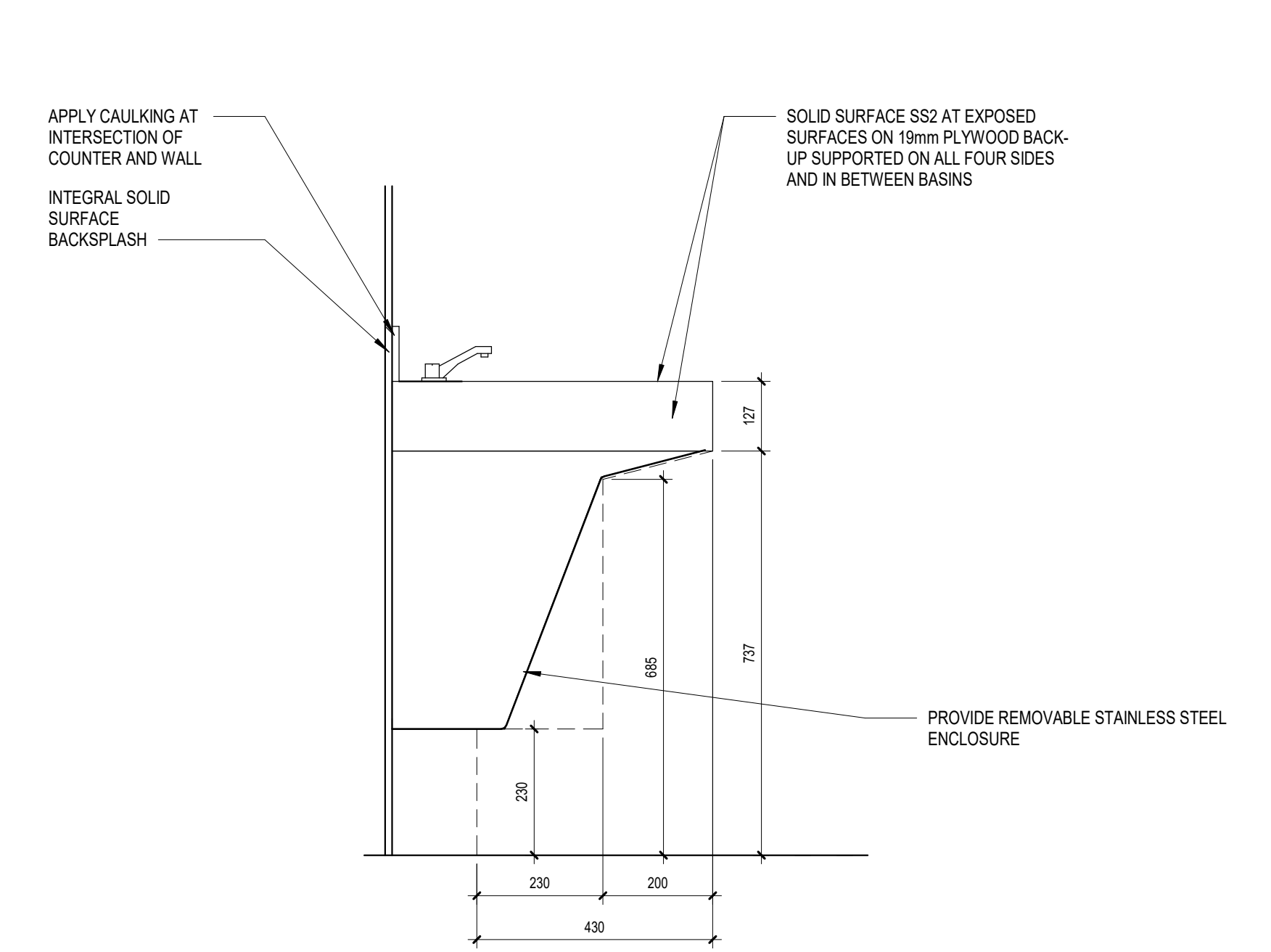
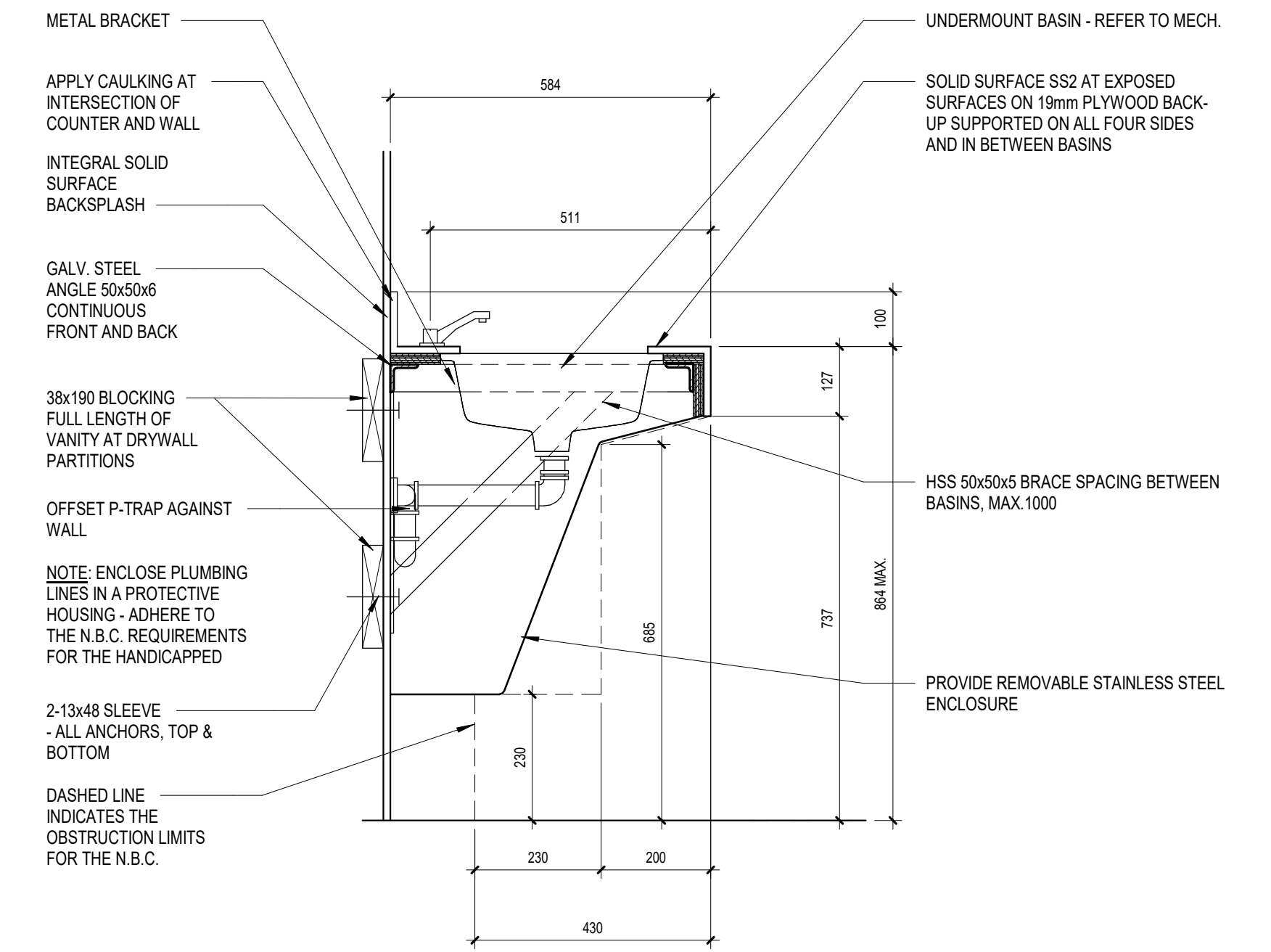
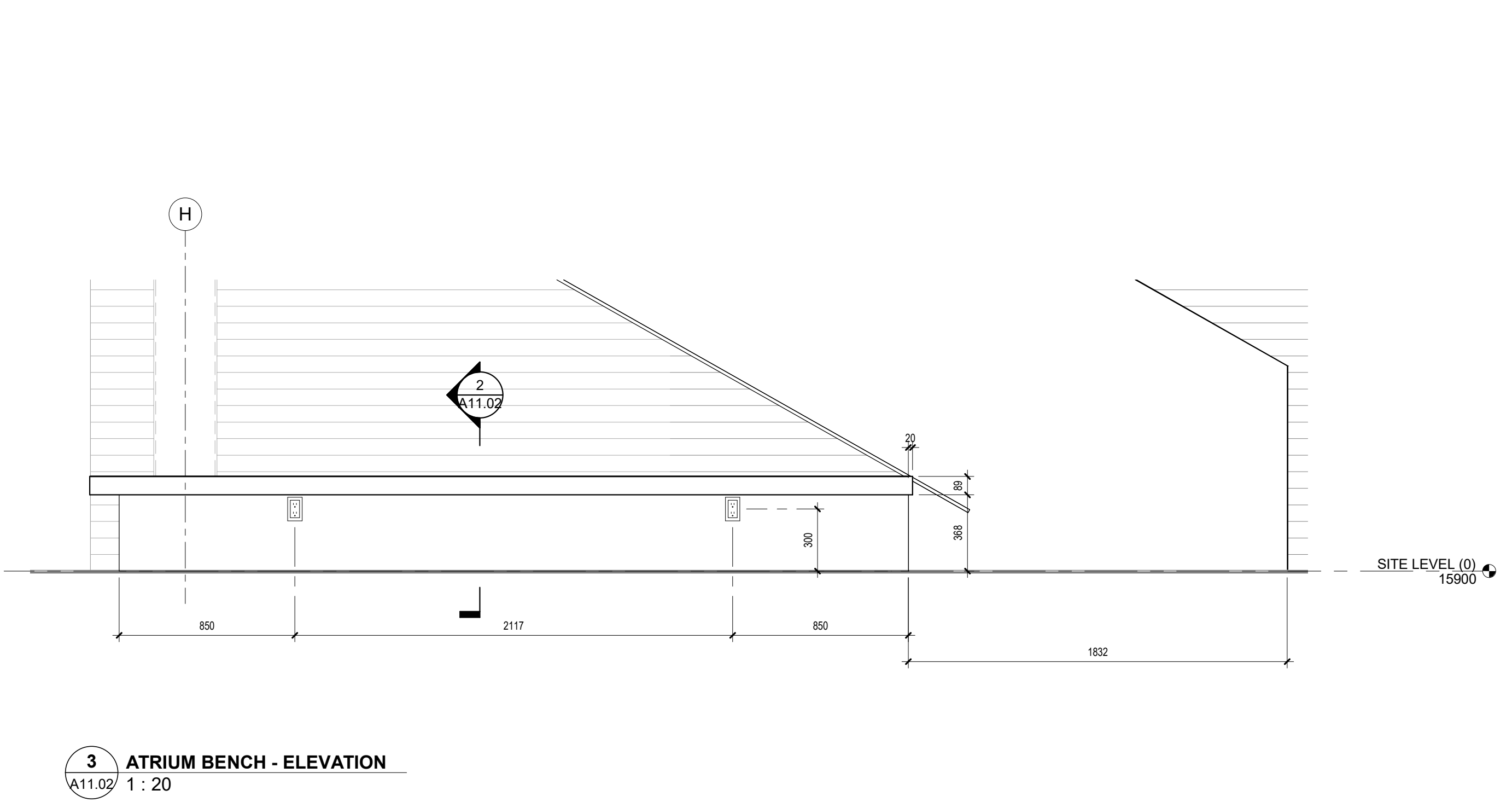
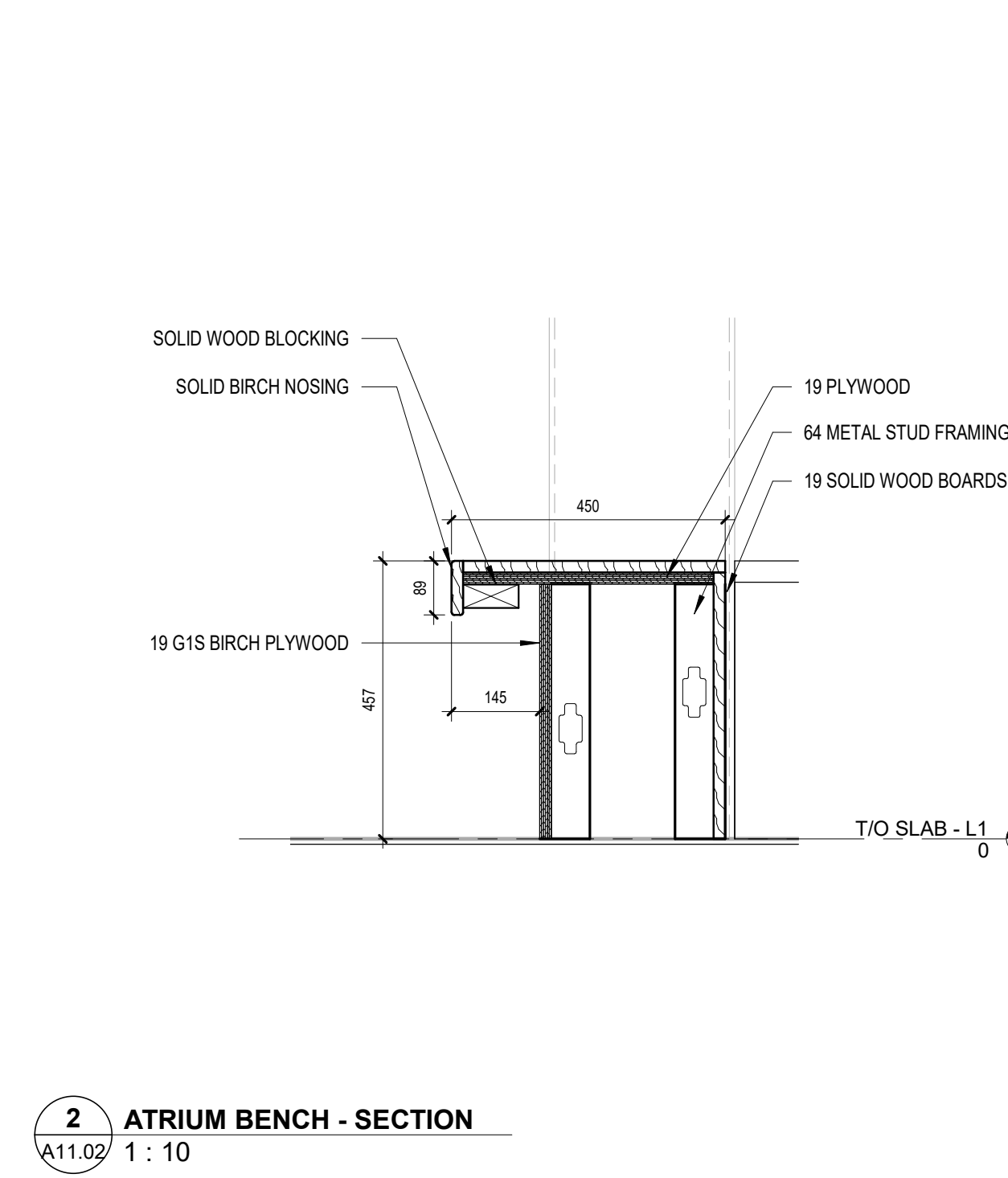
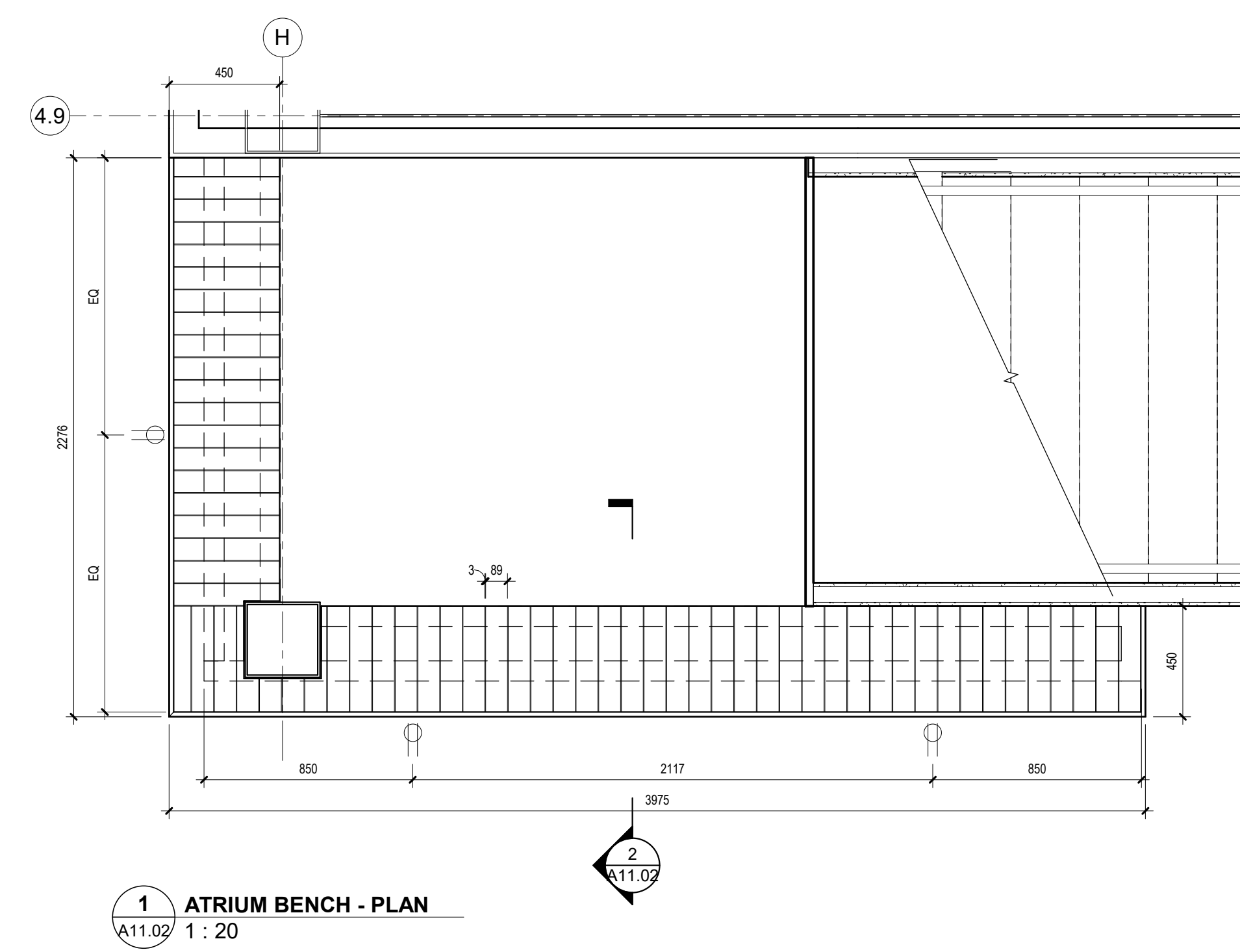
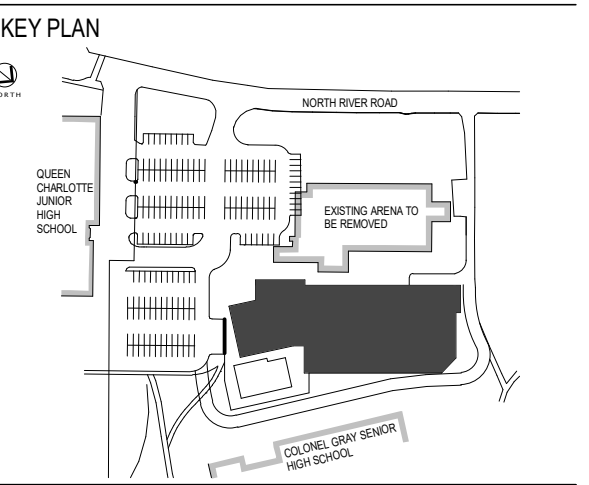
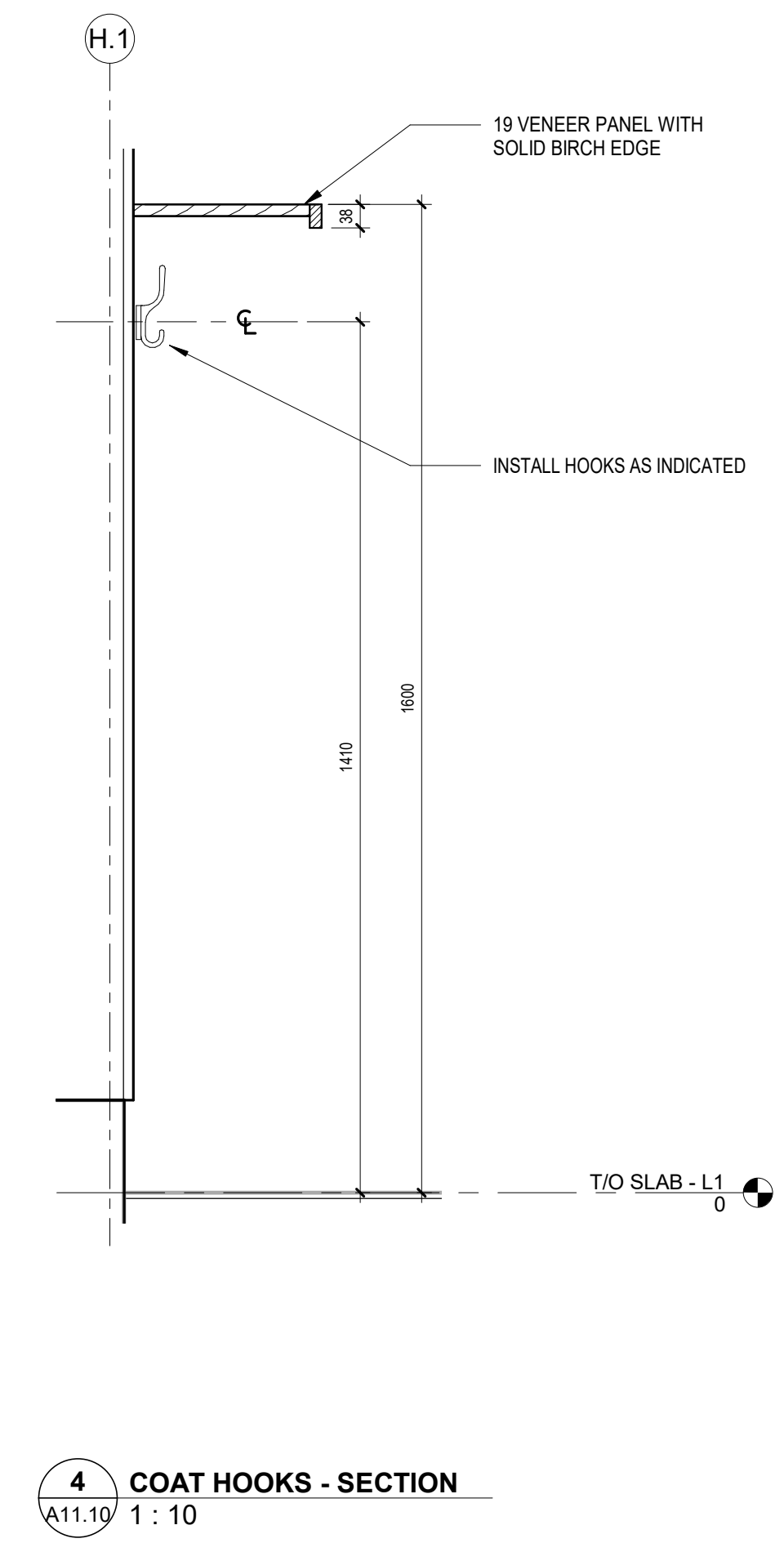
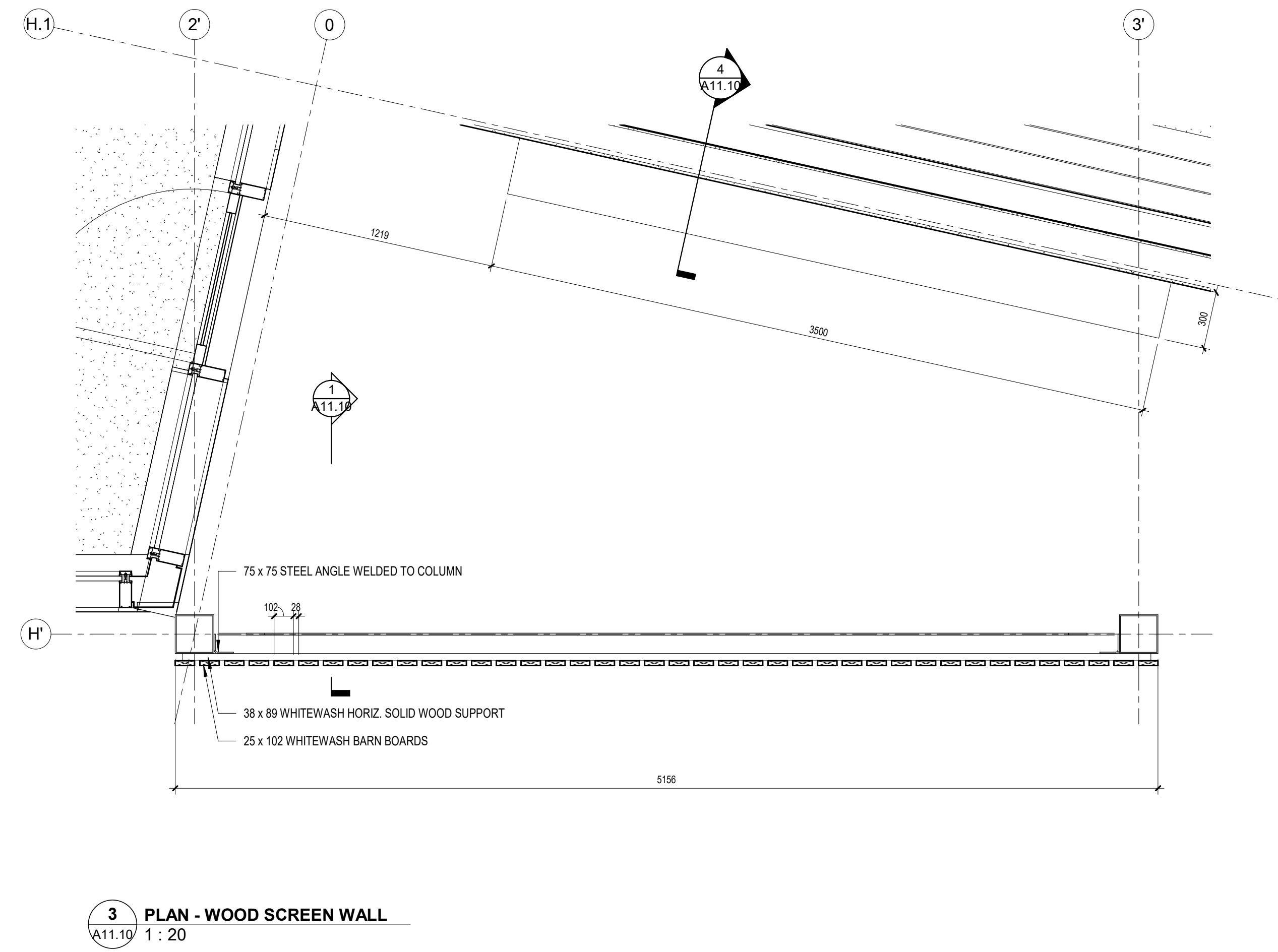
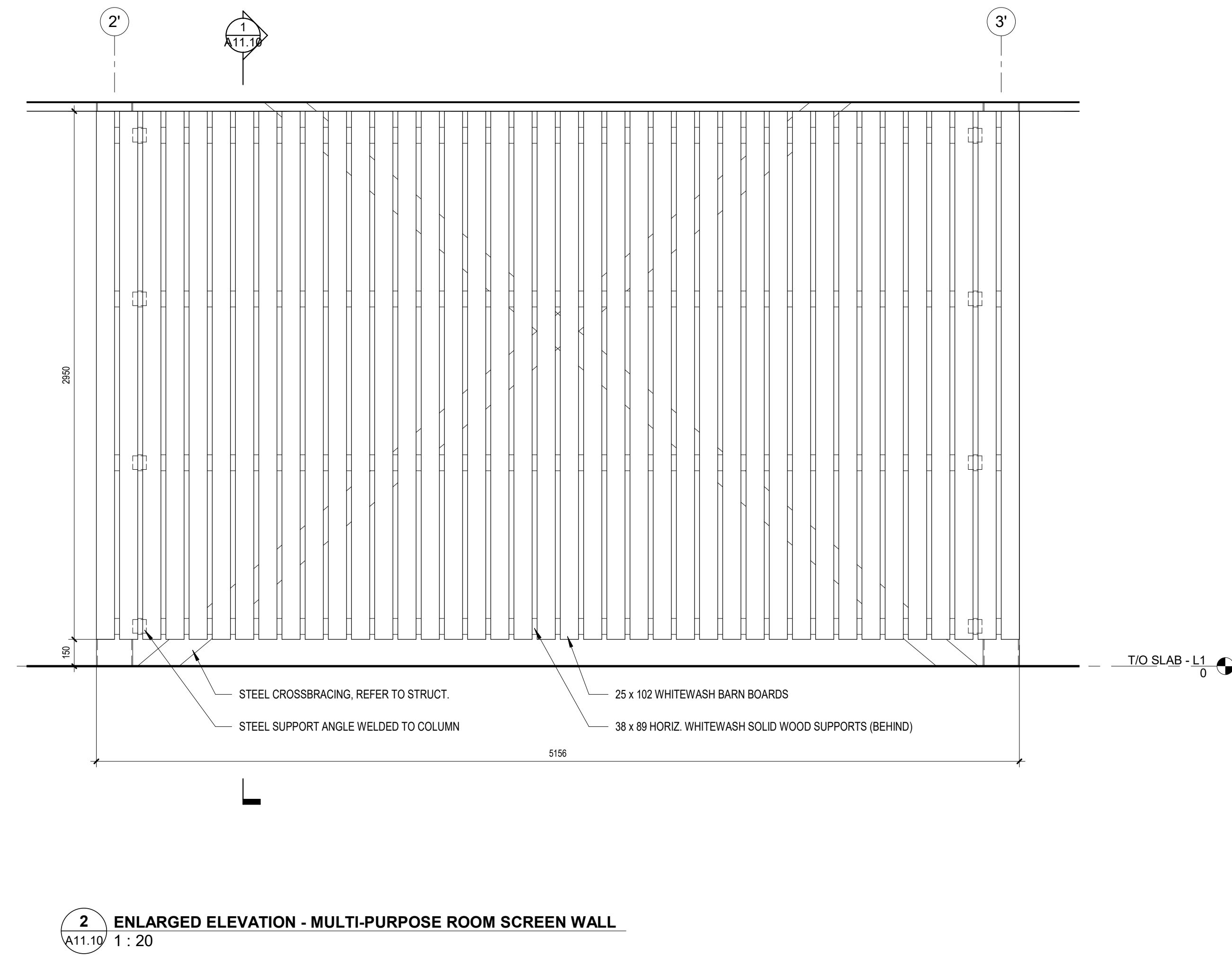
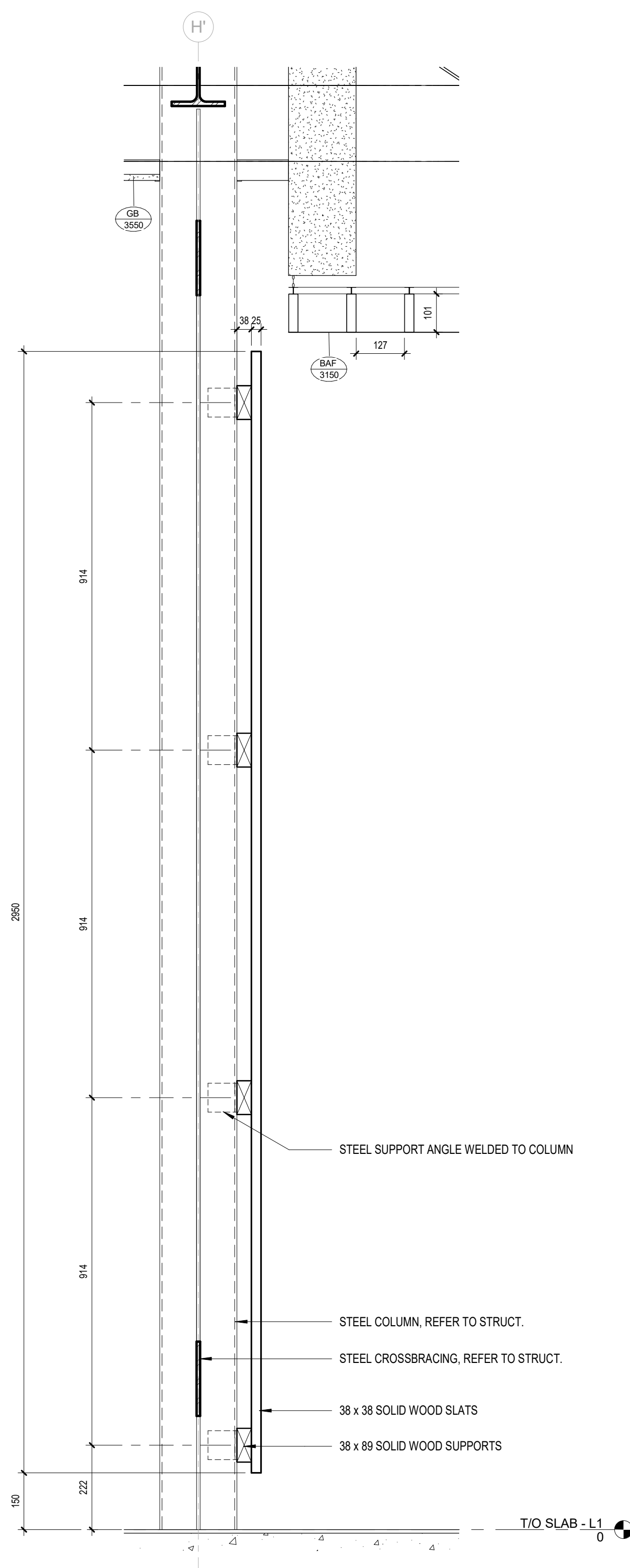


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PROJECT NAME: SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
PROJECT NO.: 21111
DRAWN BY: OM / MV / DE
CHECKED BY: MMG / PC
SCALE: As indicated

MILLWORK

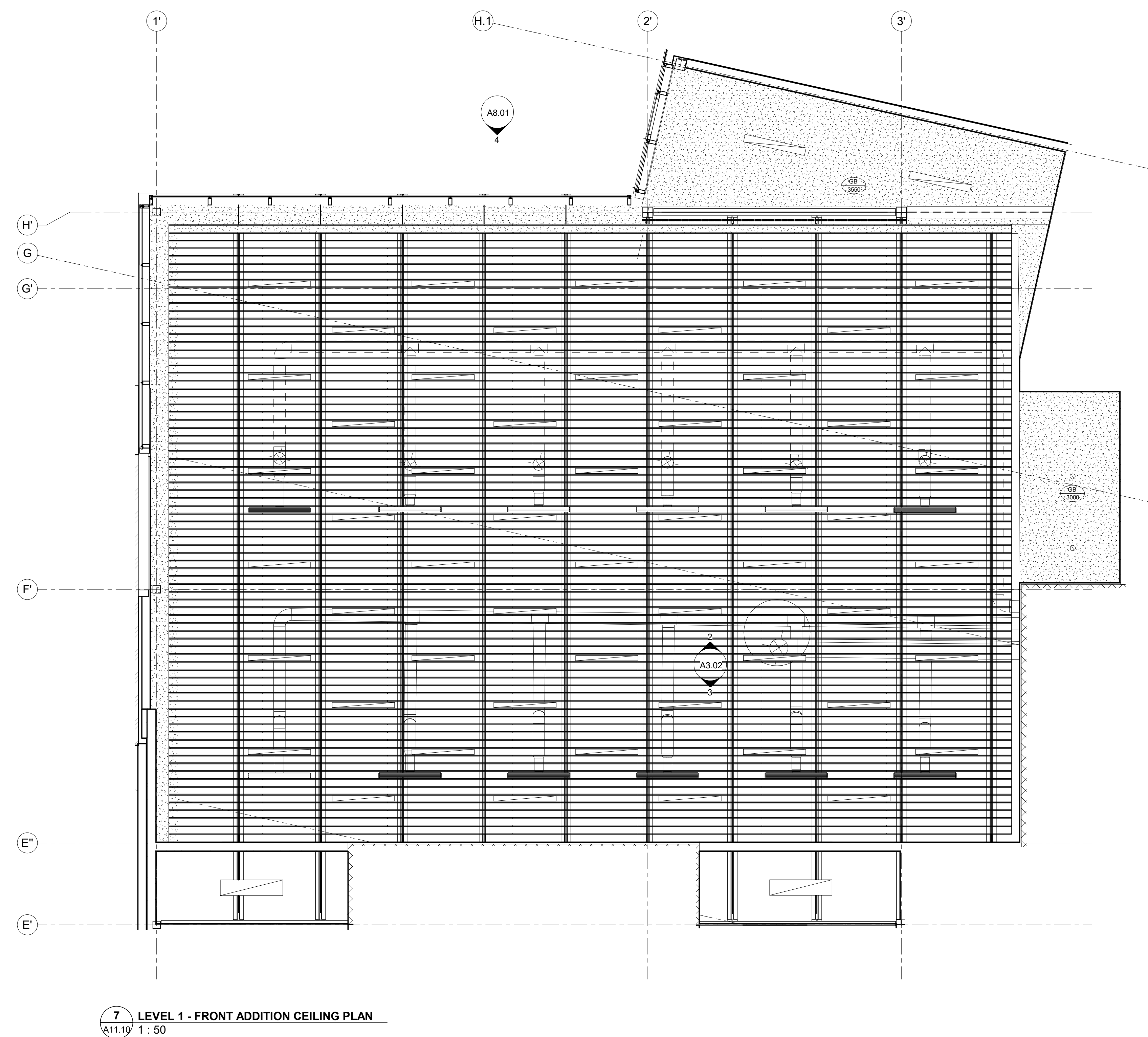
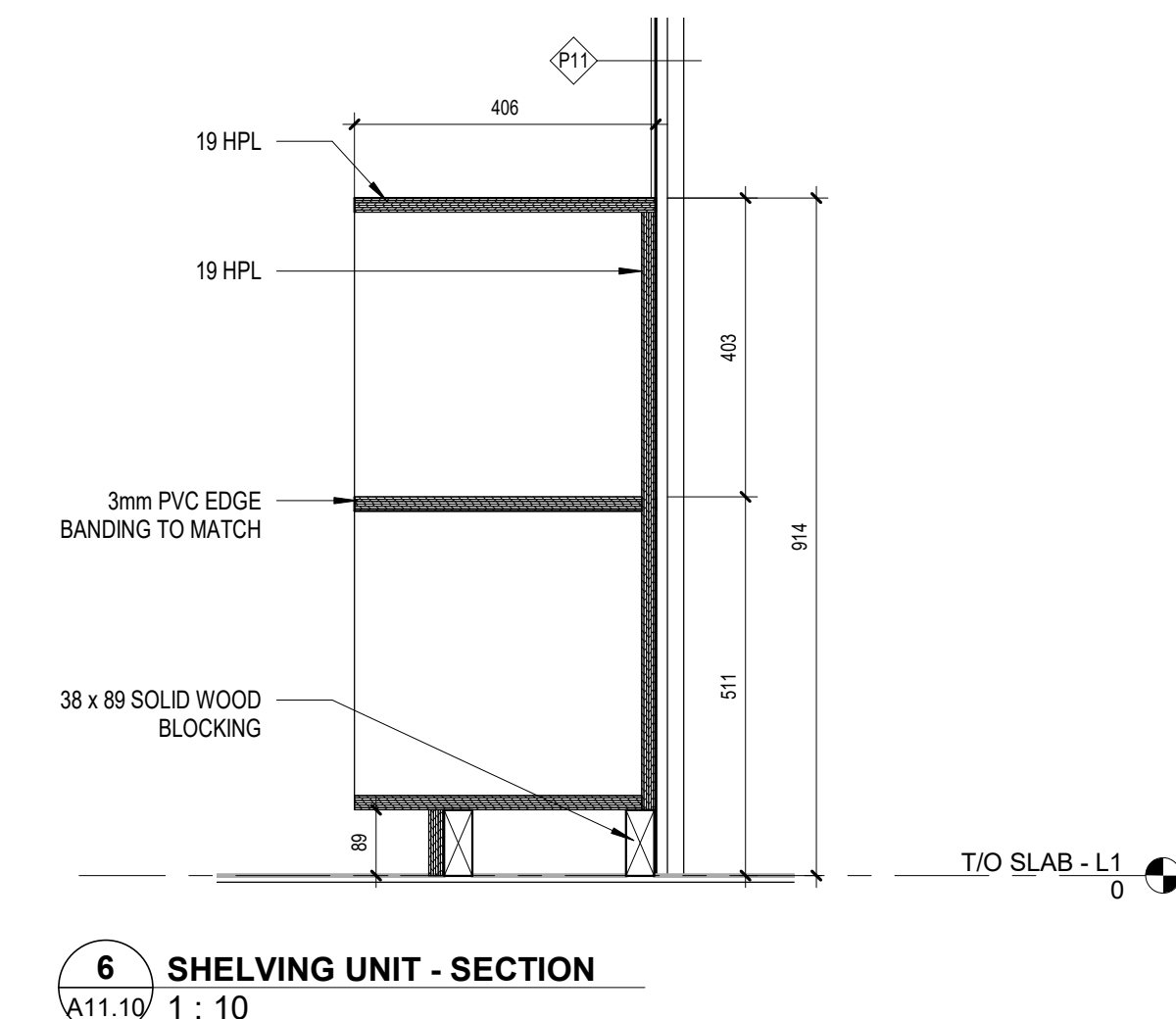
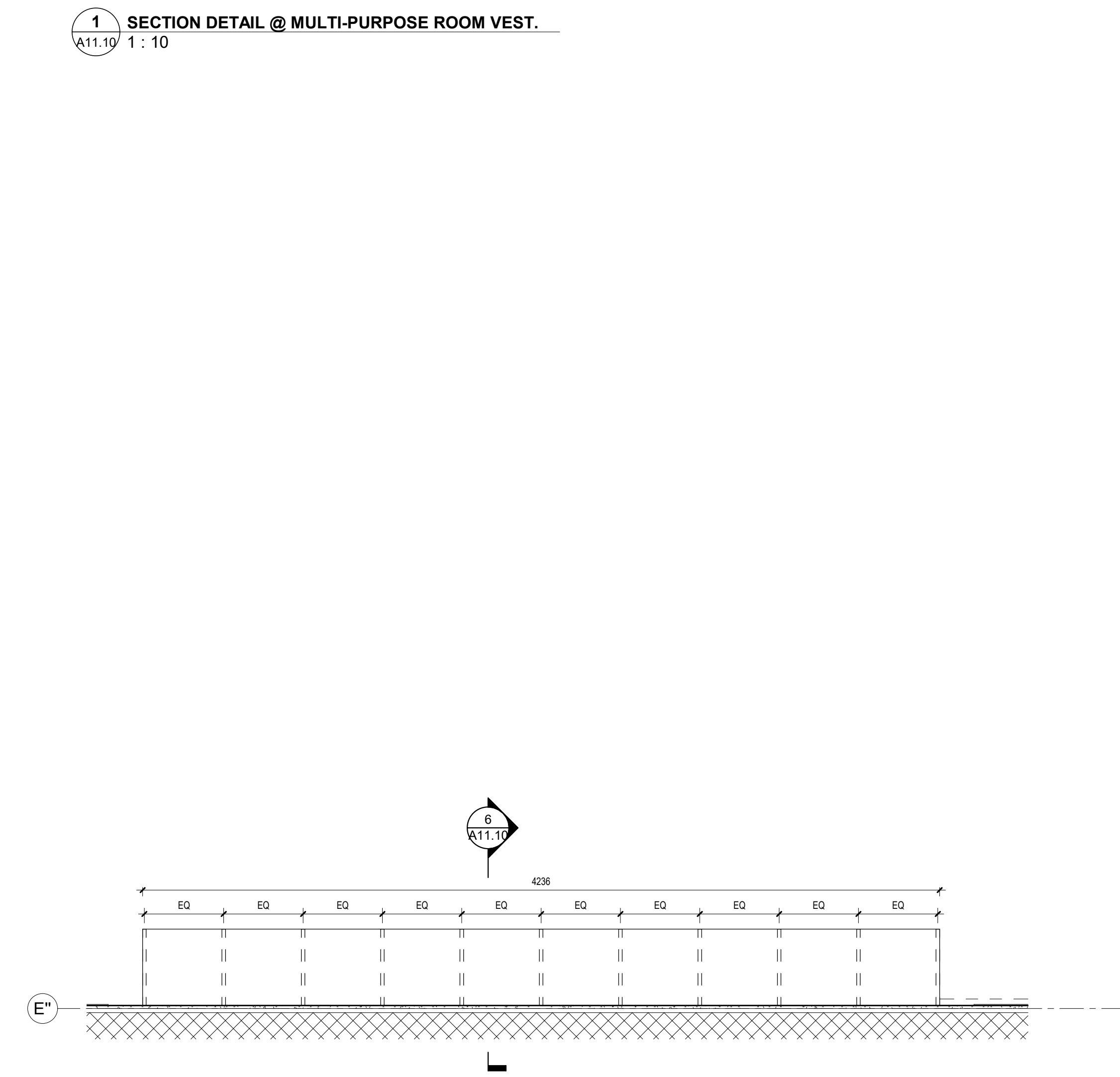


1 SECTION DETAIL @ MULTI-PURPOSE ROOM VEST.
 A11.10 1:10

2 ENLARGED ELEVATION - MULTI-PURPOSE ROOM SCREEN WALL
 A11.10 1:20

3 PLAN - WOOD SCREEN WALL
 A11.10 1:20

4 COAT HOOKS - SECTION
 A11.10 1:10



NO.	TPS - ISSUED FOR TENDER	2023-04-10
0	REVISION	DATE



PROJECT NAME:
 SIMMONS SPORTS CENTRE ARENA & POOL
 REPLACEMENT
 1710 NORTH RIVER ROAD
 CHARLOTTETOWN, PEI

PROJECT NO.: 21111
 DRAWN BY: OM / MV / DE
 CHECKED BY: MMG / PC
 SCALE: As indicated

MULTI-PURPOSE ROOM -
 CEILING, SCREEN WALL &
 MILLWORK



SITE PLAN LEGEND

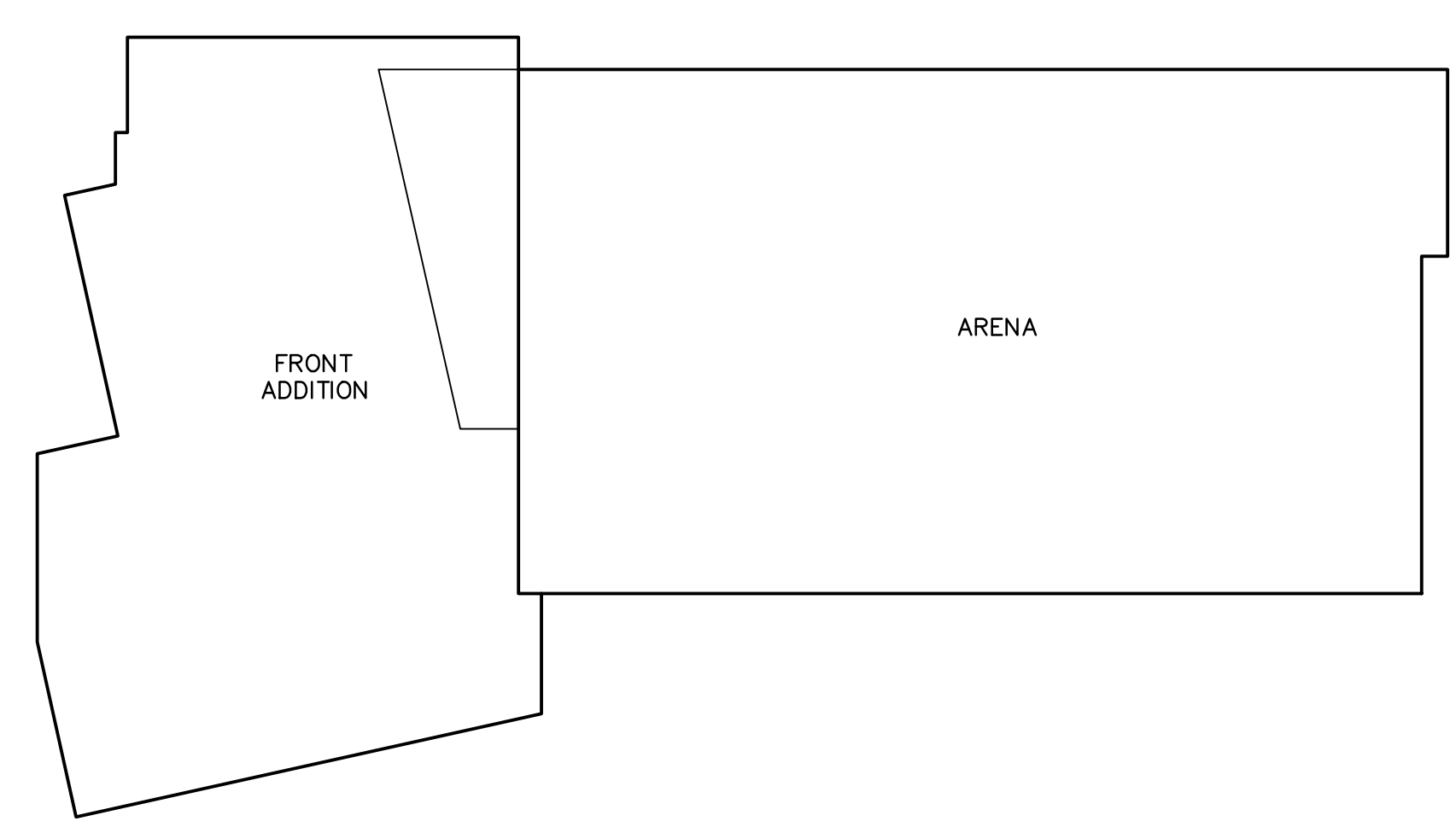
- EXISTING UTILITY POLE
 - NEW UTILITY POLE
 - GUY WIRE
 - EXISTING OVERHEAD UTILITY LINES
 - NEW OVERHEAD UTILITY LINES. COORDINATE WITH MECL
 - EXISTING UNDERGROUND CONDUITS/DUCTBANK
 - UNDERGROUND CONDUITS/DUCTBANK. REFER TO DETAIL INDICATED
 - CONCRETE ENCASED UNDERGROUND CONDUITS/DUCT BANK. REFER TO DETAIL INDICATED
 - UNDERGROUND SECTION DETAIL IDENTIFIER. REFER TO DETAIL INDICATED
 - CONDUIT STUB OUT AND CAP OFF
- LIGHTING**
- LINEAR LUMINAIRE, TYPE AS SPECIFIED.
 - CEILING MOUNTED LUMINAIRE, TYPE AS SPECIFIED.
 - WALL MOUNTED LUMINAIRE, TYPE AS SPECIFIED.
 - EXISTING POLE MOUNTED LUMINAIRE TO BE DELETED
 - POLE MOUNTED LUMINAIRE, TYPE AS SPECIFIED.
 - EMERGENCY LIGHTING SYSTEM DUAL REMOTE HEADS, 'BU-1' INDICATES WHICH BATTERY UNIT SERVES REMOTE. REFER TO LUMINAIRE SCHEDULE.
 - EMERGENCY LIGHTING BATTERY UNIT C/W DUAL HEADS, 'BU-1' INDICATES BATTERY UNIT IDENTIFIER. REFER TO LUMINAIRE SCHEDULE.
 - GREEN LED "RUNNING MAN" EXIT SIGN, RECESSED CEILING MOUNT OR WALL MOUNTED AS INDICATED. NUMBER OF FACES AND DIRECTIONAL ARROWS AS SHOWN. REFER TO LUMINAIRE SCHEDULE.
- LIGHTING CONTROL**
- ONE GANG SINGLE POLE TOGGLE SWITCH
 - 3-WAY SWITCH
 - MANUAL TIMER SWITCH
 - DIMMER SWITCH, SENSOR SWITCH #SPDD-MRD-EZ-WH
 - WIRELESS DIMMER, TYPE AS SPECIFIED.
 - PROGRAMMABLE TIME CLOCK, TYPE AS SPECIFIED.
 - CEILING MOUNTED OCCUPANCY SENSOR, TYPE AS SPECIFIED.
 - CEILING MOUNTED OCCUPANCY SENSOR, TYPE AS SPECIFIED.
 - PHOTO ELECTRIC CONTROL
 - SWITCH MOUNTED OCCUPANCY SENSOR SENSOR SWITCH #WSK-PDT-SA-WH
 - DIMMING OCCUPANCY WALL SWITCH, SENSOR SWITCH #WSK-PDT-D-SA-WH

EQUIPMENT CONNECTIONS AND CONTROLS

- 120V/208V DIRECT CONNECTION
 - MOTOR CONNECTION C/W UNFUSED DISCONNECT SWITCH.
 - 120V/208V DIRECT CONNECTION C/W UNFUSED DISCONNECT SWITCH.
 - VARIABLE FREQUENCY DRIVE
 - MOTOR CONNECTION AS SPECIFIED.
 - UNFUSED DISCONNECT SWITCH
 - CONTACTOR - SIZE AND NUMBER OF POLES AS SPECIFIED.
 - RECESSED OR SURFACE MOUNTED ELECTRICAL PANEL
 - JUNCTION BOX
 - TWO (2) BUTTON CONTROLLER UP/DOWN
 - POWER ACTIVATED DOOR EXIT BUTTON SUPPLIED BY DOOR HARDWARE SUPPLIER, WIRED BY ELECTRICAL.
- GENERAL POWER**
- 5-15R, 15A, 120V U-GROUND DUPLEX RECEPTACLE - STANDARD MOUNTING HEIGHT AND MOUNTED ABOVE COUNTER.
 - 5-20R, 20A, 120V T-SLOT U-GROUND DUPLEX RECEPTACLE - STANDARD MOUNTING HEIGHT AND MOUNTED ABOVE COUNTER.
 - 5-20R, 20A, 120V (T-SLOT) U-GROUND QUAD RECEPTACLE - STANDARD MOUNTING HEIGHT AND MOUNTED ABOVE COUNTER.
 - 120/208V SPECIAL RECEPTACLE TYPE AS INDICATED.
 - 5-20R, 20A, 120V (T-SLOT) U-GROUND DUPLEX RECEPTACLE C/W GROUND FAULT CIRCUIT INTERRUPTER - STANDARD MOUNTING HEIGHT AND MOUNTED ABOVE COUNTER.
- COMMUNICATIONS**
- DATA OUTLET - WALL MOUNTED OR MOUNTED ABOVE COUNTER. NUMERICAL INDICATES QUANTITY OF DROPS, IF NO NUMBER IS SHOWN IT INDICATES 1 DROP.
 - COMBINATION VOICE/DATA OUTLET - WALL MOUNTED OR MOUNTED ABOVE COUNTER. #D=INDICATES NUMBER OF DATA DROPS, #V=INDICATES NUMBER OF VOICE DROPS, IF NO NUMBER IS SHOWN IT INDICATES 1 DROP.
 - WALL MOUNTED TELEVISION OUTLET
 - SURFACE AND PENDANT MOUNTED PA SPEAKER
 - PAGER HORN
 - INTERCOM MASTER STATION
 - PAGER VOLUME CONTROL BOX
 - MICROPHONE
- MISCELLANEOUS**
- ELECTRICAL DRAWING NOTES
 - MECHANICAL SCHEDULE NOTES

SECURITY AND ACCESS SYSTEMS

- KEY PAD
 - OVERHEAD DOOR CONTACT
 - CARD READER
 - EGRESS MOTION DETECTOR
 - DOOR CONTACT
 - ELECTRIC DOOR LOCK
 - ELECTRIC STRIKE
 - AUTOMATIC DOOR OPENER
 - POWER TRANSFER HINGE
 - CLOSED CIRCUIT CAMERA
 - COMPUTER WORKSTATION FOR CLOSED CIRCUIT CAMERA SYSTEM
 - MONITOR FOR CLOSED CIRCUIT CAMERA SYSTEM
- FIRE ALARM SYSTEM**
- PULL STATION
 - FLUSH MOUNTED HORN STROBE COMBINATION
 - STROBE - WALL OR CEILING MOUNTED
 - SMOKE DETECTOR - WALL OR CEILING MOUNTED
 - ISOLATOR MODULE
 - RECESSED FIRE ALARM CONTROL PANEL
 - SURFACE MOUNTED FIRE ALARM ANNUNCIATOR PANEL
 - SPRINKLER SYSTEM FLOW OR PRESSURE SWITCH BY MECHANICAL AND WIRED BY ELECTRICAL. COORDINATE/CONFIRM EXACT LOCATIONS AND QUANTITIES WITH MECHANICAL DRAWINGS.
 - SPRINKLER SYSTEM OR STANDPIPE SUPERVISED VALVE BY MECHANICAL AND WIRED BY ELECTRICAL. COORDINATE/CONFIRM EXACT LOCATIONS AND QUANTITIES WITH MECHANICAL DRAWINGS.
 - CONTROL RELAY
 - SINGLE INPUT MODULE
 - DUAL INPUT MODULE
 - END OF LINE RESISTOR
- ABBREVIATIONS**
- DEL - INDICATES DEVICE TO BE DELETED
 - EV - ELECTRIC VEHICLE CHARGER
 - EX - INDICATES EXISTING DEVICE TO REMAIN
 - MV - INDICATES EXISTING DEVICE TO BE MOVED
 - REL - INDICATES DEVICE IN RELOCATED LOCATION
 - WP - WEATHERPROOF
 - ZX - INDICATES PAGING ZONE, 'X' DENOTES ZONE NUMBER



2
E0.00 KEY PLAN

CLIENT
CHARLOTTETOWN

KEY PLAN

CONSULTANT
DSRA
1501 405 9981 1499 Spring Garden Road, 4th Floor
1501 420 9400 Halifax, Nova Scotia, CAN. B3J 1S2

MEW Maricor
77 VAUGHAN HARBOUR BLVD. SUITE 200
MONCTON, NB, E1C 0K2
BUS: 506 857 4880 FAX: 506 859 8593
WWW.MEW.COM ENG. REG. NO. 16211004

N.T.S.

ELECTRICAL DRAWING LIST	
SHEET NUMBER	SHEET TITLE
E0.00	ELECTRICAL COVER SHEET
E1.01	ELECTRICAL SITE PLAN NEW WORK
E1.02	ELECTRICAL SITE AND CONDUIT DETAILS
E1.03	ELECTRICAL UNDERGROUND PLAN
E2.00	ELECTRICAL FLOOR PLAN LEVEL 1(A) ARENA - LIGHTING
E2.01	ELECTRICAL FLOOR PLAN LEVEL 1(B) - LIGHTING
E2.02	ELECTRICAL FLOOR PLAN LEVEL 2 ARENA - LIGHTING
E3.00	ELECTRICAL FLOOR PLAN LEVEL 1(A) ARENA - POWER & SYSTEMS
E3.01	ELECTRICAL FLOOR PLAN LEVEL 1(B) - POWER & SYSTEMS
E3.02	ELECTRICAL FLOOR PLAN LEVEL 2 ARENA - POWER & SYSTEMS
E3.03	ELECTRICAL ROOF PLAN - POWER & SYSTEMS
E4.00	ELECTRICAL SCHEDULES
E5.00	ELECTRICAL POWER RISER
E5.01	ELECTRICAL RISERS
E6.00	ELECTRICAL PANEL SCHEDULES

THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF NEW BRUNSWICK
MEMBER SINCE 2018
VALID FOR THE YEAR 2023

Timothy S. Jeleny
No. 1752
DATE: 10/04/23
LICENSED PROFESSIONAL ENGINEER
PROVINCIAL REGISTER

NO.	REVISION	DATE
0	TRN ISSUED FOR TENDER	2023.04.10

PROJECT NAME:
**SIMMONS SPORTS CENTRE
ARENA & POOL REPLACEMENT**
CHARLOTTETOWN
NS
SUBJECT:

PROJECT NO.: Z1111
DRAWN BY: J.A.
CHECKED BY: T.D.
SCALE: AS INDICATED

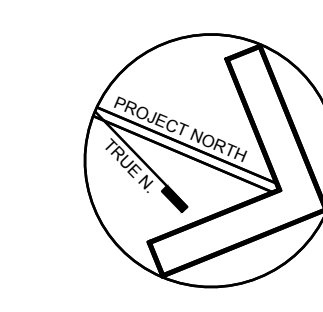
ELECTRICAL COVER SHEET

1
E0.00 ELECTRICAL LEGEND

3
E0.00 DRAWING LIST

N.T.S.

E0.00

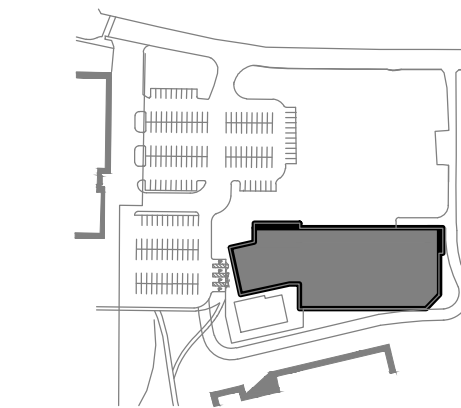


NORTH

CLIENT

CHARLOTTETOWN

KEY PLAN



CONSULTANT

DSRA
1501 420 9900 | 1495 Spring Garden Street, 4th Floor
Halifax, Nova Scotia, CAN. B3J 1G3

M&W Maricor
77 VAUGHAN HARBOUR BLVD. SUITE 200
MONCTON, NB, E1C 0K2
BUS: 506 857 4880 FAX: 506 859 8393
WWW.MCW.COM ENG. REG. NO. 16211004

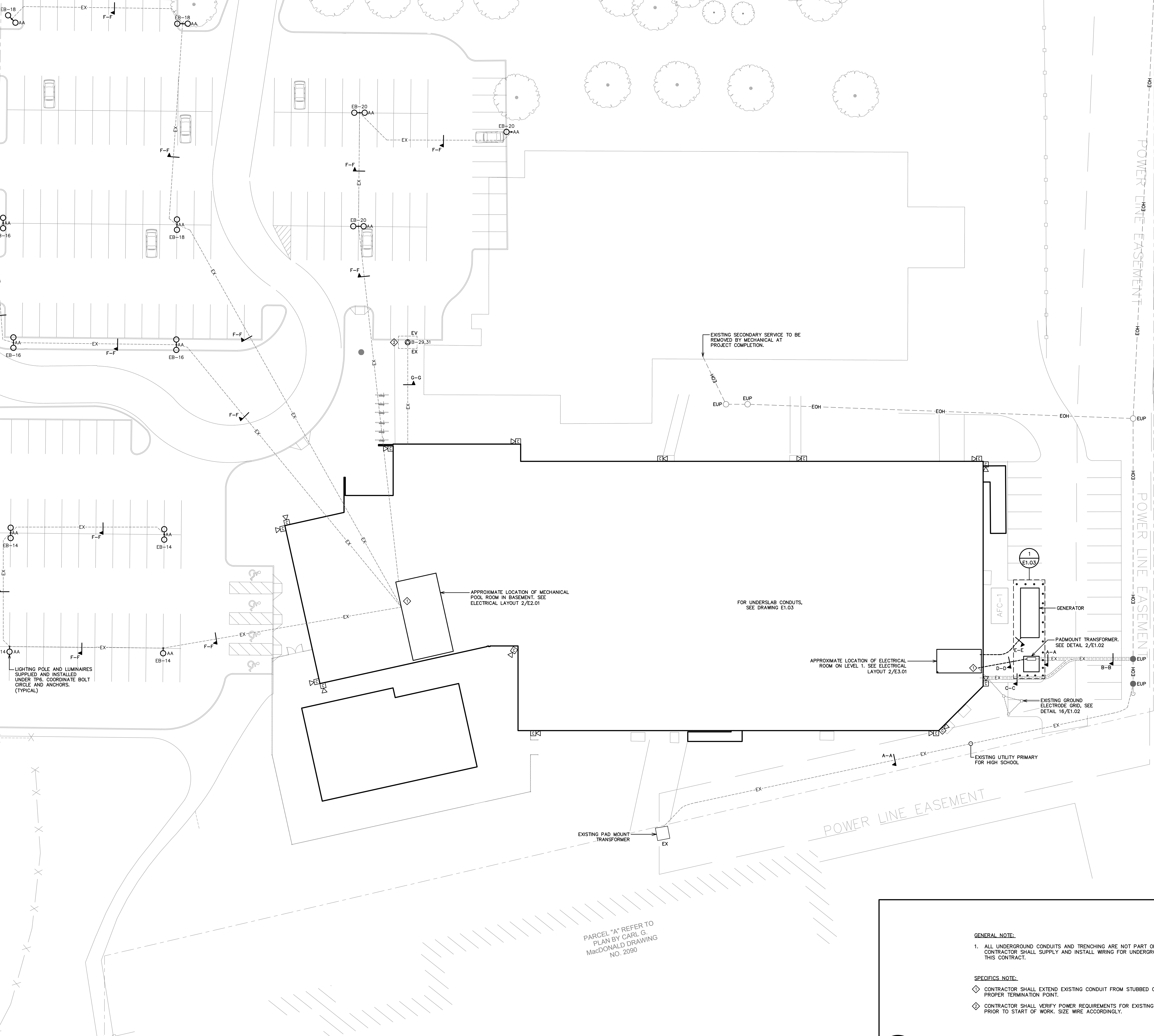
QUEEN CHARLOTTE JUNIOR HIGH SCHOOL

NORTH RIVER ROAD

POWER LINE EASEMENT

POWER LINE EASEMENT

POWER LINE EASEMENT



LIGHTING POLE AND LUMINAIRES SUPPLIED AND INSTALLED UNDER THE COORDINATE BOLT CIRCLE AND ANCHORS. (TYPICAL)

APPROXIMATE LOCATION OF MECHANICAL POOL ROOM IN BASEMENT. SEE ELECTRICAL LAYOUT 2/E2.01

FOR UNDERSLAB CONDUITS. SEE DRAWING E1.03

APPROXIMATE LOCATION OF ELECTRICAL ROOM ON LEVEL 1. SEE ELECTRICAL LAYOUT 2/E3.01

PAD MOUNT TRANSFORMER. SEE DETAIL 2/E1.02

EXISTING GROUND ELECTRODE GRID. SEE DETAIL 16/RT.02

EXISTING UTILITY PRIMARY FOR HIGH SCHOOL

PARCEL "A" REFER TO PLAN BY CARL G. MacDONALD DRAWING NO. 2090

GENERAL NOTE:

1. ALL UNDERGROUND CONDUITS AND TRENCHING ARE NOT PART OF THIS CONTRACT. CONTRACTOR SHALL SUPPLY AND INSTALL WIRING FOR UNDERGROUND CONDUITS IN THIS CONTRACT.

SPECIFICS NOTE:

◇ CONTRACTOR SHALL EXTEND EXISTING CONDUIT FROM STUBBED OUT LOCATION TO PROPER TERMINATION POINT.
◇ CONTRACTOR SHALL VERIFY POWER REQUIREMENTS FOR EXISTING EV CHARGER ON SITE PRIOR TO START OF WORK. SIZE WIRE ACCORDINGLY.

THE ASSOCIATION OF PROFESSIONAL ENGINEERS AND GEOTECHNICAL ENGINEERS OF NEW BRUNSWICK
VALID FOR THE YEAR 2023

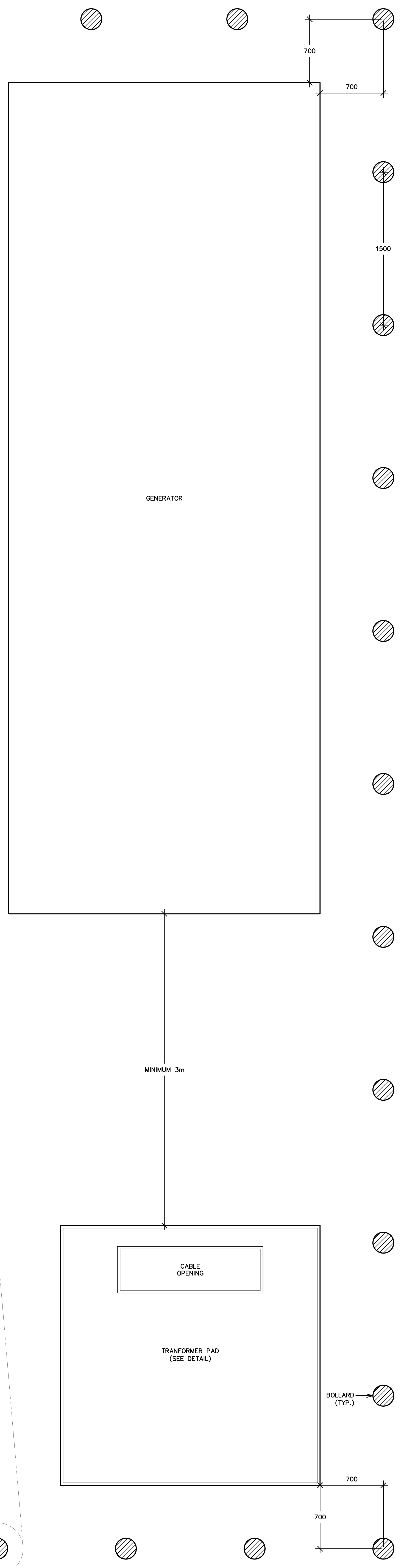
Timothy S. Usherly
No. 1752
DATE: 10/04/23
LICENSED PROFESSIONAL ENGINEER (POWER & ELECTRICITY)

NO.	REVISION	DATE
0	TRG ISSUED FOR TENDER	2023.04.10

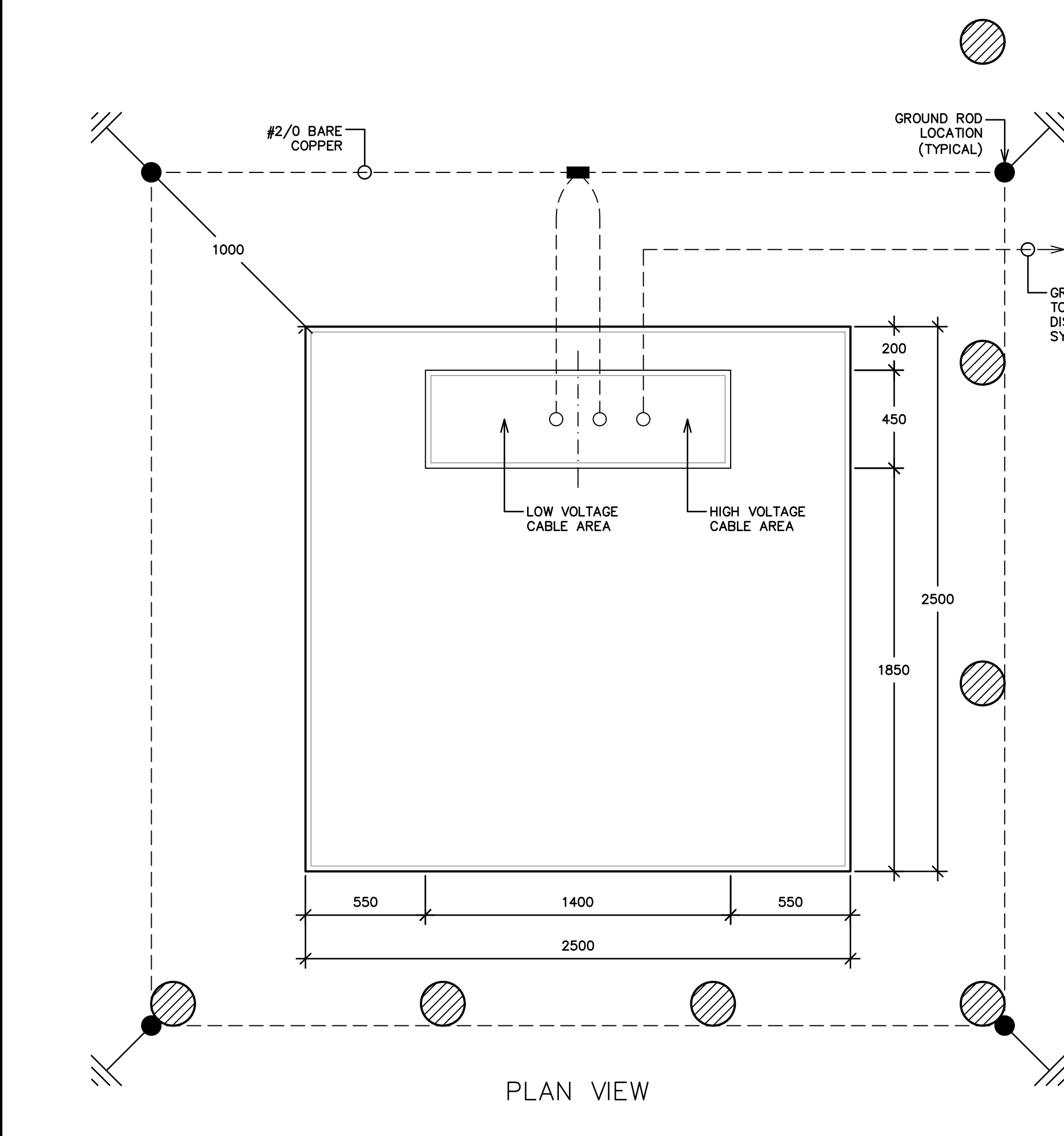
PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
CHARLOTTETOWN
SUBJECT:

PROJECT NO.: 21111
DRAWN BY: J.A.
CHECKED BY: T.D.
SCALE: AS INDICATED

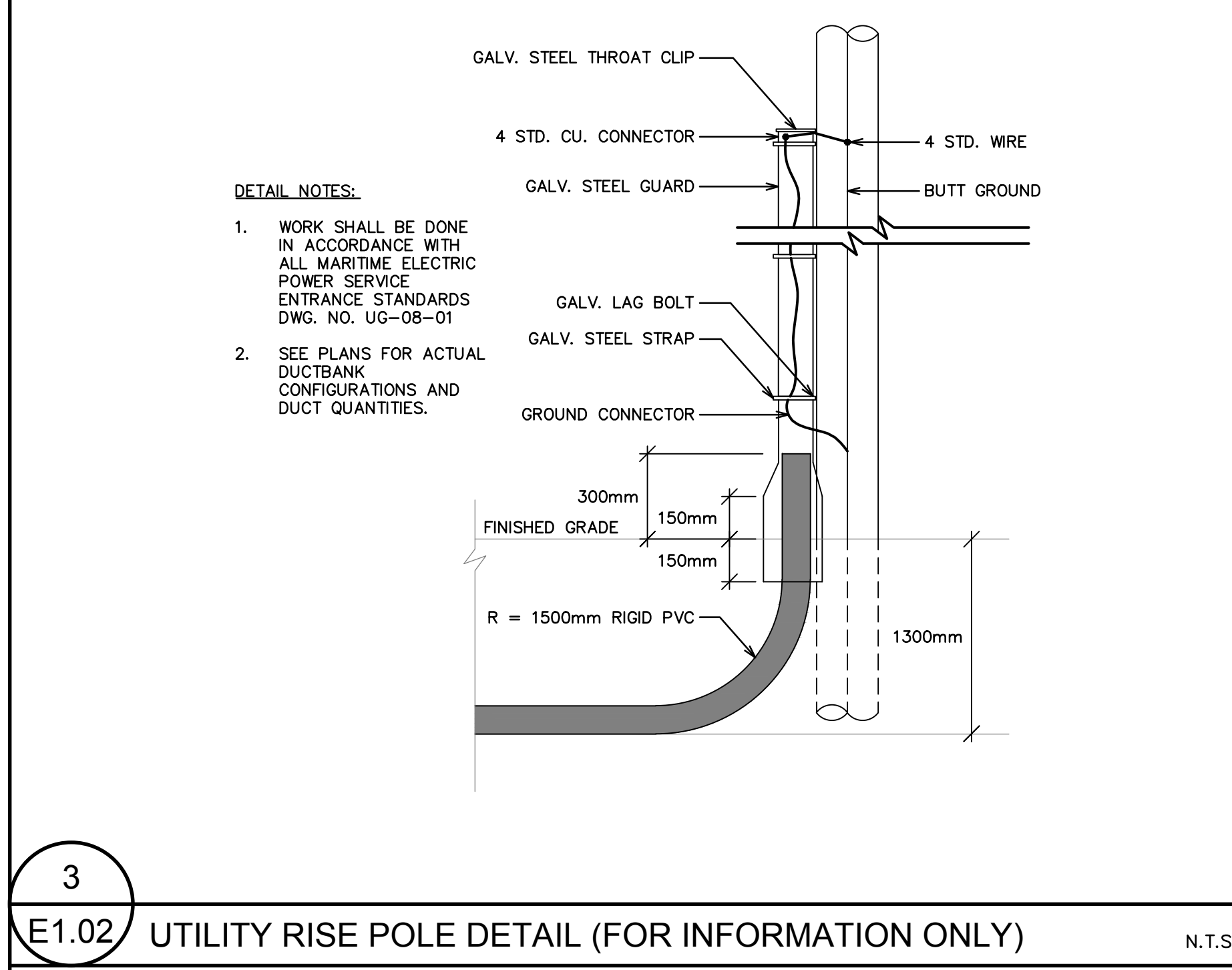
ELECTRICAL SITE PLAN NEW WORK



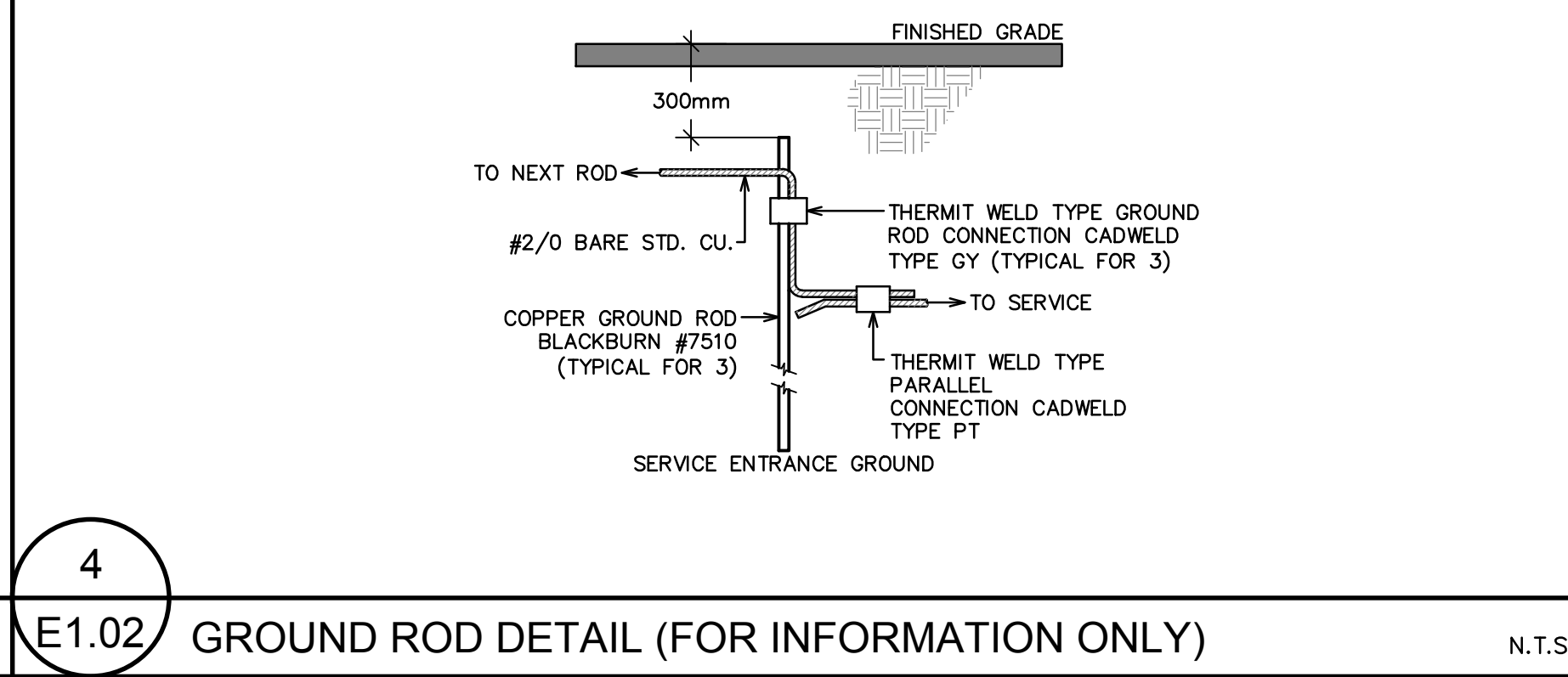
- DETAIL NOTES:**
- ONLY M&W APPROVED PLASTIC BOLLARD COVERS TO BE INSTALLED.
 - ORIENTATION OF PAD OR SECTIONALIZING CABINET MUST ALLOW 3000mm OF WORKING SPACE IN FRONT OF PAD FOR OPERATION.
 - THE TRANSFORMER OR SECTIONALIZING CABINET SHALL BE INSTALLED AT LEAST 3000mm FROM ANY COMBUSTIBLE SURFACE OR MATERIAL ON A BUILDING AND SHALL BE INSTALLED AT LEAST 6000mm FROM ANY WINDOW, DOOR OR VENTILATION OPENING ON A BUILDING. IF THESE CLEARANCES CANNOT BE MET AN APPROVED CONCRETE RETAINING WALL MUST BE PROVIDED.
 - BOLLARDS MUST HAVE PLASTIC COVER WITH REFLECTIVE TAPE. YELLOW COVERS ARE REQUIRED FOR AREAS INTENDED FOR VEHICLE TRAFFIC/PARKING.
 - HDPE POST GUARD/SURGE GUARD YELLOW C/W TWO REFLECTIVE RED STRIPES OR HDPE POST GUARD/SURGE GUARD GREEN C/W TWO REFLECTIVE WHITE STRIPES CAN BE USED FOR BOLLARD COVERS ONLY.
 - REINFORCING STEEL SET 1200mm IN GROUND. USE 50MM TUBE FOR FORM NO METAL ON BOLLARD EXTERIOR UNLESS GROUNDED.
 - ALL DIMENSION ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.



- DETAIL NOTES:**
- CONCRETE = 25MPa @ 28 DAYS.
 - CONCRETE 1.70 CU. METERS.
 - REBAR - 72.68kg
 - A 3000mm FLAT AREA MUST BE PROVIDED IN FRONT AND 1000mm ON EACH SIDE OF TRANSFORMER PAD.
 - ALL SECONDARY DUCTS TO BE LABELED WITH WEATHER PROOF TAG INDICATING THE CIRC #S AND TAP BOX THEY FEED.
 - GRAVEL TO BE NO GREATER THAN 35mm OR NO LESS THAN 15mm.
 - CONDUITS TO BE FLUSH WITH THE CONCRETE TRANSFORMER PAD.
 - ALL DIMENSION IN MILLIMETERS UNLESS STATED OTHERWISE.
 - GROUNDING SHALL BE IN ACCORDANCE WITH SECTION 10 OF THE LATEST CANADIAN ELECTRICAL CODE PART 1.
 - A ROD ELECTRODE OR PLATE ELECTRODE MAYBE USED FOR GROUNDING.
 - PLATE ELECTRODE SHALL BE IN DIRECT CONTACT WITH EXTERIOR SOIL AT NOT LESS THAN 600mm BELOW GRADE.
 - DEPTH OF GROUNDING SYSTEM TO BE BETWEEN 300mm AND 600mm.

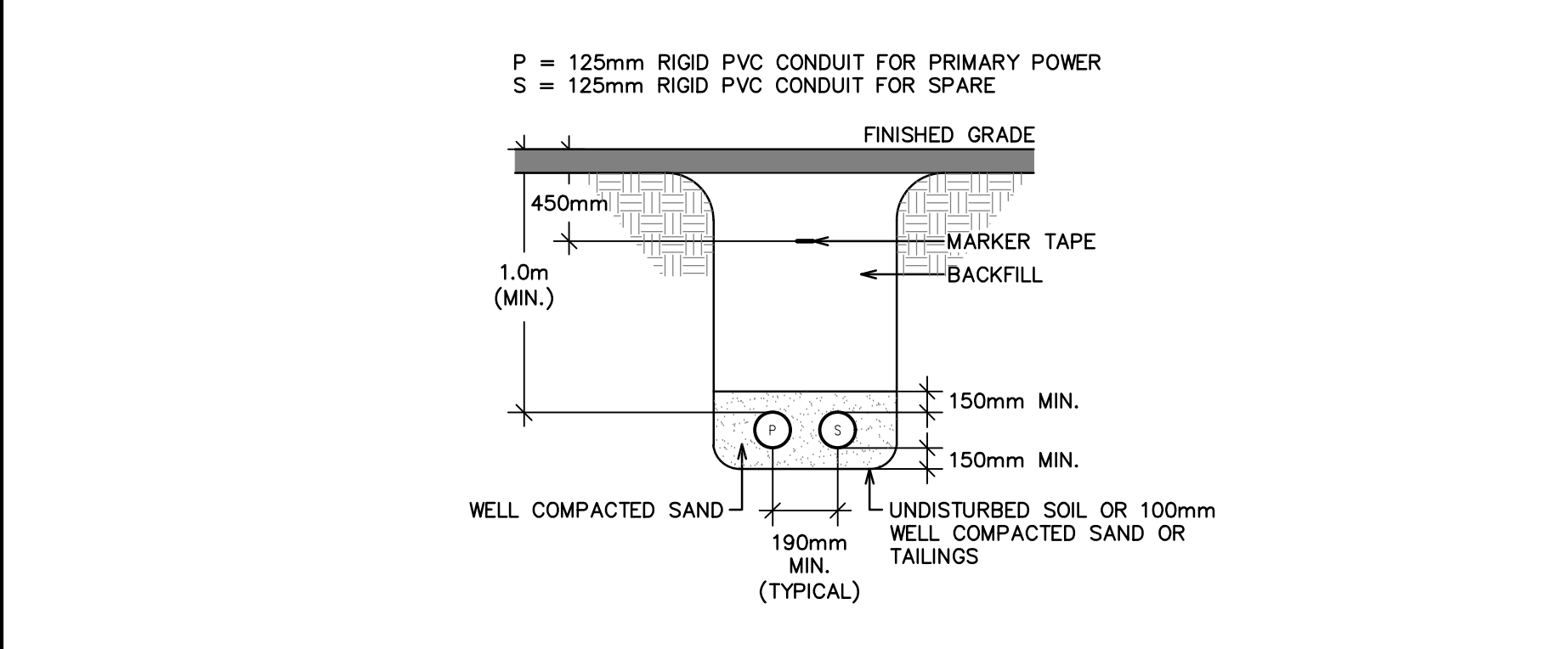


E1.02 UTILITY RISE POLE DETAIL (FOR INFORMATION ONLY) N.T.S.

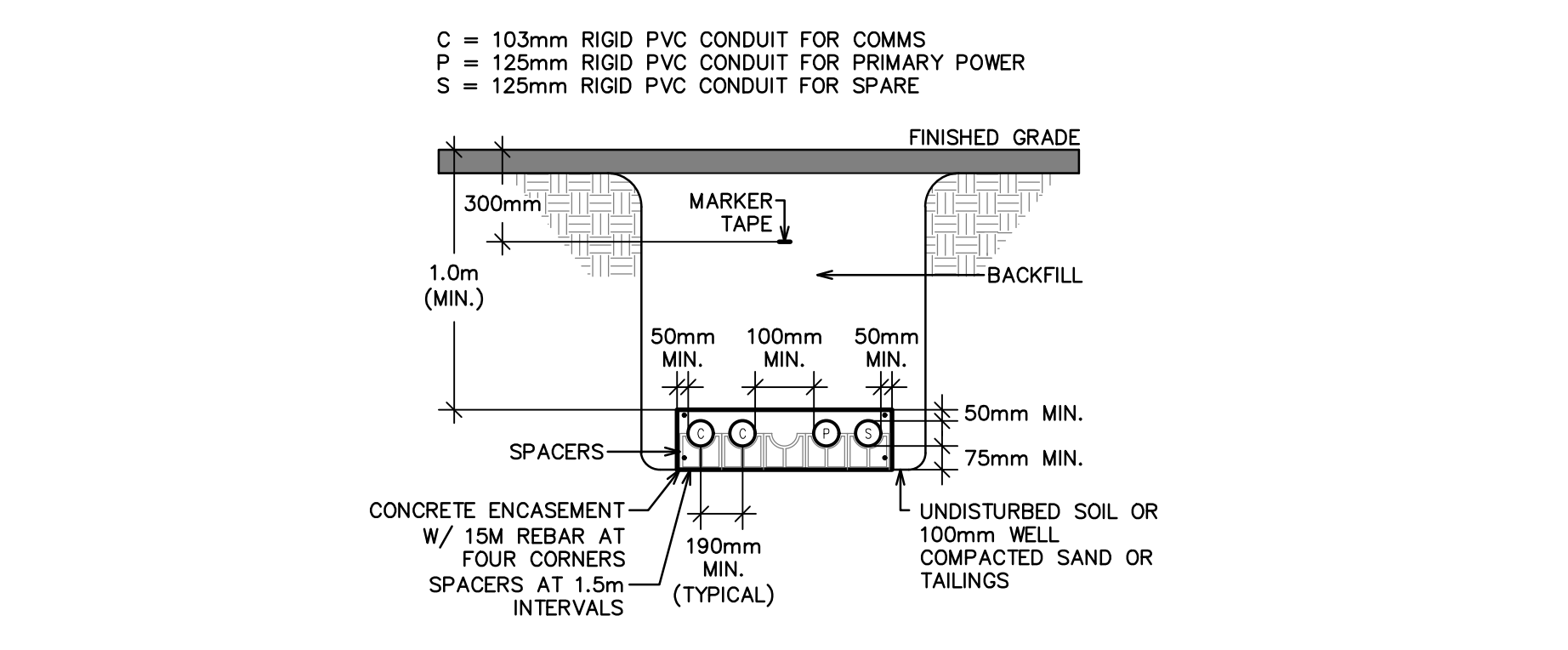


E1.02 GROUND ROD DETAIL (FOR INFORMATION ONLY) N.T.S.

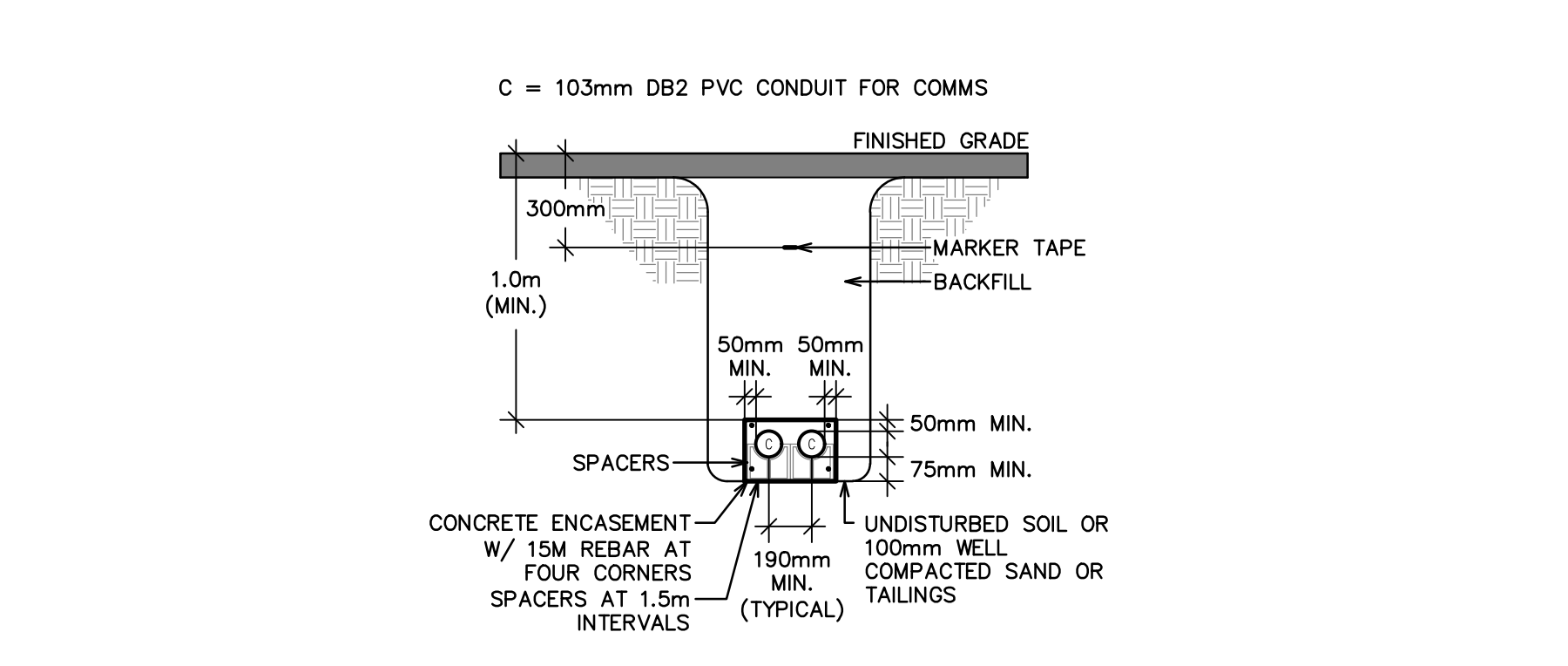
E1.02 TRANSFORMER PAD DETAIL N.T.S.



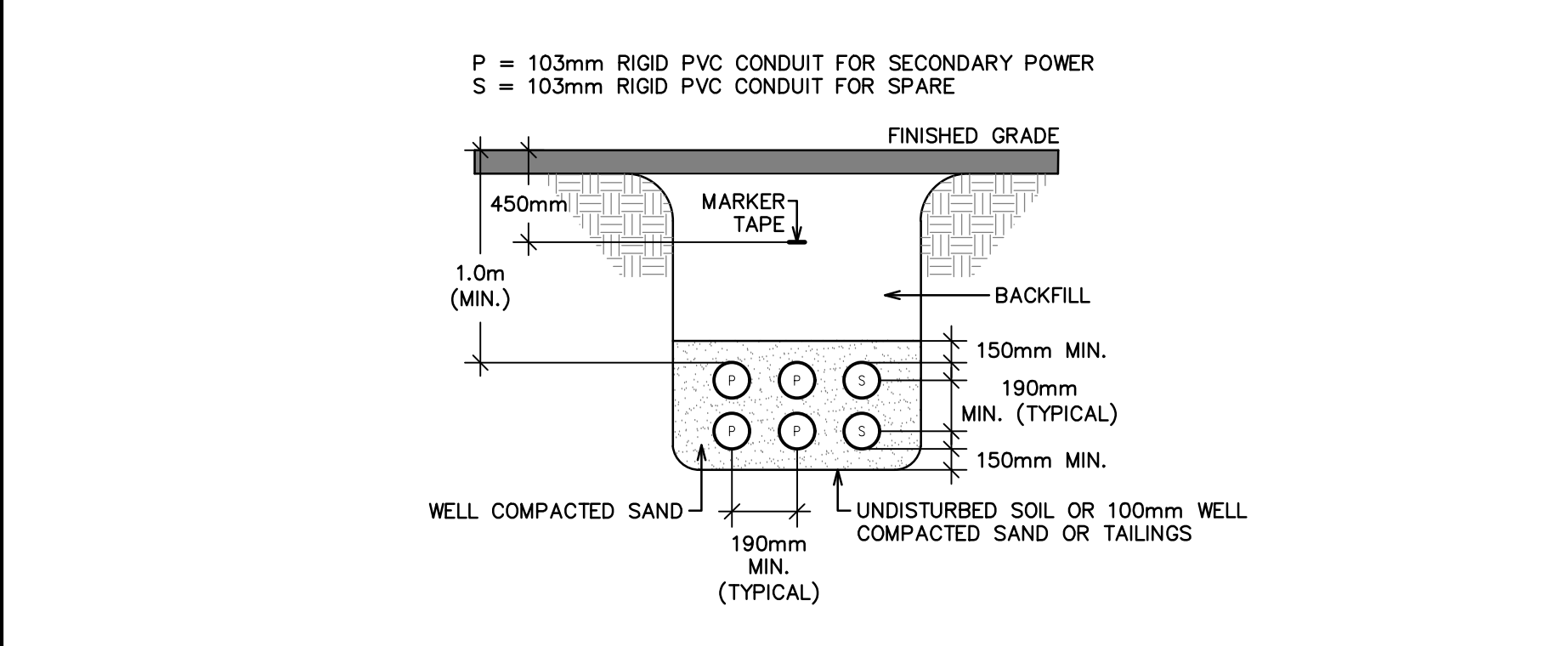
E1.02 SECTION A-A (FOR INFORMATION ONLY) N.T.S.



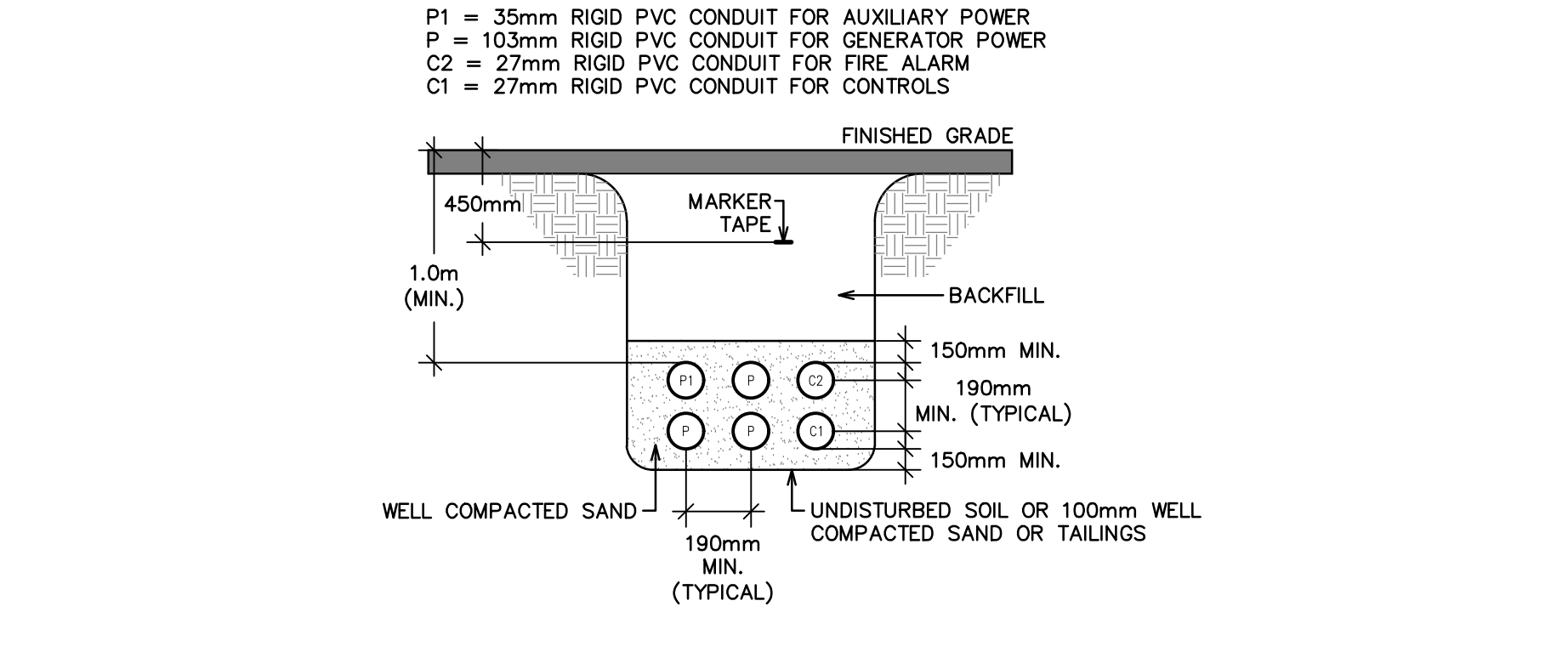
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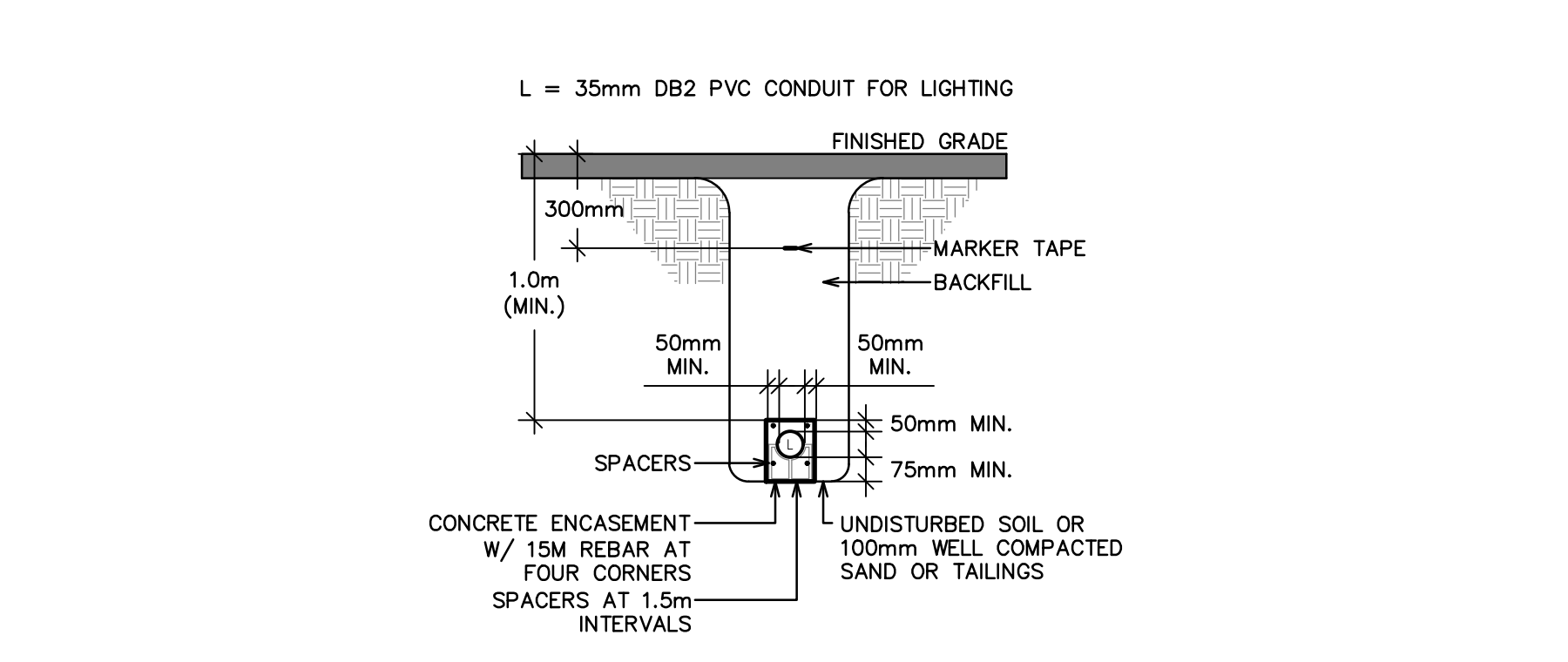
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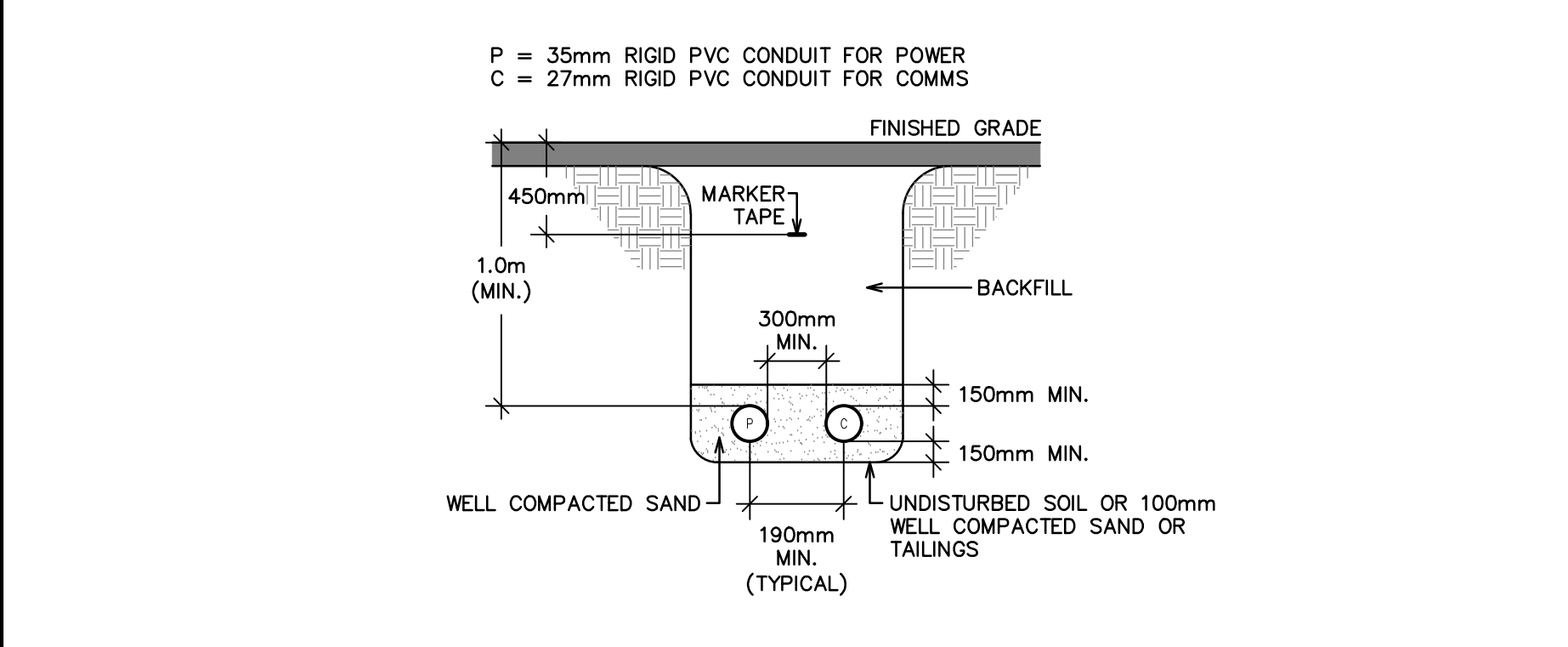
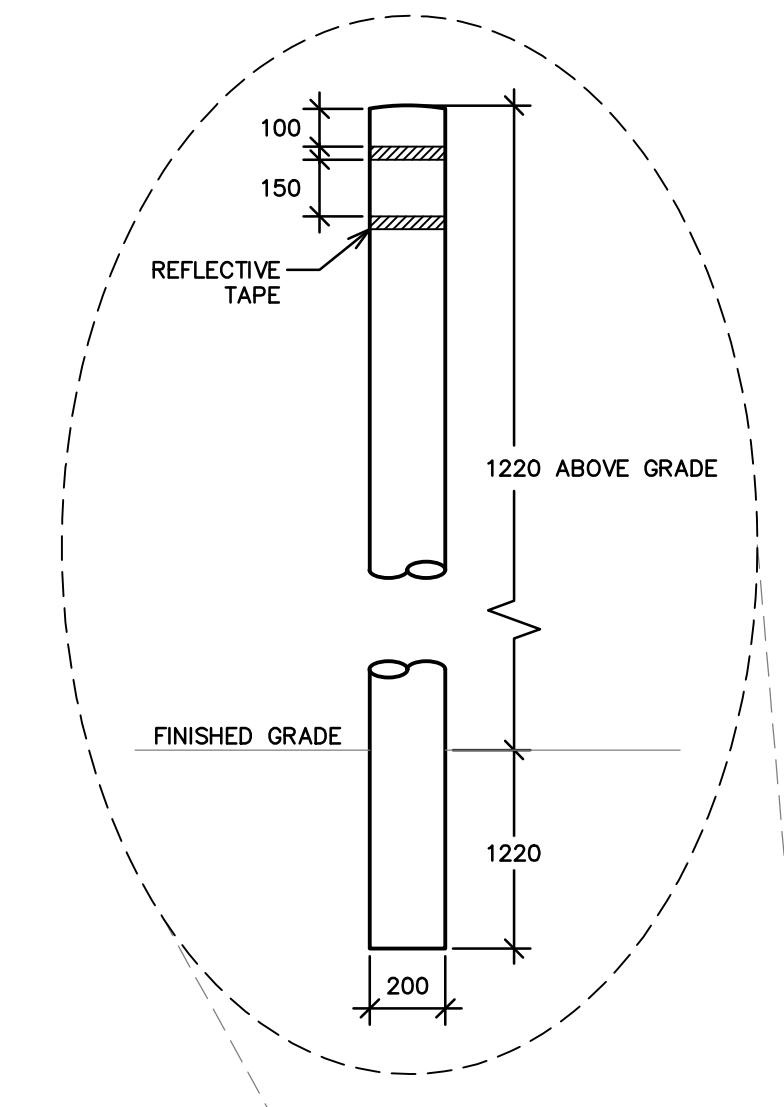
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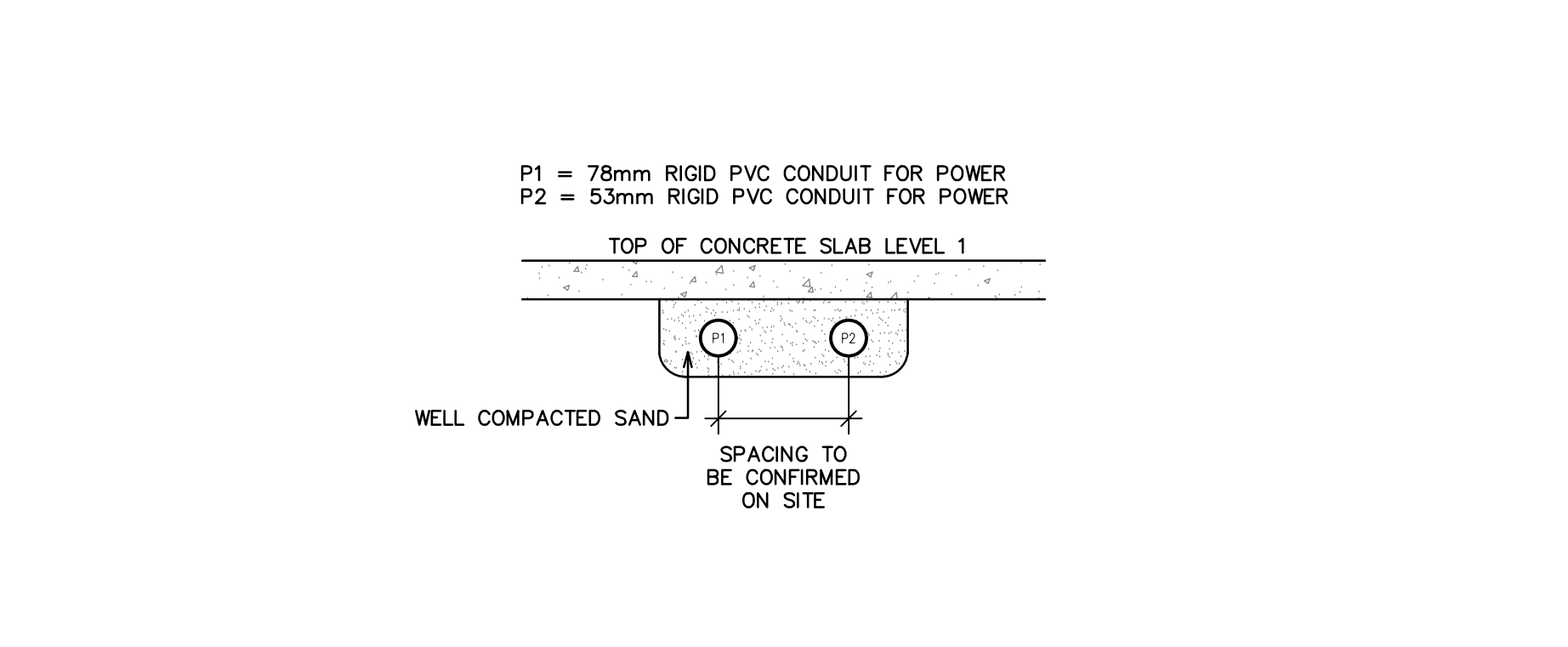
E1.02 SECTION E-E (FOR INFORMATION ONLY) N.T.S.



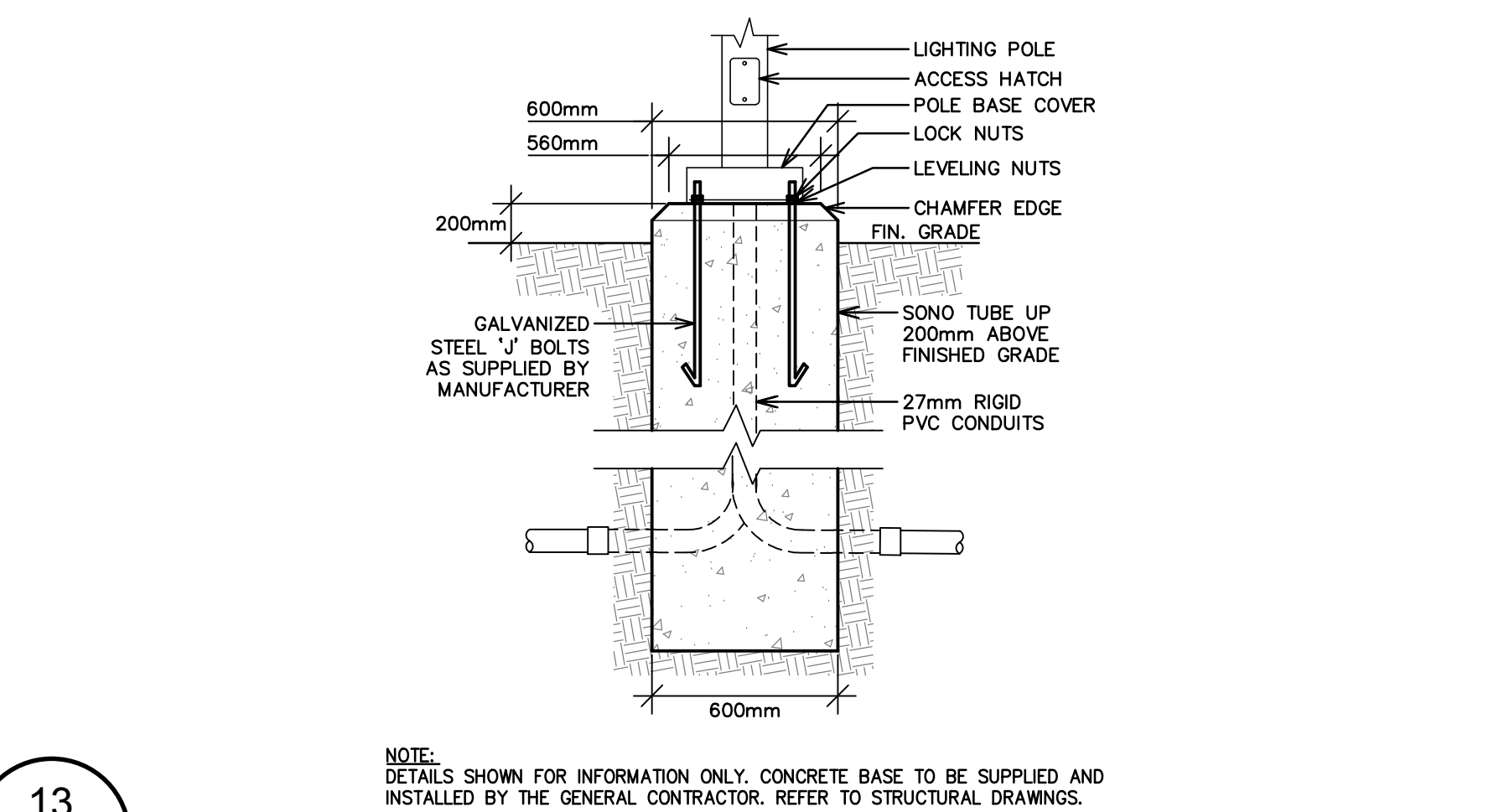
E1.02 SECTION F-F (FOR INFORMATION ONLY) N.T.S.



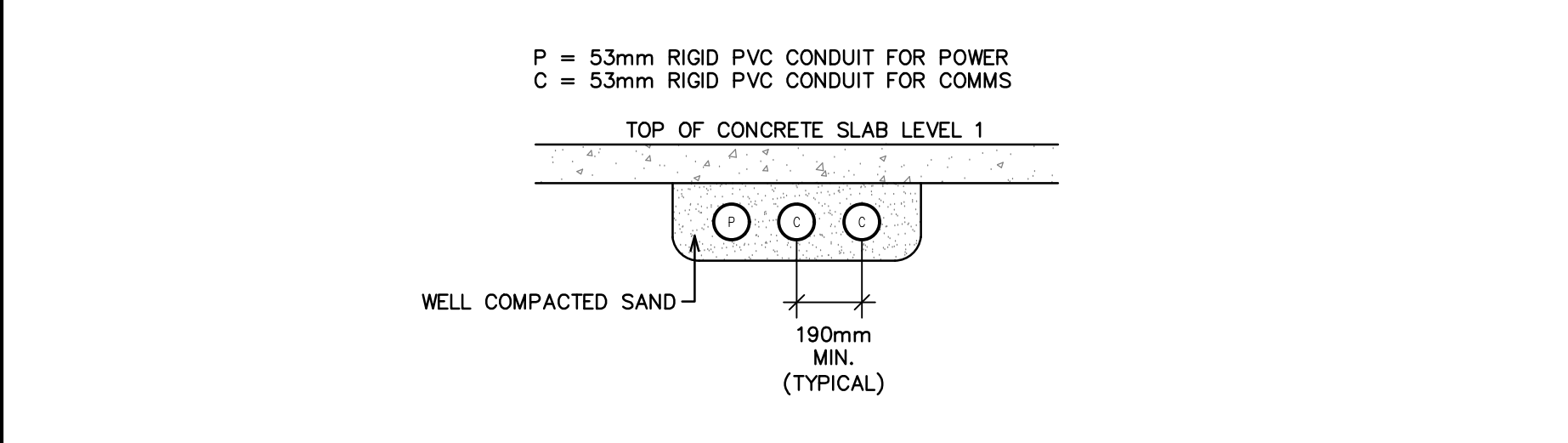
E1.02 SECTION G-G (FOR INFORMATION ONLY) N.T.S.



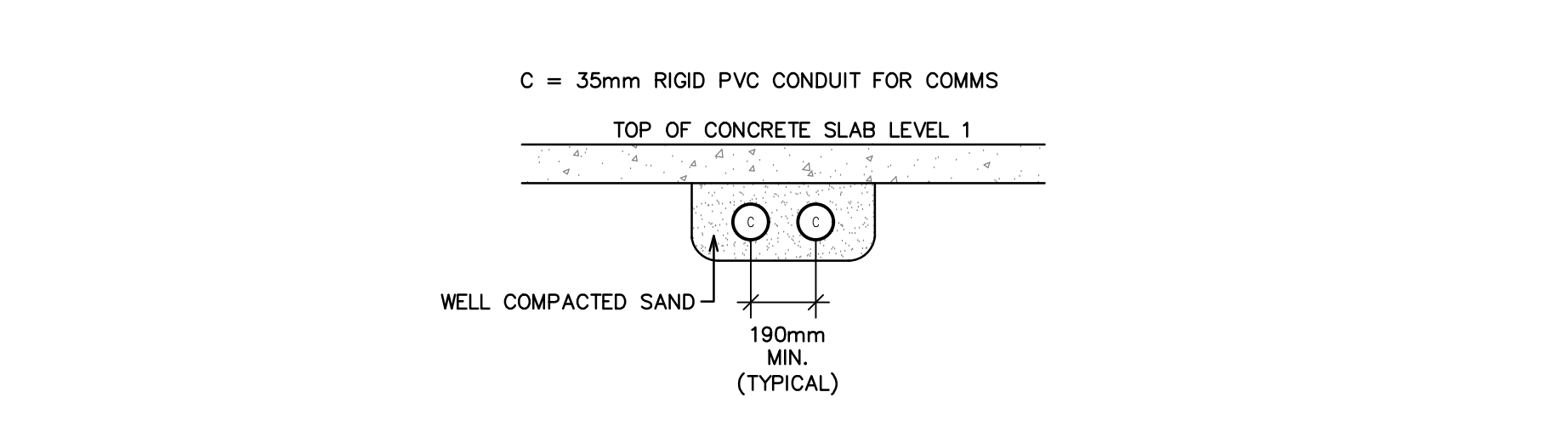
E1.02 SECTION H-H (FOR INFORMATION ONLY) N.T.S.



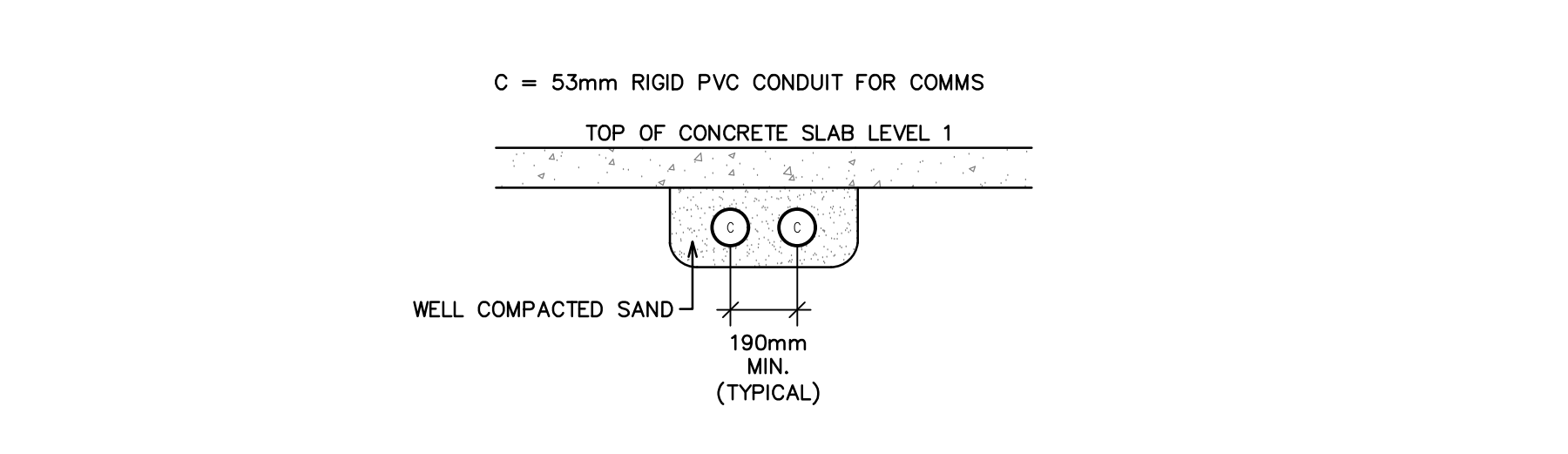
E1.02 LIGHTING POLE BASE DETAIL (FOR INFORMATION ONLY) N.T.S.



E1.02 SECTION J-J (FOR INFORMATION ONLY) N.T.S.



E1.02 SECTION K-K (FOR INFORMATION ONLY) N.T.S.



E1.02 SECTION L-L (FOR INFORMATION ONLY) N.T.S.

E1.02 BOLLARD MOUNT DETAIL N.T.S.

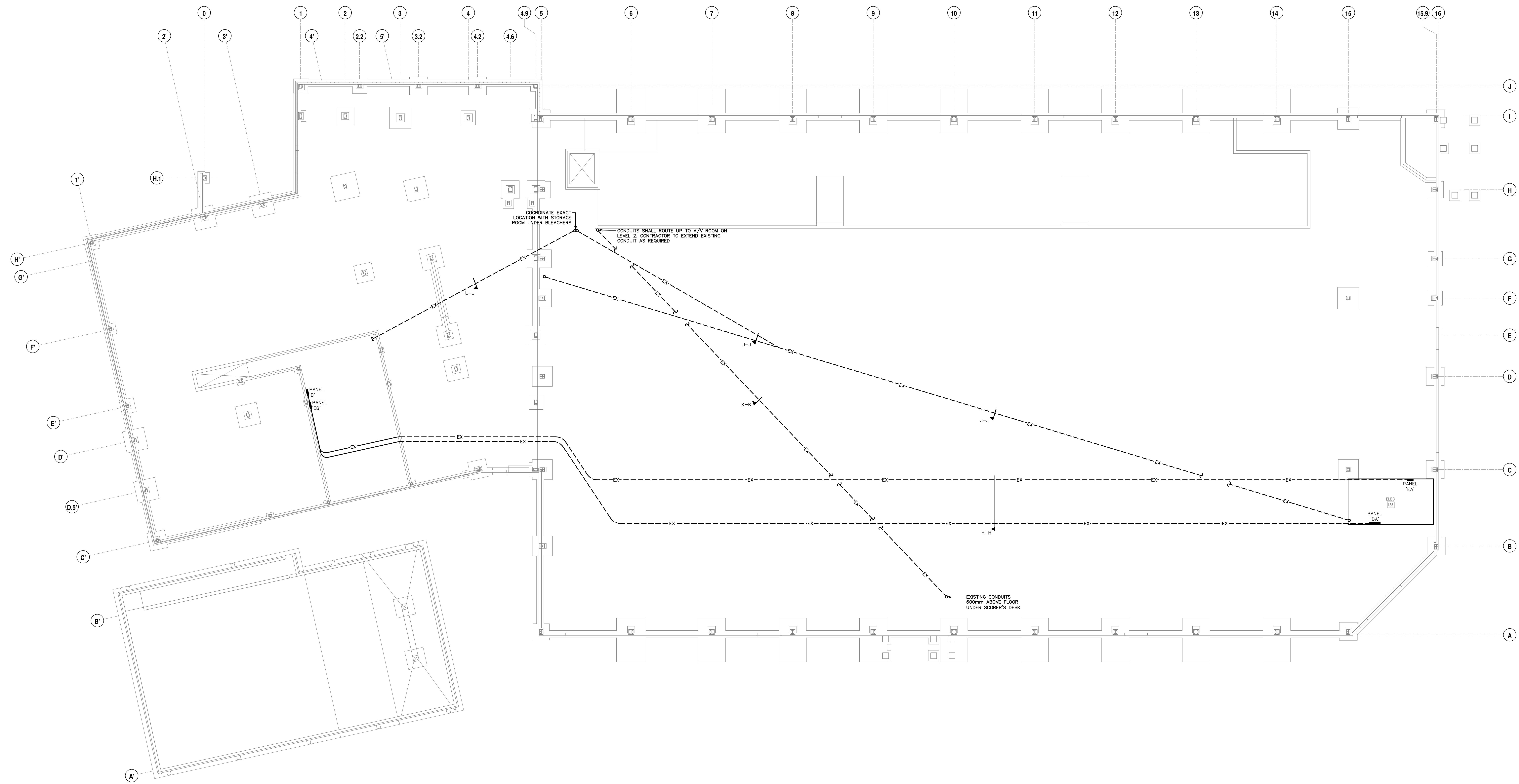
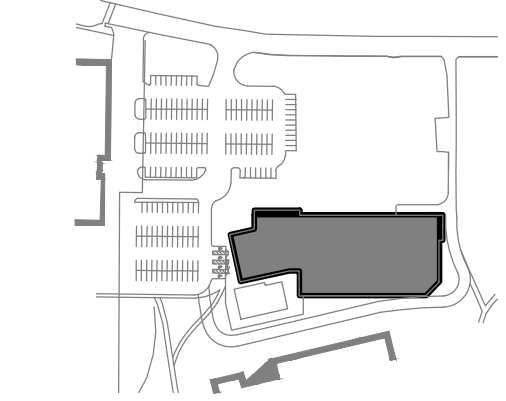
THE ASSOCIATION OF PROFESSIONAL ENGINEERS AND GEOMETRIC ENGINEERS OF CANADA
 HAS REVIEWED THESE DRAWINGS AND VALID FOR THE YEAR 2023
 Timothy S. Balfour
 No. 1752
 DATE: 10/04/23
 LICENSED PROFESSIONAL ENGINEER (GRADE CONTRACTOR)

NO.	REVISION	DATE
0	TRN ISSUED FOR TENDER	2023.04.10

PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 CHARLOTTETOWN
 SUBJECT:

PROJECT NO.: 21111
 DRAWN BY: J.A.
 CHECKED BY: T.D.
 SCALE: AS INDICATED

ELECTRICAL SITE AND CONDUIT DETAILS



THE ASSOCIATION OF PROFESSIONAL ENGINEERS AND THE PROVINCE OF NEW BRUNSWICK
VALUED FOR THE YEAR 2023

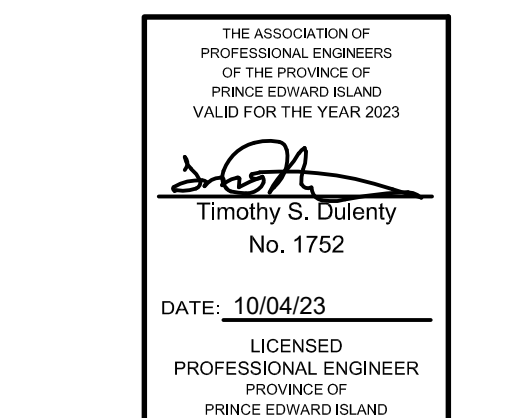
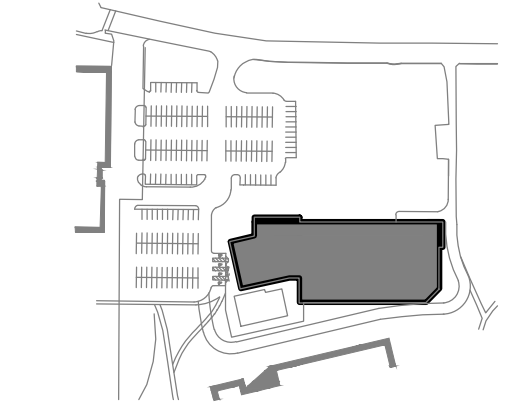
Timothy S. Blaney
No. 1752
DATE: 10/04/23
LICENSEE
PROFESSIONAL ENGINEER
PROVINCE OF NEW BRUNSWICK

NO.	REVISION	DATE
0	TRN ISSUED FOR TENDER	2023.04.10

PROJECT NAME:
SIMMONS SPORTS CENTRE
ARENA & POOL REPLACEMENT
CHARLOTTETOWN
SUBJECT:

PROJECT NO.: Z1111
DRAWN BY: J.A.
CHECKED BY: T.D.
SCALE: AS INDICATED

ELECTRICAL
UNDERGROUND PLAN

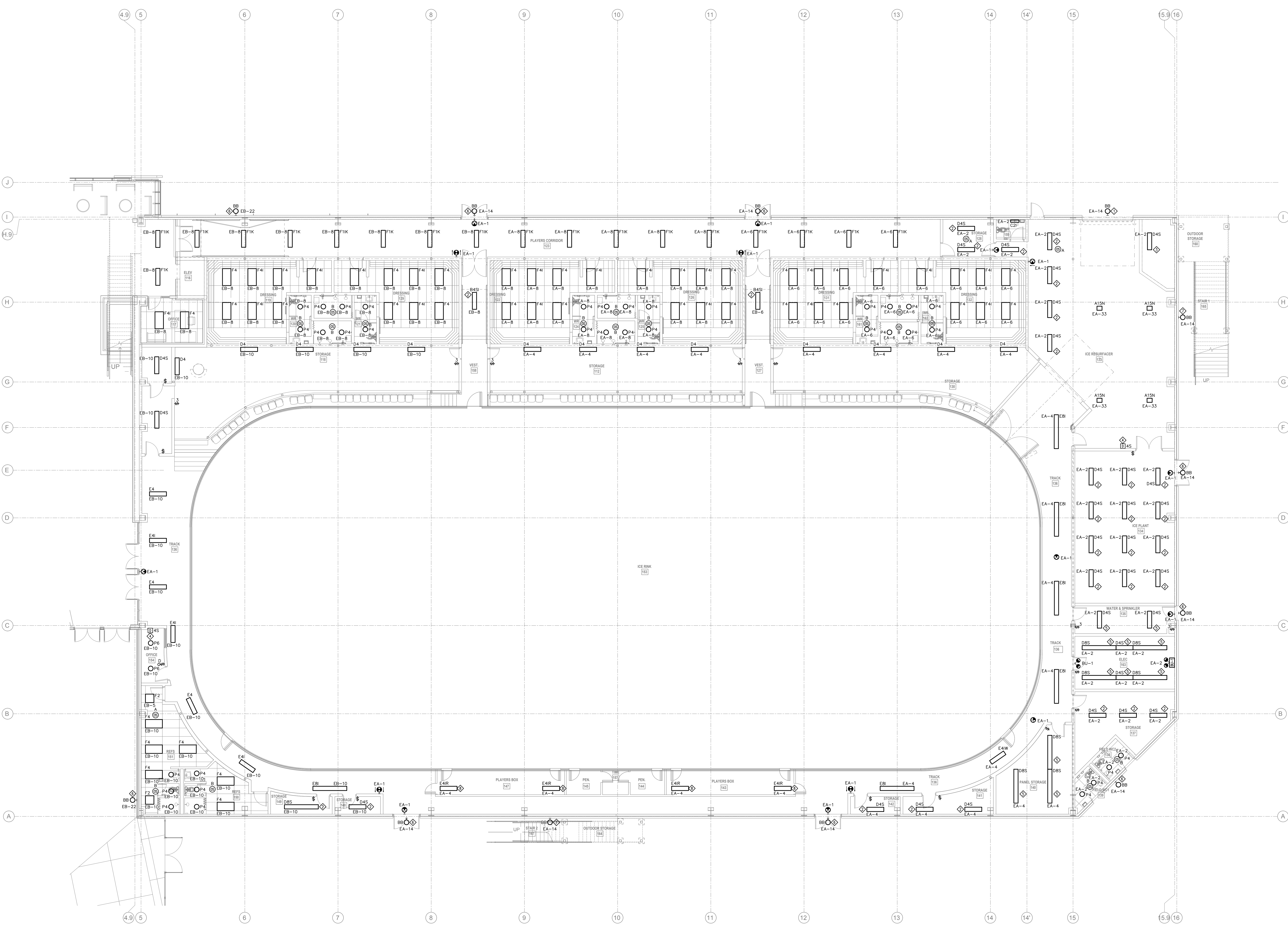


0	TPS ISSUED FOR TENDER	2023.04.10
NO.	REVISION	DATE

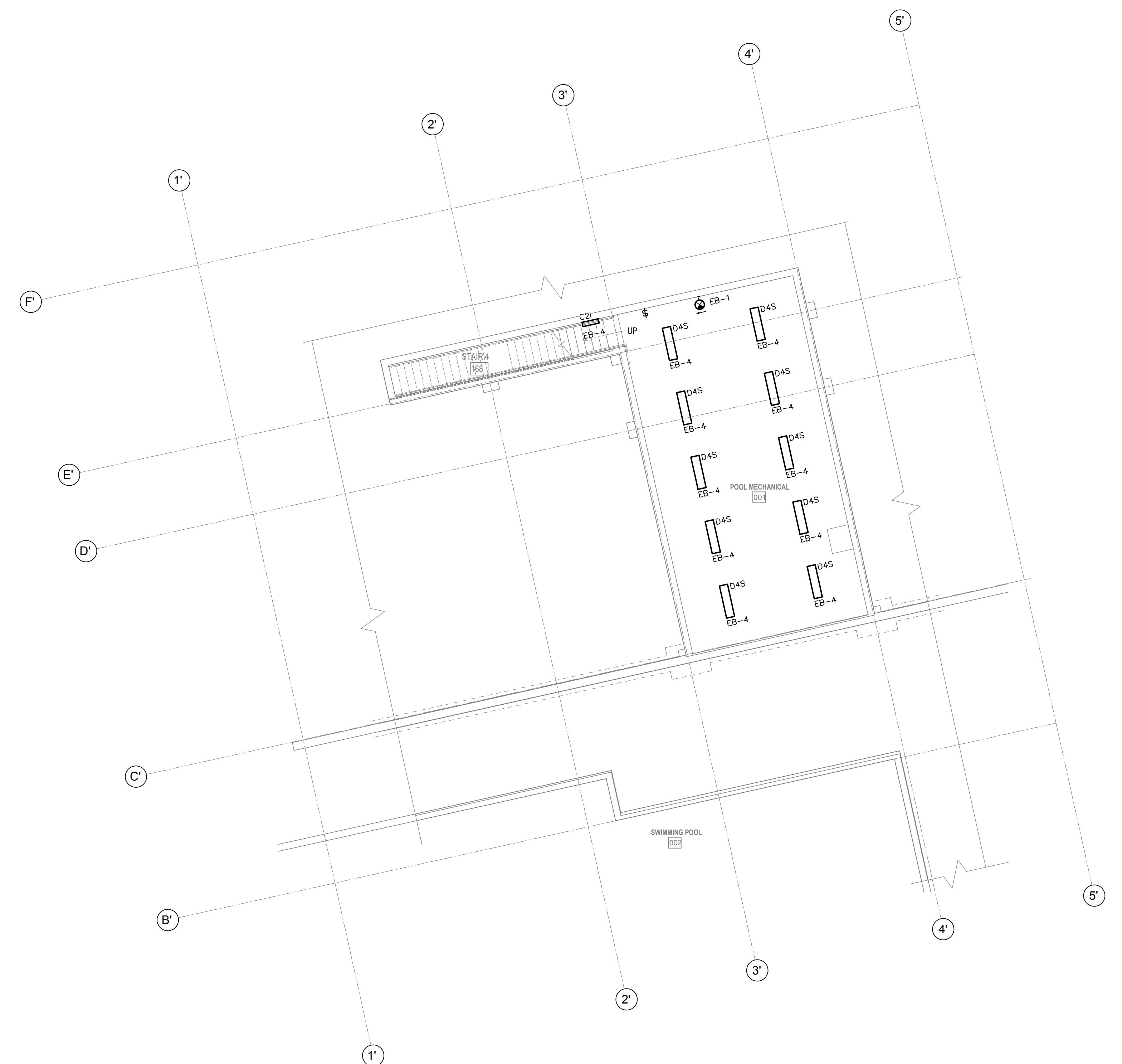
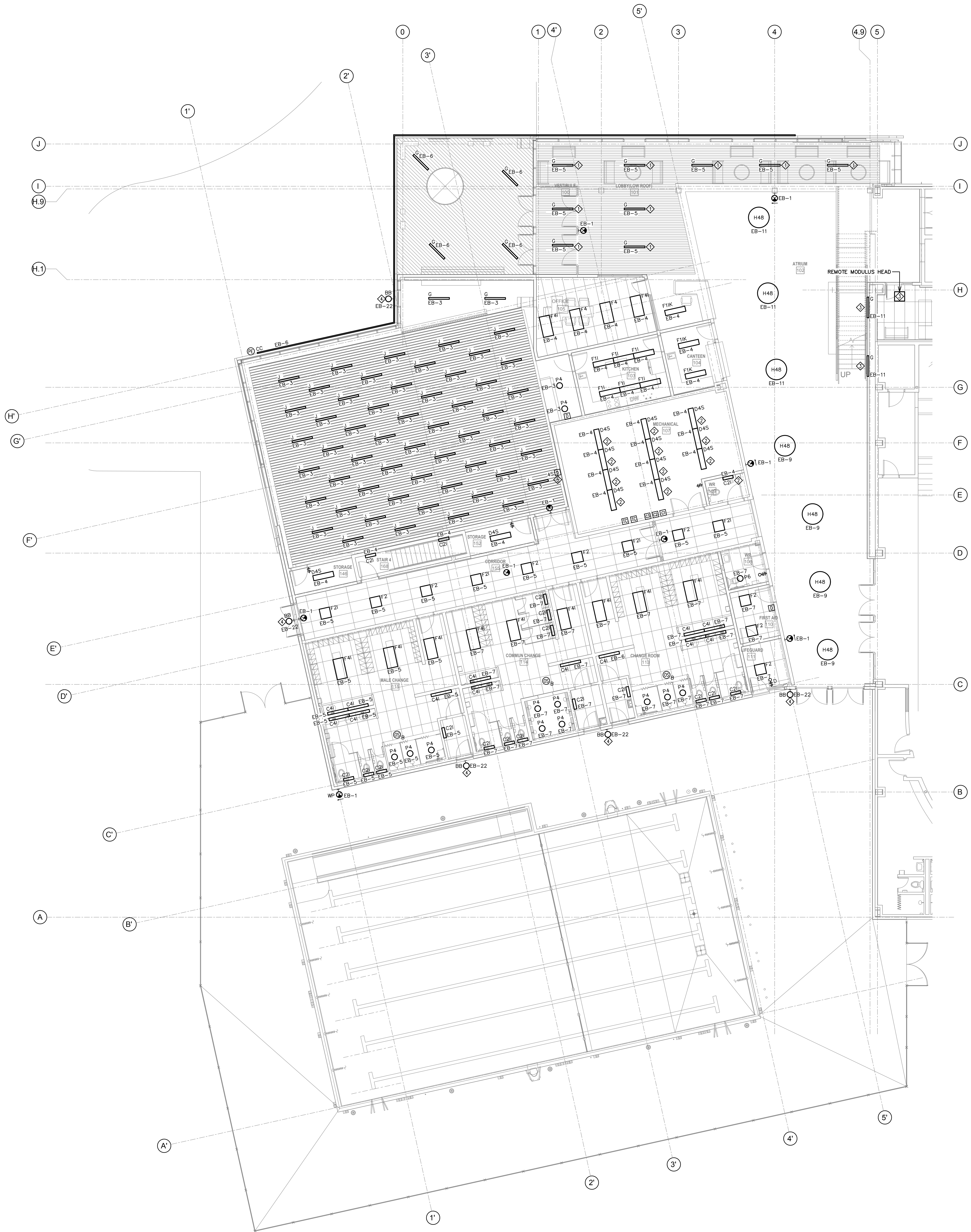
PROJECT NAME:
SIMMONS SPORTS CENTRE
ARENA & POOL REPLACEMENT
CHARLOTTETOWN
SUBJECT:

PROJECT NO.: 21111
DRAWN BY: J.A.
CHECKED BY: T.D.
SCALE: AS INDICATED

ELECTRICAL FLOOR
PLAN LEVEL 1(A)
ARENA - LIGHTING

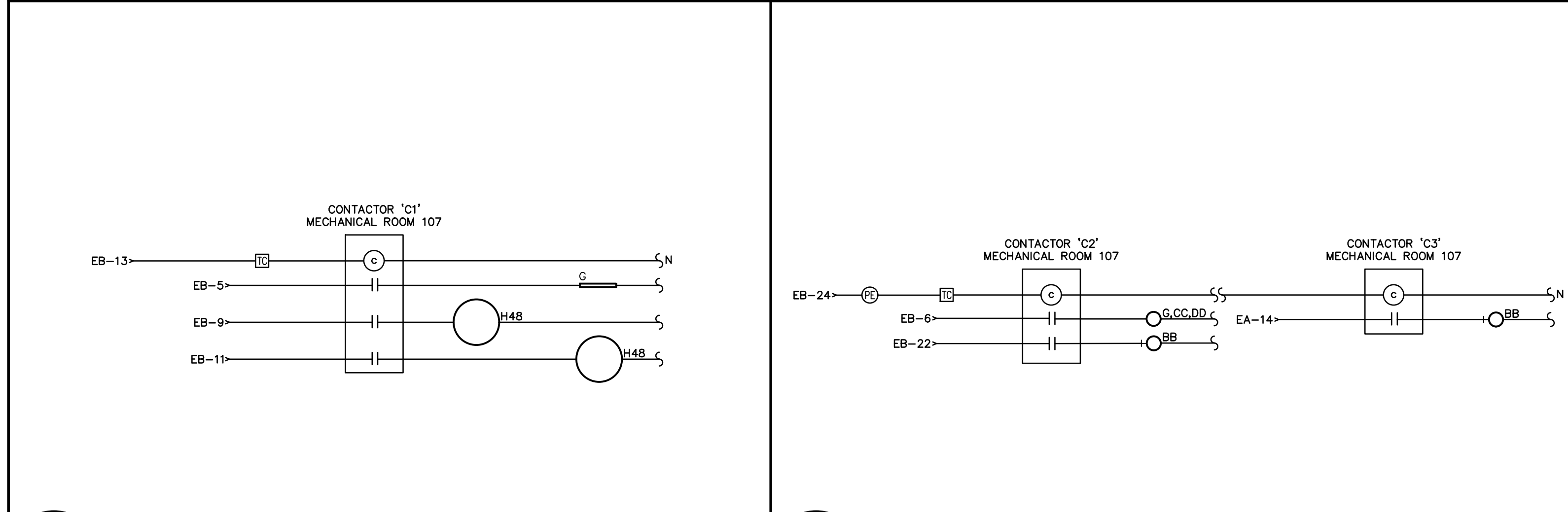


- GENERAL NOTES:**
1. MOUNT SUSPENDED FIXTURES AT 3.0m A.F.F. UNLESS OTHERWISE NOTED.
- SPECIFIC NOTES:**
- ◇ MOUNT LUMINAIRES AT 4.5m A.F.F.
 - ◇ SUSPEND LUMINAIRES AT 3.0m A.F.F.
 - ◇ SUSPEND LUMINAIRES AT 3.5m A.F.F.
 - ◇ SUPPLY AND INSTALL ONE (1) NEW WIRELESS DIMMER AT THIS LOCATION TO CONTROL NEW HIGH BAY LUMINAIRES LOCATED OVER ICE SURFACE. WIRELESS DIMMER SHALL BE 120V WIRELESS LINE POWERED WALL SWITCH WITH FOUR (4) PRE-SET SCENE SELECTOR WITH ON/OFF AND DIMS/LOWER CONTR. ACCEPTABLE PRODUCT: ACQUITY BRANDS #RPOOLA-4S-DX-120-WH-G2 OR APPROVED EQUAL.
 - ◇ SUSPEND LUMINAIRES AT 2.2m A.F.F.
 - ◇ MOUNT LUMINAIRES AT 3.75m A.F.F.
 - ◇ MOUNT LUMINAIRES AT 5m A.F.F.
 - ◇ LUMINAIRE COMPLETE WITH WIRING/CABLE.



1
E2.01 ELECTRICAL LEVEL 1(B) - LIGHTING
 SHEET SIZE: 36"x48"

2
E2.01 ELECTRICAL LEVEL 0 - LIGHTING
 SCALE: 1:100



3
E2.01 ELECTRICAL LEVEL 1(B) - LIGHTING CONTROL N.T.S.
4
E2.01 ELECTRICAL EXTERIOR LIGHTING CONTROL N.T.S.

- GENERAL NOTES:**
1. MOUNT SUSPENDED FIXTURES AT 3.0m A.F.F. UNLESS NOTED OTHERWISE.
- SPECIFIC NOTES:**
- ◇ MOUNT LUMINAIRES FLUSH WITH FINISHED CEILING.
 - ◇ MOUNT LUMINAIRES AT 2.3m A.F.F.
 - ◇ INSTALL REMOTE MODULUS HEAD UNIT PROVIDING POWER TO LUMINAIRES WITHIN T-BAR CEILING IN OFFICE AS INDICATED.
 - ◇ MOUNT LUMINAIRES AT 3.75m A.F.F.
 - ◇ SUPPLY AND INSTALL ONE (1) NEW WIRELESS DIMMER AT THIS LOCATION TO CONTROL NEW HIGH BAY LUMINAIRES LOCATED OVER ICE SURFACE. WIRELESS DIMMER SHALL BE 120V WIRELESS LINE POWERED WALL SWITCH WITH FOUR (4) PRE-SET SCENE SELECTOR WITH ON/OFF AND RAISE/LOWER CONTROL. ACCEPTABLE PRODUCT: ACUTY BRANDS (RPOOLA-45-DX-120-WH-C2 OR APPROVED EQUAL).

5
E2.01 NOTES
 SCALE: 1:100
 N.T.S.

THE ASSOCIATION OF PROFESSIONAL ENGINEERS AND PROFESSIONAL ARCHITECTS HAS REVIEWED THESE DRAWINGS AND CONFIRMS THEIR VALUE FOR THE YEAR 2023

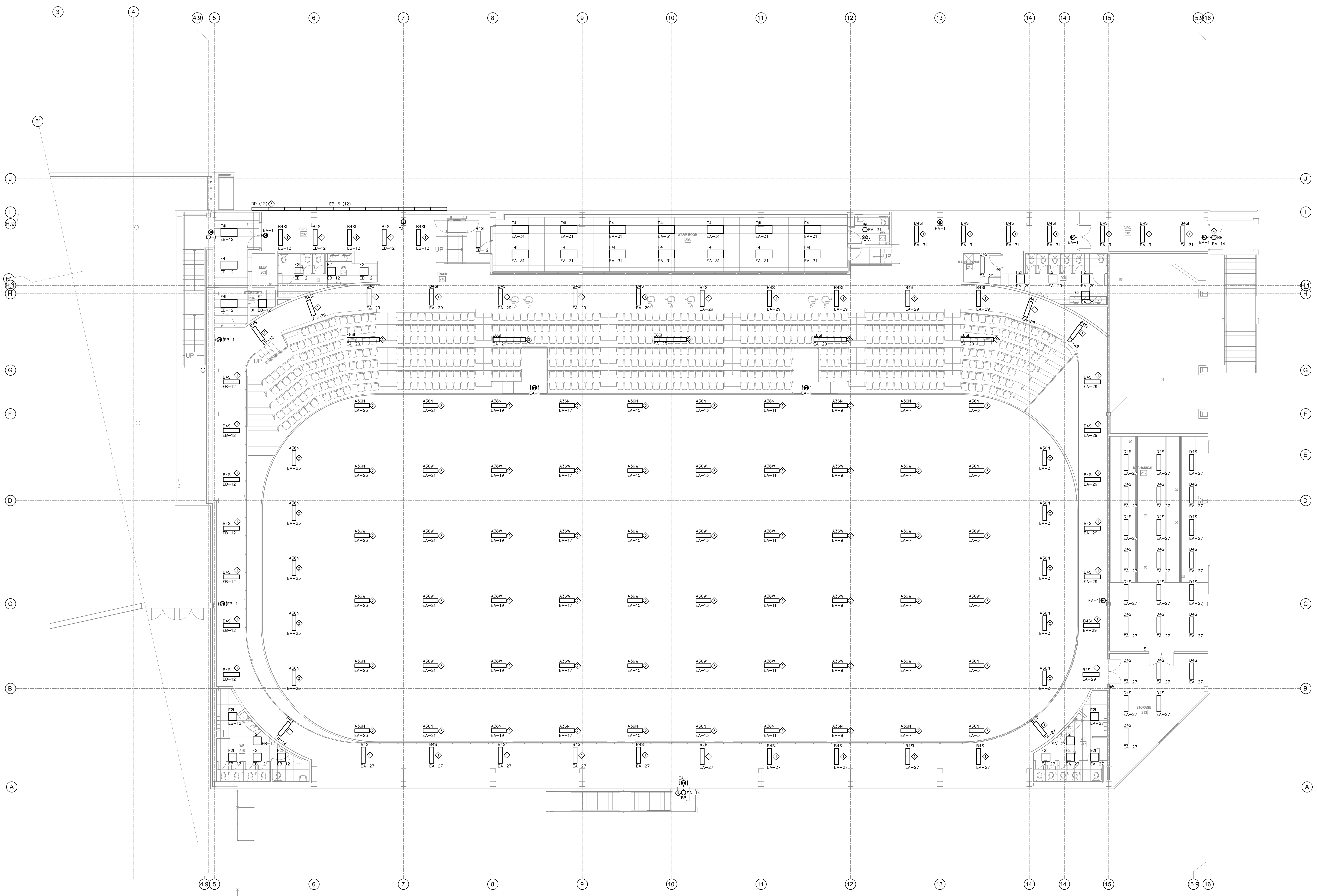
Timothy S. Usherly
 No. 1752
 DATE: 10/04/23
 LICENSED PROFESSIONAL ENGINEER (POWER & ELECTRICITY)

NO.	TRG ISSUED FOR TENDER	2023.04.10
1	REVISION	DATE

PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 CHARLOTTETOWN
 SUBJECT:

PROJECT NO.: 21111
 DRAWN BY: J.A.
 CHECKED BY: T.D.
 SCALE: AS INDICATED

ELECTRICAL FLOOR PLAN LEVEL 1(B) - LIGHTING
E2.01



THE ASSOCIATION OF PROFESSIONAL ENGINEERS AND ARCHITECTS OF CHARLOTTETOWN HAS REVIEWED THIS DRAWING AND CONFIRMS THAT IT COMPLIES WITH THE REQUIREMENTS OF THE ENGINEERING ACT AND THE ENGINEERING REGULATIONS FOR THE YEAR 2023

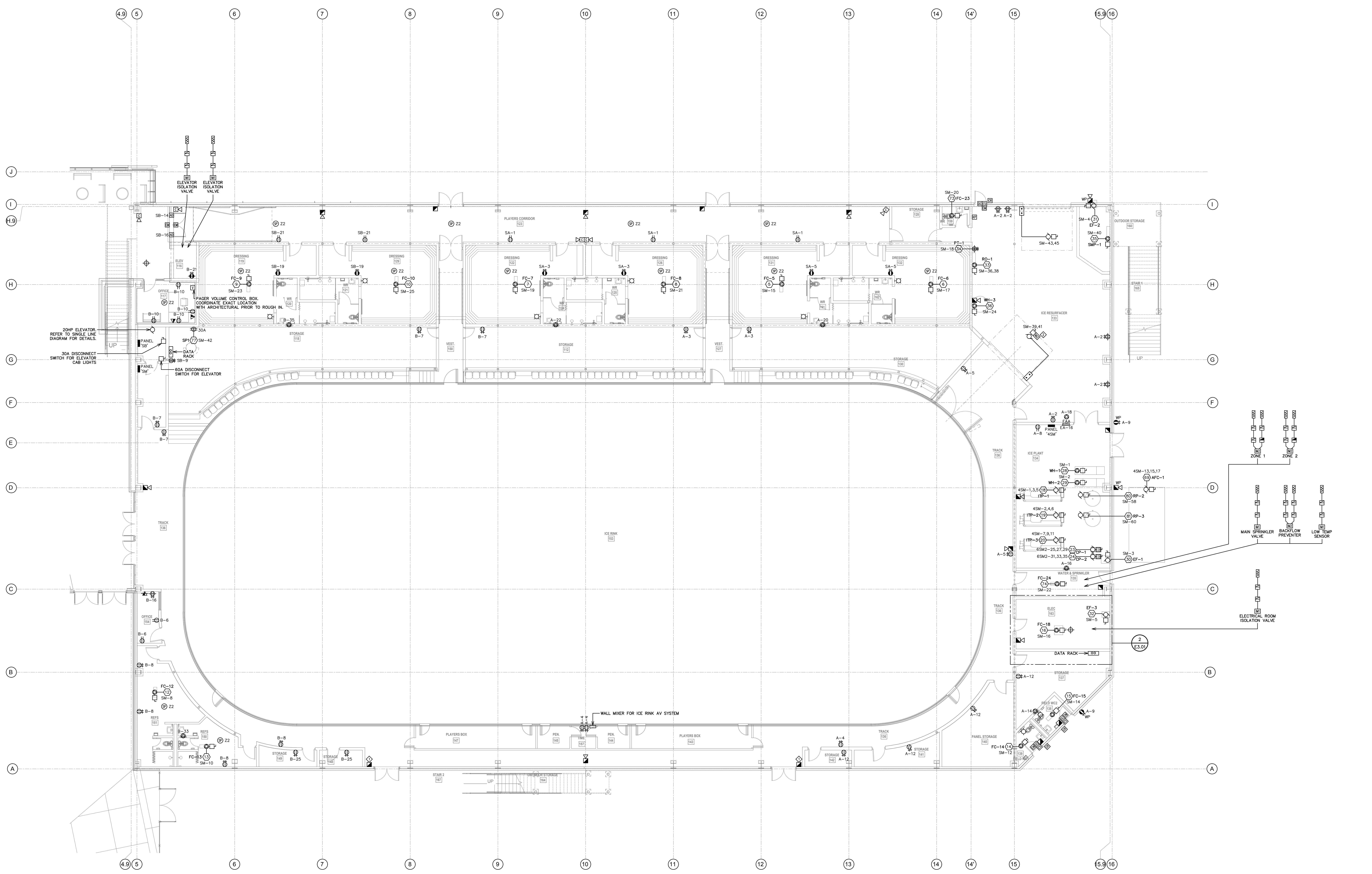
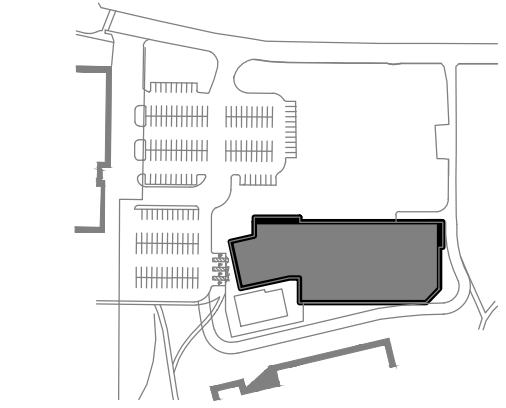
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PROJECT NAME: SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT CHARLOTTETOWN

PROJECT NO.: Z1111 DRAWN BY: J.A. CHECKED BY: T.D. SCALE: AS INDICATED

ELECTRICAL FLOOR PLAN LEVEL 2 ARENA - LIGHTING

- GENERAL NOTES: 1. MOUNT SUSPENDED FIXTURES AT 3.0m A.F.F. UNLESS OTHERWISE NOTED. SPECIFIC NOTES: ...



THE ASSOCIATION OF PROFESSIONAL ENGINEERS AND ARCHITECTS OF NEW BRUNSWICK HAS REVIEWED THIS DRAWING AND CONFIRMS THAT IT COMPLIES WITH THE REQUIREMENTS OF THE ENGINEERING ACT AND THE ENGINEERING REGULATIONS FOR THE YEAR 2023.
Timothy S. Sweeney
No. 1752
DATE: 10/04/23
LICENSEE
PROFESSIONAL ENGINEER
PROVINCE OF
NEW BRUNSWICK

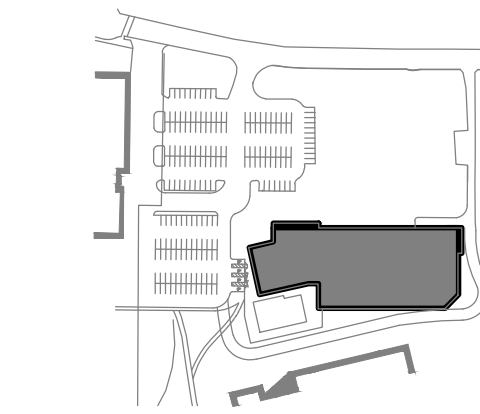
NO.	REVISION	DATE
0	TRG ISSUED FOR TENDER	2023.04.10

PROJECT NAME:
SIMMONS SPORTS CENTRE
ARENA & POOL REPLACEMENT
CHARLOTTETOWN
SUBJECT:

PROJECT NO.: Z1111
DRAWN BY: J.A.
CHECKED BY: J.D.

SCALE: AS INDICATED
ELECTRICAL FLOOR
PLAN LEVEL 1(A)
ARENA - POWER &
SYSTEMS

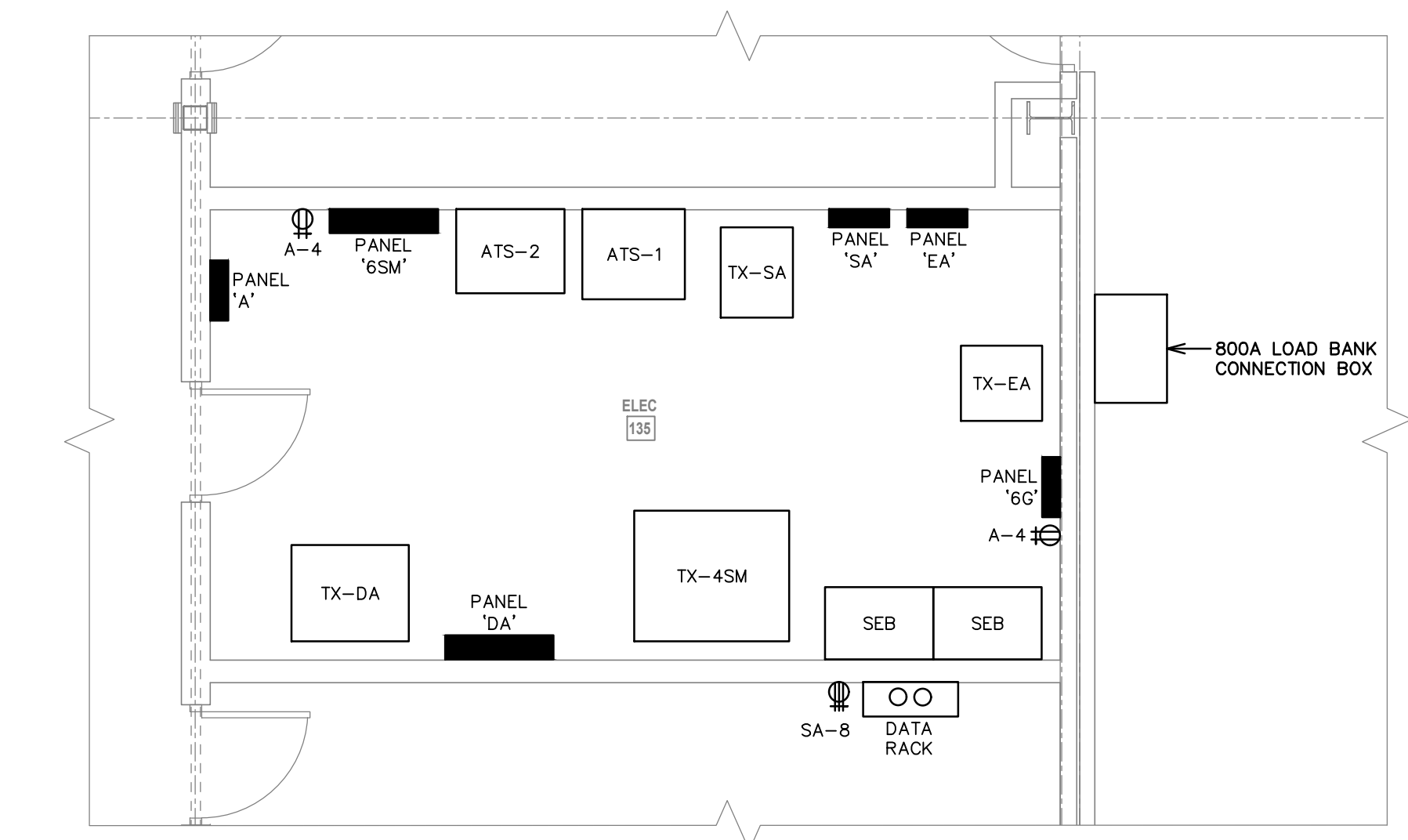
- SEPCING NOTES:**
- CONTRACTOR SHALL SUPPLY AND INSTALL NON-ADDRESSABLE FIRE ALARM DEVICES IN AREAS WHERE TEMPERATURE IS TOO LOW FOR ADDRESSABLE DEVICES. WIRE DEVICES TO REMOTE INPUT MODULE AND THE INPUT MODULE INTO THE INITIATION LOOP.
 - CONTRACTOR SHALL TIE DUAL INPUT MODULE INTO THE COVER AND FUSIBLE LINK CONTACT TO OUTPUT SUPERVISORY AND ALARM SIGNALS RESPECTIVELY.



SPECIFIC NOTES:
 ◆ MOUNT RECEPTACLE 0.3m A.F.F.
 ◆ MOUNT RECEPTACLE ON STRUCTURAL COLUMN. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT MOUNTING LOCATION.
 ◆ PENDANT MOUNTED SPEAKER, MOUNTED 3350mm A.F.F.

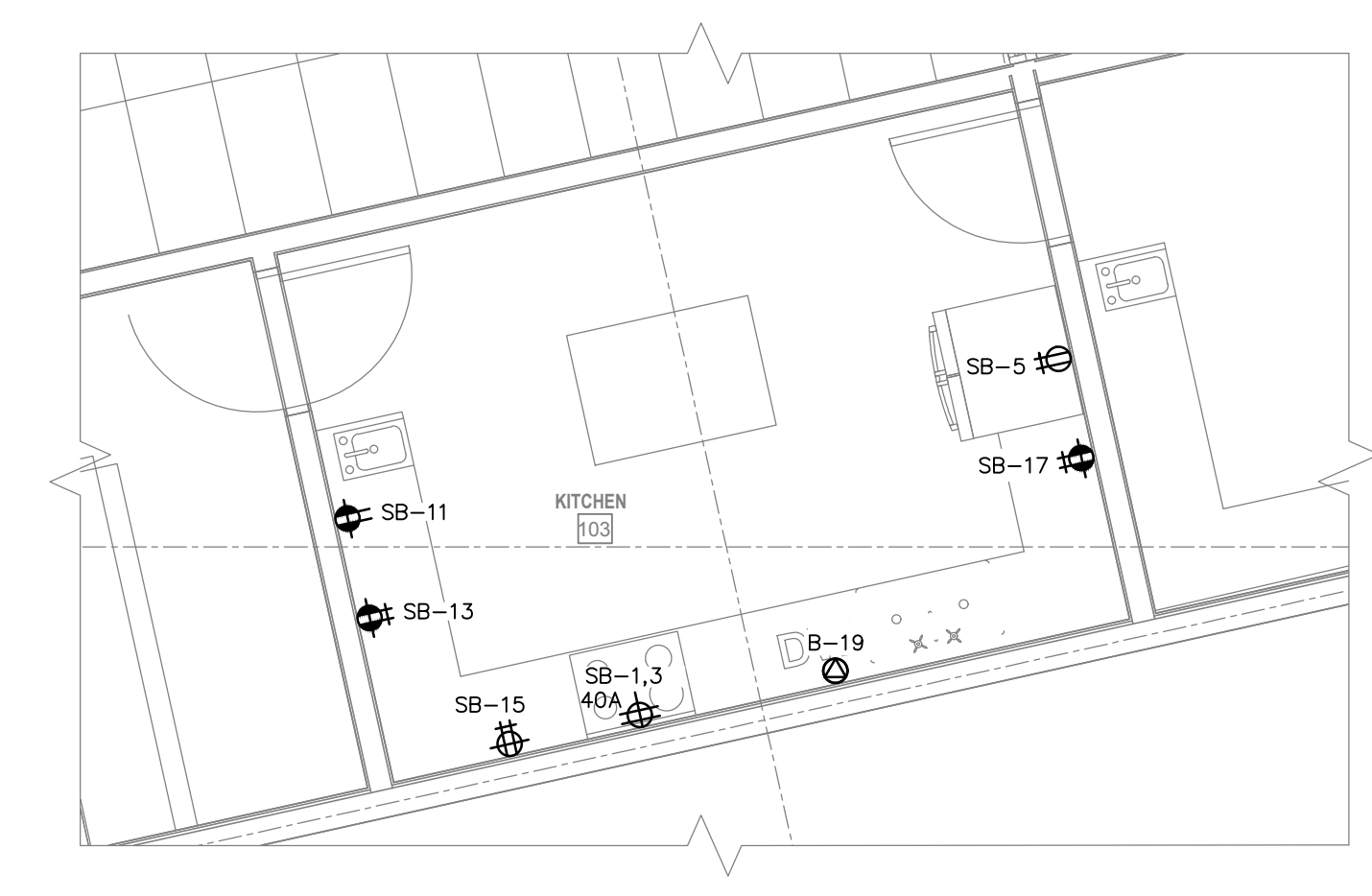
1
E3.01 ELECTRICAL LEVEL 1(B) - POWER & SYSTEMS

SHEET SIZE: 36"x48"



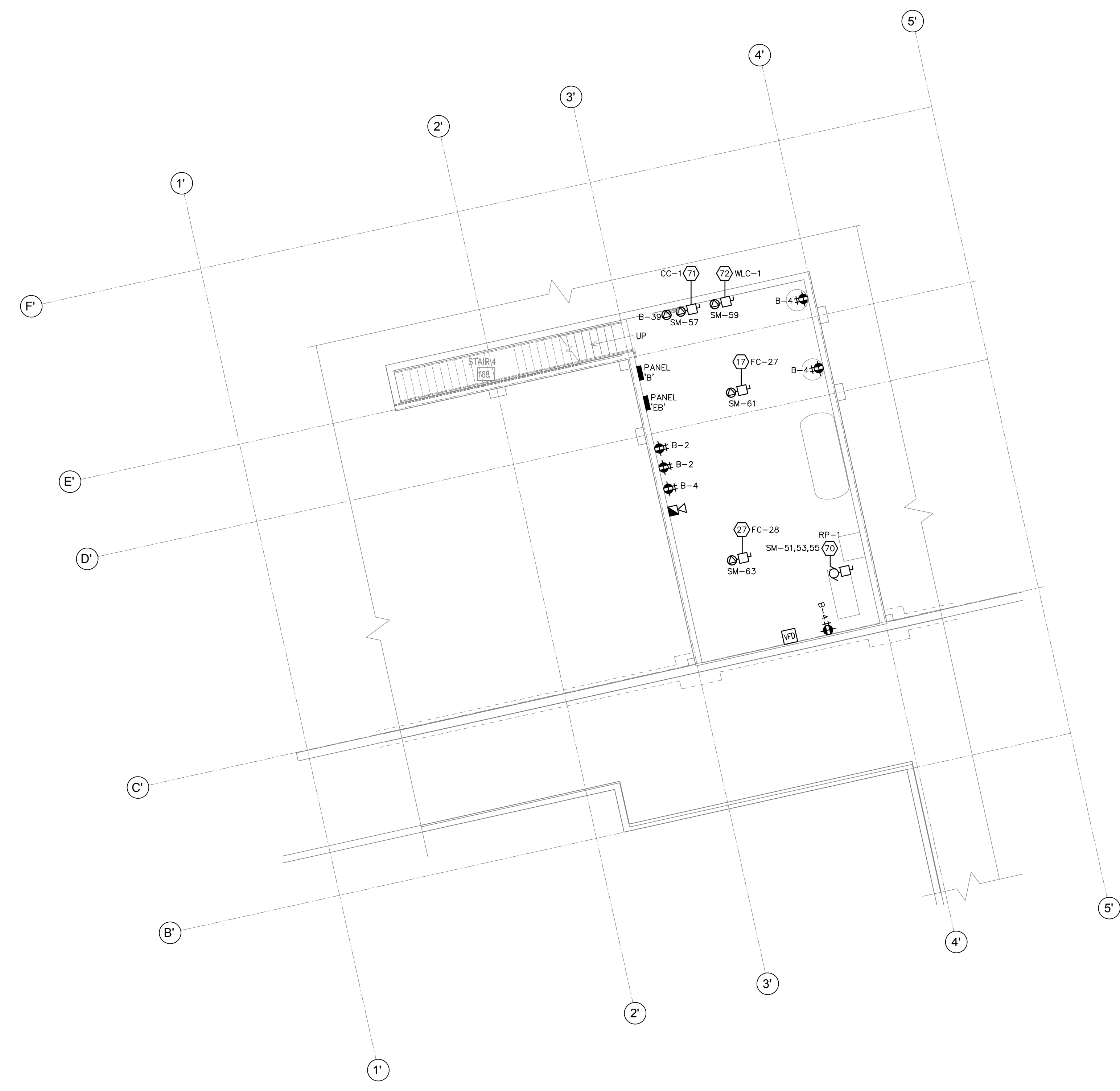
2
E3.01 ELECTRICAL ROOM 135 ENLARGEMENT - POWER & SYSTEMS

SCALE: 1:50



3
E3.01 KITCHEN ENLARGEMENT - POWER & SYSTEMS

SCALE: 1:50



4
E3.01 ELECTRICAL LEVEL 0 - POWER & SYSTEMS

SCALE: 1:100

THE ASSOCIATION OF PROFESSIONAL ENGINEERS AND PROFESSIONAL ARCHITECTS OF THE PROVINCE OF CHARLOTTETOWN HAS REVIEWED THESE DRAWINGS AND CONFIRMS THEIR VALUE FOR THE YEAR 2023

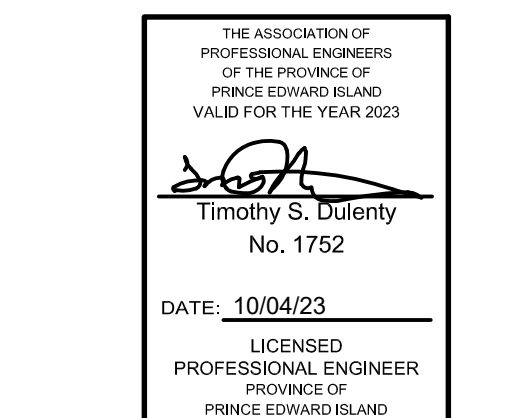
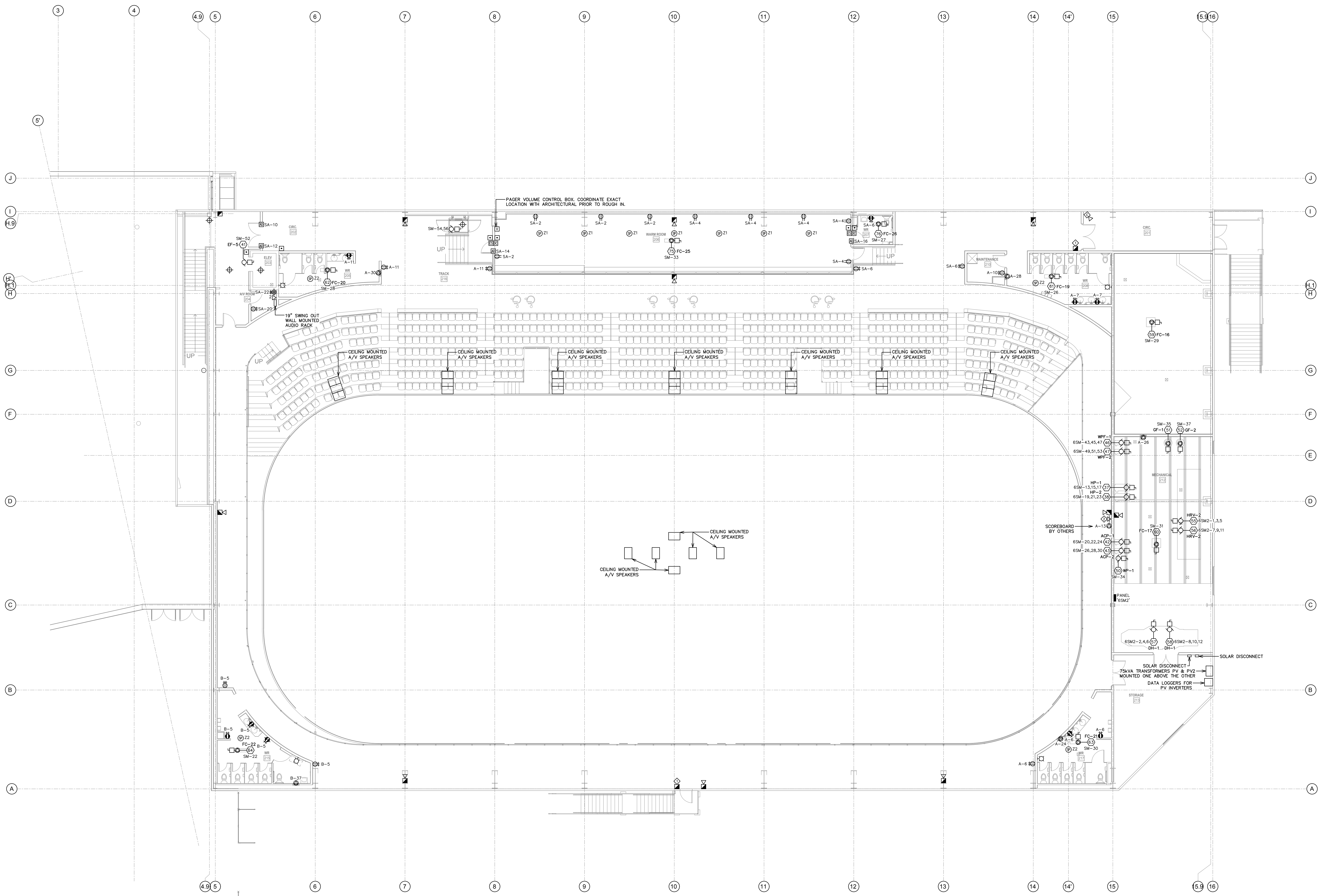
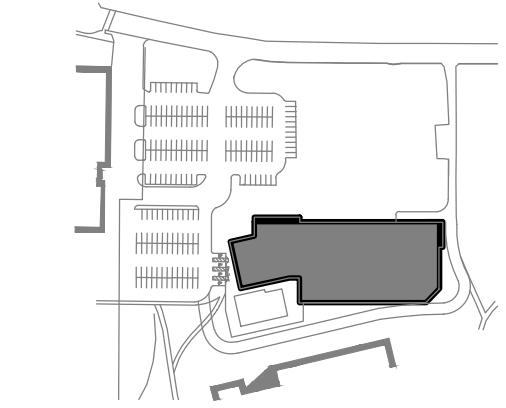
Timothy S. Clancy
 No. 1752
 DATE: 10/04/23
 LICENSED PROFESSIONAL ENGINEER (PROV. OF CHARLOTTETOWN)

NO.	REVISION	DATE
0	TRG ISSUED FOR TENDER	2023.04.10

PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 CHARLOTTETOWN
 SUBJECT:

PROJECT NO.: Z1111
 DRAWN BY: J.A.
 CHECKED BY: T.D.
 SCALE: AS INDICATED

ELECTRICAL FLOOR PLAN LEVEL 1(B) - POWER & SYSTEMS



NO.	REVISION	DATE
0	TRN ISSUED FOR TENDER	2023.04.10

PROJECT NAME:
SIMMONS SPORTS CENTRE
ARENA & POOL REPLACEMENT
CHARLOTTETOWN
SUBJECT:

PROJECT NO.: Z1111
DRAWN BY: J.A.
CHECKED BY: T.D.
SCALE: AS INDICATED

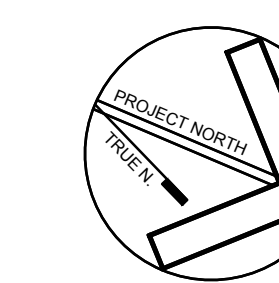
ELECTRICAL FLOOR
PLAN LEVEL 2 ARENA
- POWER & SYSTEMS

GENERAL NOTES:

- SPEAKER WIRES SHALL BE 16/2 CABLING DAISY CHAINING SPEAKERS IN THE SAME ZONE WHERE PRACTICAL.
- ALL WALL MIXERS REQUIRE A HOME-RUN CAT6 CABLE FROM THE AV RACK IN ROOM 004.

SEEDING NOTES:

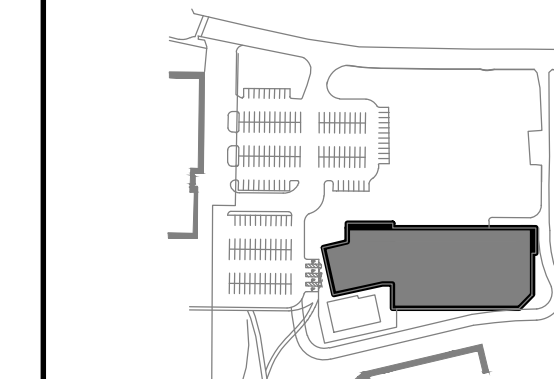
- CONTRACTOR SHALL SUPPLY AND INSTALL NON-ADDRESSABLE FIRE ALARM DEVICES IN AREAS WHERE TEMPERATURE IS TOO LOW FOR ADDRESSABLE DEVICES. WIRE DEVICES TO REMOTE INPUT MODULE AND THE INPUT MODULE INTO THE INITIATION LOOP.
- CONFIRM EXACT REQUIREMENTS AND MOUNTING HEIGHT OF SCOREBOARD PRIOR TO ROUGH IN.



CLIENT

CHARLOTTETOWN

KEY PLAN

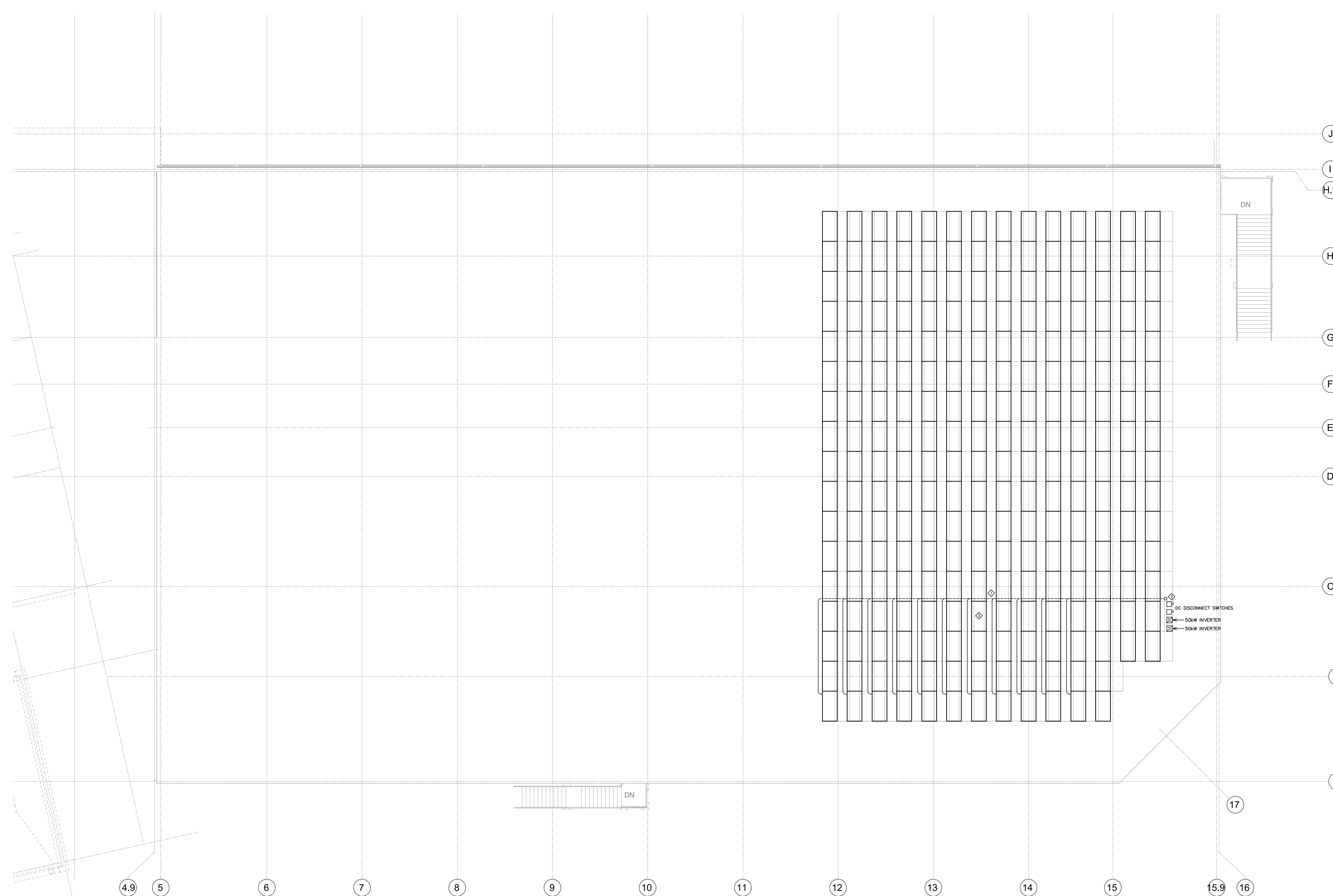


CONSULTANT

DSRA

1501 422 9990 | 1478 Spring Garden Street, 4th Floor
1501 422 9450 | Halifax, Nova Scotia, CAN. B3J 1G7

M&W Maricor
77 VAUGHAN HARBOUR BLVD. SUITE 200
MONCTON, NB E1C 0K2
BUS: (506) 857-8880 FAX: (506) 859-8393
WWW.M&W.COM ENG. REG. NO. 16211004



THE ASSOCIATION OF PROFESSIONAL ENGINEERS AND THE PROVINCE OF CHARLOTTETOWN HAVE REVIEWED THIS PLAN AND CONFIRMED THAT IT COMPLIES WITH THE REQUIREMENTS OF THE PROFESSIONAL ENGINEERING ACT AND REGULATIONS THEREUNDER.
DATE: 10/04/23
No. 1752
TIMOTHY S. BURNETT
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF CHARLOTTETOWN

NO.	REVISION	DATE
0	TRN ISSUED FOR TENDER	2023.04.10

PROJECT NAME:
SIMMONS SPORTS CENTRE
ARENA & POOL REPLACEMENT
CHARLOTTETOWN
SUBJECT:

PROJECT NO.: Z1111
DRAWN BY: J.A.
CHECKED BY: J.D.
SCALE: AS INDICATED

ELECTRICAL ROOF
PLAN - POWER &
SYSTEMS

- SPECIFIC NOTES:**
- ◇ ALL DC STRING CABLING C/W RODENT GUARD FASTENED TO THE BACK OF PV PANELS.
 - ◇ ROOF PENETRATION FOR AC CABLING TO TRANSFORMERS, FASTEN DC DISCONNECTS TO ROOF PEDISTAL.
 - ◇ ROOF MOUNTED SOLAR ARRAY, PROVIDE BONDING AND PV SOLAR BONDING TO THE PANELS 15' FACING SOUTH, COORDINATE WITH STRUCTURAL FOR RACKING CONNECTIONS TO STRUCTURAL STEEL.

MECHANICAL SCHEDULE table with columns: NO., ITEM, DESCRIPTION, LOCATION, LOAD, VOLTS, #, BREAKER, FEEDER, DISCONNECT, STARTER, PANEL, NOTES. Includes items 1-49 and 50-107.

NOTES: 1. FUTURE CONNECTION. 2. VERIFY CORRECT CONDUCTOR SIZES FOR VOLTAGE DROPS PRIOR TO START OF WORK. 3. DEVICES ARE TO BE SUPPLIED AS PART OF TP#7. TP#7 CONTRACTOR SHALL PROVIDE THE BREAKER, TP#7 CONTRACTOR SHALL SUPPLY AND INSTALL CONDUIT AND WIRE AS INDICATED ON THE SCHEDULE TO THE DESIGNATED EQUIPMENT.

STARTER LEGEND: MS= MANUAL TYPE MOTOR STARTER C/W O/L PROTECTION. HSM= MAGNETIC STARTER C/W HAND/OFF/AUTO SELECTOR SWITCH. VFD= VARIABLE FREQUENCY DRIVE, SUPPLIED BY MECHANICAL CONTRACTOR, WREY BY ELECTRICAL CONTRACTOR.

1 E4.00 MECHANICAL SCHEDULE

N.T.S.

LUMINAIRE SCHEDULE table with columns: TYPE, MANUFACTURER, DESCRIPTION, VOLTAGE, MOUNTING, SOURCE, NOTES. Includes items E4, E4R, E8, E8S, F1K, F1K, F2, F2, F3, F4, F4, F4, F4, G.

NOTES: 1. COORDINATE WITH ARCHITECT FOR EXACTING ROUTING OF FIXTURE IN WALL. 2. COLOR BY ARCHITECT. 3. PROVIDE ALL ACCESSORIES AND MOUNTING HARDWARE FOR A FULL AND COMPLETE WORKING SYSTEM. 4. NUMBER IN PARENTHESES REPRESENTS NUMBER OF LUMINAIRES. 5. BOTTOM OF LUMINAIRE TO BE FLUSH WITH UNDERSIDE OF SLATS. 6. COMPLETE WITH NOVA POLE #N24K4LD. REFER TO SITE PLAN FOR POLE QUANTITIES AND FIXTURE ORIENTATION PRIOR TO ORDERING.

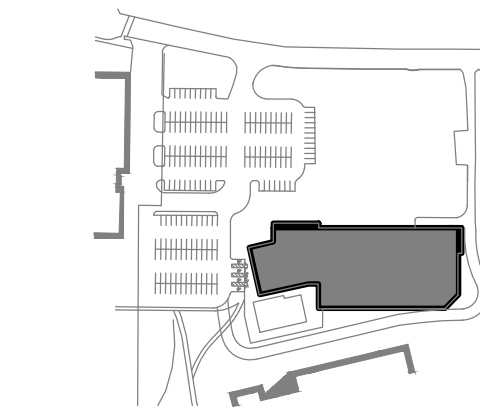
2 E4.00 LUMINAIRE SCHEDULE

N.T.S.

CHARLOTTETOWN logo, KEY PLAN diagram, CONSULTANT DSRA logo, and MCW Maricor logo with contact information.

Professional Engineer stamp for Timothy S. Bentley, dated 10/04/23, and project information for SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT.

ELECTRICAL SCHEDULES E4.00



CABLE & CONDUIT SCHEDULE - COPPER

MAX BREAKER SIZE	REF	WIRE SIZE	AMP	CONDUIT SIZE			BONDING CONDUCTOR
				4C	3C	2C	
15	F1	#12	25	21 (1/2")	21 (1/2")	21 (1/2")	F10
20	F2	#12	25	21 (1/2")	21 (1/2")	21 (1/2")	F10
30	F3	#10	35	27 (1/2")	27 (1/2")	27 (1/2")	F10
40	F4	#8	50	37 (1/2")	37 (1/2")	37 (1/2")	F10
60	F5	#6	75	48 (1/2")	48 (1/2")	48 (1/2")	F6
80	F6	#4	100	61 (1/2")	61 (1/2")	61 (1/2")	F6
100	F7	#3	150	81 (1/2")	81 (1/2")	81 (1/2")	F6
150	F8	#2	225	111 (1/2")	111 (1/2")	111 (1/2")	F6
200	F9	#1	300	141 (1/2")	141 (1/2")	141 (1/2")	F6
250	F10	#1	300	141 (1/2")	141 (1/2")	141 (1/2")	F6
300	F11	#1	300	141 (1/2")	141 (1/2")	141 (1/2")	F6
350	F12	#1	300	141 (1/2")	141 (1/2")	141 (1/2")	F6
400	F13	#1	300	141 (1/2")	141 (1/2")	141 (1/2")	F6
450	F14	#1	300	141 (1/2")	141 (1/2")	141 (1/2")	F6
500	F15	#1	300	141 (1/2")	141 (1/2")	141 (1/2")	F6

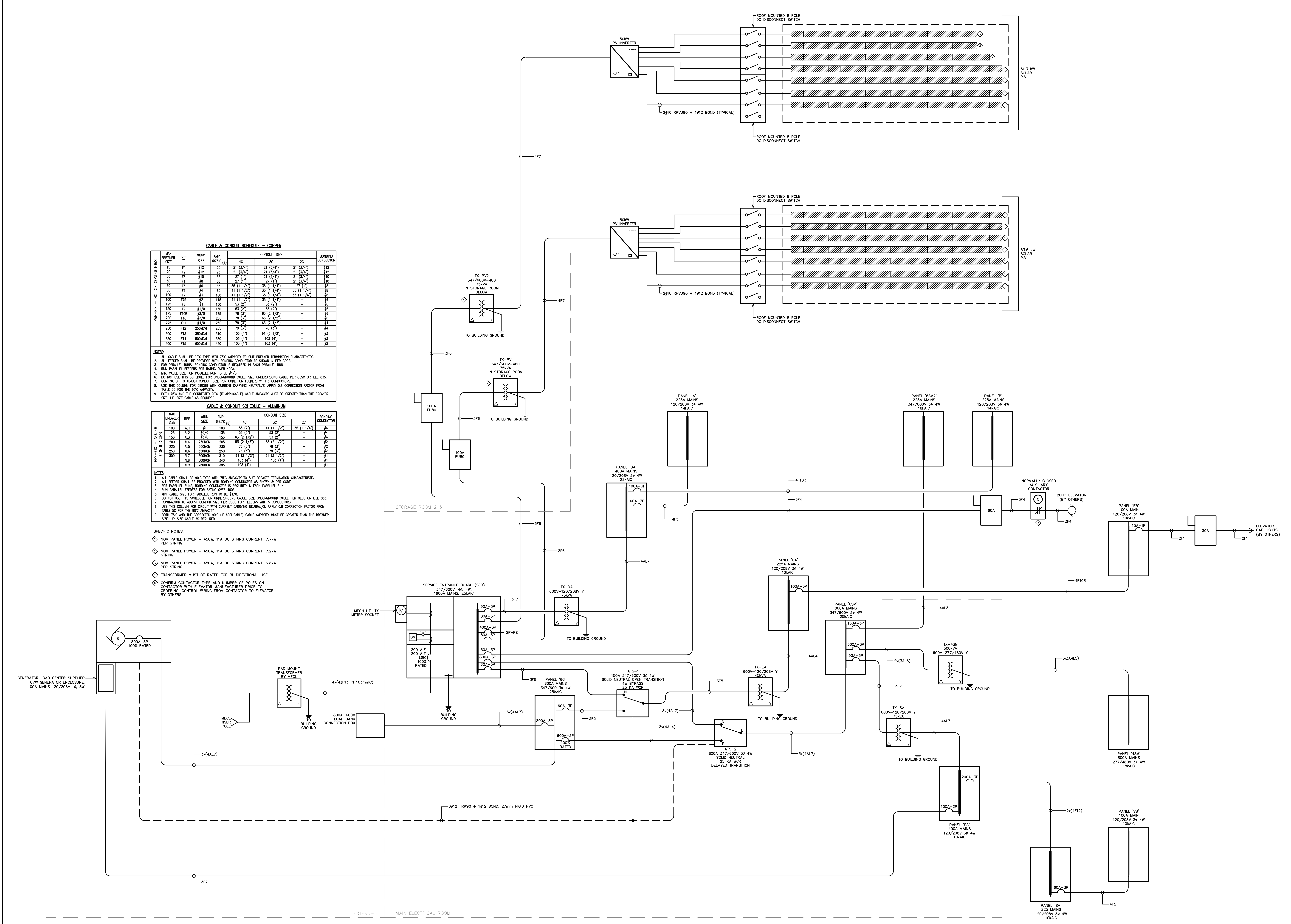
- NOTES:**
- ALL CABLE SHALL BE 90°C TYPE WITH 70°C AMPACITY TO SUIT BREAKER TERMINATION CHARACTERISTIC.
 - ALL FEEDER SHALL BE PROVIDED WITH BONDING CONDUCTOR AS SHOWN & PER CODE.
 - FOR PARALLEL RING BONDING CONDUCTOR IS REQUIRED IN EACH PARALLEL RUN.
 - RUN PARALLEL FEEDERS FOR RATING OVER 400A.
 - MIN CABLE SIZE FOR PARALLEL RUN TO BE #1/0.
 - DO NOT USE THIS SCHEDULE FOR UNDERGROUND CABLE. SEE UNDERGROUND CABLE PER OESC OR IEEE 835.
 - CONDUCTOR TO ADJUST CONDUIT SIZE PER CODE FOR FEEDERS WITH 5 CONDUCTORS.
 - USE THIS COLUMN FOR CIRCUIT WITH CURRENT CARRYING NEUTRAL/S. APPLY O&B CORRECTION FACTOR FROM TABLE 5C FOR THE 90°C AMPACITY.
 - BOTH 75°C AND THE CORRECTED 90°C (IF APPLICABLE) CABLE AMPACITY MUST BE GREATER THAN THE BREAKER SIZE. UP-SIZE CABLE AS REQUIRED.

CABLE & CONDUIT SCHEDULE - ALUMINUM

MAX BREAKER SIZE	REF	WIRE SIZE	AMP	CONDUIT SIZE			BONDING CONDUCTOR
				4C	3C	2C	
100	A1	#1	100	33 (1/2")	41 (1/2")	38 (1/2")	F4
125	A2	#1/0	135	33 (1/2")	33 (1/2")	33 (1/2")	F4
150	A3	#1/0	150	43 (1/2")	43 (1/2")	43 (1/2")	F4
200	A4	250MCM	200	63 (1/2")	63 (1/2")	63 (1/2")	F2
225	A5	300MCM	225	78 (1/2")	78 (1/2")	78 (1/2")	F2
250	A6	300MCM	250	78 (1/2")	78 (1/2")	78 (1/2")	F2
300	A7	300MCM	300	91 (1/2")	91 (1/2")	91 (1/2")	F1
350	A8	300MCM	350	103 (1/2")	103 (1/2")	103 (1/2")	F1
400	A9	300MCM	385	103 (1/2")	103 (1/2")	103 (1/2")	F1

- NOTES:**
- ALL CABLE SHALL BE 90°C TYPE WITH 70°C AMPACITY TO SUIT BREAKER TERMINATION CHARACTERISTIC.
 - ALL FEEDER SHALL BE PROVIDED WITH BONDING CONDUCTOR AS SHOWN & PER CODE.
 - FOR PARALLEL RING BONDING CONDUCTOR IS REQUIRED IN EACH PARALLEL RUN.
 - RUN PARALLEL FEEDERS FOR RATING OVER 400A.
 - MIN CABLE SIZE FOR PARALLEL RUN TO BE #1/0.
 - DO NOT USE THIS SCHEDULE FOR UNDERGROUND CABLE. SEE UNDERGROUND CABLE PER OESC OR IEEE 835.
 - CONDUCTOR TO ADJUST CONDUIT SIZE PER CODE FOR FEEDERS WITH 5 CONDUCTORS.
 - USE THIS COLUMN FOR CIRCUIT WITH CURRENT CARRYING NEUTRAL/S. APPLY O&B CORRECTION FACTOR FROM TABLE 5C FOR THE 90°C AMPACITY.
 - BOTH 75°C AND THE CORRECTED 90°C (IF APPLICABLE) CABLE AMPACITY MUST BE GREATER THAN THE BREAKER SIZE. UP-SIZE CABLE AS REQUIRED.

- SPECIFIC NOTES:**
- ◇ NOM PANEL POWER - 450W, 11A DC STRING CURRENT, 7.2kW PER STRING
 - ◇ NOM PANEL POWER - 450W, 11A DC STRING CURRENT, 7.2kW STRING
 - ◇ NOM PANEL POWER - 450W, 11A DC STRING CURRENT, 8.8kW PER STRING
 - ◇ TRANSFORMER MUST BE RATED FOR BI-DIRECTIONAL USE.
 - ◇ CONFIRM CONTACTOR TYPE AND NUMBER OF POLES ON CONTACTOR WITH ELEVATOR MANUFACTURER PRIOR TO ORDERING. CONTROL WIRING FROM CONTACTOR TO ELEVATOR BY OTHERS.



THE ASSOCIATION OF PROFESSIONAL ENGINEERS AND ARCHITECTS OF NEW BRUNSWICK
 MEMBER REGISTERED UNDER THE PROFESSIONAL ENGINEERS ACT
 VALID FOR THE YEAR 2023

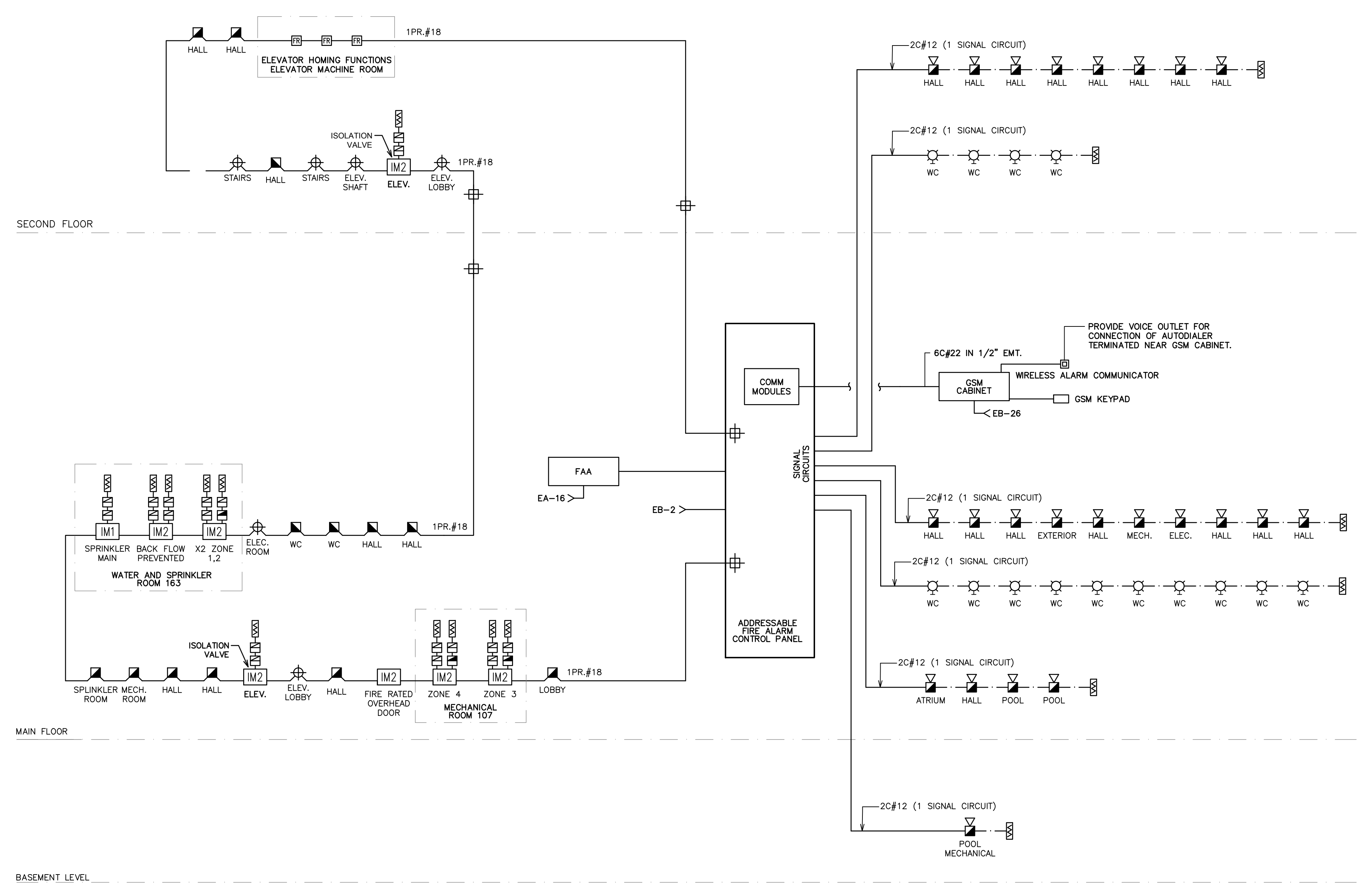
Timothy S. Blaney
 No. 1752
 DATE: 10/04/23
 LICENSED PROFESSIONAL ENGINEER
 (PRACTICE CONTRACT NUMBER)

NO.	TRG ISSUED FOR TENDER	2023.04.10
1	REVISION	DATE

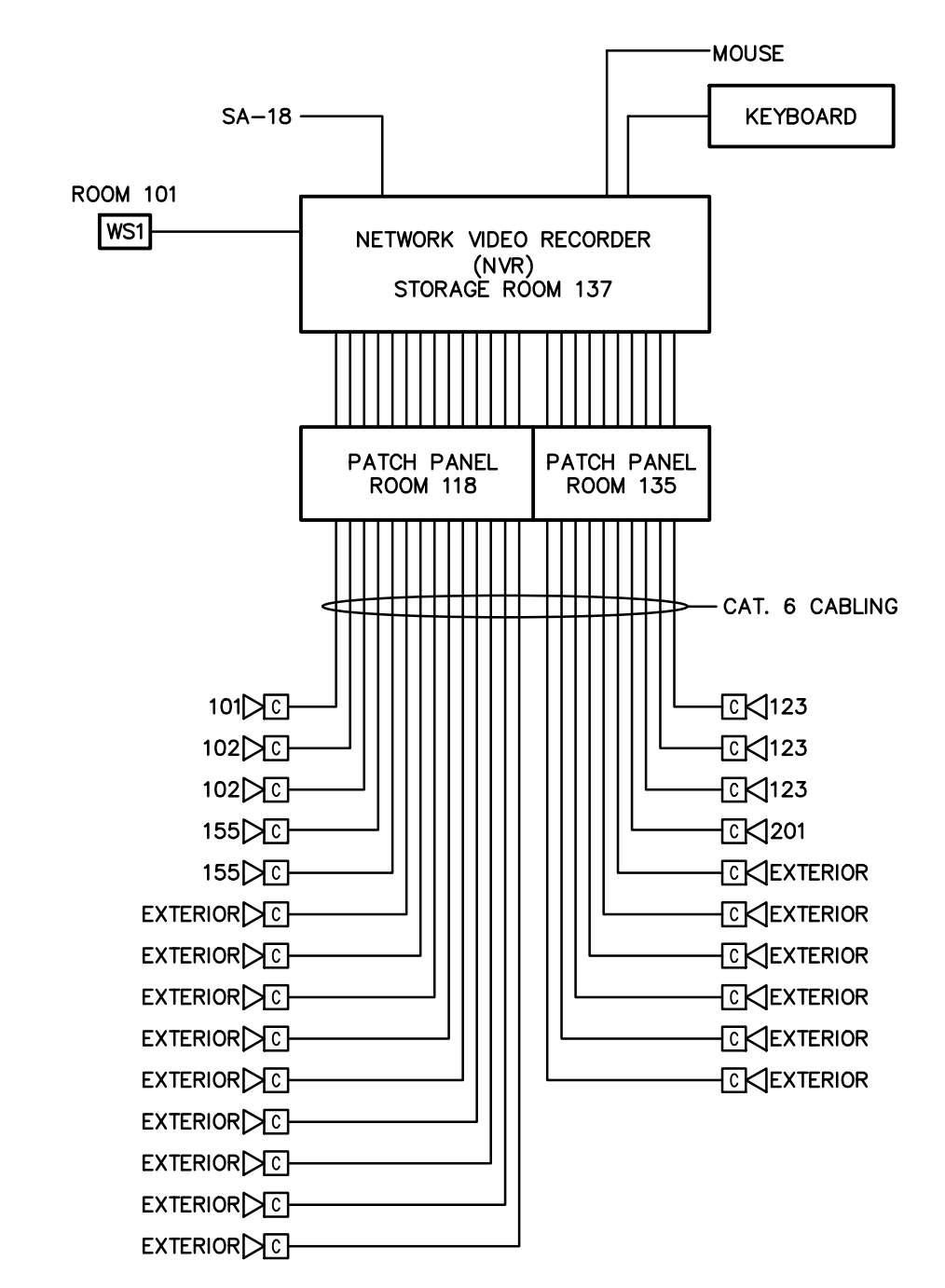
PROJECT NAME:
**SIMMONS SPORTS CENTRE
 ARENA & POOL REPLACEMENT**
 CHARLOTTETOWN
 NB

PROJECT NO.: 21111
 DRAWN BY: S.R.
 CHECKED BY: T.D.
 SCALE: AS INDICATED

ELECTRICAL POWER RISER

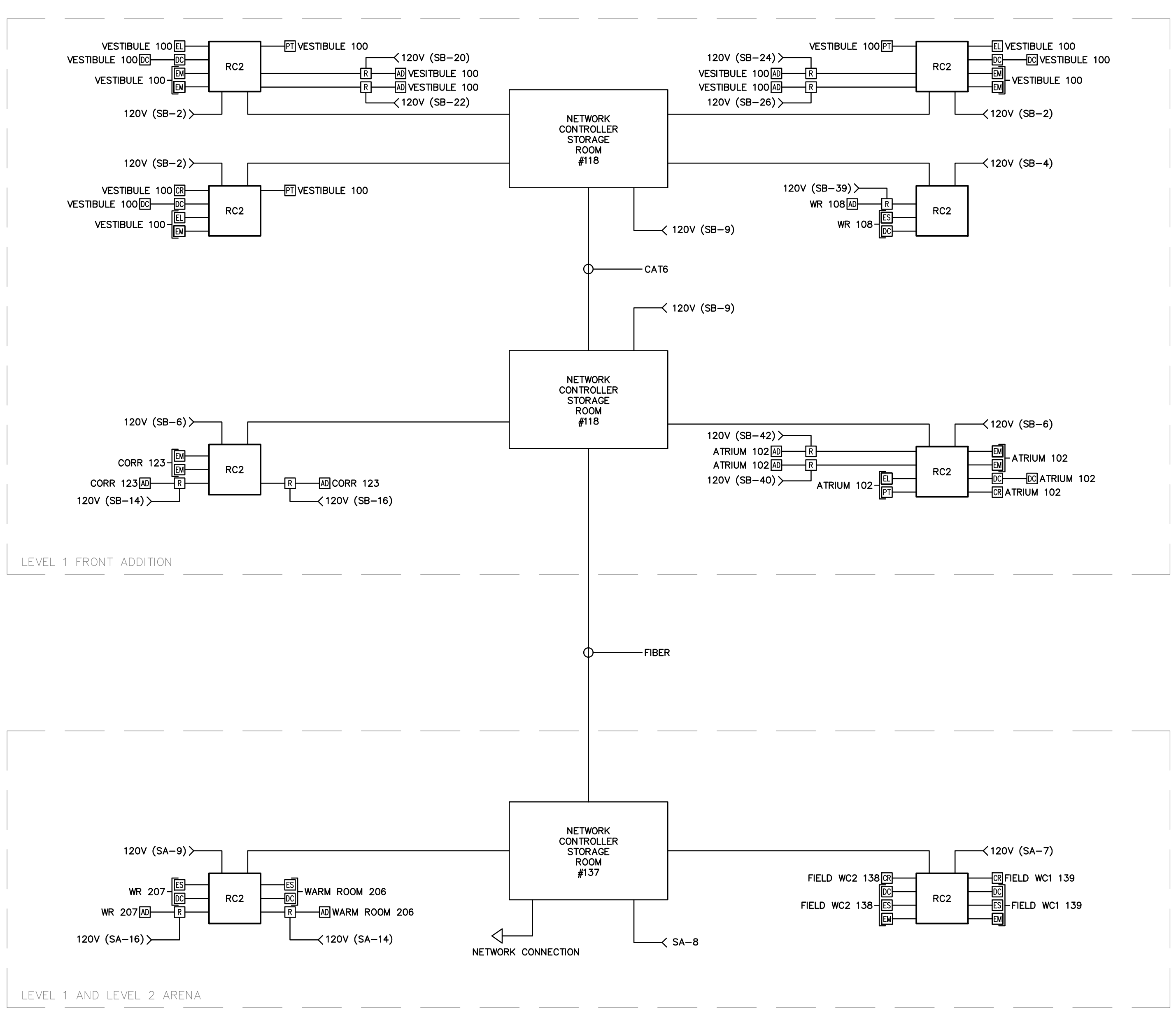


- FIRE ALARM SYSTEM NOTES:**
- ELECTRICAL CONTRACTOR SHALL COORDINATE EXACT LOCATION OF ALL FIRE ALARM EQUIPMENT ON SITE PRIOR TO BEGINNING.
 - WIRING IN EMT CONDUIT UNLESS NOTED OTHERWISE.
 - LIST OF ROOM TAGS SHALL BE SUBMITTED TO USER FOR APPROVAL PRIOR TO COMMENCING SYSTEM VERIFICATION.
 - FIRE ALARM RISER IS FOR GENERAL INFORMATION ONLY. SEQUENCING OF DEVICES WITHIN A ZONE MAY BE DONE DIFFERENTLY THAN THAT SHOWN. CONTRACTOR SHALL INDICATE ACTUAL DEVICE SEQUENCE FOR EACH ZONE FOR THIS SYSTEM AND PLANS, ONTO RECORD DRAWINGS. FIRE ALARM SYSTEM DEVICES SHALL REQUIRE VERIFICATION BY FACTORY TRAINED PERSONNEL. SUBMIT REPORT TO ENGINEER FOR REVIEW AND SUPPLY VERIFICATION CERTIFICATE FOR O&M MANUALS. CONFIRM QUANTITY OF DEVICES WITH FLOOR PLANS AND APPLICABLE CODES AND STANDARDS.
 - INITIATING DEVICE CIRCUIT SHALL BE 18/20 FAS 100V IN 1/2" CONDUIT.
 - NOTIFICATION APPLIANCE CIRCUIT SHALL BE #14 AND MINIMUM OF QUANTITY INDICATED, WITH CONDUIT TO SUIT.
 - ELECTRICAL CONTRACTOR SHALL SYNCHRONIZE ALL HORN/STROBES THROUGHOUT BUILDING. (TEMPORAL PATTERN).
 - ELECTRICAL CONTRACTOR SHALL SUPPLY AND INSTALL PASSIVE GRAPHIC ADJACENT FIRE ALARM CONTROL PANEL TO THE ENGINEER'S APPROVAL.
 - FIRE ALARM SYSTEM SHALL BE INSTALLED/VERIFIED/TESTED TO THE LATEST EDITION OF THE FOLLOWING STANDARDS:
 - CAN/ULC-5524-14 INSTALLATION OF FIRE ALARM SYSTEMS.
 - CAN/ULC-5536-13 INSPECTION AND TESTING OF FIRE ALARM SYSTEMS.
 - CAN/ULC-5537-13 VERIFICATION OF FIRE ALARM SYSTEMS.
 - CAN/ULC-5561-13 INSTALLATION AND SERVICES FOR FIRE SIGNAL RECEIVING CENTRES AND SYSTEMS.
 - CAN/ULC-5575-14 MASS NOTIFICATION.
 - FIRE ALARM CONTROL PANEL TO BE SUPPLIED WITH 2 METHODS OF CALL-OUT COMMUNICATIONS (AUTODIALER FOR VOICE AND GSM MODULE FOR CELL.) PROVIDE DEDICATED VOICE LINE NEXT TO GSM CABINET.
 - PROVIDE ISOLATION MODULES AS PER THE CAN/ULC 5524-14. (MINIMUM OF TWO FOR EACH FIRE ZONE.)
 - FIRE ALARM RISER IS FOR GENERAL INFORMATION ONLY. CONFIRM QUANTITY OF DEVICES WITH FLOOR PLANS AND APPLICABLE CODES AND STANDARDS.
 - PROVIDE (3) FIRE ALARM CONTROL RELAYS FOR ELEVATOR CONTROLLERS TO CARRY OUT THE FOLLOWING FUNCTIONS:
 - UPON RECEIVING SIGNAL FROM SHAFT OR MACHINE ROOM SMOKE DETECTOR, HOME ELEVATOR. (RELAY #1)
 - UPON RECEIVING SIGNAL FROM LOBBY SMOKE DETECTOR, HOME ELEVATOR TO ALTERNATE FLOOR. (RELAY #2)
 - UPON RECEIVING ALARM SIGNAL FROM FIRE ALARM CONTROL PANEL, HOME ELEVATOR. (RELAY #3)
 - COORDINATE PROGRAMMING WITH ELEVATOR INSTALLER.
 - ELECTRICAL CONTRACTOR SHALL MAKE ALL REQUIRED CONNECTIONS TO SPRINKLER SYSTEM. CONFIRM EXACT LOCATION AND QUANTITY OF SPRINKLER SYSTEM DEVICES WITH GENERAL CONTRACTOR AND SPRINKLER DRAWINGS PRIOR TO SUBMITTING TENDER PRICE. NO EXTRA COSTS WILL BE ENTERED BY THE OWNER.
 - ELECTRICAL CONTRACTOR TO PROVIDE APPROPRIATE ADDRESSABLE RELAY MODULES TO SHUT DOWN POWER TO AIR HANDLING UNITS UPON ACTIVATION OF FIRE ALARM SYSTEM.
 - SUPPLY AND INSTALL:
 - DIALER RED CABINET C/W BUILT-IN TRANSFORMER, MAIN BOARD, KEYPAD, 30 CELLULAR COMMUNICATOR AND BATTERIES. CABINET TO BE INSTALLED NEAR NEW FIRE ALARM CONTROL PANEL. INSTALLATION TO CONFORM TO CAN/ULC-5561, MODEL NO. #SC-3532-512HC.
 - KEYPAD TO BE MOUNTED NEXT TO DIALER RED CABINET C/W 3/4" NIPPLE TO CABINET.
 - (1) 120V DEDICATED CIRCUIT TO CABINET AS INDICATED.
 - (1) RUN OF 60#22 CABLE IN 3/4" EMT FROM DIALER RED CABINET TO FIRE ALARM CONTROL PANEL. TERMINATE AS REQUIRED. COORDINATE TERMINATION REQUIREMENTS WITH FIRE ALARM CONTROL PANEL AND DIALER MANUFACTURERS.
 - ENSURE PROPER CELLULAR RECEPTION FROM CELL SITE FOR GSM MODULE. IF SIGNAL IS NOT SUFFICIENT, PROVIDE AN EXTENDER ANTENNA.
 - DUCT-TYPE SMOKE DETECTOR SHALL BE INSTALLED IN THE SUPPLY DUCTWORK OF THE AIR-HANDLING UNITS. SHOULD DUCTWORK LAYOUT NOT BE SUITABLE FOR SINGLE DEVICE INSTALLATION, PROVIDE ADDITIONAL DEVICES AND INSTALL IN SUITABLE DUCTWORK PER CAN/ULC-5524-14.
 - COORDINATE WITH MECHANICAL TO SUPPLY POWER AND A DUAL INPUT MODULE FOR ALL COMBINATION FIRE/SMOKE DAMPERS TO MONITOR THE DAMPER END SWITCH AND THE INTERNAL SMOKE DETECTOR FOR TROUBLE AND ALARM SIGNALS RESPECTIVELY. IF COMBINATION FIRE/SMOKE DAMPERS ARE SUPPLIED WITHOUT INTEGRAL SMOKE DETECTION, PROVIDE DUCT DETECTORS ON EITHER SIDE OF THE DAMPER.

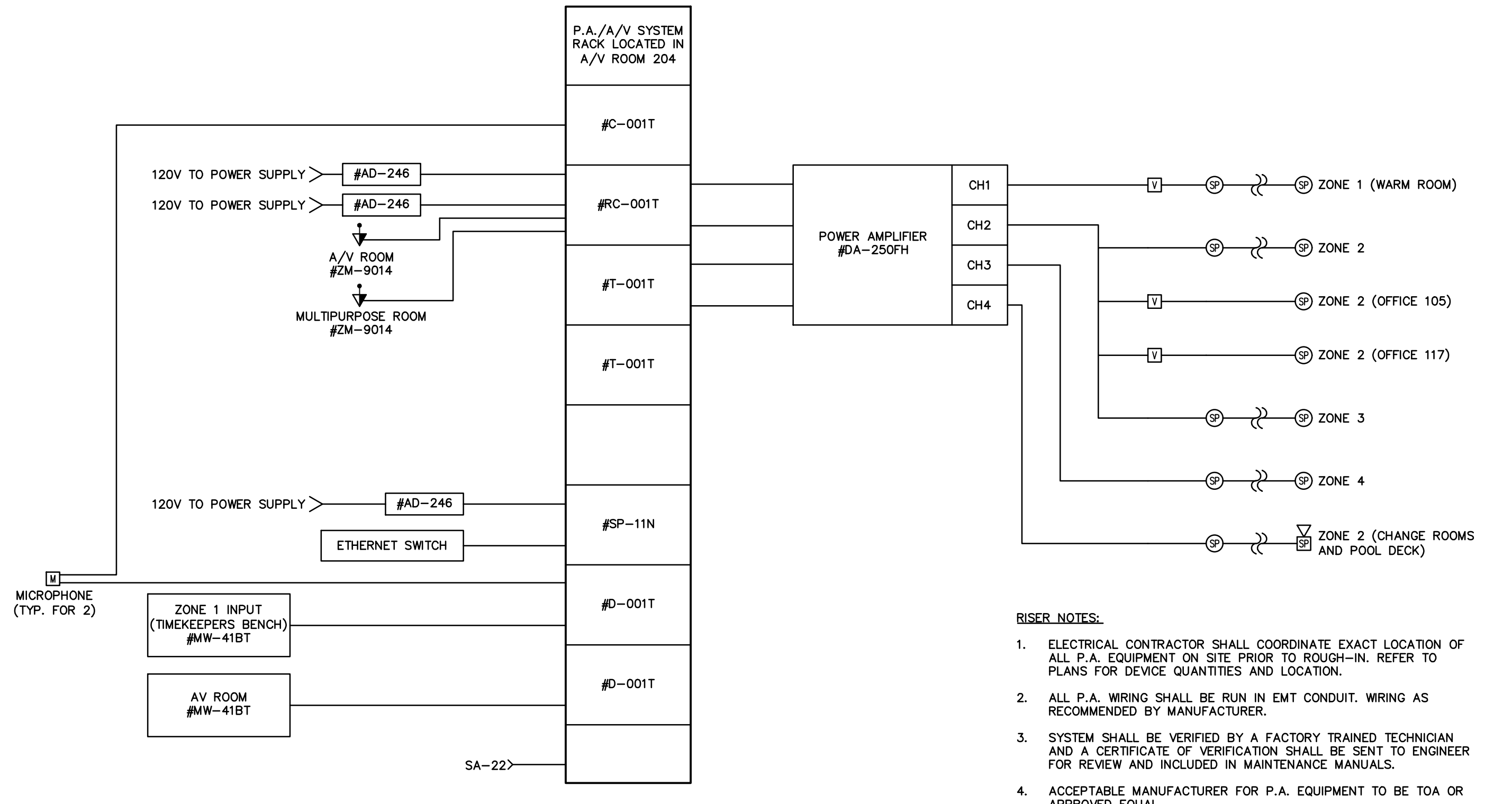


1
E5.01 FIRE ALARM RISER

2
E5.01 CCTV RISER



- DOOR ACCESS CONTROL NOTE:**
- ELECTRICAL CONTRACTOR SHALL COORDINATE QUANTITIES AND TYPES OF HARDWARE REQUIRED FOR ALL DOOR ACCESS CONTROL WITH ARCHITECT AND DOOR HARDWARE SUPPLIER PRIOR TO ORDERING.



- BSER NOTES:**
- ELECTRICAL CONTRACTOR SHALL COORDINATE EXACT LOCATION OF ALL P.A. EQUIPMENT ON SITE PRIOR TO BEGINNING. REFER TO PLANS FOR DEVICE QUANTITIES AND LOCATION.
 - ALL P.A. WIRING SHALL BE RUN IN EMT CONDUIT. WIRING AS RECOMMENDED BY MANUFACTURER.
 - SYSTEM SHALL BE VERIFIED BY A FACTORY TRAINED TECHNICIAN AND A CERTIFICATE OF VERIFICATION SHALL BE SENT TO ENGINEER FOR REVIEW AND INCLUDED IN MAINTENANCE MANUALS.
 - ACCEPTABLE MANUFACTURER FOR P.A. EQUIPMENT TO BE TOA OR APPROVED EQUAL.

THE ASSOCIATION OF PROFESSIONAL ENGINEERS AND ARCHITECTS OF NEW BRUNSWICK
 HAS REVIEWED THESE PLANS
 AND ISSUED THIS SEAL
 VALID FOR THE YEAR 2023
 Timothy S. Blaney
 No. 1752
 DATE: 10/04/23
 LICENSED PROFESSIONAL ENGINEER
 (PRACTICE CONTRACTING)

NO.	REVISION	DATE
0	TRN ISSUED FOR TENDER	2023.04.10

PROJECT NAME:
SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT
 CHARLOTTETOWN
 SUBJECT:

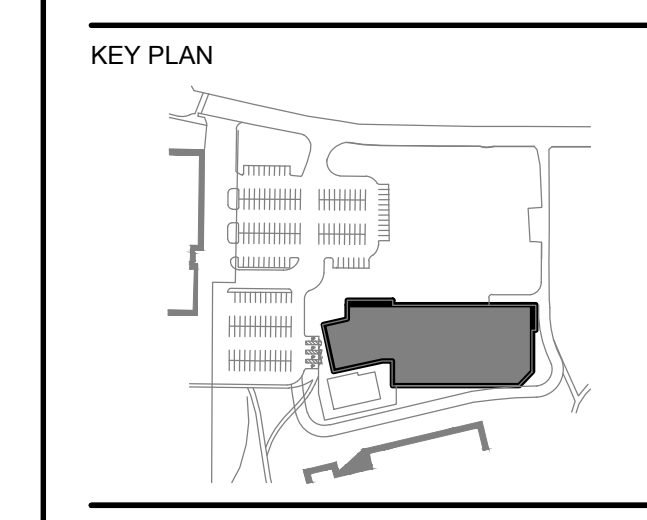
PROJECT NO.: Z1111
 DRAWN BY: S.R.
 CHECKED BY: T.D.
 SCALE: AS INDICATED

ELECTRICAL RISERS

3
E5.01 DOOR ACCESS RISER

4
E5.01 P.A. RISER

E5.01



PANEL VOLTAGE: 600 PANEL '65M' table with columns for CCT, DESCRIPTION, WATTAGE, BRKR, and PHASE LOADS.

PANEL VOLTAGE: 600 PANEL '65M2' table with columns for CCT, DESCRIPTION, WATTAGE, BRKR, and PHASE LOADS.

PANEL VOLTAGE: 480 PANEL '45M' table with columns for CCT, DESCRIPTION, WATTAGE, BRKR, and PHASE LOADS.

PANEL VOLTAGE: 208 PANEL 'SA' table with columns for CCT, DESCRIPTION, WATTAGE, BRKR, and PHASE LOADS.

PANEL VOLTAGE: 208 PANEL 'EA' table with columns for CCT, DESCRIPTION, WATTAGE, BRKR, and PHASE LOADS.

PANEL VOLTAGE: 208 PANEL 'EB' table with columns for CCT, DESCRIPTION, WATTAGE, BRKR, and PHASE LOADS.

PANEL VOLTAGE: 208 PANEL 'A' table with columns for CCT, DESCRIPTION, WATTAGE, BRKR, and PHASE LOADS.

PANEL VOLTAGE: 208 PANEL 'B' table with columns for CCT, DESCRIPTION, WATTAGE, BRKR, and PHASE LOADS.

PANEL VOLTAGE: 208 PANEL 'SM' table with columns for CCT, DESCRIPTION, WATTAGE, BRKR, and PHASE LOADS.

PANEL VOLTAGE: 208 PANEL 'SB' table with columns for CCT, DESCRIPTION, WATTAGE, BRKR, and PHASE LOADS.

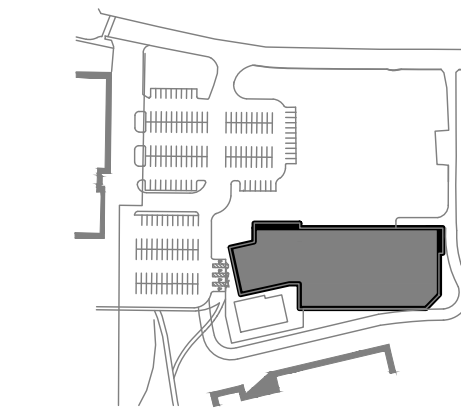
Professional Engineer signature and stamp for Timothy S. Stierly.

TPS ISSUED FOR TENDER 2023.04.10

PROJECT NAME: SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT

PROJECT NO.: 21111 DRAWN BY: J.A. CHECKED BY: T.D. SCALE: AS INDICATED

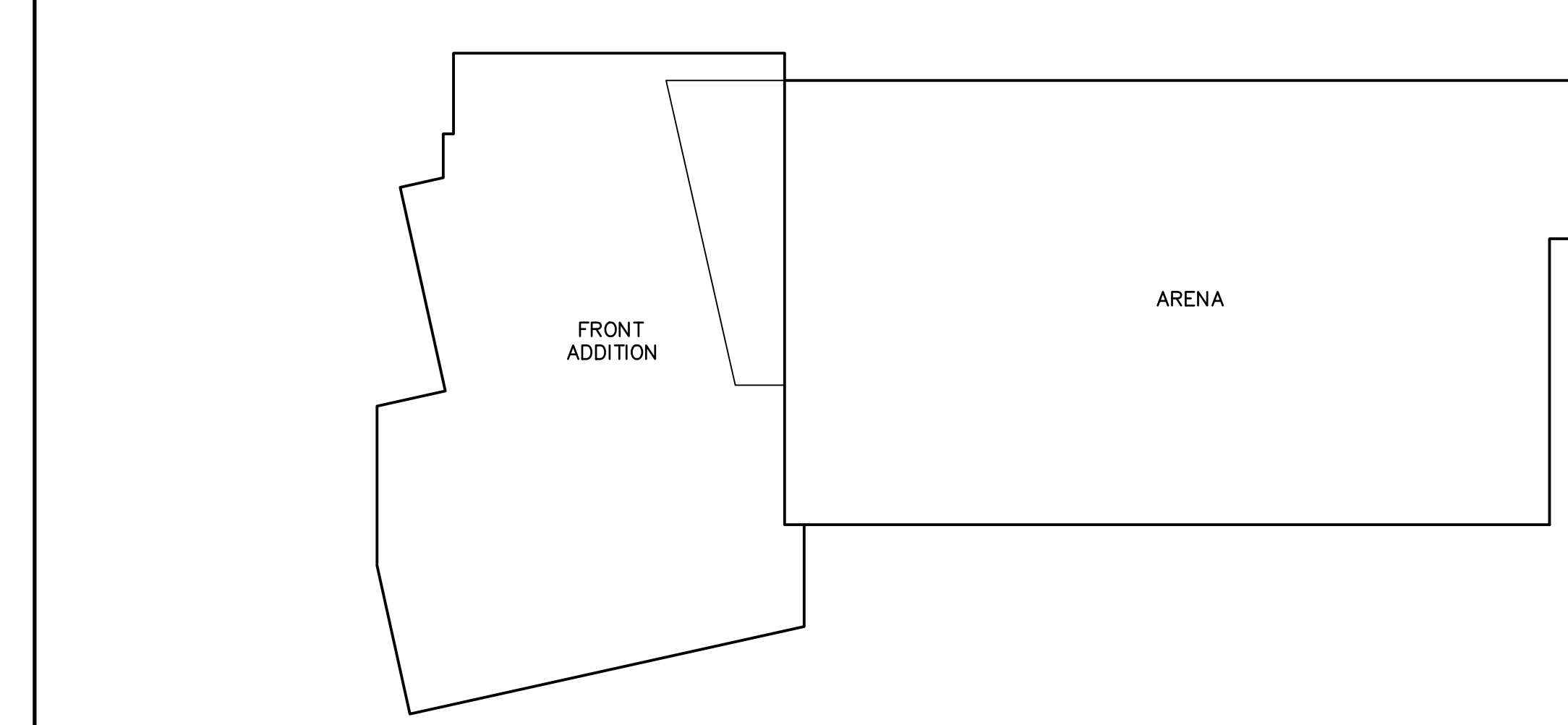
ELECTRICAL PANEL SCHEDULES



MCW Consultants Ltd.

SYMBOL LEGEND

SINGLE LINE PIPE FITTINGS			
	PLUG VALVE		SAFETY OR RELIEF VALVE
	PINCH VALVE		QUICK OPEN OR CLOSE
	THREE-WAY VALVE		HOSE BIBB VALVE
	TWO-WAY CONTROL VALVE		LOCK SHIELD
	THREE-WAY CONTROL VALVE		HAND WHEEL RISE STEM (OS&Y)
	NEEDLE VALVE		GEAR OPERATED MANUAL VALVE
	SHUTOFF COCK		SOLENOID OPERATED VALVE
	SWING CHECK VALVE		VACUUM BREAKER
	SPRING TYPE CHECK VALVE		FLOW AND REGULATING VALVE
	MULTIPURPOSE SPRING TYPE CHECK VALVE		INVERTED BUCKET STEAM TRAP
	MULTIPURPOSE ANGLE VALVE		FLOAT AND THERMOSTATIC STEAM TRAP
	ANGLE STOP AND CHECK		THERMOSTATIC STEAM BIMETAL AND BELLOW
	FLOW MEASURING VALVE		THERMODYNAMIC (DISK) STEAM TRAP
	DIFFERENTIAL PRV REGULATOR		VARIABLE ORIFICE (PITON) STEAM TRAP
	DIFFERENTIAL REDUCING REGULATOR		SIGHT GLASS
	GAS PRV		FIXED ORIFICE STEAM TRAP
	BACK FLOW PREVENTER		HORIZONTAL VALVE
	CONTINUATION		HEAT TRACE
	SINGLE GAS SUPPLY VALVE		DOUBLE GAS SUPPLY VALVE
	AIR SUPPLY VALVE		FLOW DIRECTION
	WATER METER		PUMP
	THRUST BLOCK		FLANGE
	SCREWED UNION		90 DEGREE ELBOW
	45 DEGREE ELBOW		ELBOW UP
	ELBOW DOWN		BASE SUPPORTED ROUND ELBOW
	PIPE CAP		TEE
	TEE UP		TEE DOWN
	BOTTOM BRANCH		TOP BRANCH
	GATE VALVE		BALL VALVE
	BUTTERFLY VALVE		CONTROL BALANCING VALVE
	GLOBE VALVE		ANGLE GLOBE VALVE
	EXPANSION COMPENSATOR		FLEXIBLE CONNECTION



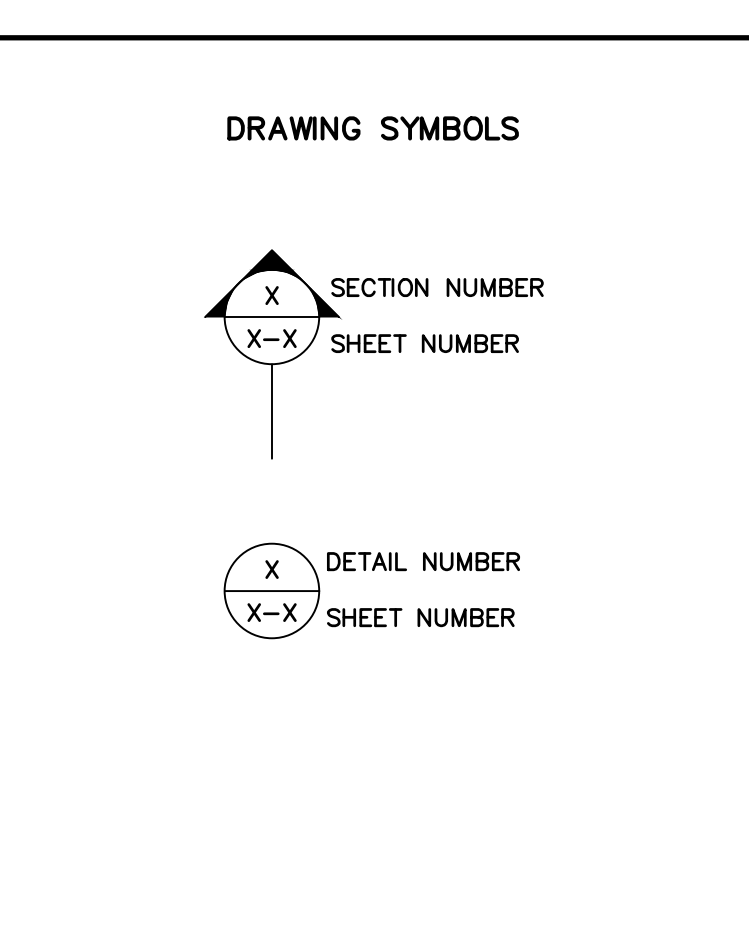
1 M0.00 KEY PLAN N.T.S.

FIRE PROTECTION	
	NEW TYPE 'A' UPRIGHT SPRINKLER HEAD QUICK RESPONSE 155T
	NEW TYPE 'B' UPRIGHT SPRINKLER HEAD INTERMEDIATE CLASSIFICATION QUICK RESPONSE 200T
	NEW TYPE 'C' RECESSED PENDENT QUICK RESPONSE SPRINKLER HEAD 155T c/w TWO PIECE ESCUTCHEON CUP
	NEW TYPE 'D' CONCEALED PENDENT SPRINKLER HEAD 155T c/w COVER PLATE
	NEW TYPE 'E' HORIZONTAL SIDEWALL SPRINKLER HEAD 155T
	NEW TYPE 'F' HORIZONTAL DRY SIDEWALL SPRINKLER QUICK RESPONSE 155T
	NEW TYPE 'N' INTERMEDIATE LEVEL UPRIGHT SPRINKLER HEAD 155T
	SPRINKLER HEAD WIRE GUARD
	LIGHTING FIXTURES REFER TO DIV. 26 ELECTRICAL
	OCCUPANCY SENSOR REFER TO DIV. 26 ELECTRICAL
	MECHANICAL SUPPLY DIFFUSER REFER TO DIV. 26 MECHANICAL
	MECHANICAL RETURN GRILLE REFER TO DIV. 26 MECHANICAL
	GYPSUM BOARD CEILING TYPE IDENTIFICATION
	EXPOSED TO STRUCTURE CEILING TYPE IDENTIFICATION
	LINER METAL PANEL CEILING TYPE IDENTIFICATION
	METAL DECK UNDERSIDE OF FLOOR ABOVE CEILING TYPE IDENTIFICATION
	STEEL LINER PANEL UNDERSIDE OF FLOOR ABOVE CEILING TYPE IDENTIFICATION
	ALUMINUM BAFFLE CEILING SUSPENDED ALUM. BLADES EXTERIOR WOOD SOFFIT
	METAL GRADING
	IDENTIFIED FINISH FLOOR TO FINISH CEILING HEIGHT
	ACOUSTIC TILE (T-BAR) CEILING TYPE IDENTIFICATION
	FIRE PROTECTION ZONE BOUNDARY AREA
	NEW FIRE PROTECTION MAIN
	PIPING TEE
	PIPING TEE UP
	PIPING TEE DOWN
	AUXILIARY DRAIN
	ISOLATION VALVE
	ELECTRICALLY SUPERVISED CONTROL VALVE
	PIPING TOP BRANCH
	PIPING BOTTOM BRANCH
	NEW RISER NIPPLE
	NEW FLOOR ZONE CONTROL ASSEMBLY ELECTRICALLY SUPERVISED (FLOW SWITCH AND CONTROL VALVE)
	WATER BACKFLOW PREVENTER DEVICE
	FIRE DEPARTMENT SIAMESE CONNECTION
	AUXILIARY DRAIN
	DRAIN PIPING
	PIPING RISER UP
	PIPING ELBOW
	PIPING ELBOW DOWN
	PIPING CAP
	4.5 kg ABC MULTI-PURPOSE DRY CHEMICAL FIRE EXTINGUISHER 4A-60BC c/w SEMI-RECESSED CABINET
	4.5 kg ABC MULTI-PURPOSE DRY CHEMICAL FIRE EXTINGUISHER 4A-60BC c/w WALL BRACKET
	2.2 kg ABC MULTI-PURPOSE DRY CHEMICAL FIRE EXTINGUISHER 4A-60BC c/w WALL BRACKET
	4.5 kg ABC MULTI-PURPOSE DRY CHEMICAL FIRE EXTINGUISHER 4A-60BC c/w SEMI-RECESSED FIRE RATED CABINET

PLUMBING & DRAINAGE	
	ROOF DRAIN
	FLOOR DRAIN
	HUB DRAIN
	HUB DRAIN
	FLOOR DRAIN
	CATCH BASIN
	INTERCEPTOR
	FLOOR DRAIN WITH TRAP
	FLOOR DRAIN FROM ABOVE
	STORM DRAIN FROM ABOVE
	CLEAN OUT PLUG
	CLEAN OUT FLOOR
	TRAP
	HOT / DRAIN / COLD CONNECTIONS
	WATER HAMMER ARRESTOR
	DCW DOMESTIC COLD WATER
	TW TEMPERED HOT WATER
	DHW DOMESTIC HOT WATER
	DHW DOMESTIC HOT WATER RECIRCULATION
	SAN SANITARY DRAIN ABOVE
	SAN SANITARY DRAIN BELOW
	V VENT
	SD STORM DRAIN ABOVE
	SD STORM DRAIN BELOW
	PG PROPANE GAS PIPING

GENERAL NOTES

1. NOT ALL SYMBOLS SHOWN ON THIS LEGEND ARE NECESSARILY USED ON THIS PROJECT.



MECHANICAL DRAWING LIST	
SHEET NO	DESCRIPTION
M0.00	COVER SHEET - MECHANICAL
M0.01	SITE PLAN - MECHANICAL
M1.00	ARENA ZONING FLOOR PLANS AND DESIGN APPROACH - FIRE PROTECTION
M1.01	LEVEL 1 (A) ARENA FLOOR PLAN - FIRE PROTECTION
M1.02	LEVEL 1 (B) & BASEMENT FLOOR PLANS - FIRE PROTECTION
M1.03	LEVEL 2 ARENA FLOOR PLAN - FIRE PROTECTION
M1.04	DETAILS - FIRE PROTECTION
M2.01	LEVEL 1(A) ARENA UNDERGROUND FLOOR PLAN - SANITARY & STORM
M2.02	LEVEL 1(B) & BASEMENT UNDERGROUND FLOOR PLANS - SANITARY & STORM
M2.03	LEVEL 1(A) ARENA FLOOR PLAN - SANITARY & STORM
M2.04	LEVEL 1 (B) & BASEMENT FLOOR PLANS - SANITARY & STORM
M2.05	LEVEL 2 ARENA FLOOR PLAN SANITARY & STORM
M2.06	ROOF PLAN - SANITARY & STORM
M2.07	LEVEL 1 ARENA FLOOR PLAN - DOMESTIC WATER
M2.08	LEVEL 1 (B) & BASEMENT FLOOR PLANS - DOMESTIC WATER
M2.09	LEVEL 2 ARENA FLOOR PLAN - DOMESTIC WATER
M2.10	DETAILS - PLUMBING
M3.00	PROPANE GAS PIPING

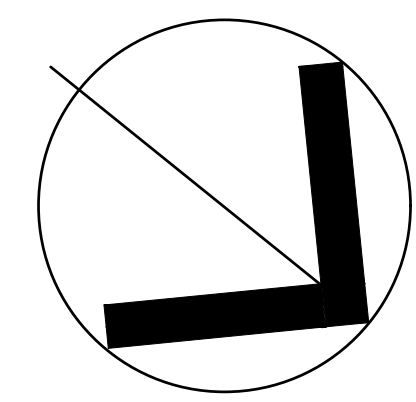


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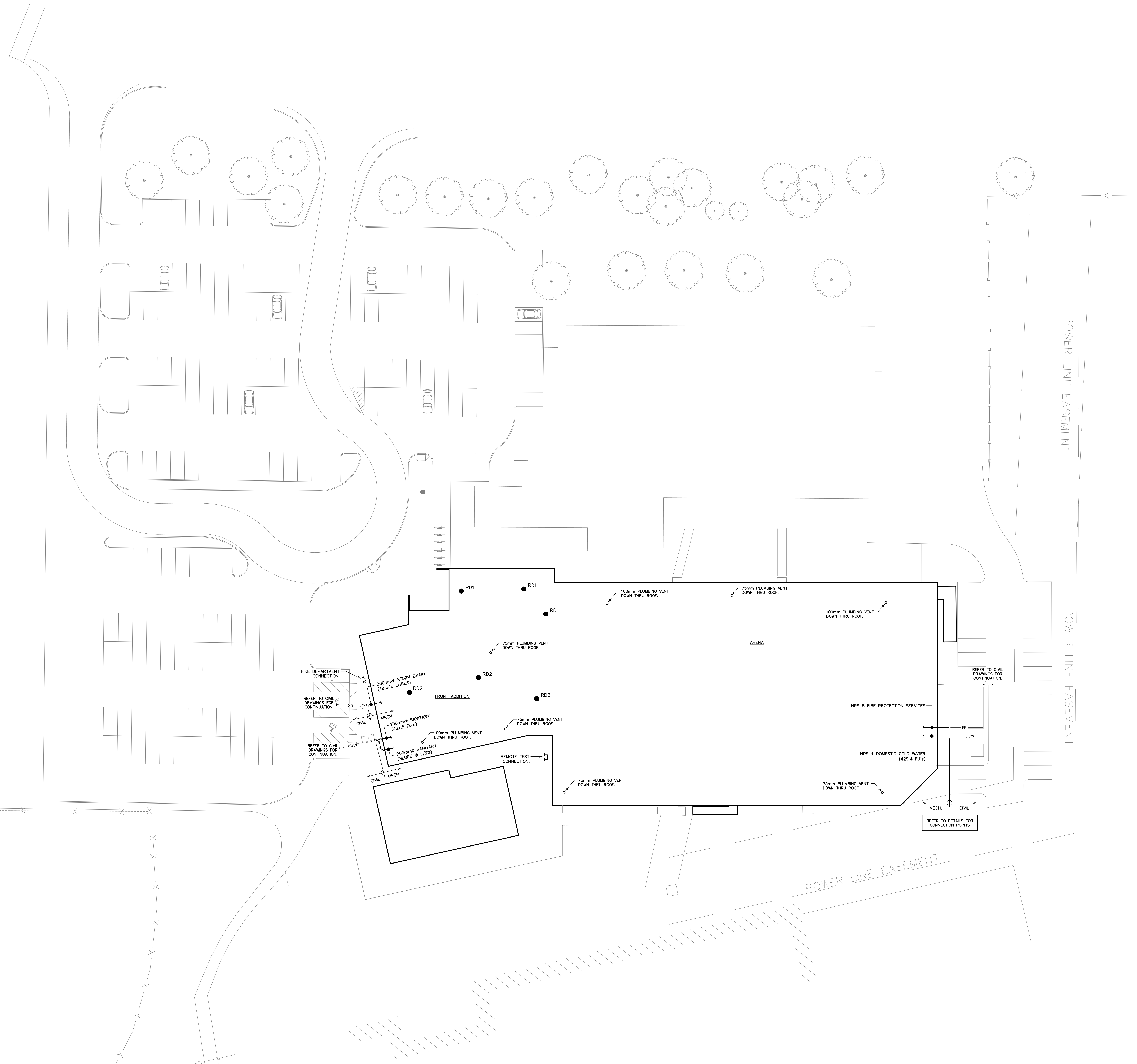
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**SIMMONS SPORTS CENTRE
 ARENA & POOL REPLACEMENT**
 CHARLOTTETOWN
 PE
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COVER SHEET -
 MECHANICAL



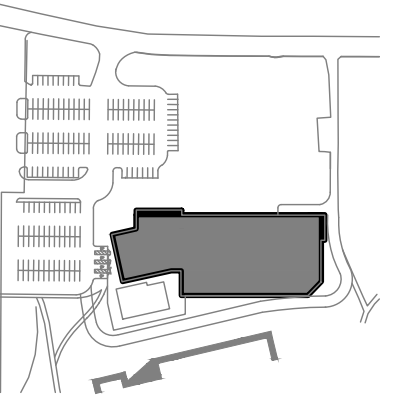
NORTH



CLIENT

CHARLOTTETOWN

KEY PLAN



CONSULTANT

DSRA

1 903 420 9990 | 1 878 Spring Garden Street, 4th Floor
1 903 420 9400 | Halifax, Nova Scotia, CAN. B3J 1G7

MEW Maricor

77 VAUGHAN HARBOUR BLVD. SUITE 200
MONCTON, NB, E1C 0K2
BUS: 506 857 8880 FAX: 506 859 8393
WWW.MEW.COM ENG. REG. NO. 16211004

THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF PRINCE EDWARD ISLAND
Scale: 1:250
No. 2325
DATE: 10/04/2023
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF PRINCE EDWARD ISLAND

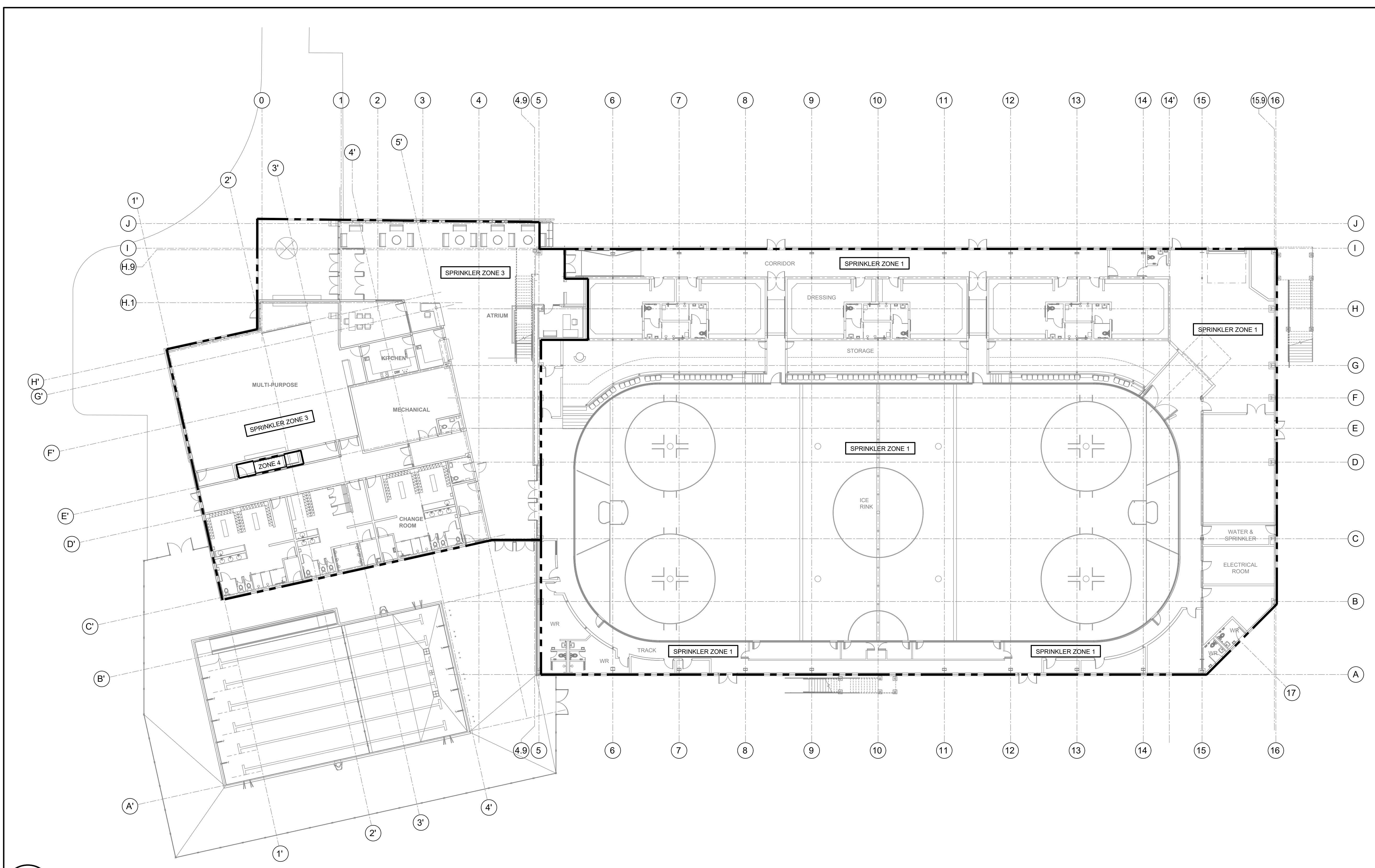
NO.	TRF ISSUED FOR TENDER	2023.04.10
1	REVISION	DATE

STAMP

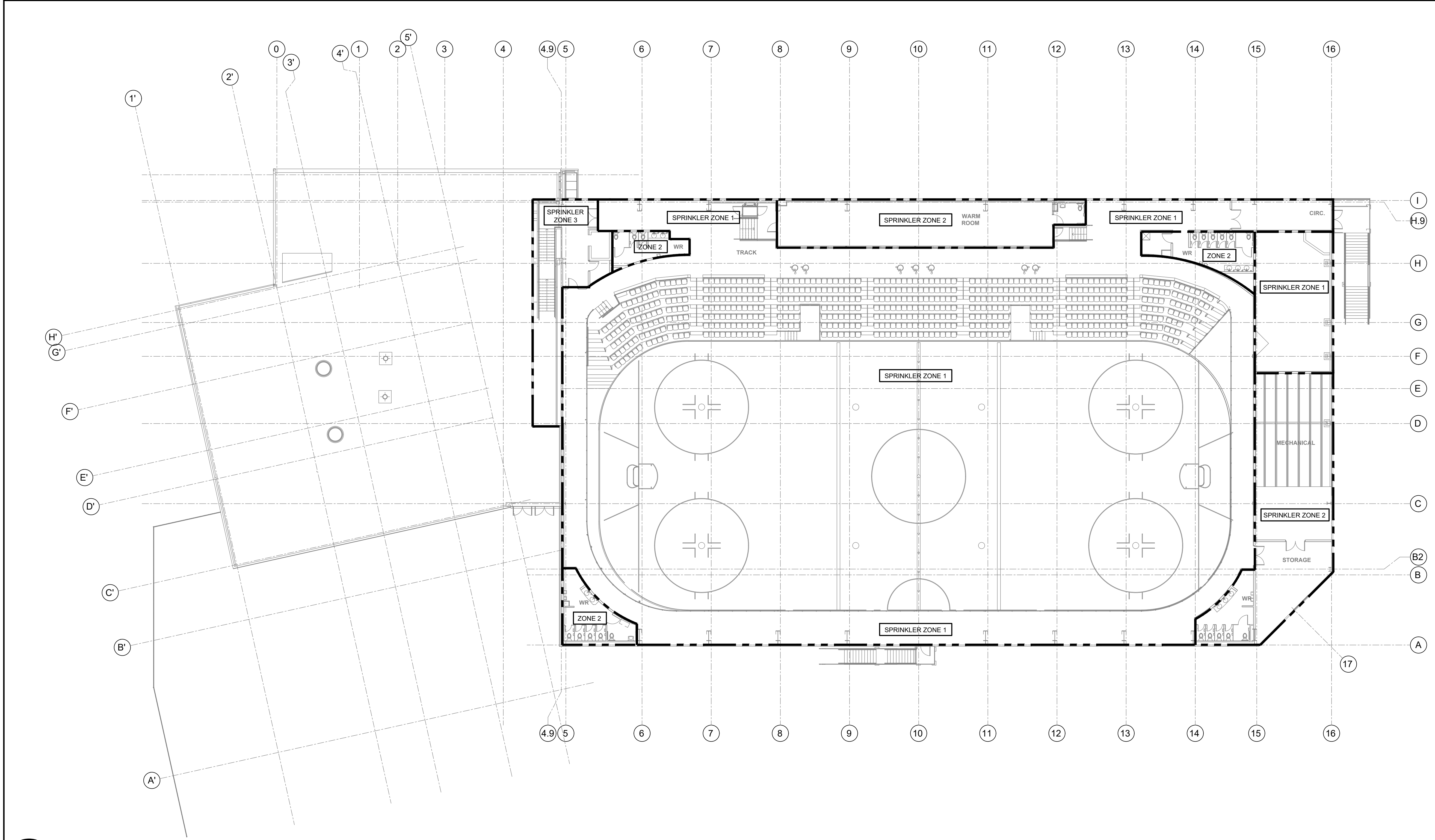
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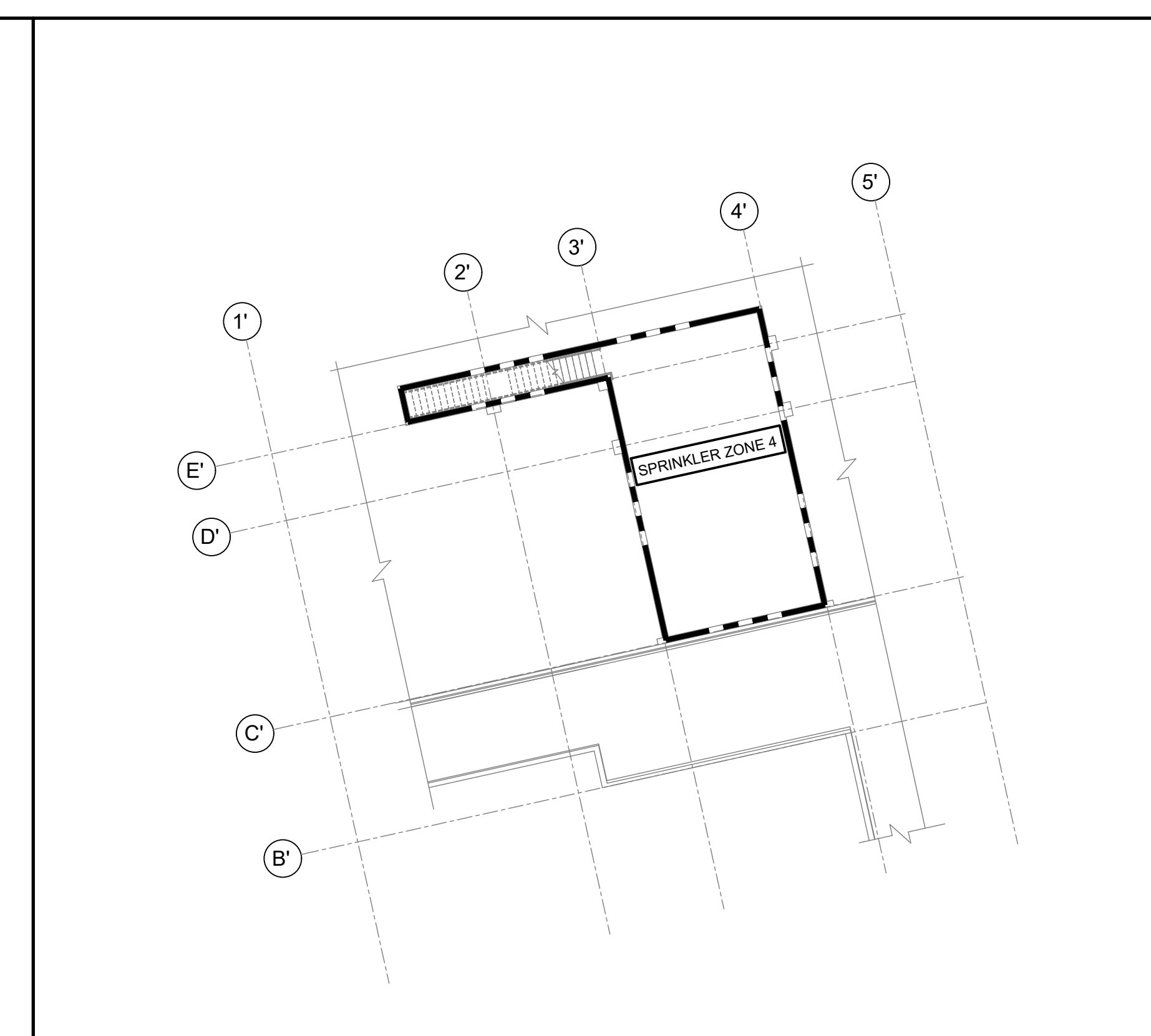
SITE PLAN -
MECHANICAL



1 M1.00 LEVEL 1 ARENA FLOOR PLAN ZONING - FIRE PROTECTION SCALE: 1:200



2 M1.00 LEVEL 2 ARENA FLOOR PLAN ZONING - FIRE PROTECTION SCALE: 1:200



3 M1.00 BASEMENT LEVEL FLOOR PLAN ZONING - FIRE PROTECTION 1:200

WATER FLOW TEST
NOVEMBER 25, 2021
- TOTAL FLOW = 532 GPM @ 42 PSI
- 920 GPM @ 41 PSI
- STATIC PRESSURE = 44 PSI

5 M1.00 WATER FLOW TEST

LIGHT HAZARD OCCUPANCY
PENDENT / UPRIGHTS - QUICK RESPONSE
- 4.6 meters x 4.6 meters MAXIMUM SPACING
- 1830mm MINIMUM SPACING
- 2285mm MAXIMUM SPACING FROM WALLS
HORIZONTAL SIDEWALL - QUICK RESPONSE
- 4.2 meters x 4.2 meters MAXIMUM SPACING
- 1830mm MINIMUM SPACING
- 2135mm MAXIMUM SPACING FROM WALLS
ORDINARY HAZARD OCCUPANCY
PENDENT / UPRIGHTS - QUICK RESPONSE
- 12.1 meters SQUARED MAXIMUM SPACING
- 1830mm MINIMUM SPACING
- 2285mm MAXIMUM SPACING FROM WALLS
HORIZONTAL SIDEWALL - QUICK RESPONSE
- 9.3 meters SQUARED MAXIMUM SPACING
- 1830mm MINIMUM SPACING
- 1525mm MAXIMUM SPACING FROM WALLS

6 M1.00 HAZARD OCCUPANCY

SPRINKLER ZONE 1
DESIGN APPROACH
THE FOLLOWING DESIGN CRITERIA SHALL BE FOLLOWED:

ICE RINK AND SEATING; UNDER BLEACHERS DRESSING AND STORAGE;
ZONE DESIGN USING WET PIPE SYSTEM IN ACCORDANCE WITH REQUIREMENTS OF NBCC 2015, NPC 2015, NFPA 10 - 2013, NFPA 13 - 2013, NFPA 25 - 2014 AND AUTHORITY HAVING JURISDICTION (AHJ).
OCCUPANCY: LIGHT HAZARD
DENSITY: 4.1 LPM / 139m²
I/O HOSE: 379 LPM

STORAGE ROOMS;
OCCUPANCY: ORDINARY HAZARD GROUP 2
DENSITY: 8.1 LPM / 139m²
I/O HOSE: 948 LPM

MECHANICAL / ELECTRICAL ROOMS;
OCCUPANCY: ORDINARY HAZARD GROUP 1
DENSITY: 6.1 LPM / 139m²
I/O HOSE: 948 LPM

ICE SURFACE (MAX HEIGHT OF 3.0m);
OCCUPANCY: ORDINARY HAZARD GROUP 2
DENSITY: 8.1 LPM / 139m²
I/O HOSE: 948 LPM

DRESSING ROOMS;
OCCUPANCY: LIGHT HAZARD
DENSITY: 4.1 LPM / 139m²
I/O HOSE: 379 LPM

CORRIDOR AND WALKING TRACKS;
OCCUPANCY: LIGHT HAZARD
DENSITY: 4.1 LPM / 139m²
I/O HOSE: 379 LPM

WASHROOMS;
OCCUPANCY: LIGHT HAZARD
DENSITY: 4.1 LPM / 139m²
I/O HOSE: 379 LPM

SPRINKLER ZONE 2
DESIGN APPROACH
THE FOLLOWING DESIGN CRITERIA SHALL BE FOLLOWED:

WARM ROOM, WASHROOMS AND UPPER MECHANICAL;
ZONE DESIGN USING WET PIPE SYSTEM IN ACCORDANCE WITH REQUIREMENTS OF NBCC 2015, NPC 2015, NFPA 10 - 2013, NFPA 13 - 2013, NFPA 25 - 2014 AND AUTHORITY HAVING JURISDICTION (AHJ).
OCCUPANCY: LIGHT HAZARD
DENSITY: 4.1 LPM / 139m²
I/O HOSE: 379 LPM

STORAGE ROOMS;
OCCUPANCY: ORDINARY HAZARD GROUP 2
DENSITY: 8.1 LPM / 139m²
I/O HOSE: 948 LPM

MECHANICAL ROOMS;
OCCUPANCY: ORDINARY HAZARD GROUP 1
DENSITY: 6.1 LPM / 139m²
I/O HOSE: 948 LPM

WASHROOMS;
OCCUPANCY: LIGHT HAZARD
DENSITY: 4.1 LPM / 139m²
I/O HOSE: 379 LPM

WARM ROOM;
OCCUPANCY: LIGHT HAZARD
DENSITY: 4.1 LPM / 139m²
I/O HOSE: 379 LPM

SPRINKLER ZONE 3
DESIGN APPROACH
THE FOLLOWING DESIGN CRITERIA SHALL BE FOLLOWED:

LOBBY AND CHANGE ROOM POOL AREA;
ZONE DESIGN USING WET PIPE SYSTEM IN ACCORDANCE WITH REQUIREMENTS OF NBCC 2015, NPC 2015, NFPA 10 - 2013, NFPA 13 - 2013, NFPA 25 - 2014 AND AUTHORITY HAVING JURISDICTION (AHJ).
OCCUPANCY: LIGHT HAZARD
DENSITY: 4.1 LPM / 139m²
I/O HOSE: 379 LPM

STORAGE / MULTI-PURPOSE ROOMS;
OCCUPANCY: ORDINARY HAZARD GROUP 2
DENSITY: 8.1 LPM / 139m²
I/O HOSE: 948 LPM

MECHANICAL / KITCHEN AND CANTINEEN;
OCCUPANCY: ORDINARY HAZARD GROUP 1
DENSITY: 6.1 LPM / 139m²
I/O HOSE: 948 LPM

CHANGE ROOMS;
OCCUPANCY: LIGHT HAZARD
DENSITY: 4.1 LPM / 139m²
I/O HOSE: 379 LPM

OFFICE / VESTIBULE AND ATRIUM;
OCCUPANCY: LIGHT HAZARD
DENSITY: 4.1 LPM / 139m²
I/O HOSE: 379 LPM

SPRINKLER ZONE 4
DESIGN APPROACH
THE FOLLOWING DESIGN CRITERIA SHALL BE FOLLOWED:

BASEMENT LEVEL AREA;
ZONE DESIGN USING WET PIPE SYSTEM IN ACCORDANCE WITH REQUIREMENTS OF NBCC 2015, NPC 2015, NFPA 10 - 2013, NFPA 13 - 2013, NFPA 25 - 2014 AND AUTHORITY HAVING JURISDICTION (AHJ).
OCCUPANCY: ORDINARY HAZARD GROUP 1
DENSITY: 6.1 LPM / 139m²
I/O HOSE: 948 LPM

POOL MECHANICAL ROOM;
OCCUPANCY: ORDINARY HAZARD GROUP 1
DENSITY: 6.1 LPM / 139m²
I/O HOSE: 948 LPM

4 M1.00 FIRE PROTECTION ZONING

CLIENT

CHARLOTTETOWN

KEY PLAN

CONSULTANT

DSRA
191 420 9990 | 1499 Spring Garden Street, 4th Floor
Halifax, Nova Scotia, CAN. B3J 1J2

McW Maricor
77 VAUGHAN HARBOUR BLVD. SUITE 200
MONCTON, NB, E1C 0K2
BUS: (506) 857-6880 FAX: (506) 859-8393
WWW.MCW.COM ENG. REG. NO. 1621004

THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF NEW BRUNSWICK HAS VALIDATED THE SEAL FOR THE YEAR 2021

Scale: 1:200
No. 2325
DATE: 10/24/2023
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF NEW BRUNSWICK

0	TRN ISSUED FOR TENDER	2023.04.10
1	REVISION	DATE

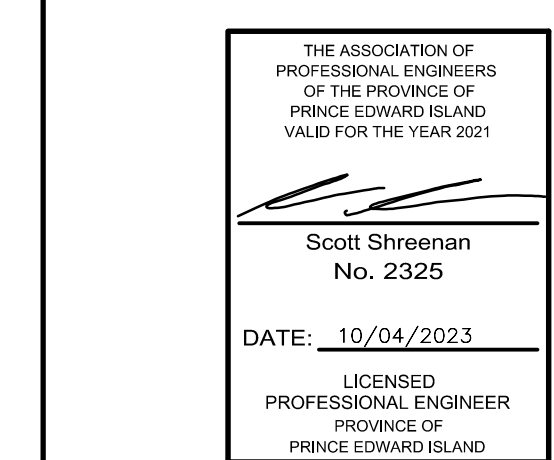
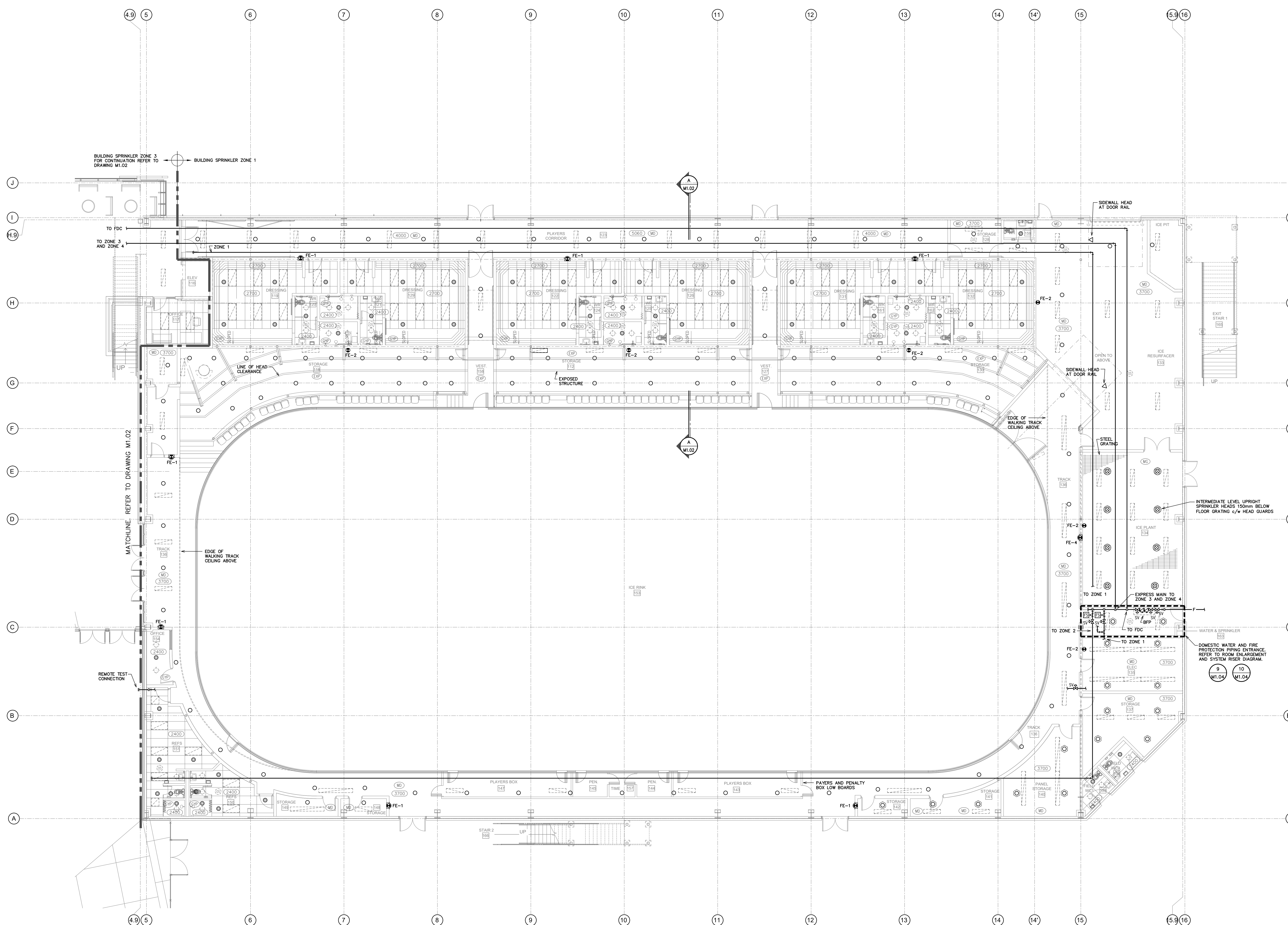
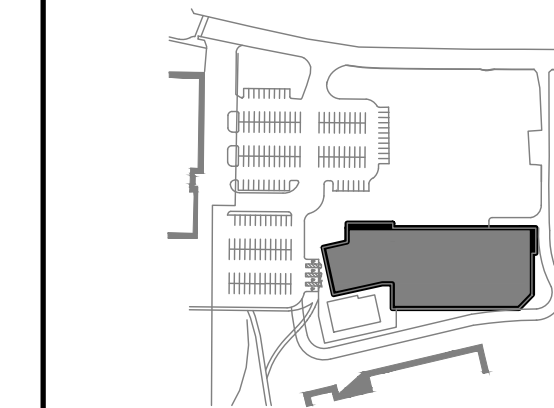
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PROJECT NAME:
SIMMONS SPORTS CENTRE
ARENA & POOL REPLACEMENT
CHARLOTTETOWN
NS

SUBJECT:

PROJECT NO.: Z1111
DRAWN BY: K.C.S.
CHECKED BY: S.S.
SCALE: AS INDICATED
ARENA ZONING FLOOR PLANS AND DESIGN APPROACH - FIRE PROTECTION

M1-00



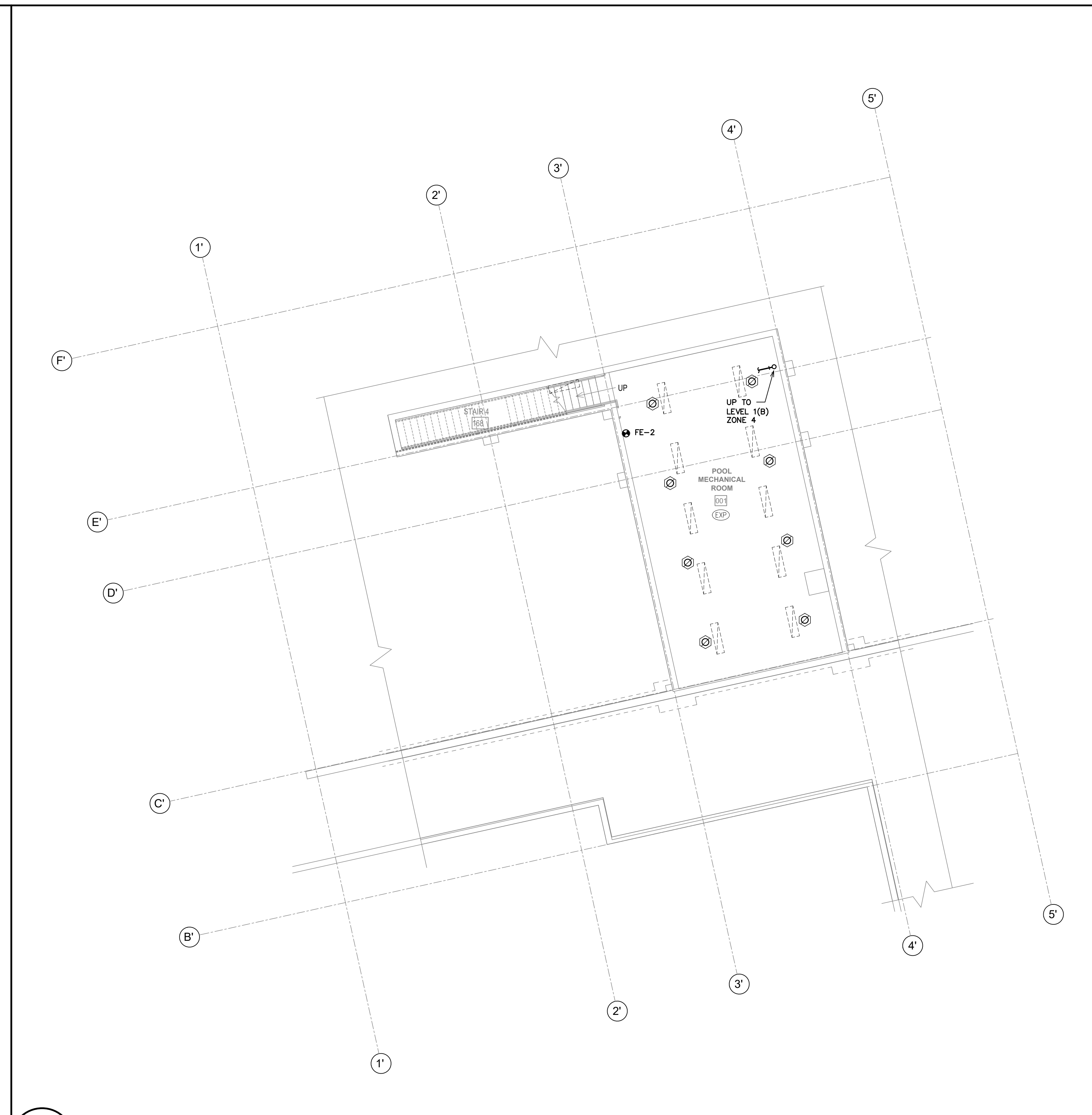
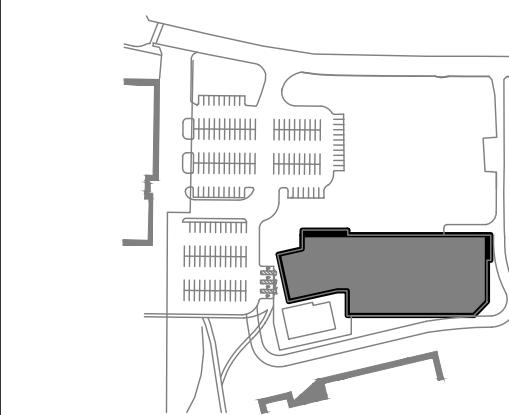
NO.	TRK ISSUED FOR TENDER	2023.04.10
0	TRK ISSUED FOR TENDER	2023.04.10
1	REVISION	DATE

STAMP

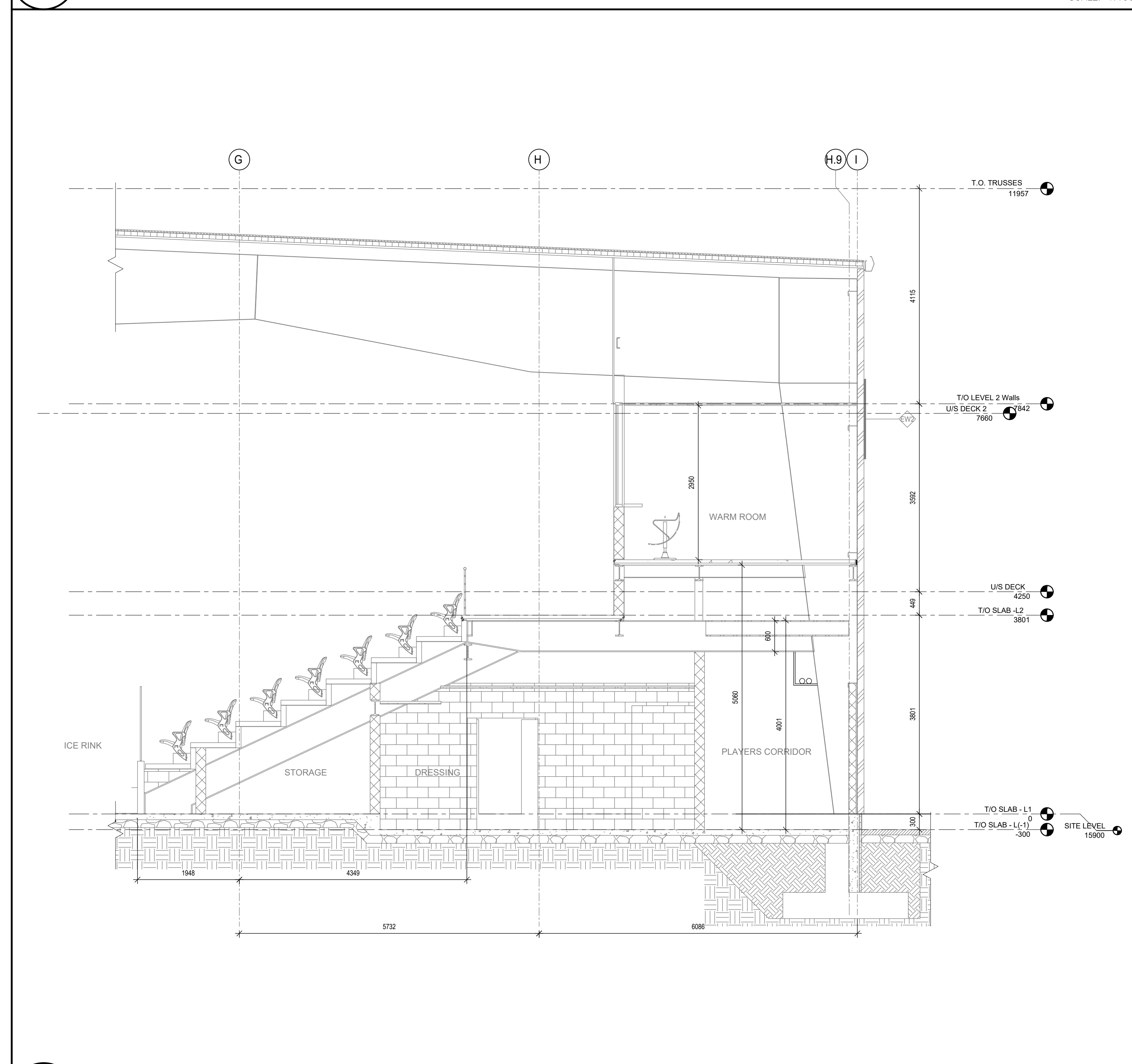
PROJECT NAME:
SIMMONS SPORTS CENTRE
ARENA & POOL REPLACEMENT
CHARLOTTETOWN
SUBJECT:

PROJECT NO.: Z1111
DRAWN BY: K.C.S.
CHECKED BY: S.S.
SCALE: AS INDICATED

LEVEL 1 (A) ARENA
FLOOR PLAN - FIRE
PROTECTION



M1.02 BASEMENT FLOOR PLAN - FIRE PROTECTION SCALE: 1:100



M1.02 BUILDING SECTION 'A' SCALE: 1:50

THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF NEW BRUNSWICK HAS MADE FOR THE YEAR 2021

Scale: Simonman No. 2325
DATE: 10/04/2023
LICENSED PROFESSIONAL ENGINEER PROVINCE OF NEW BRUNSWICK

Table with 3 columns: NO., REVISION, DATE. Row 1: 0, TRS ISSUED FOR TENDER, 2023.04.10

PROJECT NAME: SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT CHARLOTTETOWN
SUBJECT:

PROJECT NO.: 21111
DRAWN BY: T.M.
CHECKED BY: S.S.
SCALE: AS INDICATED

LEVEL 1 (B) & BASEMENT FLOOR PLANS - FIRE PROTECTION

NOTE: 1 THE DRAFT STOPS SHALL BE LOCATED IMMEDIATELY ADJACENT TO THE OPENING. SHALL BE AT LEAST 457mm (18 in.) DEEP, AND SHALL BE OF NONCOMBUSTIBLE OR LIMITED-COMBUSTIBLE MATERIAL THAT WILL STAY IN PLACE BEFORE AND DURING SPRINKLER OPERATION. SPRINKLERS SHALL BE SPACED NOT MORE THAN 1.2m (6 ft) APART AND PLACED 150 to 300mm (6 to 12 in.) FROM THE DRAFT STOP ON THE SIDE AWAY FROM THE OPENING. WHERE SPRINKLERS ARE CLOSER THAN 1.5m (6 ft), CROSS Baffles SHALL BE PROVIDED. GENERAL CONTRACTOR TO SUPPLY AND INSTALL ALL NECESSARY MATERIALS. REFER TO ARCHITECTURAL DRAWINGS FOR FURTHER DETAILS.

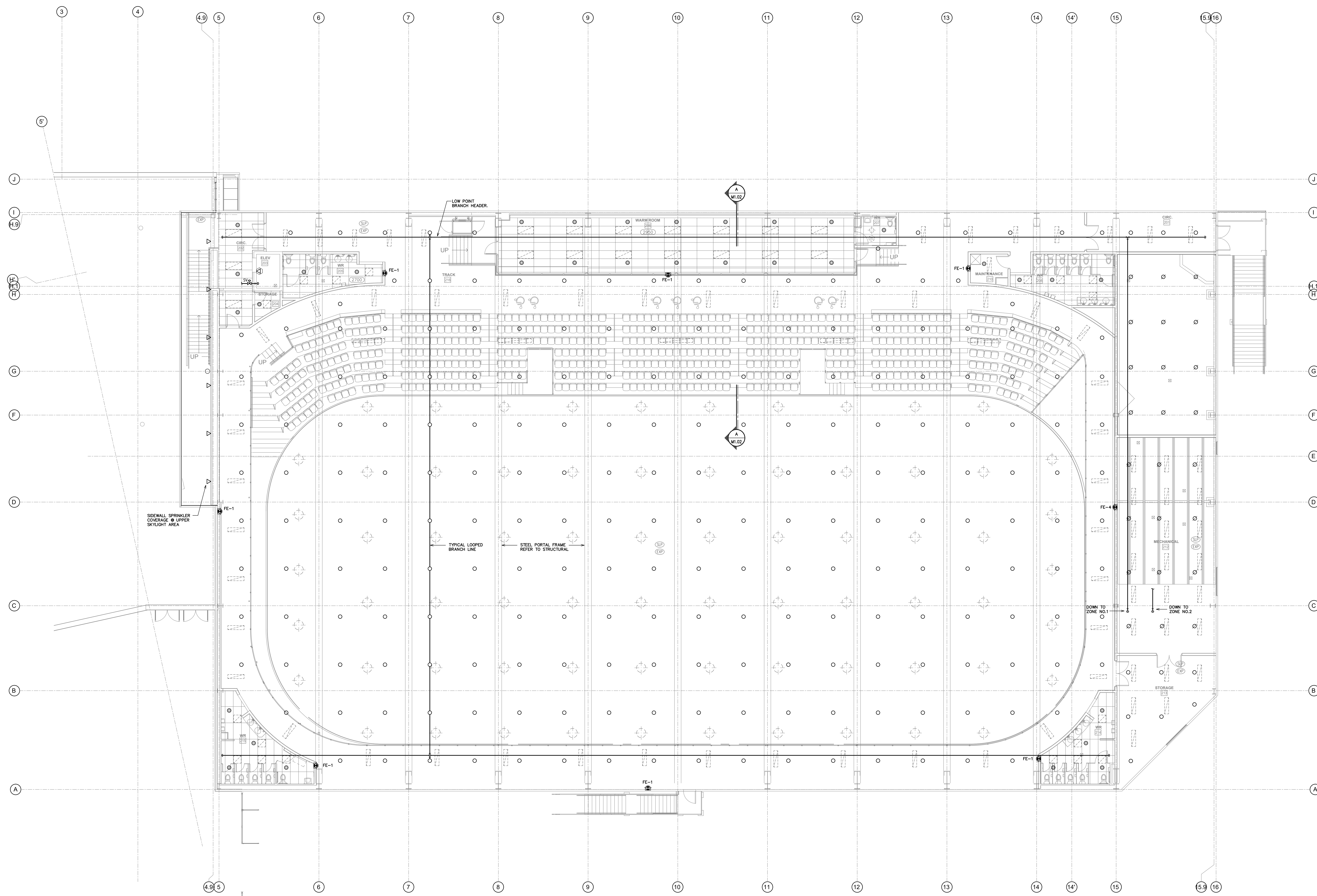
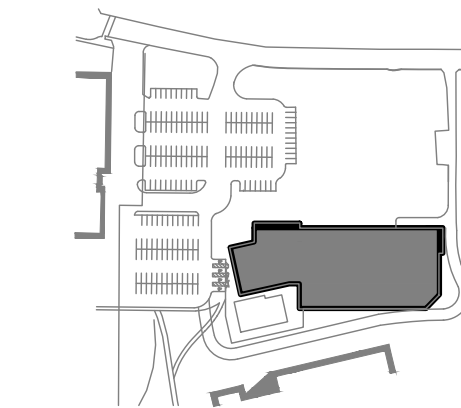
NOTE: 4 EXTERIOR CANOPY TO BE COMPLETE WITH SPRINKLER COVERAGE, ONE SIDEWALL HEADS ABOVE AND BELOW CEILING

NOTE: 2 MULTI-PURPOSE TO BE COMPLETE WITH SPRINKLER COVERAGE ABOVE AND BELOW PENDENT BELOW UPRIGHT ABOVE. REFER TO DETAIL M1.04

NOTE: 3 COORDINATE FIRE DEPARTMENT CONNECTION ON SITE TO ENSURE MAXIMUM DISTANCE OF 45m (150'-0") FROM NEAREST HYDRANT. REFER TO CIVIL DRAWINGS



M1.02 LEVEL 1(B) FLOOR PLAN - FIRE PROTECTION SHEET SIZE: 36"x48"



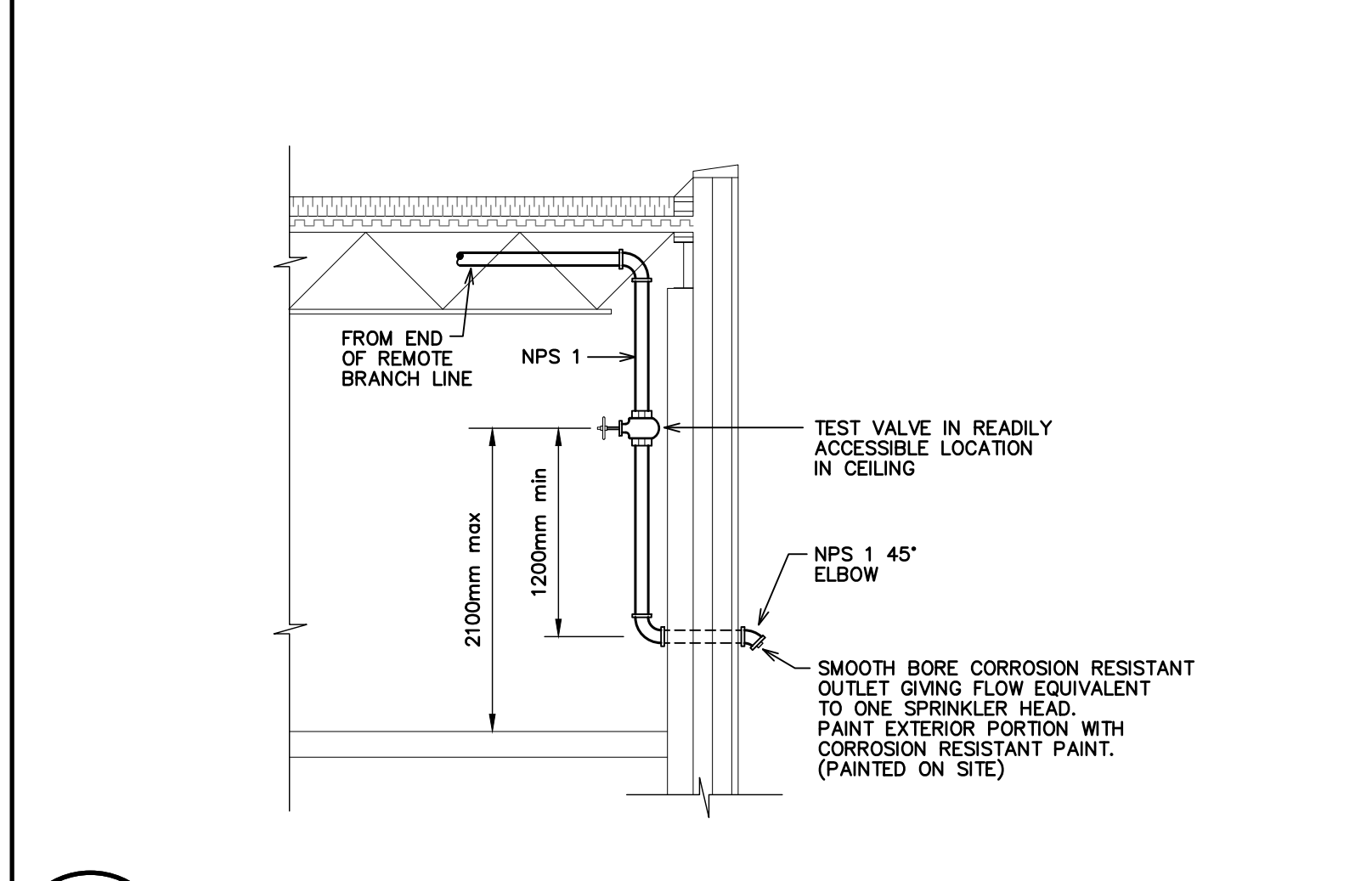
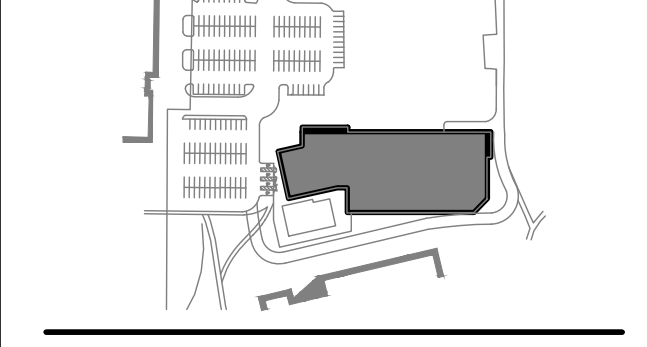
THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF PRINCE EDWARD ISLAND
Scale: Simonman No. 2325
DATE: 10/04/2023
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF PRINCE EDWARD ISLAND

NO.	TRK ISSUED FOR TENDER	2023.04.10
1	REVISION	DATE

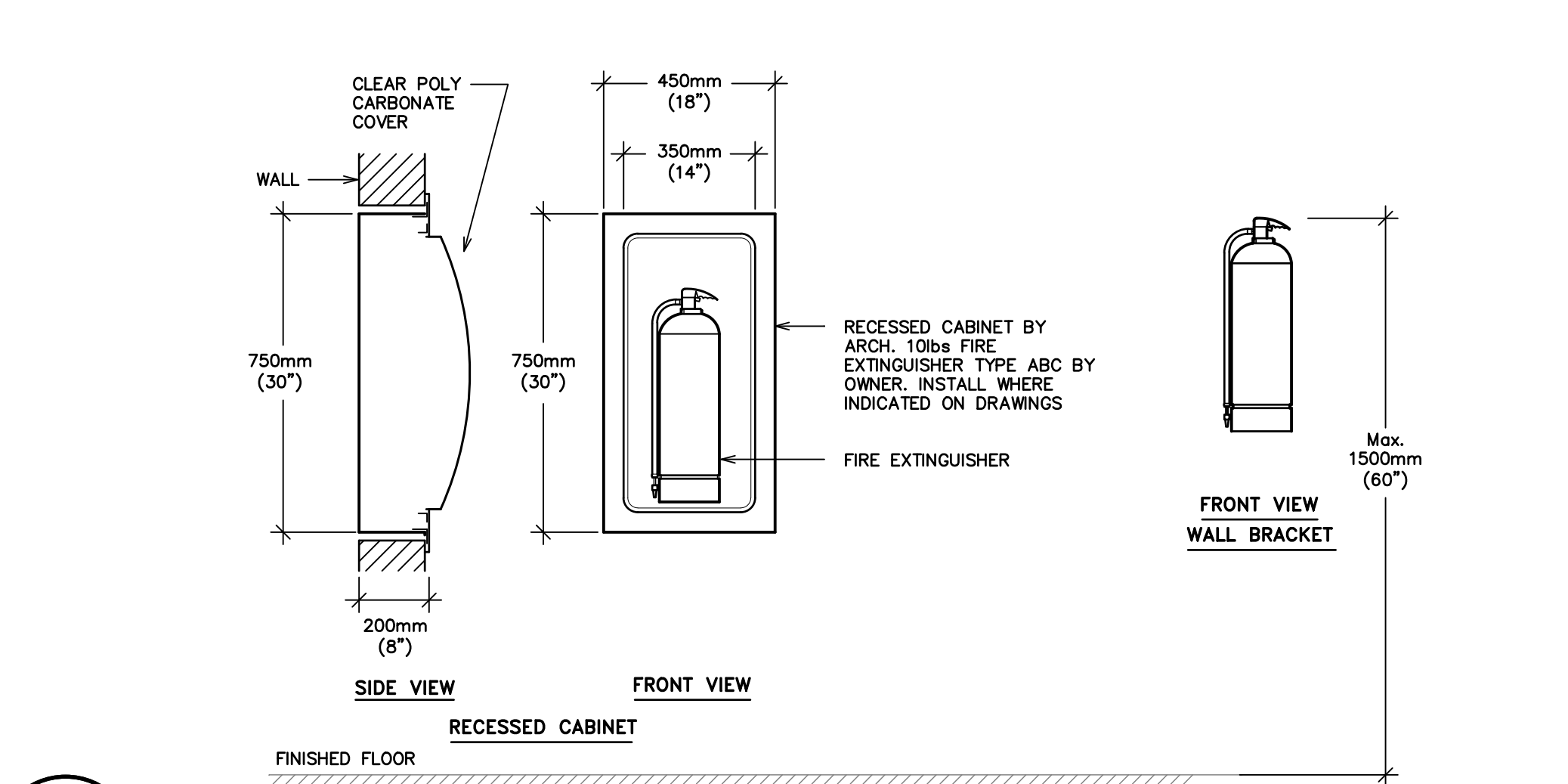
PROJECT NAME:
SIMMONS SPORTS CENTRE
ARENA & POOL REPLACEMENT
CHARLOTTETOWN
SUBJECT:

PROJECT NO.: 21111
DRAWN BY: T.M.
CHECKED BY: S.S.
SCALE: AS INDICATED

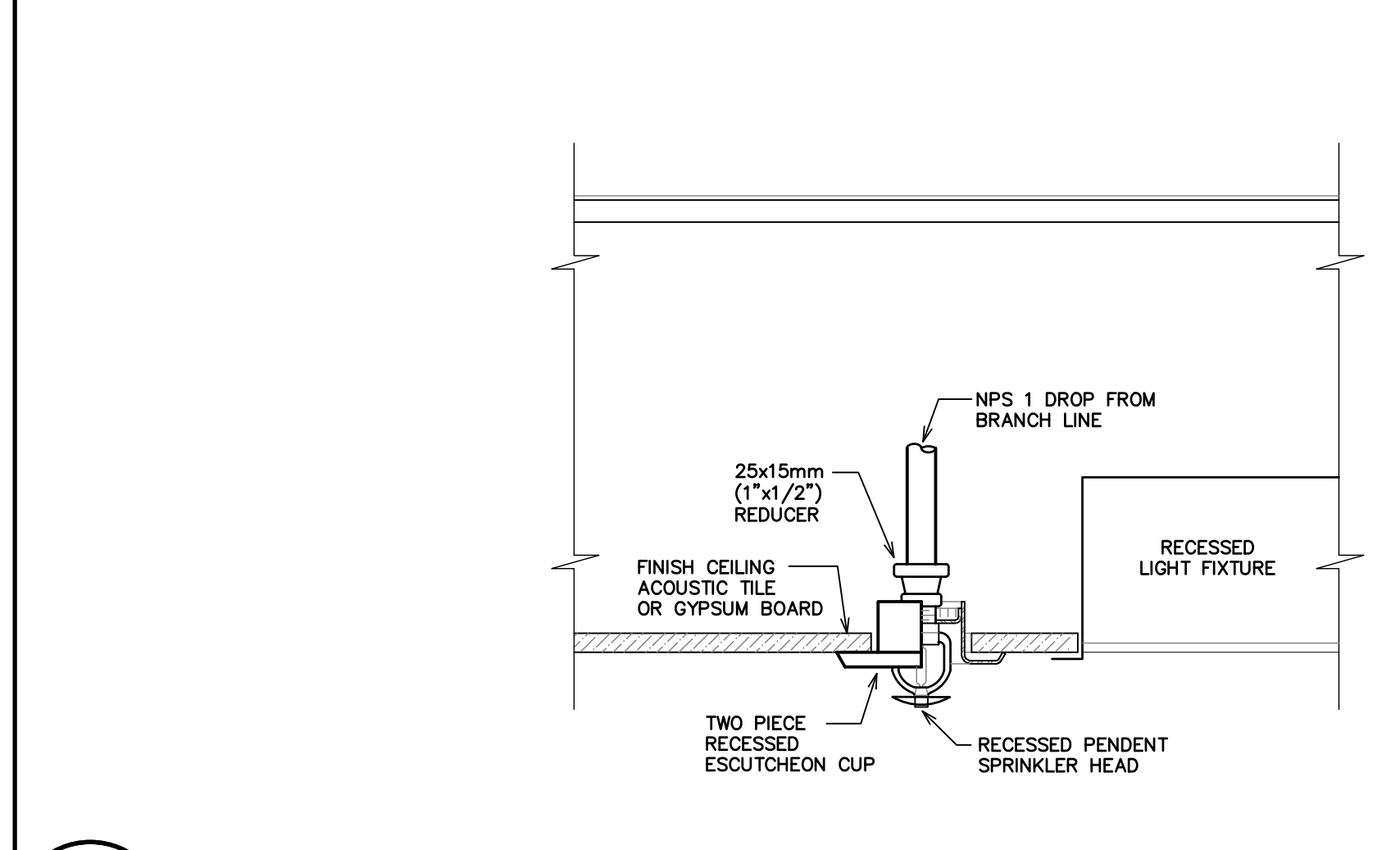
LEVEL 2 ARENA FLOOR
PLAN - FIRE PROTECTION



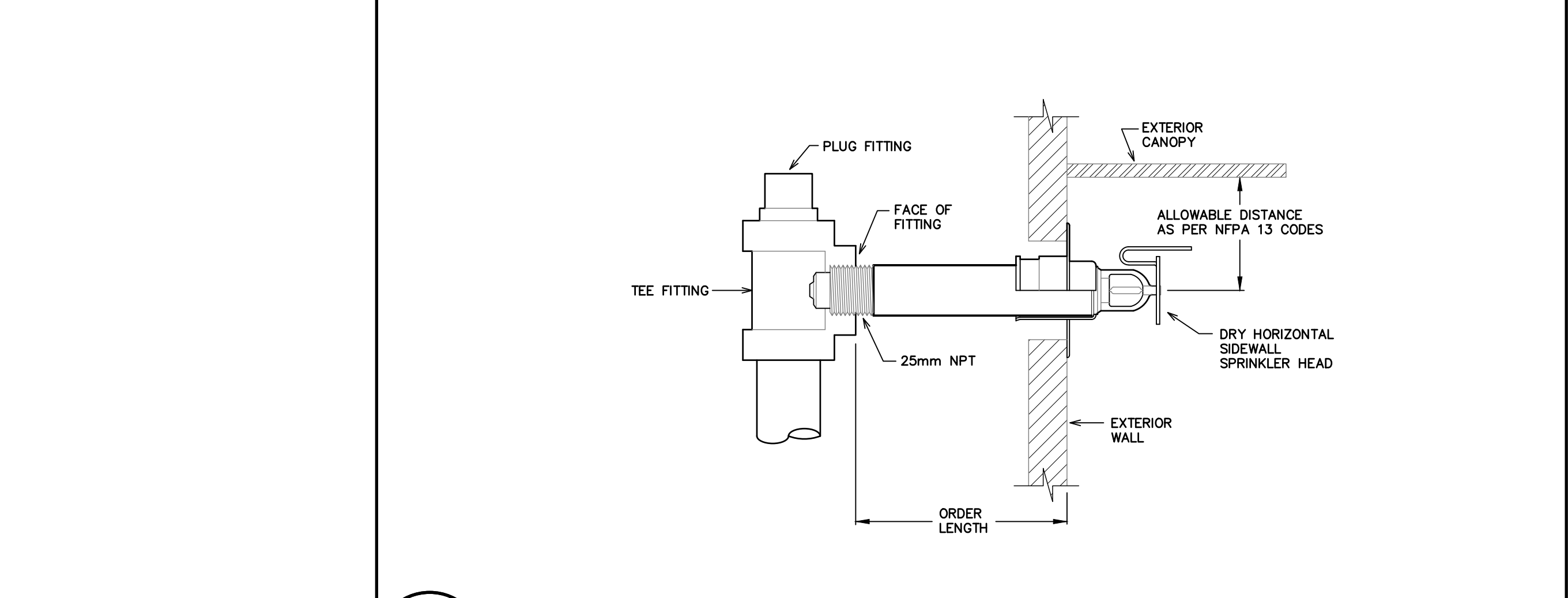
1 M1.04 SYSTEM REMOTE INSPECTOR'S TEST CONNECTION N.T.S.



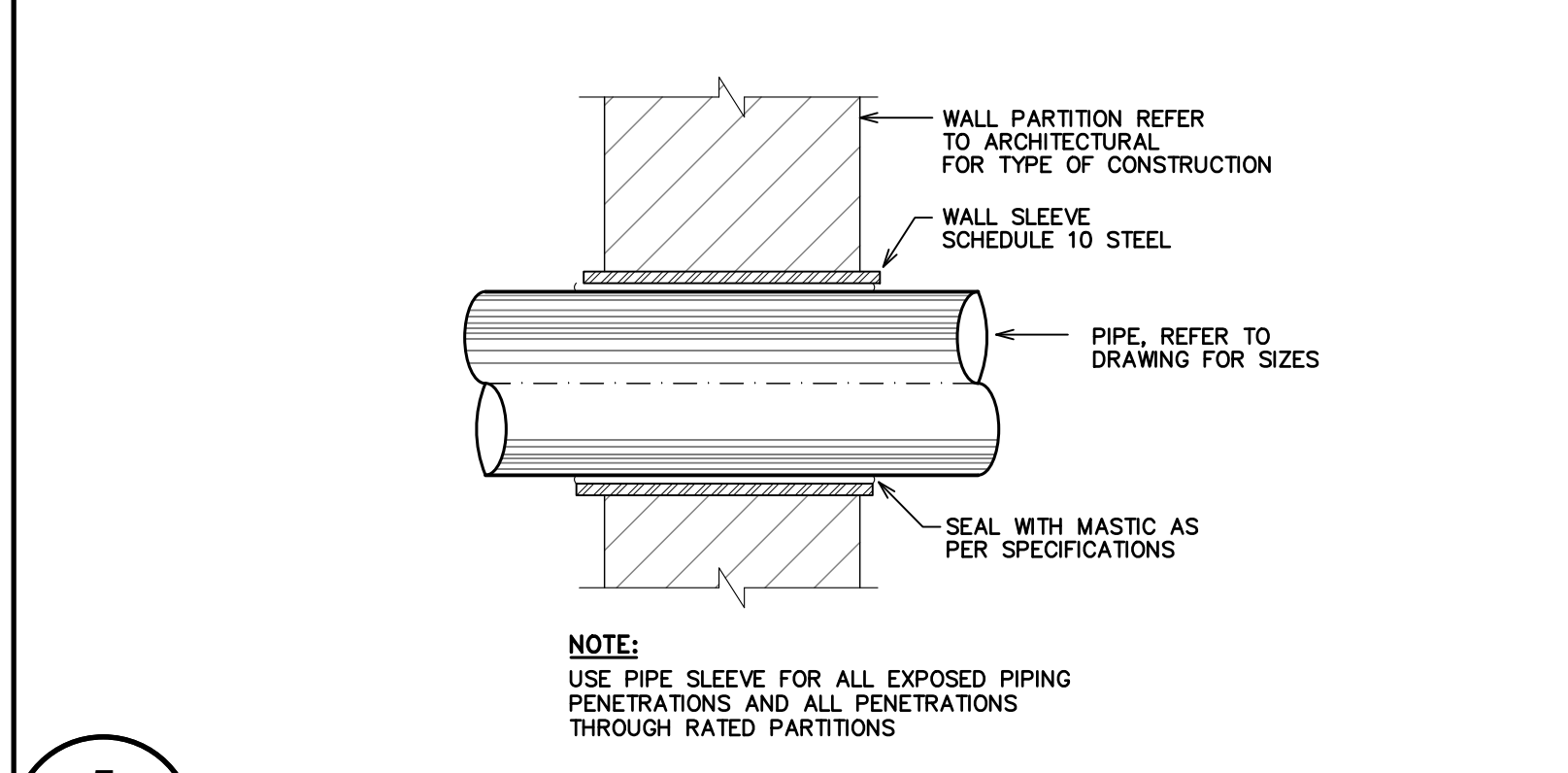
2 M1.04 FIRE EXTINGUISHER AND RECESSED CABINET DETAIL N.T.S.



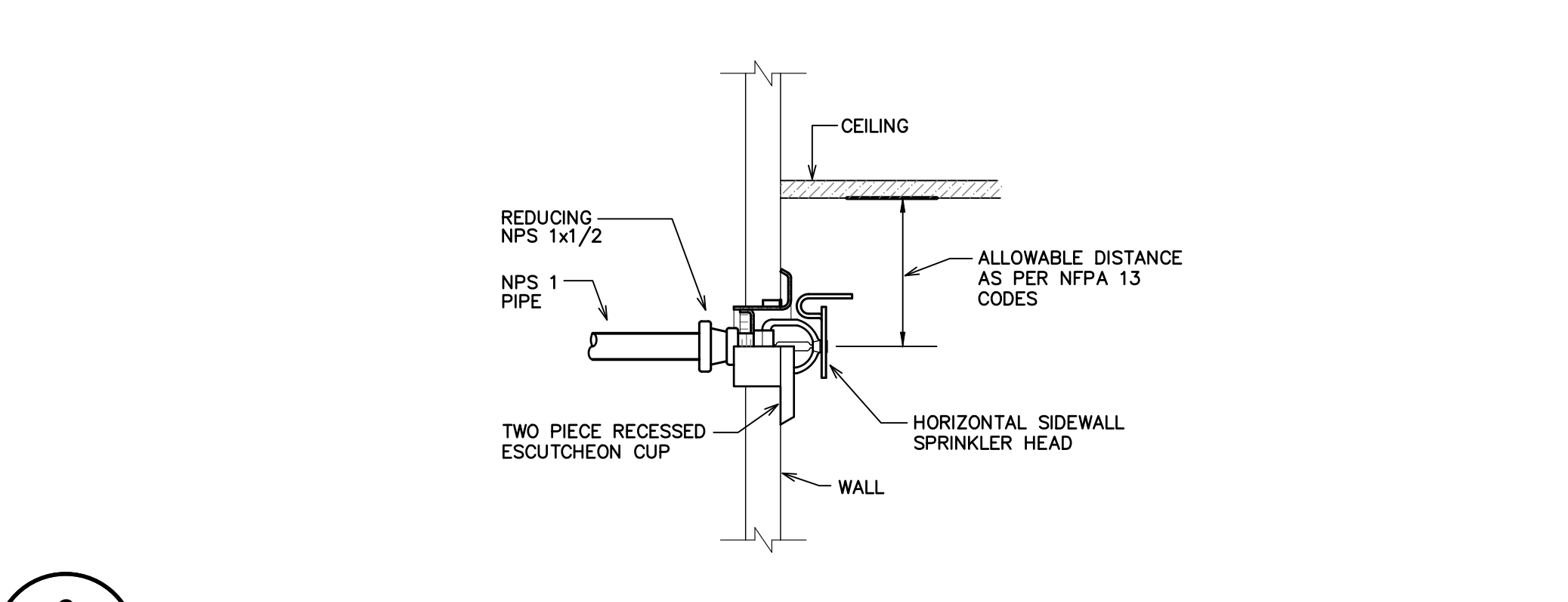
3 M1.04 RECESSED SPRINKLER HEAD DETAIL N.T.S.



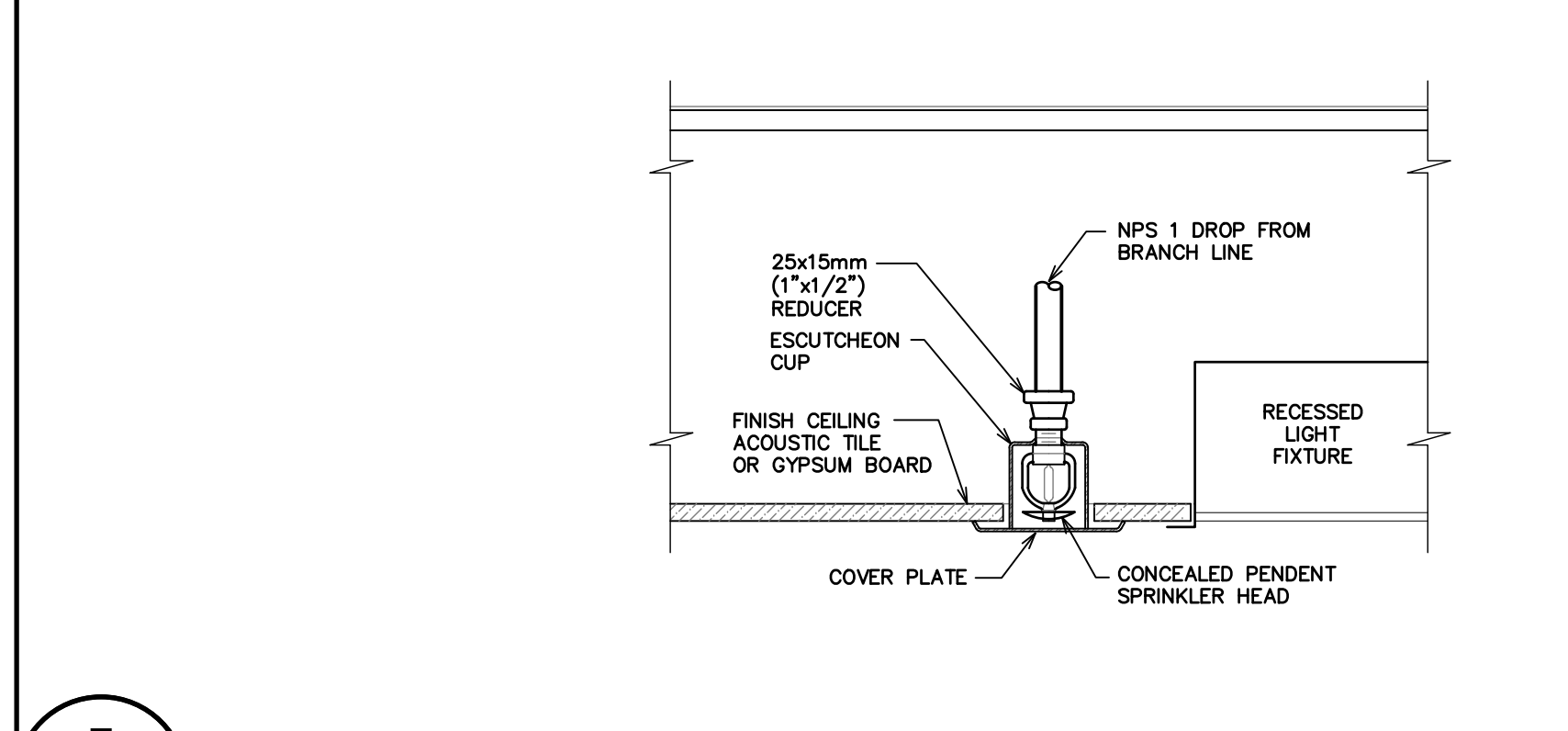
4 M1.04 HORIZONTAL DRY SIDEWALL SPRINKLER HEAD DETAIL N.T.S.



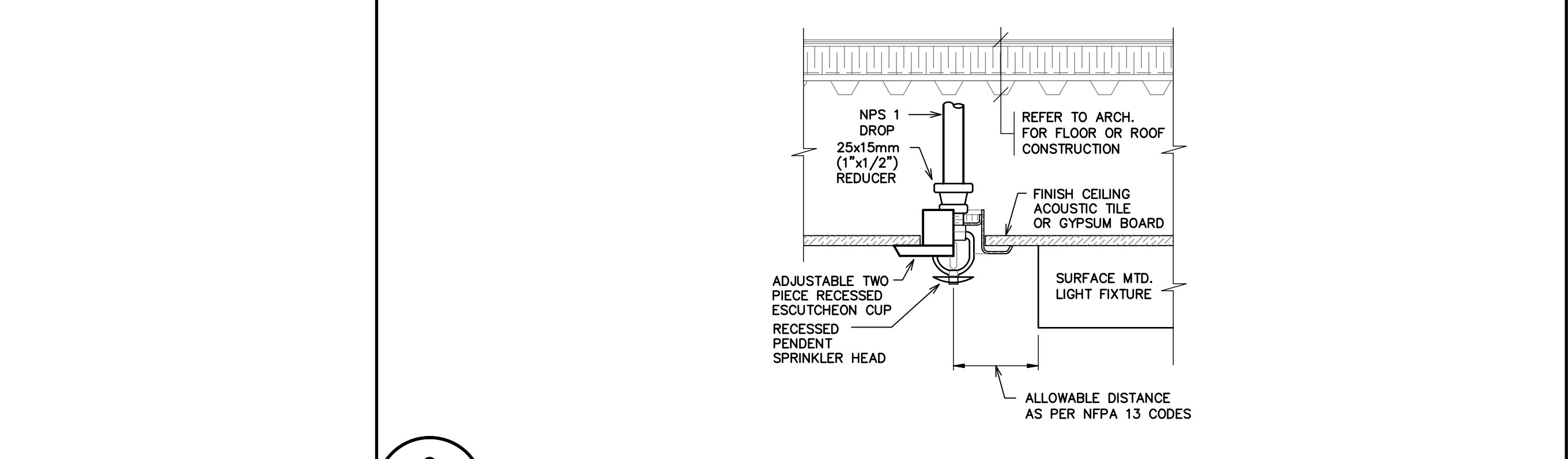
5 M1.04 PIPING SLEEVE DETAIL N.T.S.



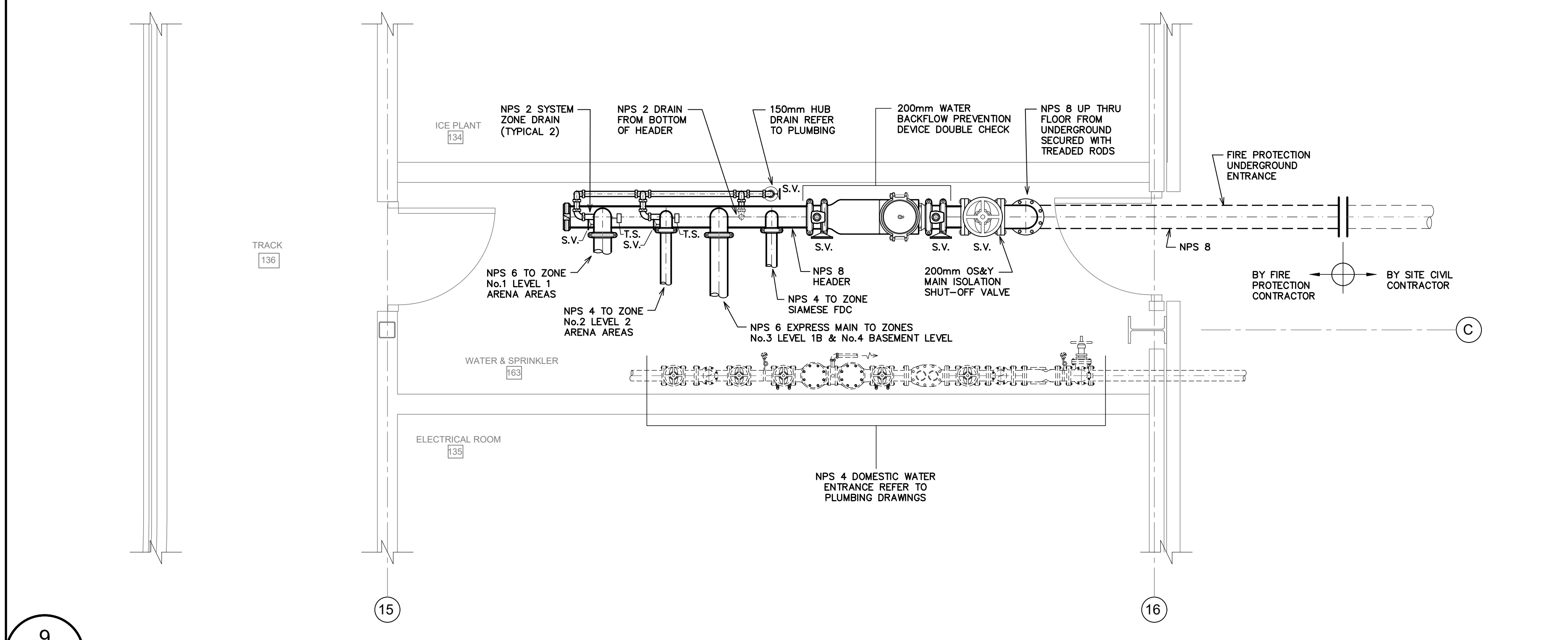
6 M1.04 HORIZONTAL SIDEWALL SPRINKLER DETAIL N.T.S.



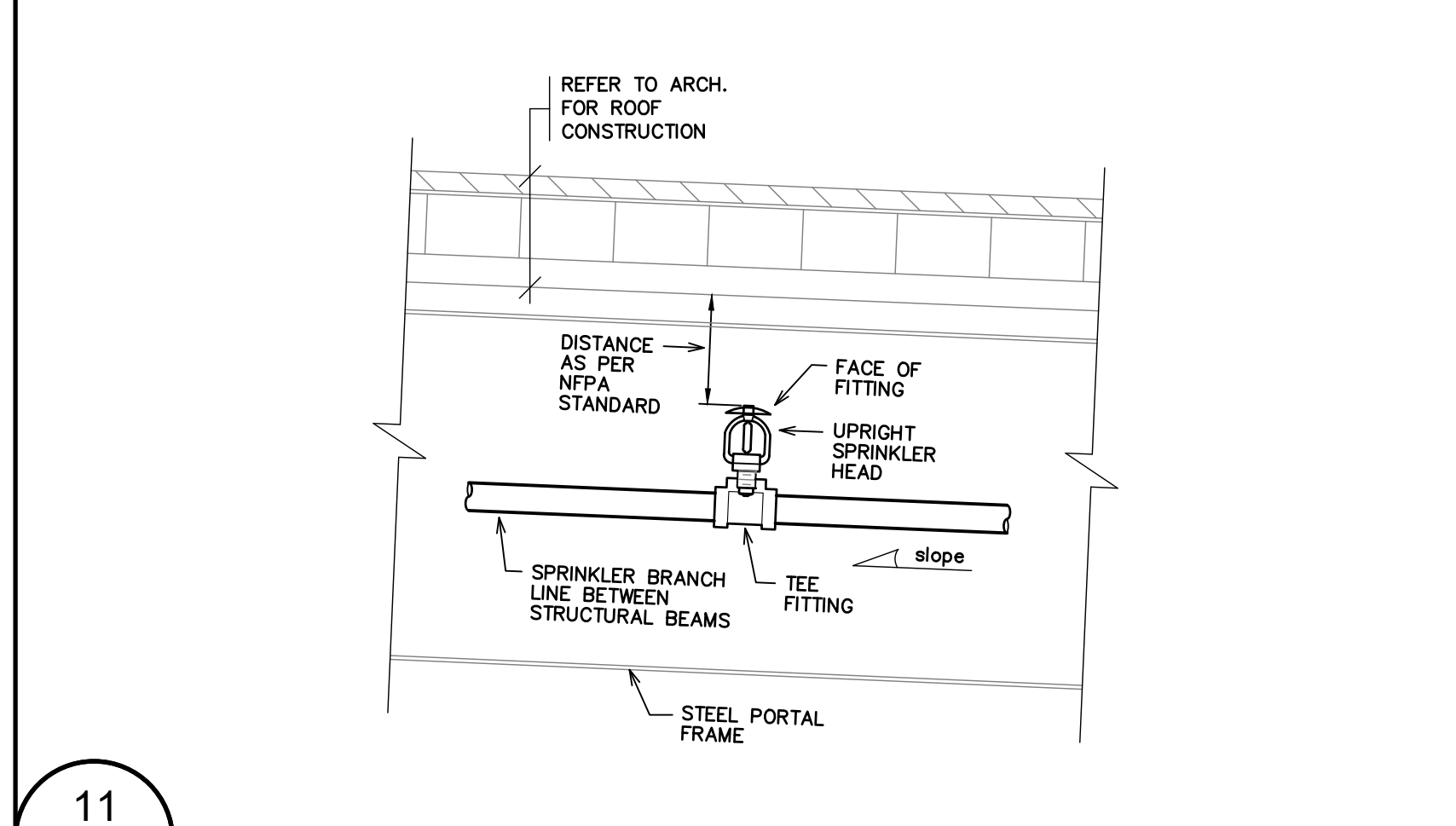
7 M1.04 CONCEALED SPRINKLER HEAD DETAIL N.T.S.



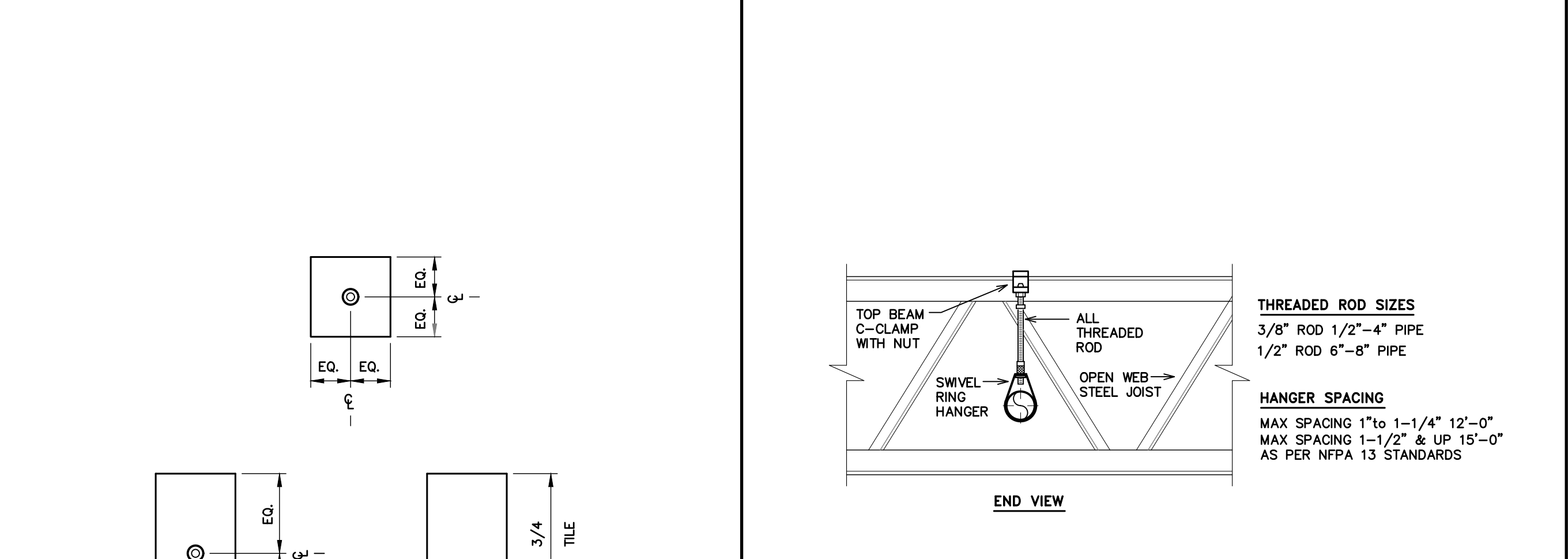
8 M1.04 RECESSED PENDENT SPRINKLER HEAD SURFACE LIGHTING DETAIL N.T.S.



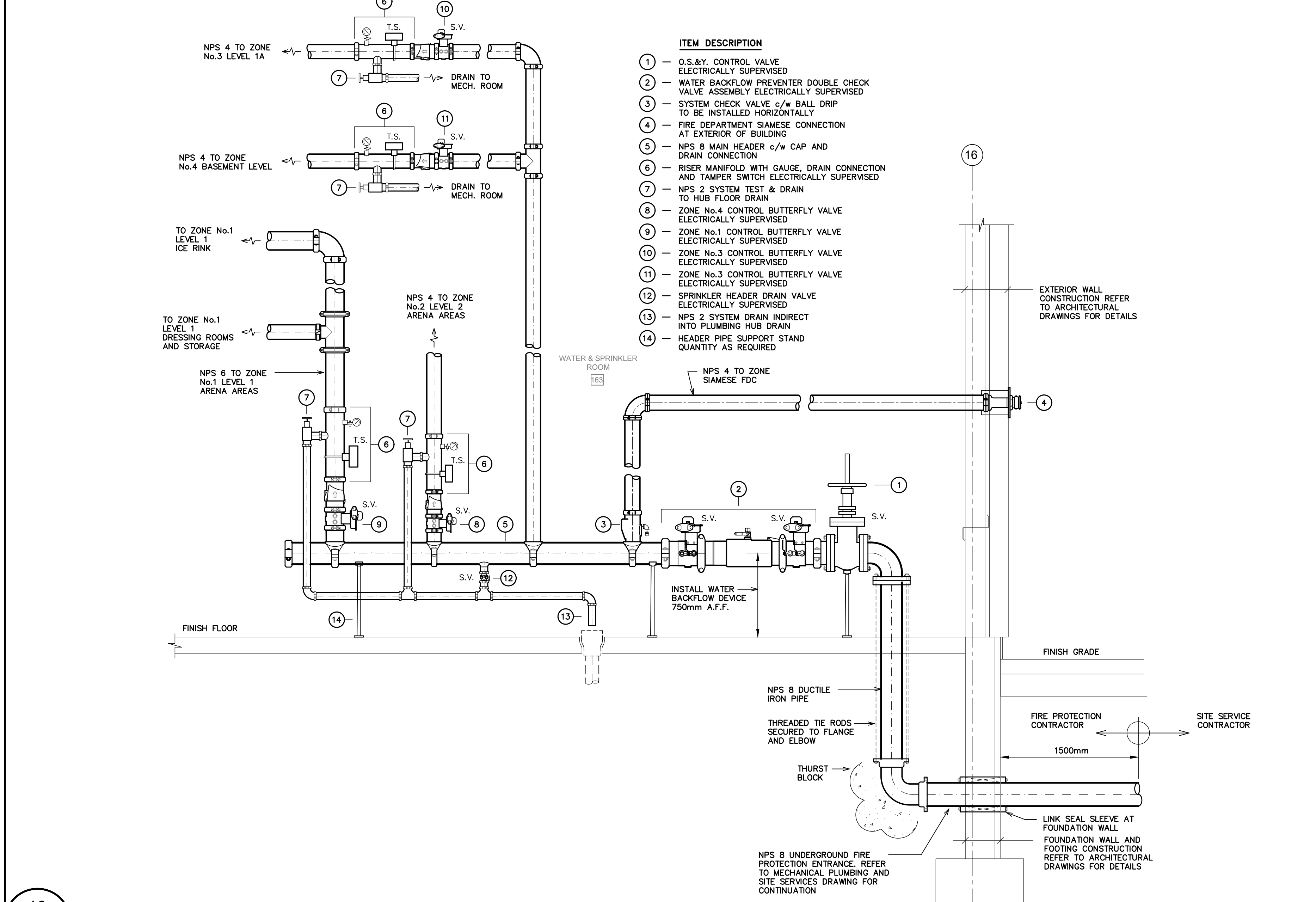
9 M1.04 FIRE PROTECTION SYSTEM ENTRANCE FLOOR PLAN ENLARGEMENT SCALE: 1:30



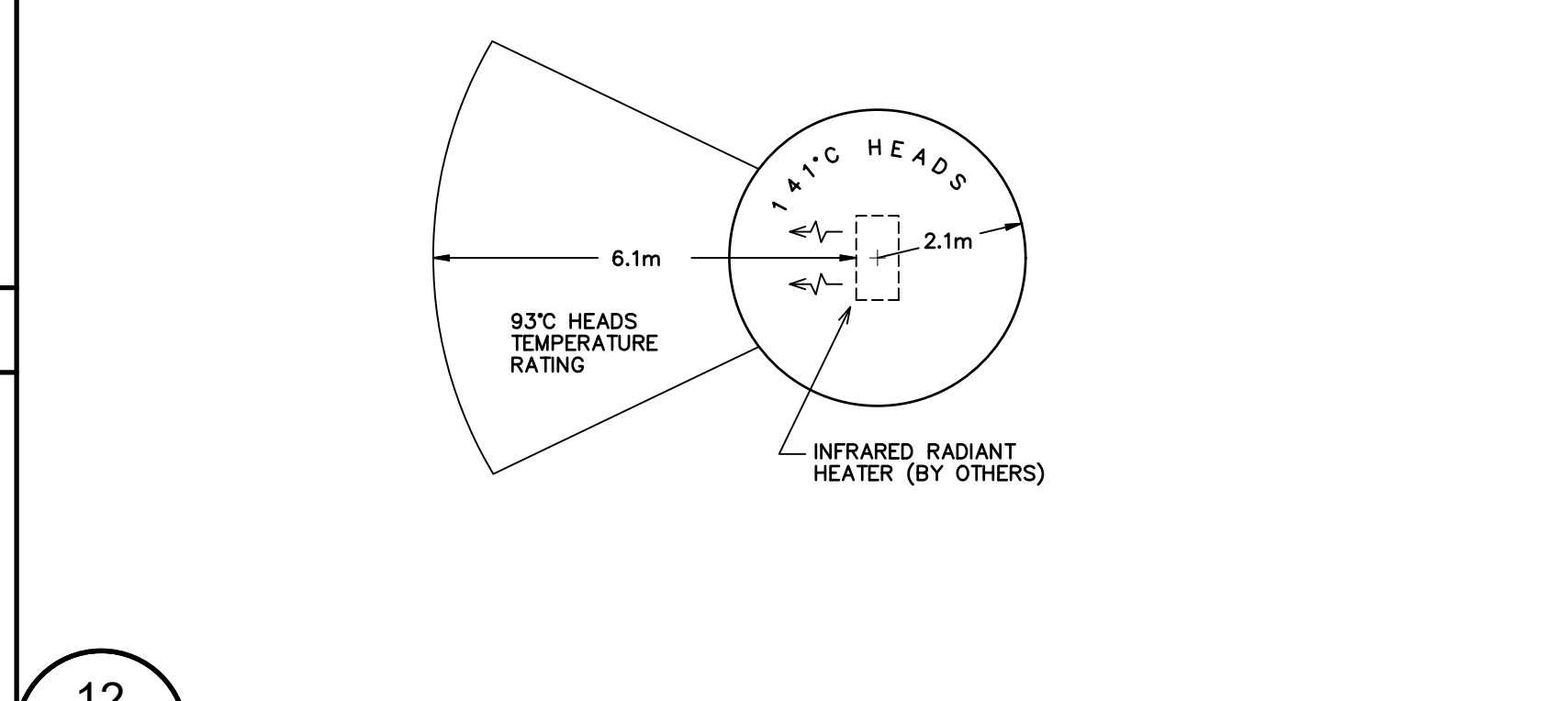
11 M1.04 UPRIGHT SPRINKLER HEAD DETAIL AT ICE SURFACE



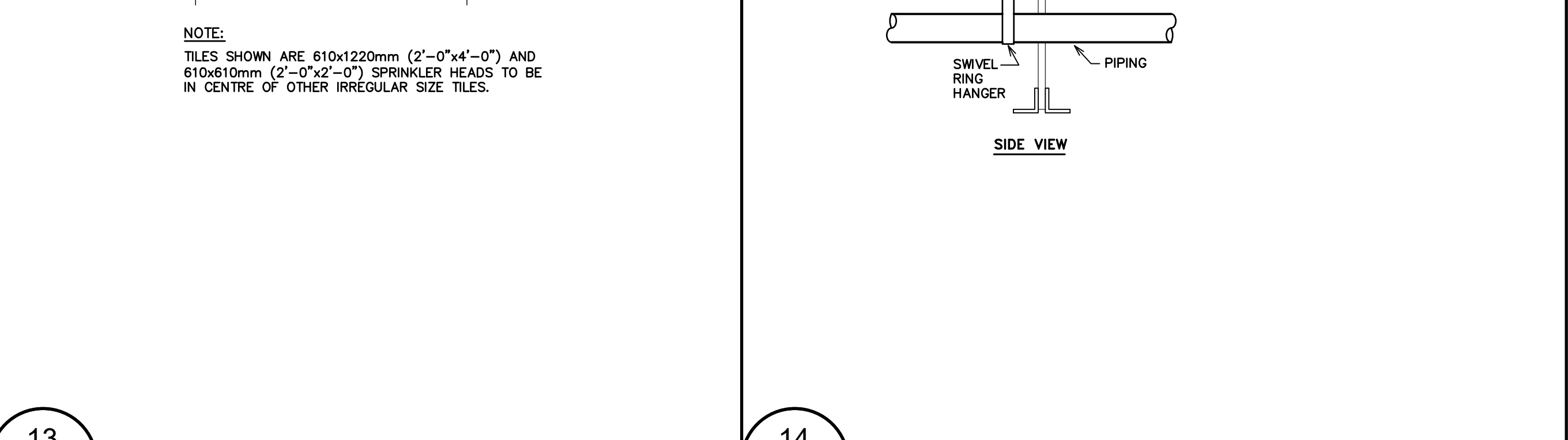
13 M1.04 SPRINKLER HEAD TILE LAYOUT DETAIL N.T.S.



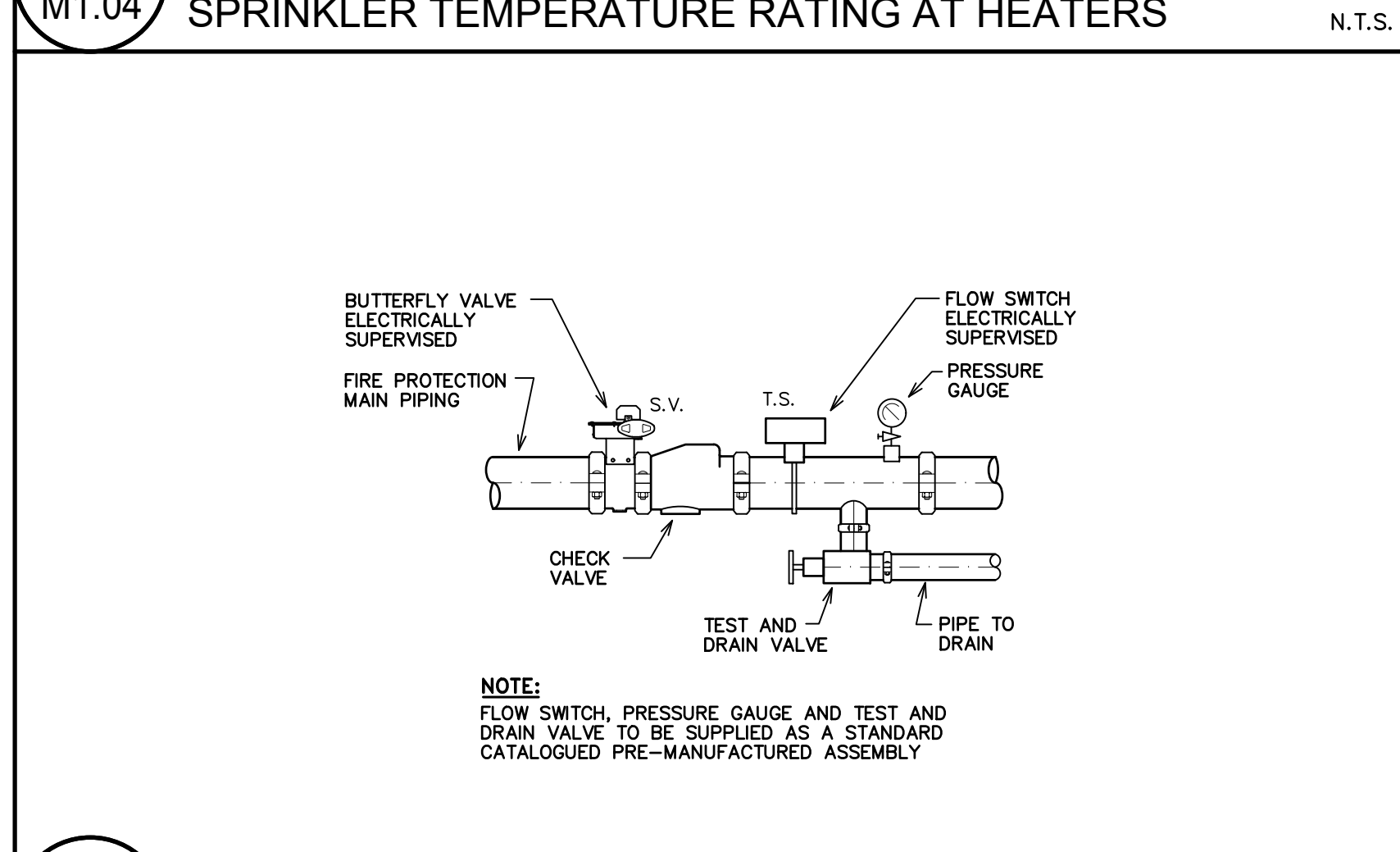
10 M1.04 FIRE PROTECTION ENTRANCE HEADER DETAIL N.T.S.



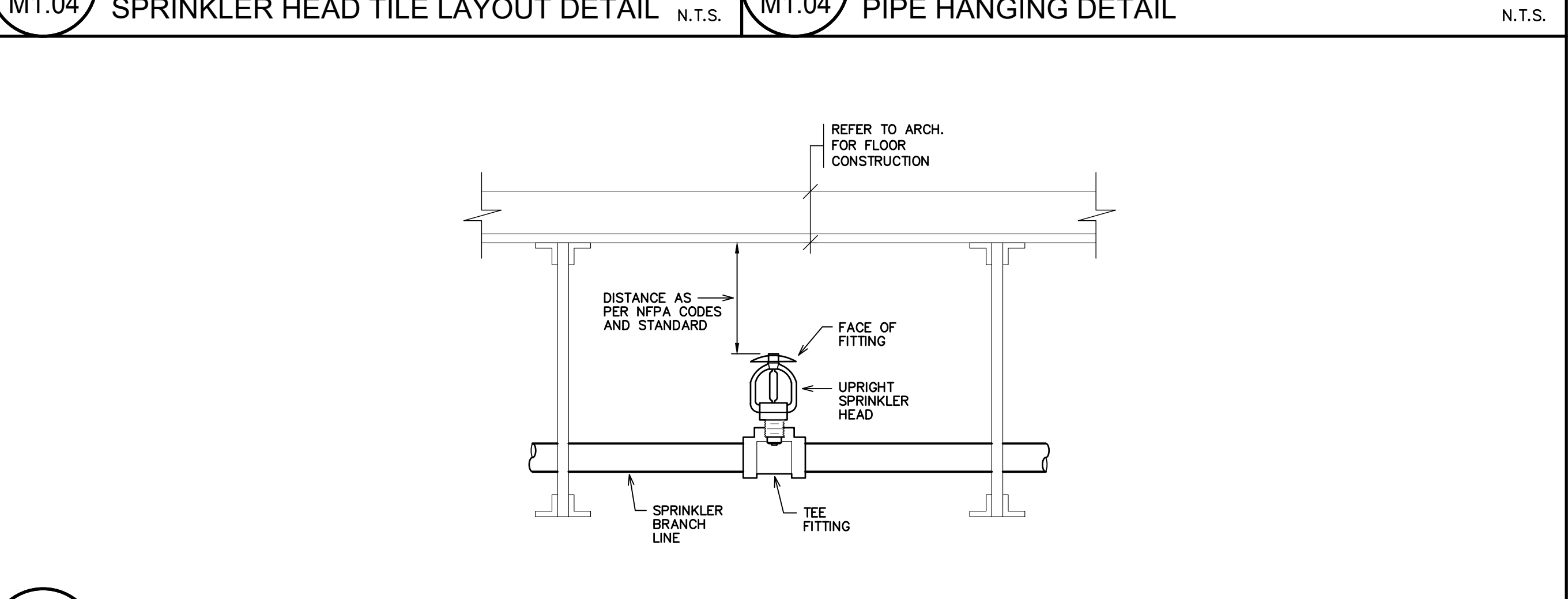
12 M1.04 SPRINKLER TEMPERATURE RATING AT HEATERS N.T.S.



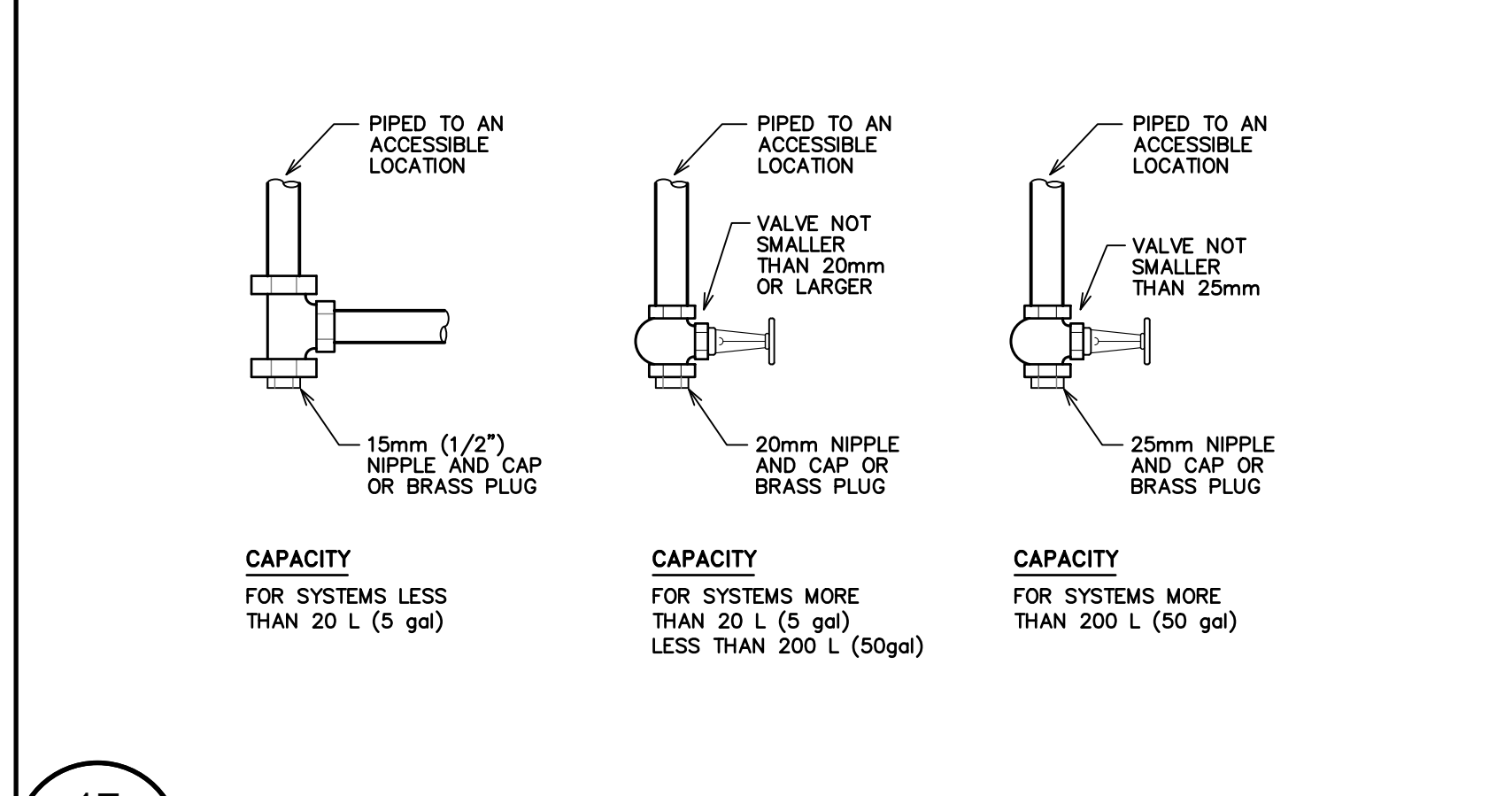
14 M1.04 PIPE HANGING DETAIL N.T.S.



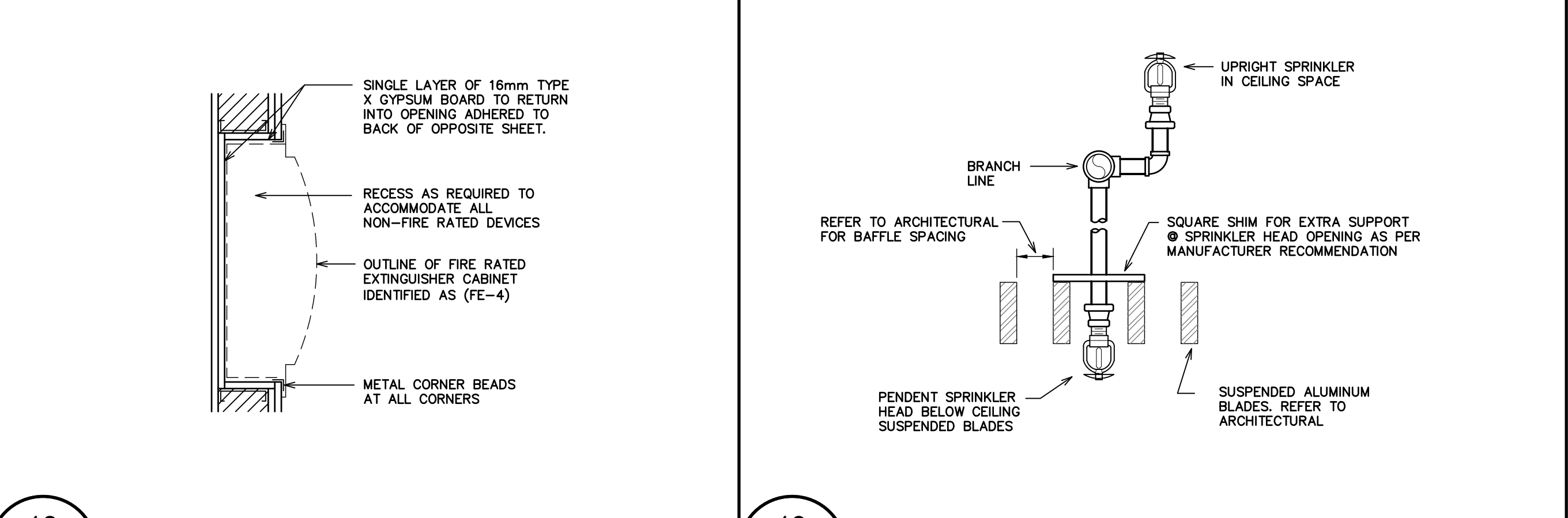
15 M1.04 SYSTEM FLOOR CONTROL ZONE DETAIL N.T.S.



16 M1.04 UPRIGHT SPRINKLER HEAD DETAIL N.T.S.



17 M1.04 LOW POINT DRAIN DETAILS N.T.S.



18 M1.04 FIRE EXTINGUISHER CABINET (FE-4) N.T.S.

THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF NEW BRUNSWICK HAS REVIEWED THIS DRAWING AND VALID FOR THE YEAR 2023. SCALE SHOWN: No. 2325 DATE: 10/04/2023 LICENSED PROFESSIONAL ENGINEER PROVINCE OF NEW BRUNSWICK

Table with 3 columns: NO., REVISION, DATE. Row 1: 0, TRS ISSUED FOR TENDER, 2023.04.10

PROJECT NAME: SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT CHARLOTTETOWN NB

PROJECT NO.: 21111 DRAWN BY: T.M. CHECKED BY: S.S. SCALE: AS INDICATED

DETAILS - FIRE PROTECTION

**FOR INFORMATION ONLY -
UNDERGROUND BY
SEPERATE CONTRACT**

M2.01 LEVEL 1 ARENA FLOOR PLAN - TRAP PRIMER LOCATIONS

SCALE: 1:250

CLIENT

CHARLOTTETOWN

KEY PLAN

CONSULTANT

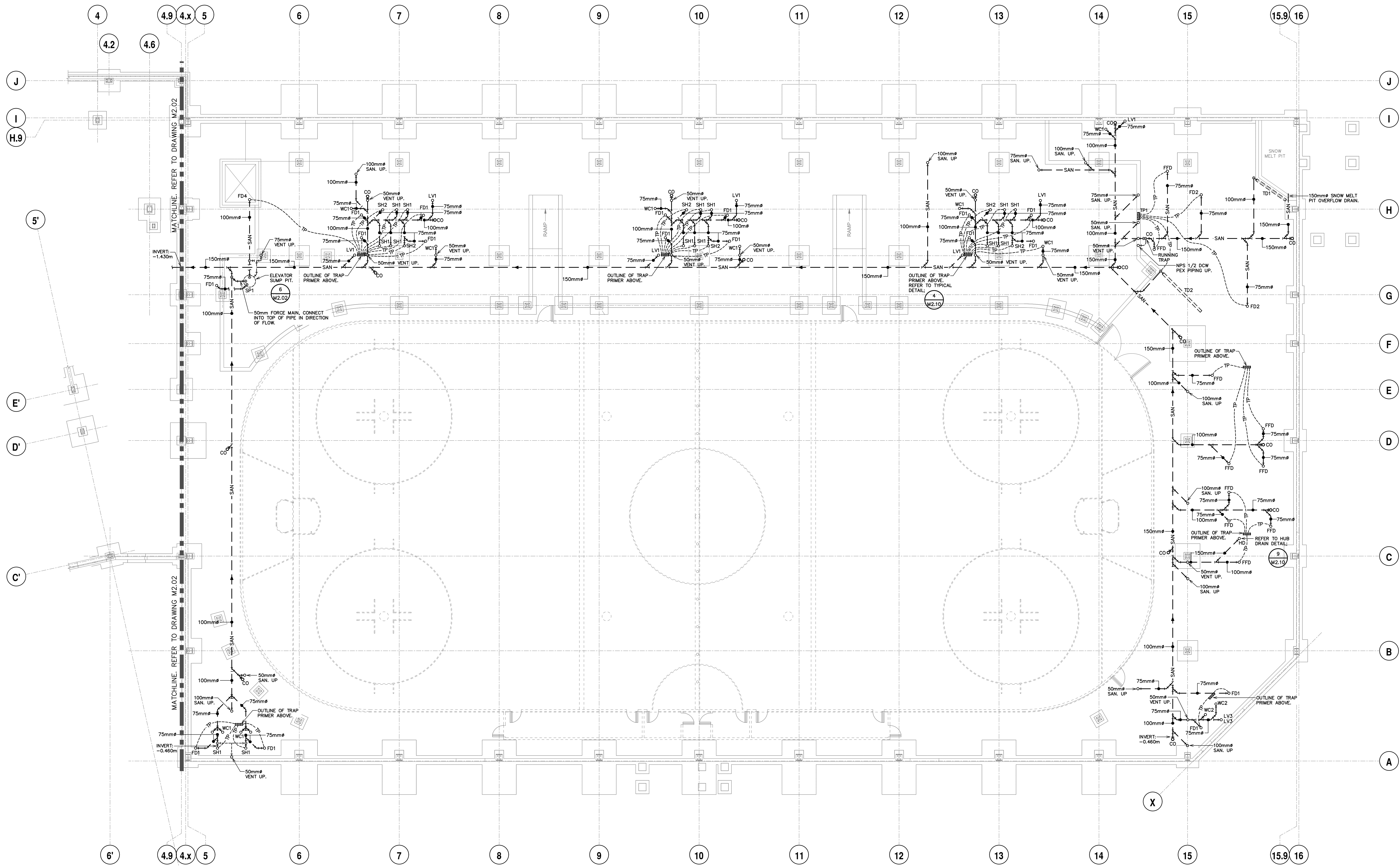
DSRA

1101 400 8990 | 1000 Spring Garden Street, 4th Floor
 1101 400 8990 | Halifax, Nova Scotia, CAN. B3J 1G7

McW Maricor

77 VAUGHAN HARBOUR BLVD. SUITE 200
 MONCTON, NB E1C 0K2
 BUS: 506 857 8880 FAX: 506 859 8393
 WWW.MCW.COM ENG. REG. NO. 16211004

GENERAL FLUING NOTE:
 1. ALL CLEANOUTS (CO) ARE FULL LINE SIZE,
 TO A MAXIMUM OF 150mm.



M2.01 LEVEL 1(A) ARENA UNDERGROUND FOUNDATION PLAN - SANITARY & STORM

THE ASSOCIATION OF
 PROFESSIONAL ENGINEERS
 OF THE PROVINCE OF
 PRINCE EDWARD ISLAND
 (PAID FOR THE YEAR 2021)

Scale: Simonman
 No. 2325

DATE: 10/24/2023

LICENSED
 PROFESSIONAL ENGINEER
 PROVINCE OF
 PRINCE EDWARD ISLAND

NO.	REVISION	DATE
1	ISSUED FOR TENDER	2023.02.24

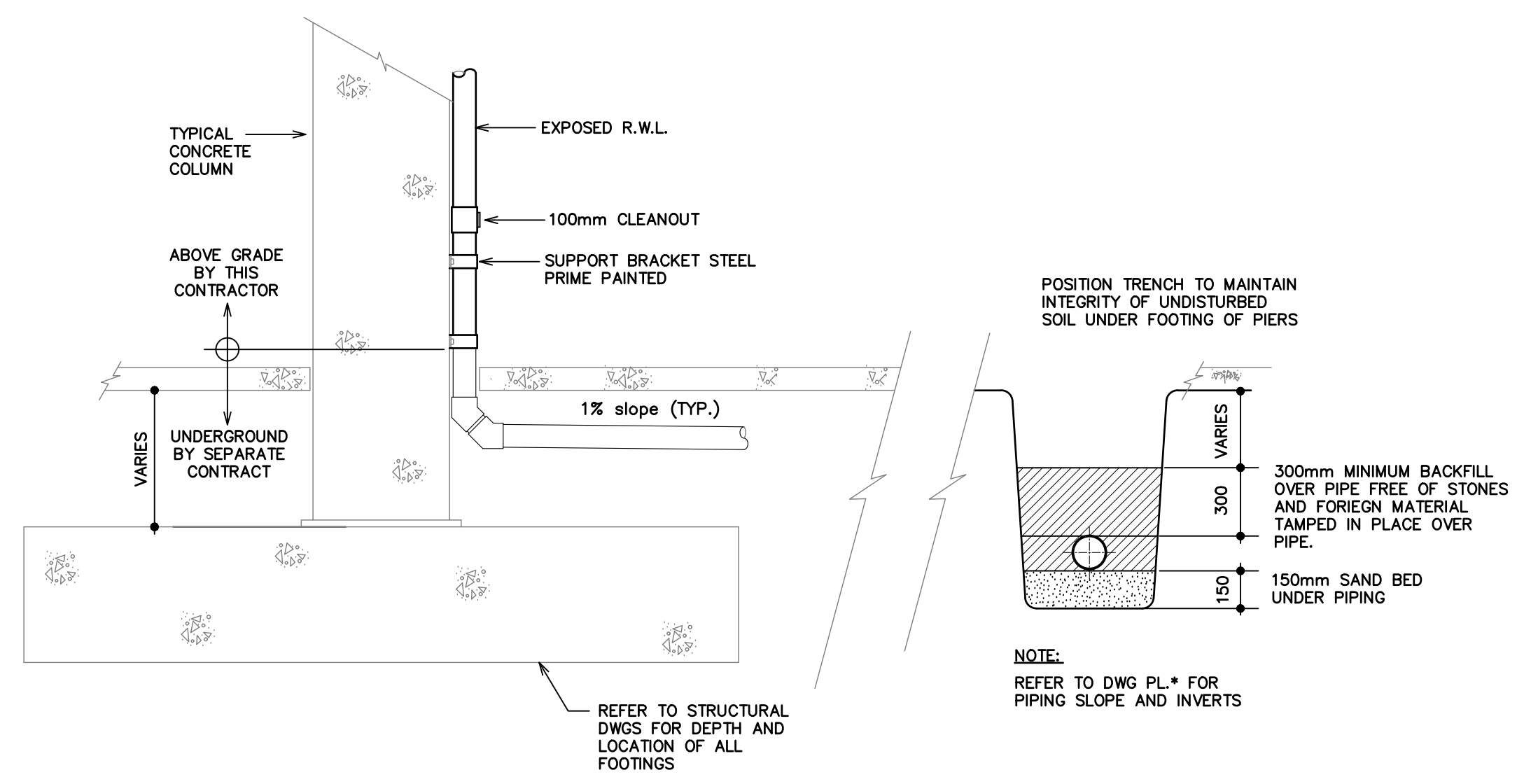
PROJECT NAME:
**SIMMONS SPORTS CENTRE
 ARENA & POOL REPLACEMENT**
 CHARLOTTETOWN
 SUBJECT:

PROJECT NO.: 21111
 DRAWN BY: K.C.S.
 CHECKED BY: S.S.
 SCALE: AS INDICATED

LEVEL 1(A) ARENA
 UNDERGROUND FLOOR
 PLAN - SANITARY & STORM

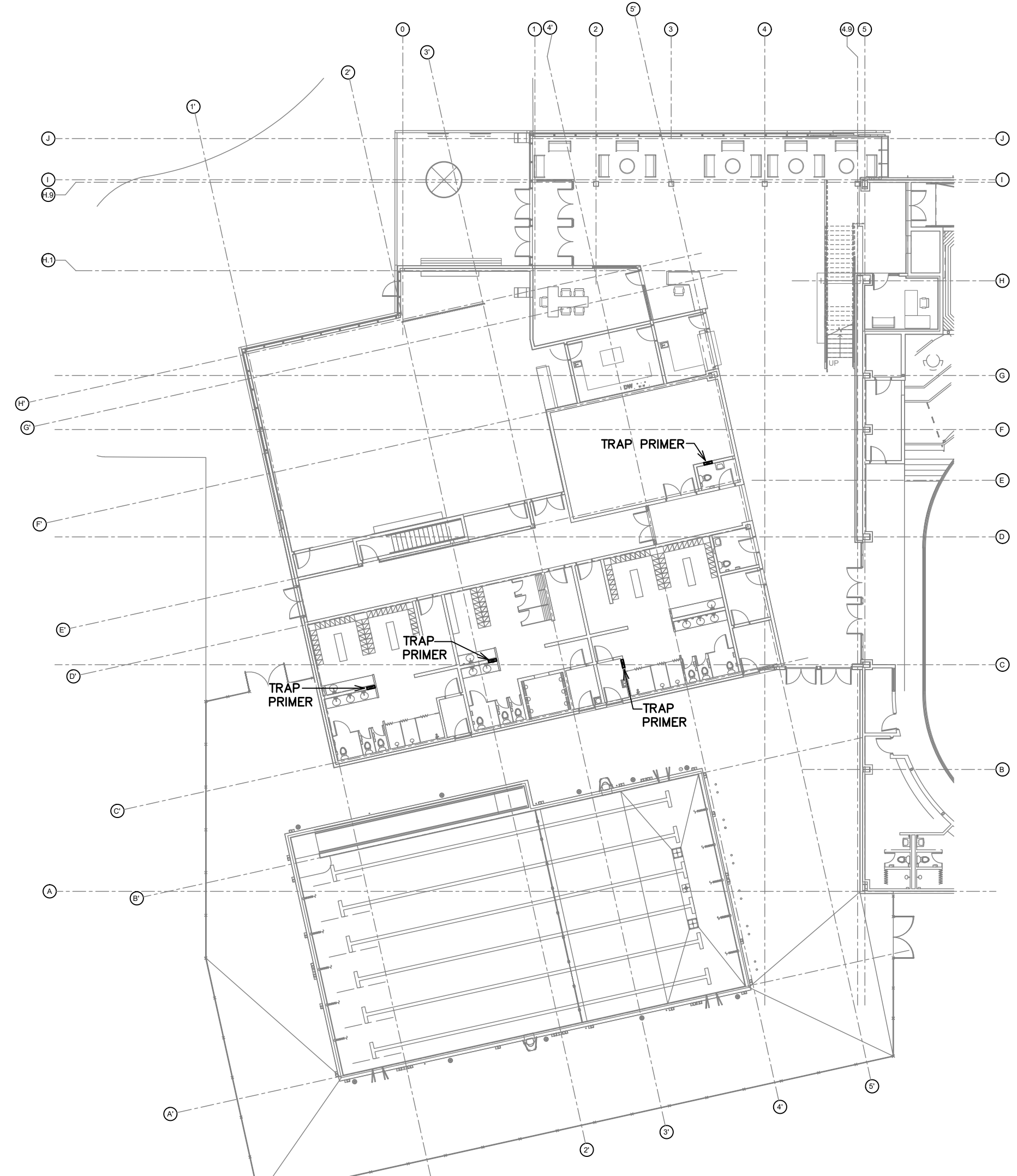
M2.01

SCALE: 1:100



4 M2.02 TYPICAL RAINWATER LEADER INSTALLATION DETAIL

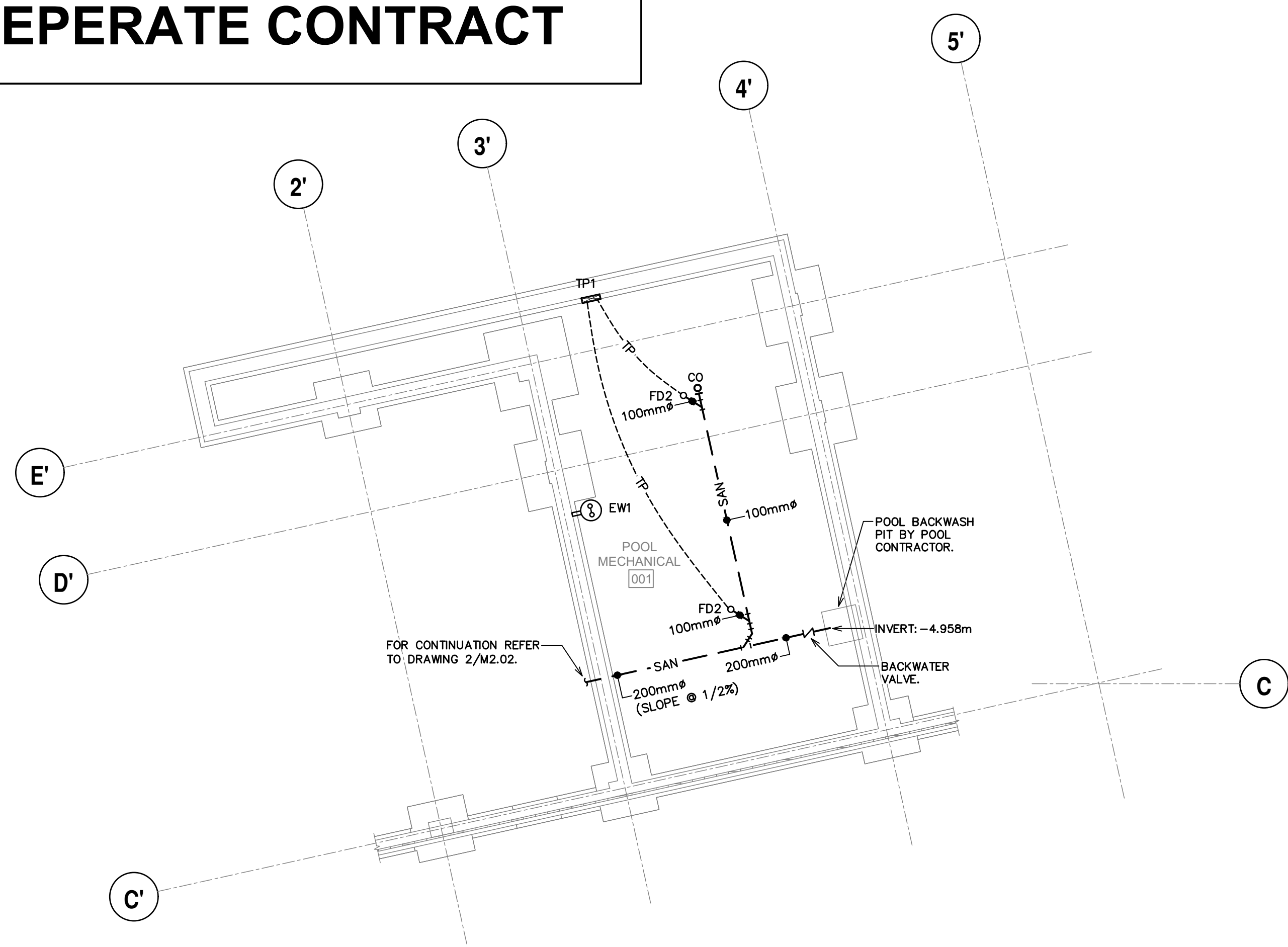
N.T.S.



3 M2.02 LEVEL 1 ADDITION FLOOR PLAN - TRAP PRIMER LOCATIONS

SCALE: 1:250

FOR INFORMATION ONLY - UNDERGROUND BY SEPERATE CONTRACT



1 M2.02 BASEMENT UNDERGROUND FLOOR PLAN - SANITARY & STORM

SCALE: 1:100

FOR INFORMATION ONLY - UNDERGROUND BY SEPERATE CONTRACT

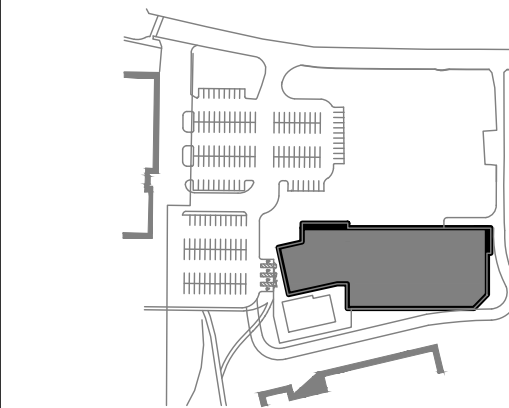


2 M2.02 LEVEL 1(B) UNDERGROUND FLOOR PLAN - SANITARY & STORM

SCALE: 1:100

CLIENT

KEY PLAN



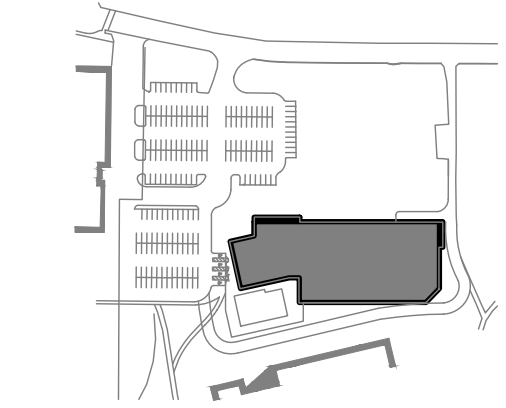
CONSULTANT

THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF NEW BRUNSWICK HAS REVIEWED THIS DRAWING AND ISSUED FOR THE YEAR 2023.
Scale: 1:100
No. 2325
DATE: 10/04/2023
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF NEW BRUNSWICK

NO.	REVISION	DATE
1	ISSUED FOR TENDER	2023.02.24

PROJECT NAME:
SIMMONS SPORTS CENTRE
ARENA & POOL REPLACEMENT
CHARLOTTETOWN
SUBJECT:

PROJECT NO.: 21111
DRAWN BY: K.C.S.
CHECKED BY: S.S.
SCALE: AS INDICATED
LEVEL 1(B) & BASEMENT
UNDERGROUND FLOOR
PLANS - SANITARY &
STORM



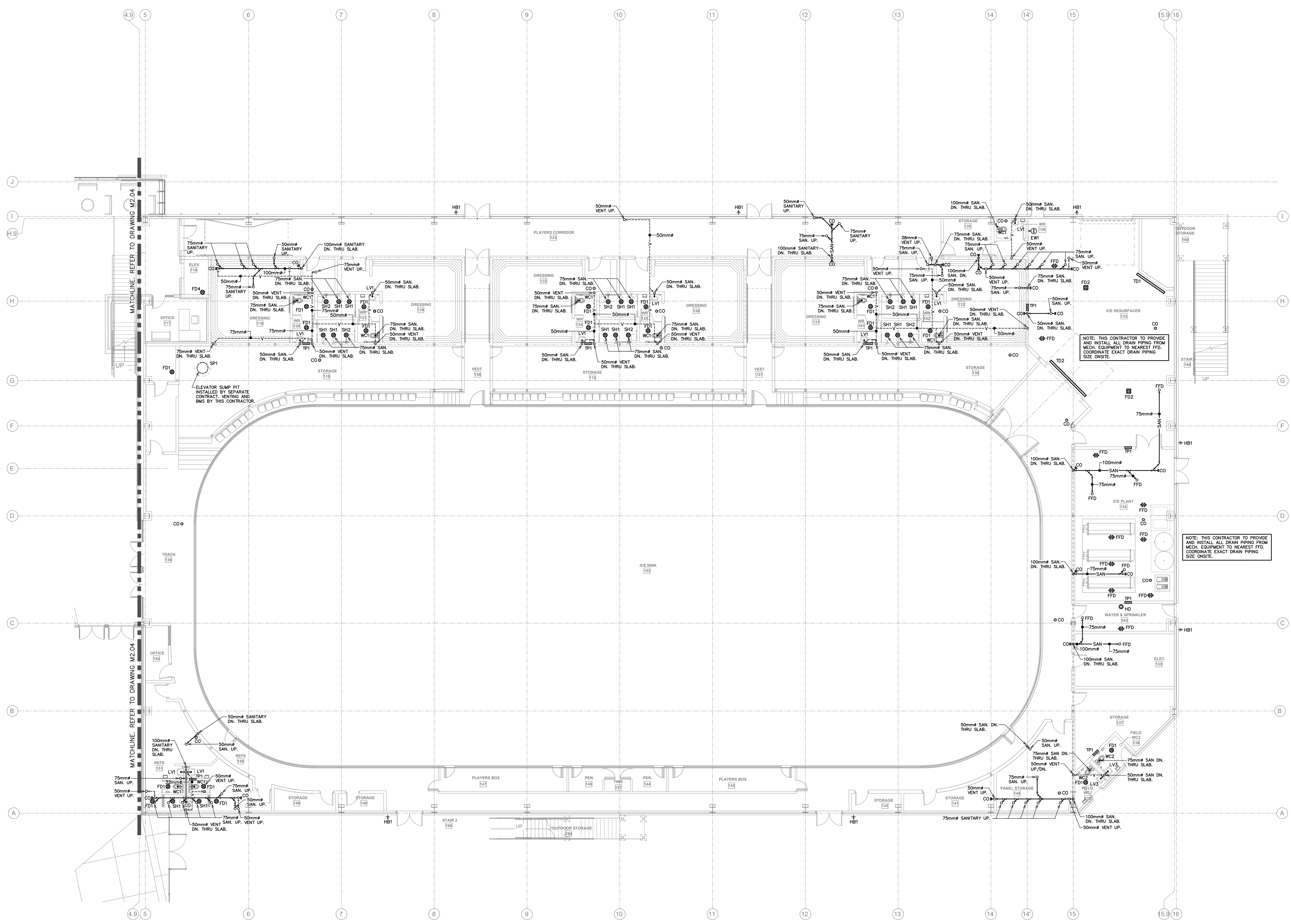
THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF PRINCE EDWARD ISLAND
Scale: 1:100
DATE: 10/24/2023
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF PRINCE EDWARD ISLAND

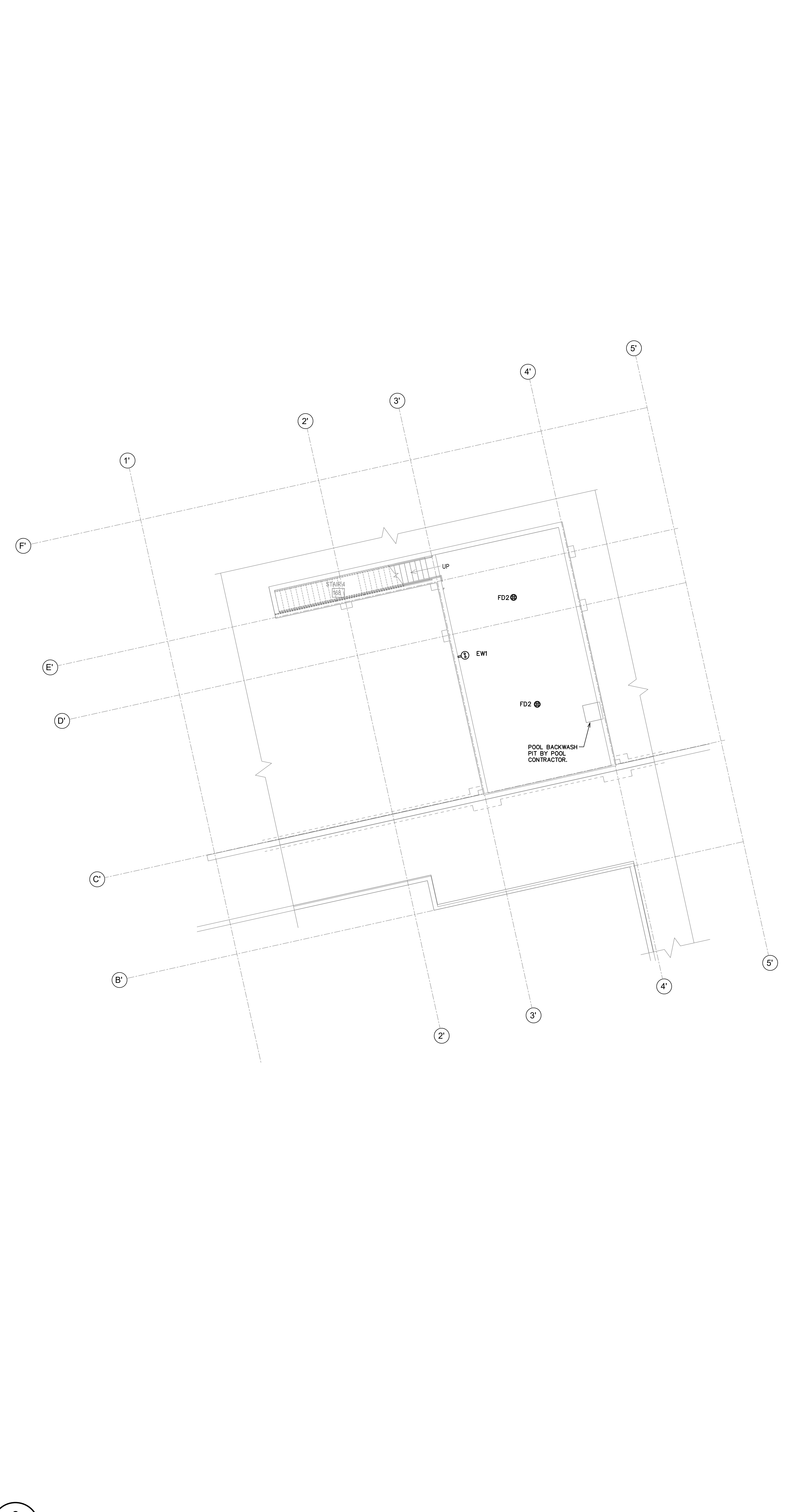
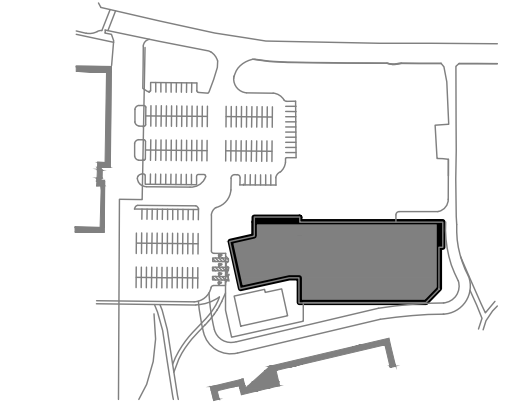
NO.	REVISION	DATE
0	TRN ISSUED FOR TENDER	2023.04.10
1		

PROJECT NAME:
SIMMONS SPORTS CENTRE
ARENA & POOL REPLACEMENT
CHARLOTTETOWN
SUBJECT:

PROJECT NO.: Z1111
DRAWN BY: K.C.S.
CHECKED BY: S.S.
SCALE: AS INDICATED

LEVEL 1(A) ARENA
FLOOR PLAN - SANITARY
& STORM





2 M2.04 BASEMENT FLOOR PLAN - SANITARY & STORM

SHEET SIZE: 36"x48"



1 M2.04 LEVEL 1(B) FLOOR PLAN - SANITARY & STORM

SCALE: 1:100

SCALE: 1:100

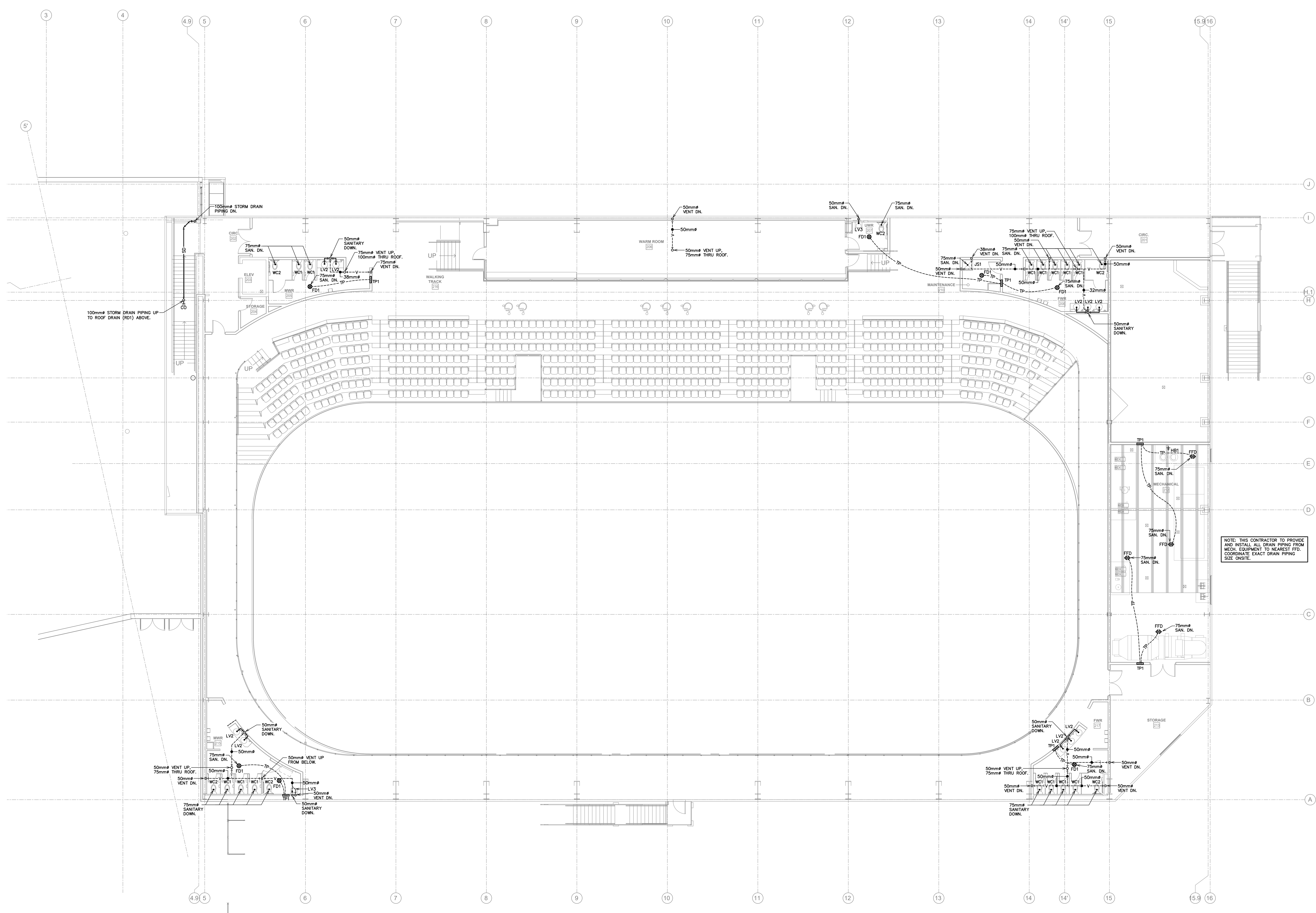
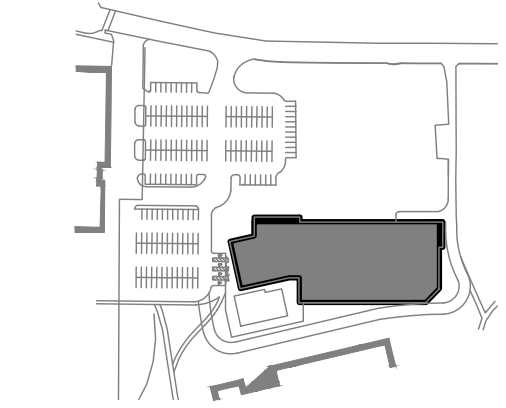
THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF PRINCE EDWARD ISLAND
Scale: Simonman
No. 2325
DATE: 10/04/2023
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF PRINCE EDWARD ISLAND

NO.	TRK ISSUED FOR TENDER	2023.04.10
1	REVISION	DATE

PROJECT NAME:
SIMMONS SPORTS CENTRE
ARENA & POOL REPLACEMENT
CHARLOTTETOWN
SUBJECT:

PROJECT NO.: 21111
DRAWN BY: K.C.S.
CHECKED BY: S.S.
SCALE: AS INDICATED

LEVEL 1 (B) & BASEMENT
FLOOR PLANS -
SANITARY & STORM



NOTE: THIS CONTRACTOR TO PROVIDE AND INSTALL ALL DRAIN PIPING FROM MECH. EQUIPMENT TO NEAREST FFD. COORDINATE EXACT DRAIN PIPING SIZE ON SITE.

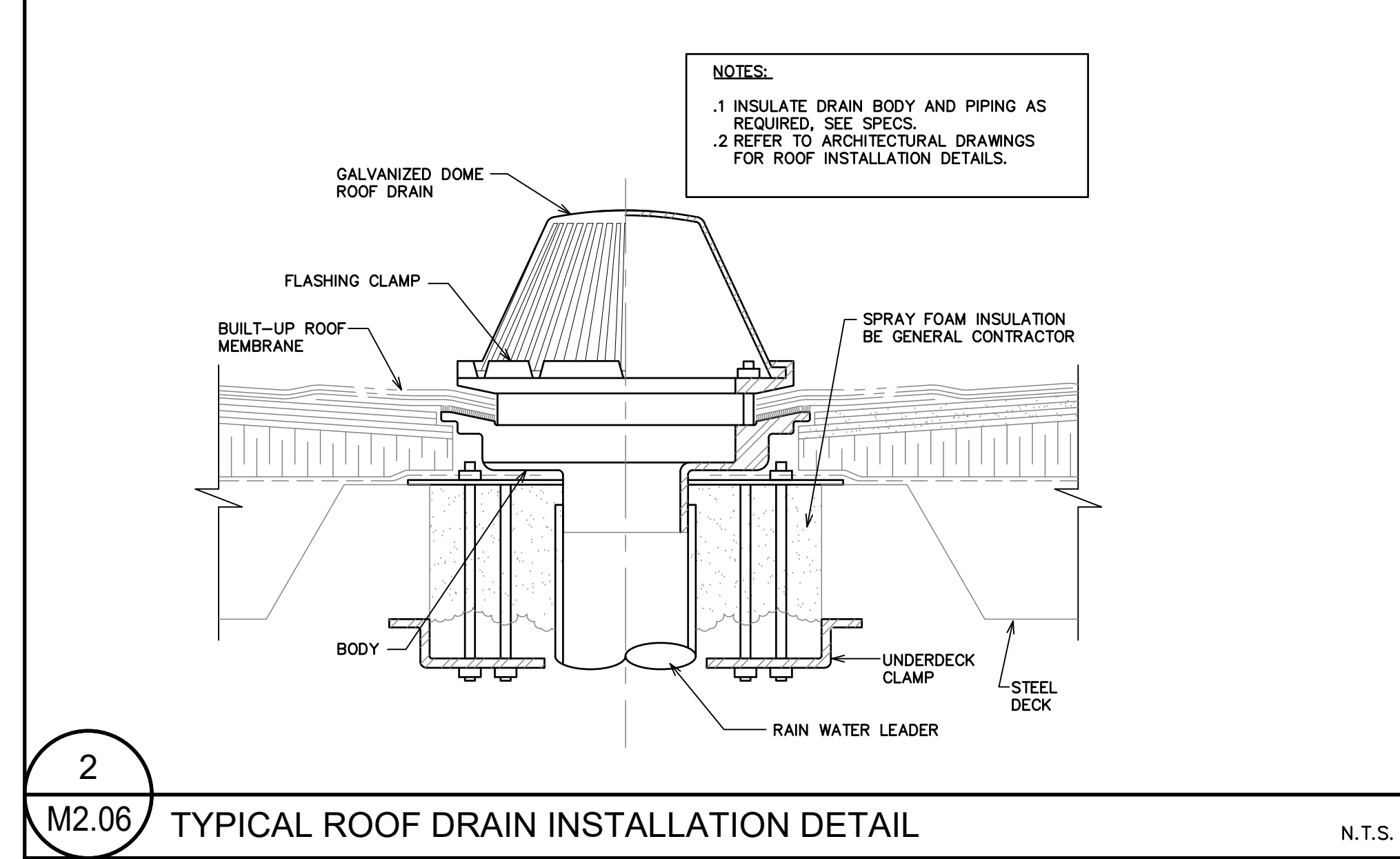
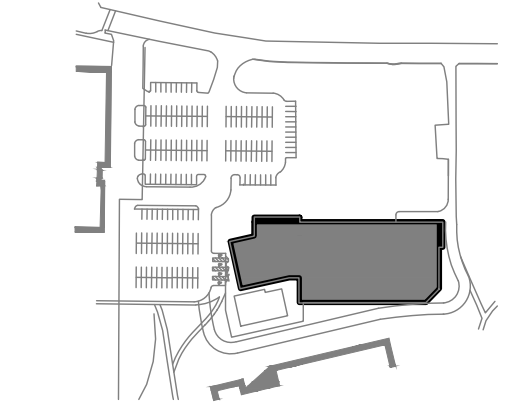
THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF PRINCE EDWARD ISLAND
Scale: 1/2" = 1'-0"
DATE: 10/24/2023
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF PRINCE EDWARD ISLAND

NO.	TRF ISSUED FOR TENDER	2023.04.10
1	REVISION	DATE

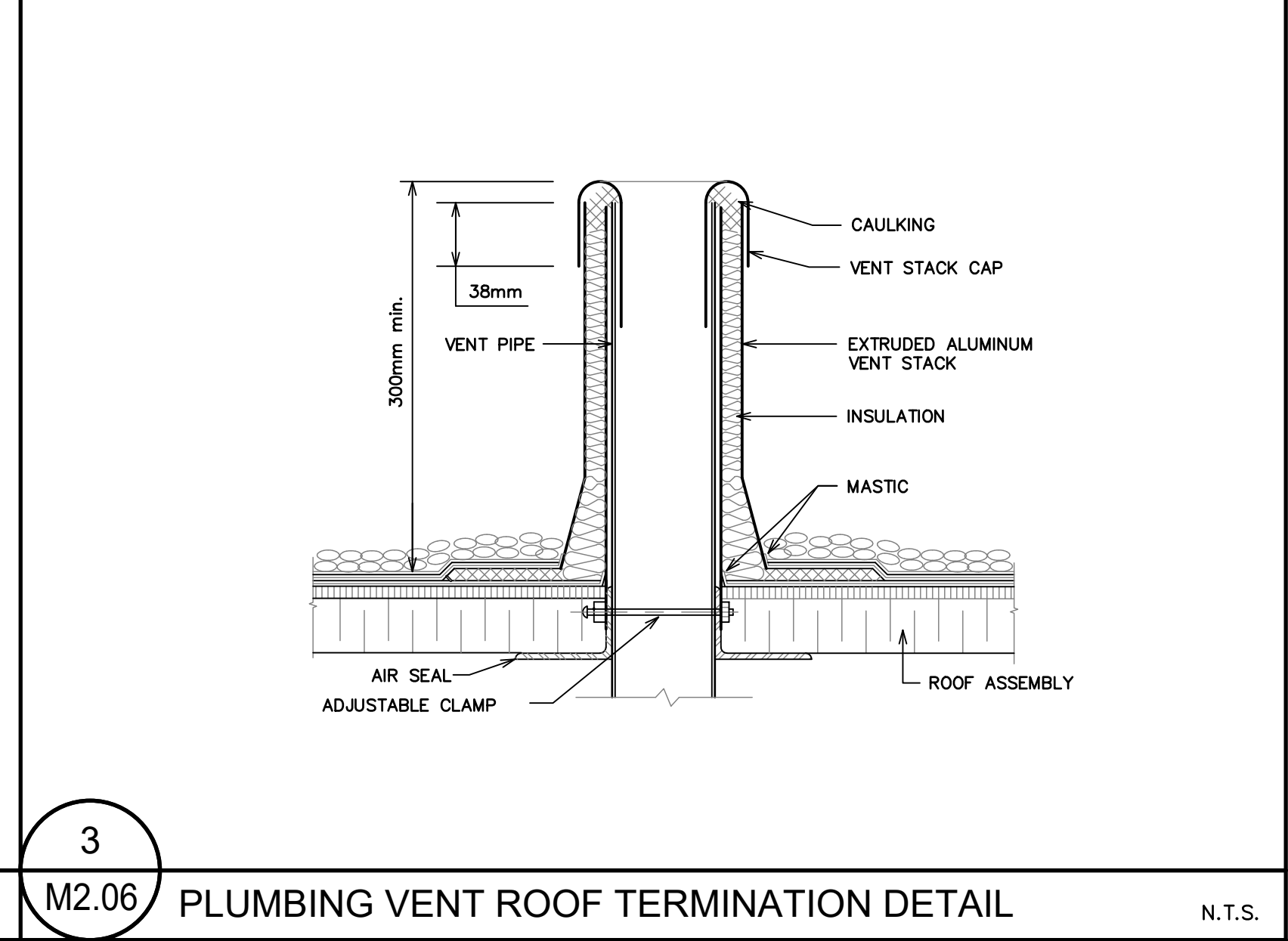
PROJECT NAME:
SIMMONS SPORTS CENTRE
ARENA & POOL REPLACEMENT
CHARLOTTETOWN
SUBJECT:

PROJECT NO.: 21111
DRAWN BY: K.C.S.
CHECKED BY: S.S.
SCALE: AS INDICATED

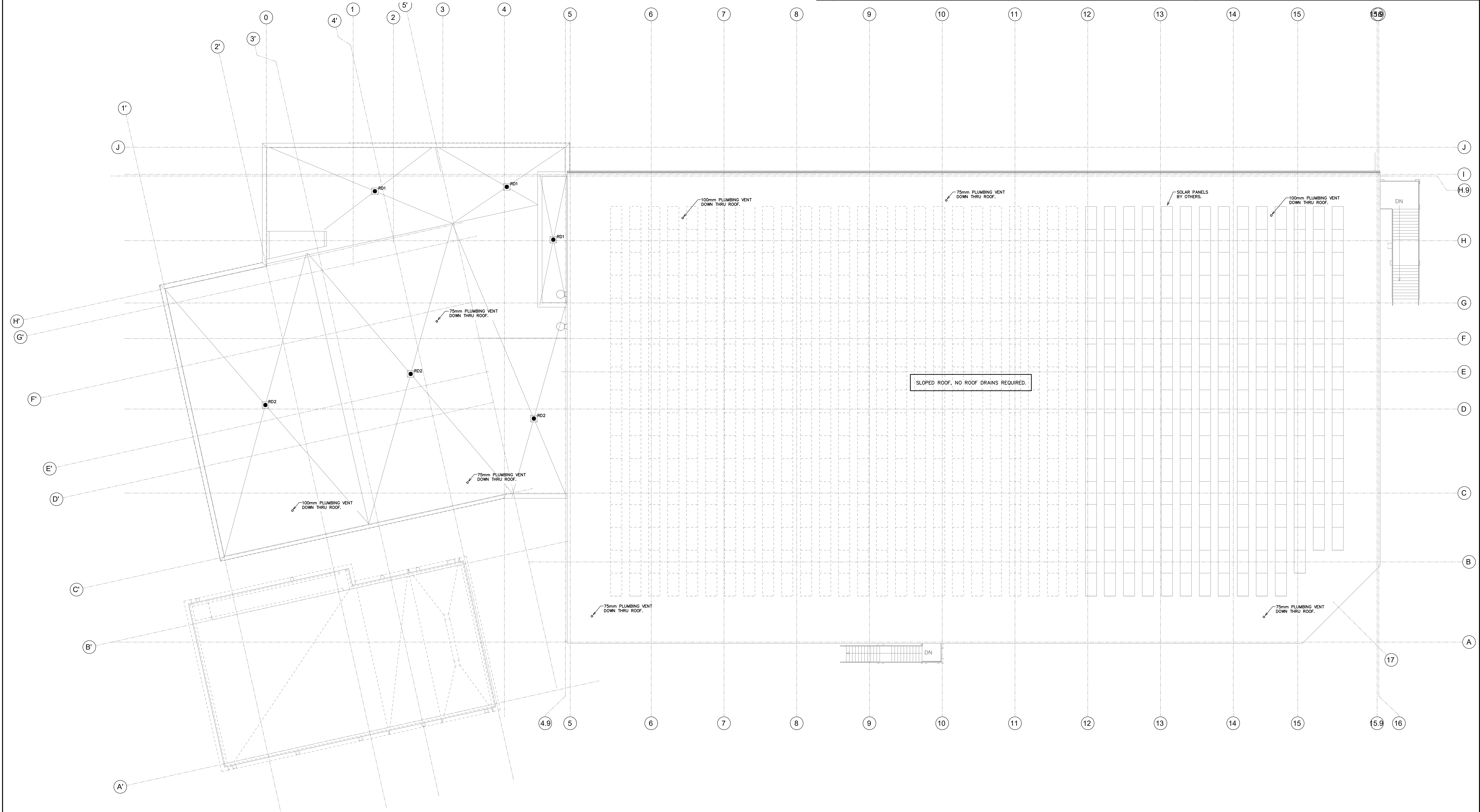
LEVEL 2 ARENA
FLOOR PLAN
SANITARY & STORM



2 M2.06 TYPICAL ROOF DRAIN INSTALLATION DETAIL



3 M2.06 PLUMBING VENT ROOF TERMINATION DETAIL



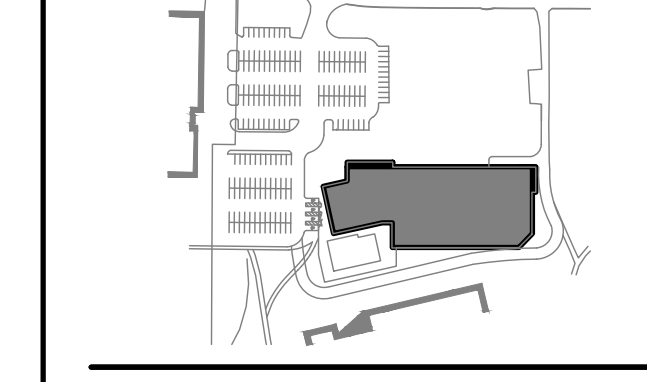
THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF PEI
 No. 2325
 DATE: 10/04/2023
 LICENSED PROFESSIONAL ENGINEER
 PROVINCE OF PEI

NO.	REVISION	DATE
0	TRN ISSUED FOR TENDER	2023.04.10

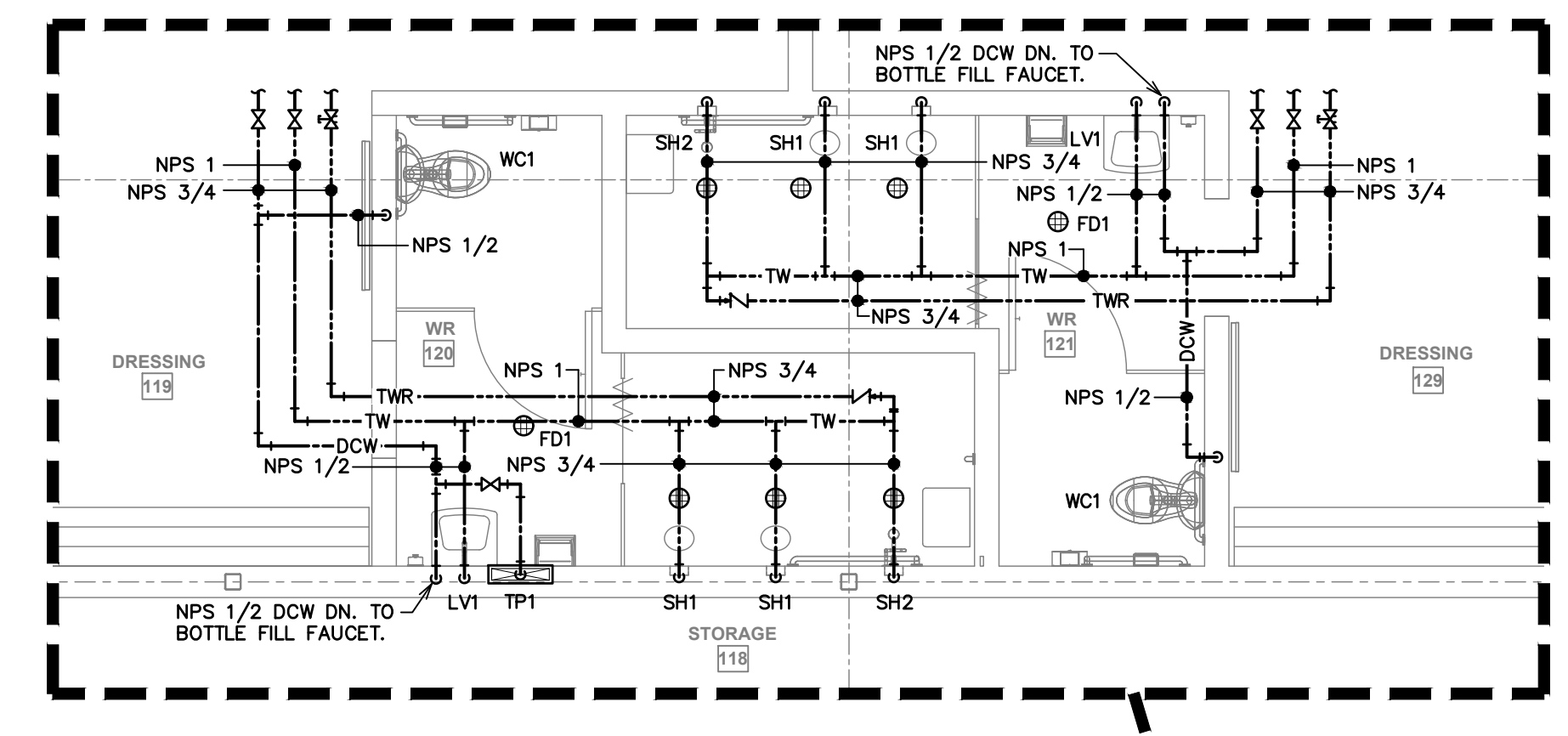
PROJECT NAME:
 SIMMONS SPORTS CENTRE
 ARENA & POOL REPLACEMENT
 CHARLOTTETOWN
 SUBJECT:

PROJECT NO.: Z1111
 DRAWN BY: K.C.S.
 CHECKED BY: S.S.
 SCALE: AS INDICATED

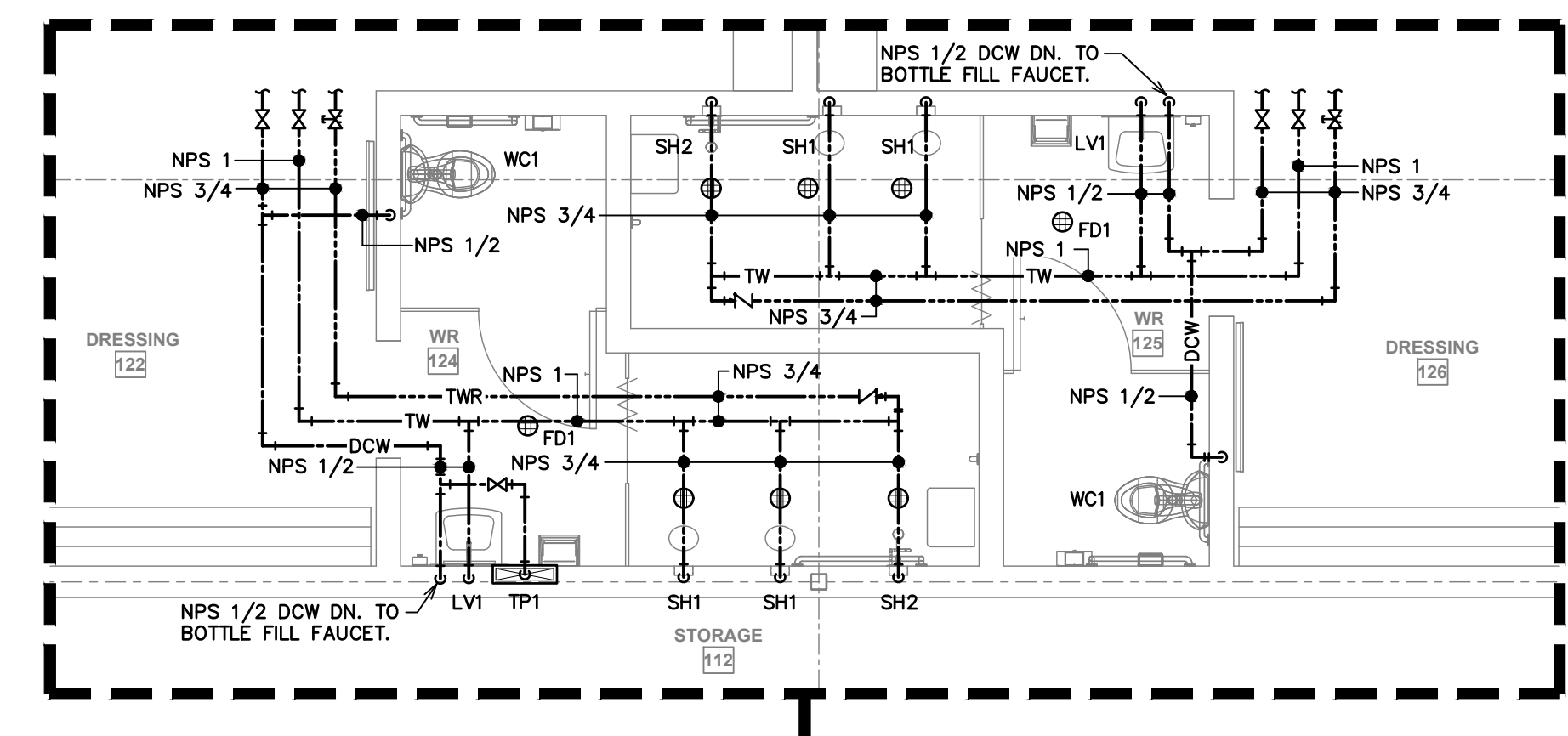
ROOF PLAN - SANITARY & STORM



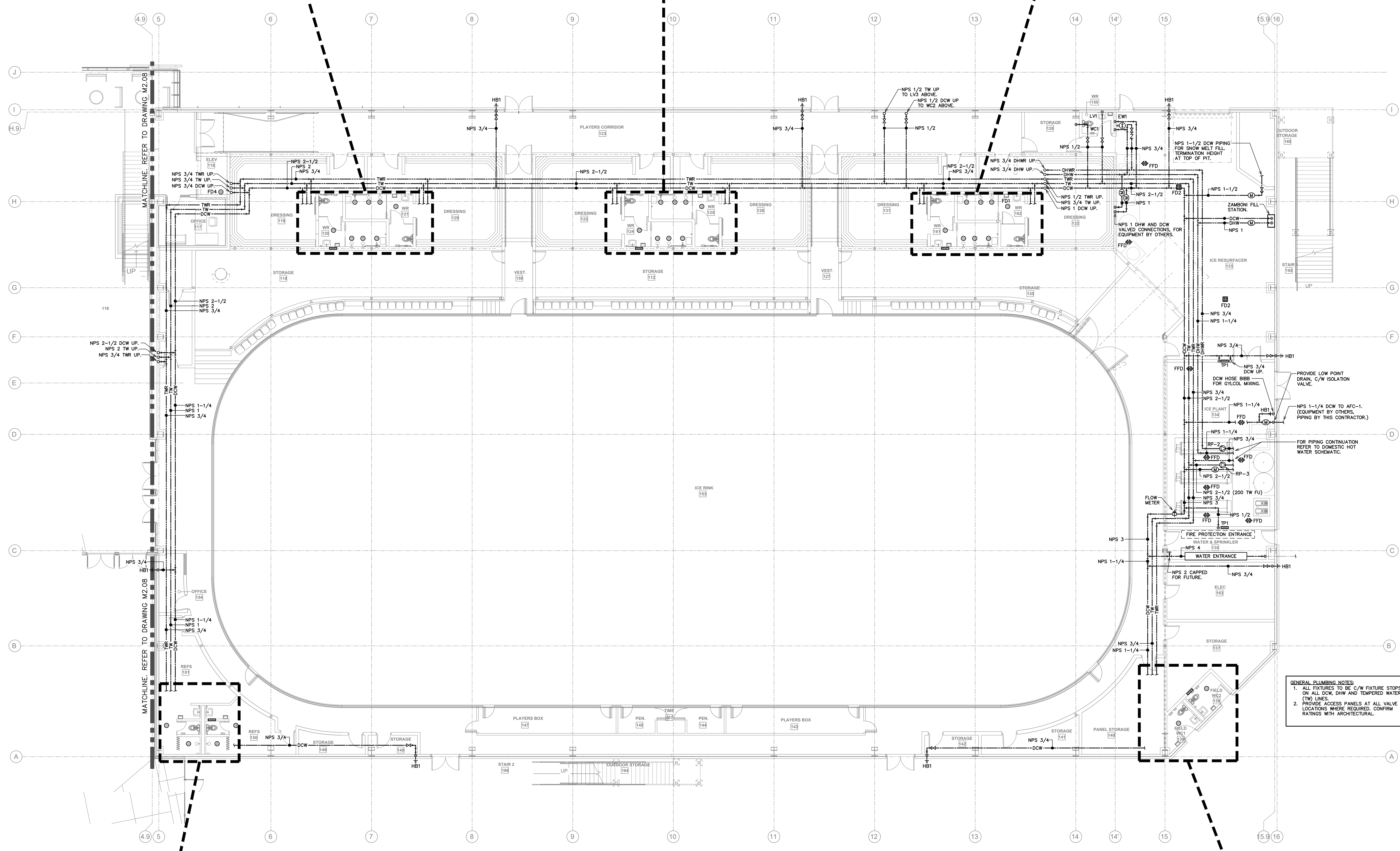
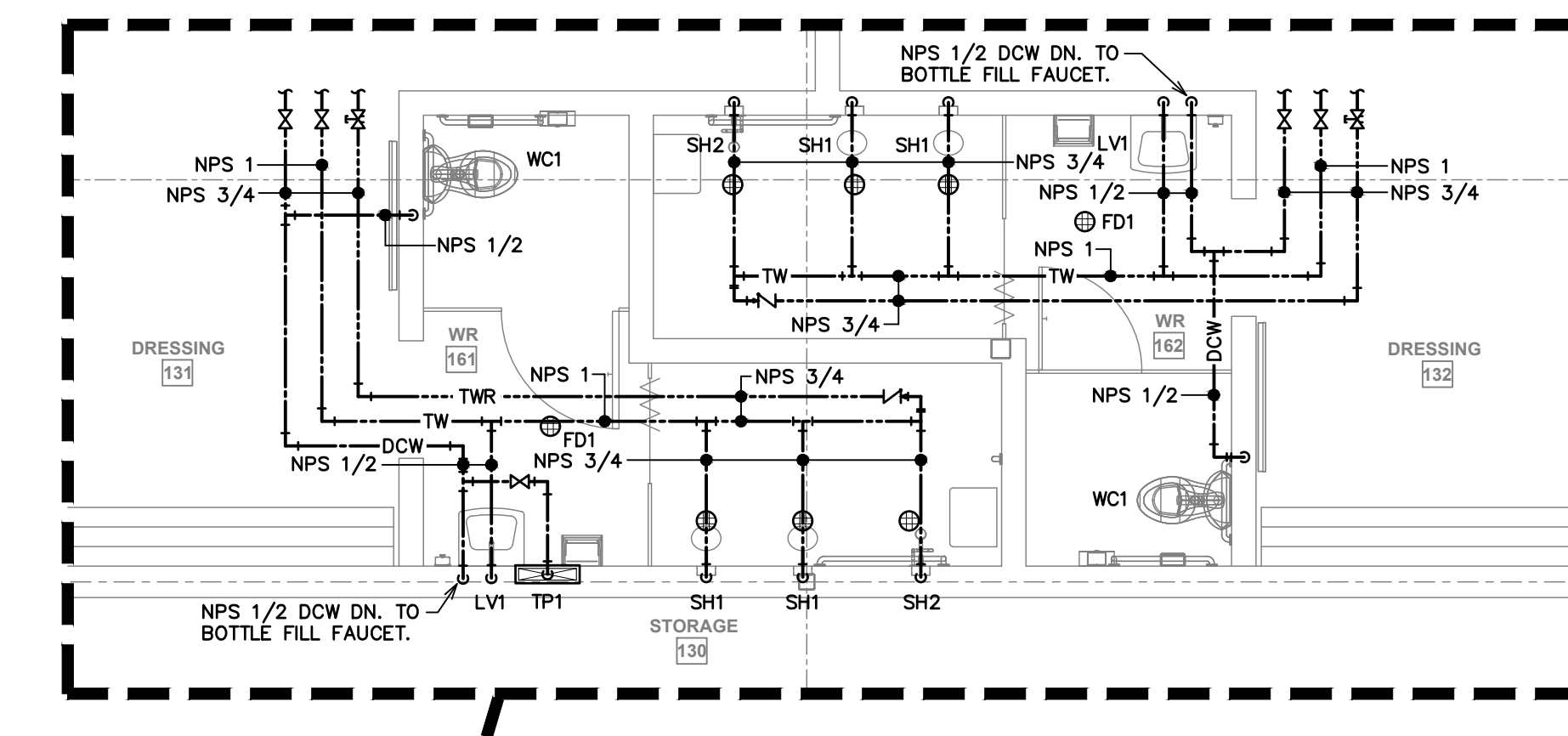
WASHROOM ENLARGEMENT SCALE 1:50



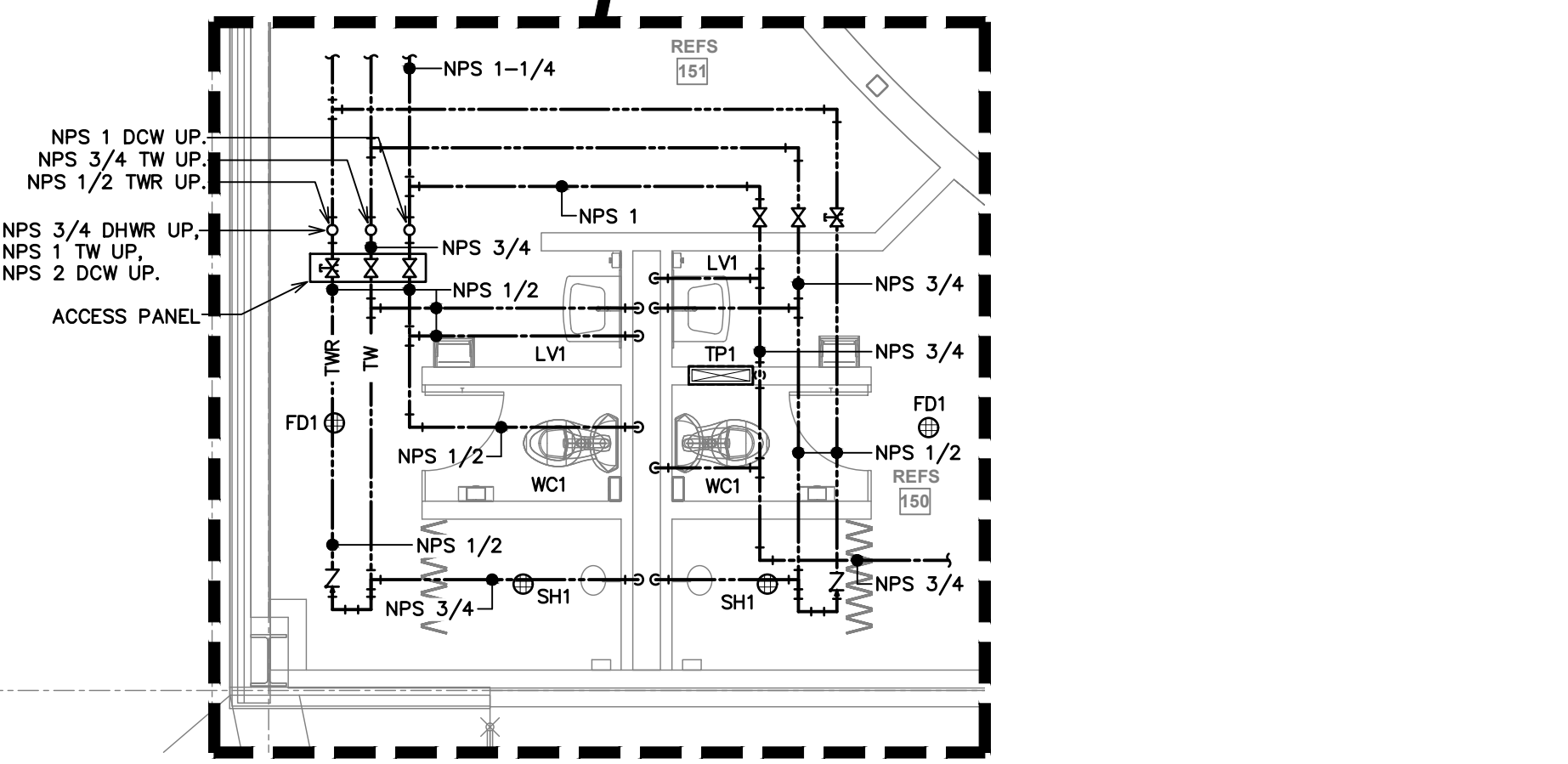
WASHROOM ENLARGEMENT SCALE 1:50



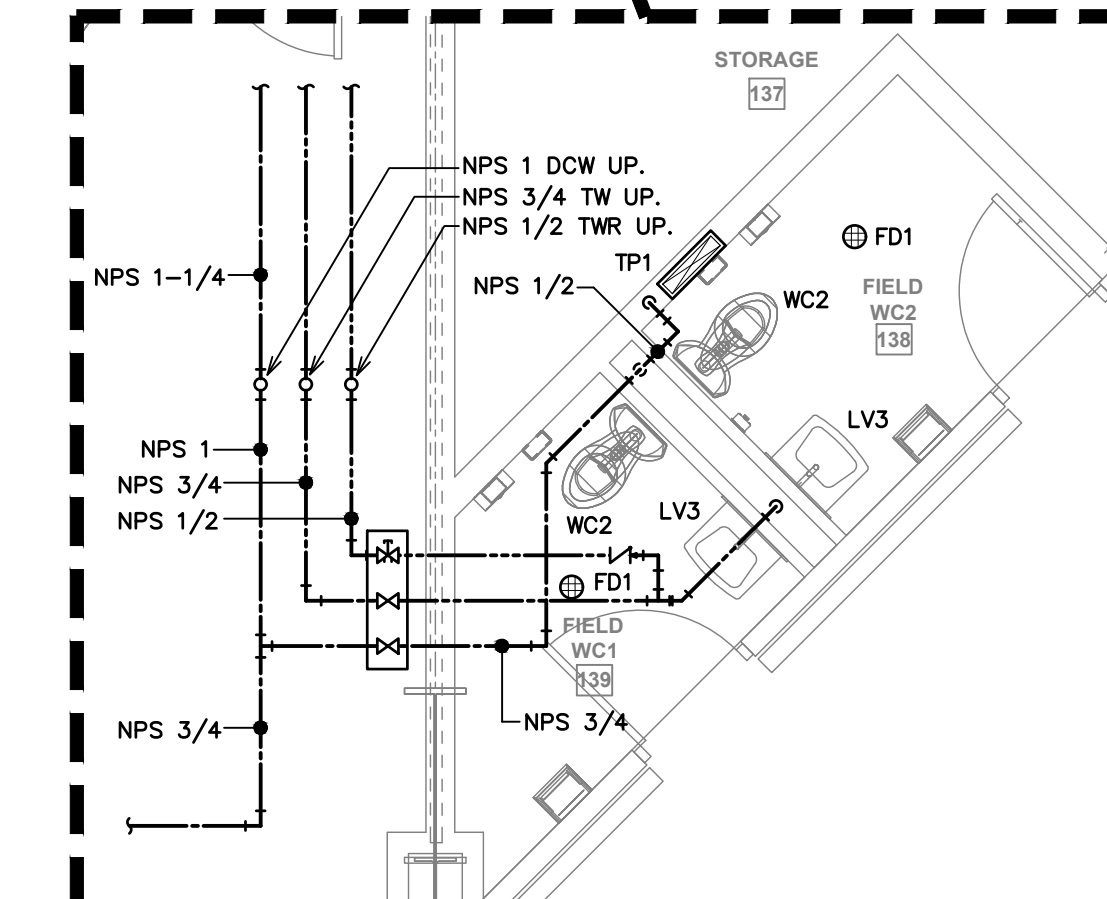
WASHROOM ENLARGEMENT SCALE 1:50



WASHROOM ENLARGEMENT SCALE 1:50



WASHROOM ENLARGEMENT SCALE 1:50



GENERAL PLUMBING NOTES:
1. ALL FIXTURES TO BE C/W FIXTURE STOPS ON ALL DCW, DHW AND TEMPERED WATER (TW) LINES.
2. PROVIDE ACCESS PANELS AT ALL VALVE LOCATIONS WHERE REQUIRED. CONFIRM RATINGS WITH ARCHITECTURAL.

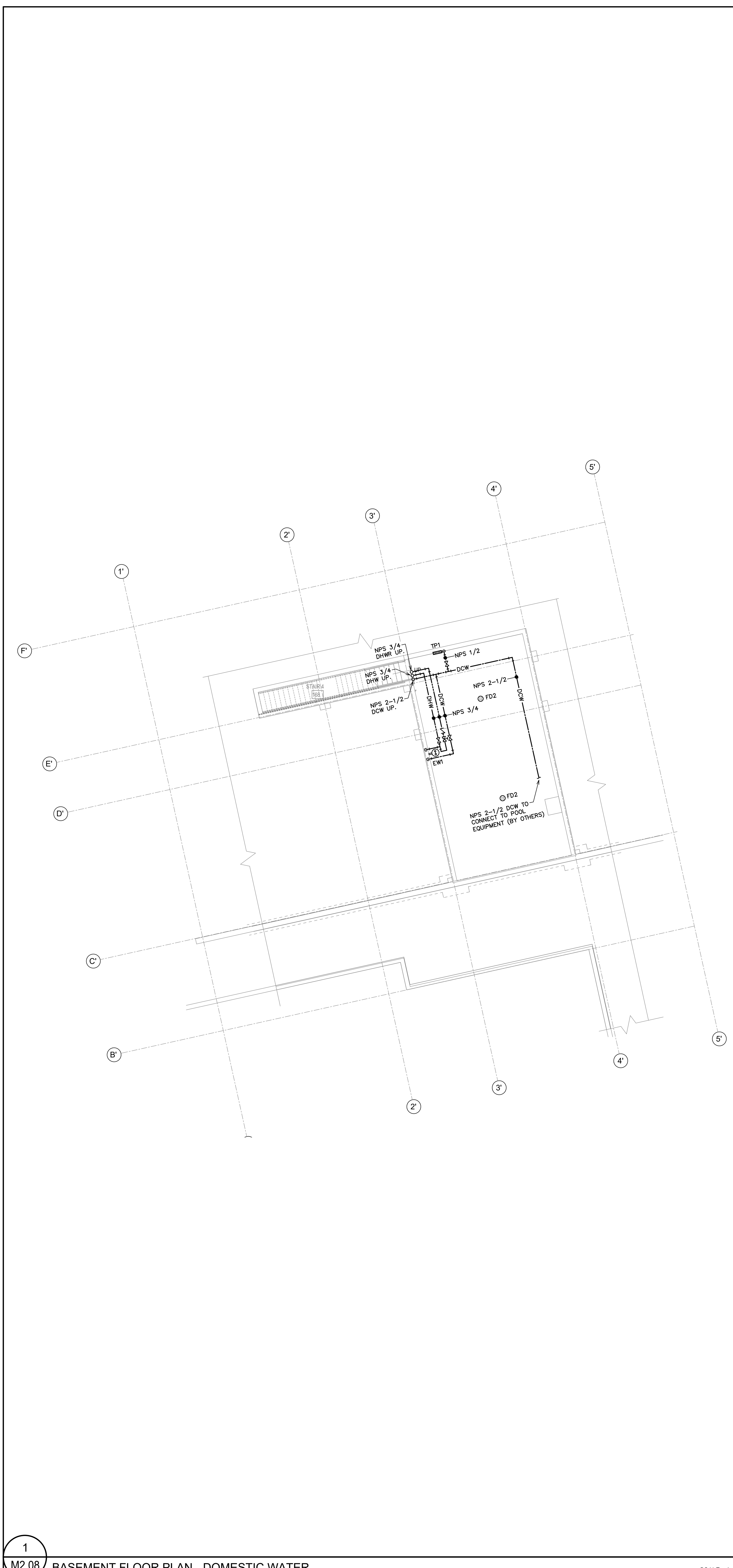
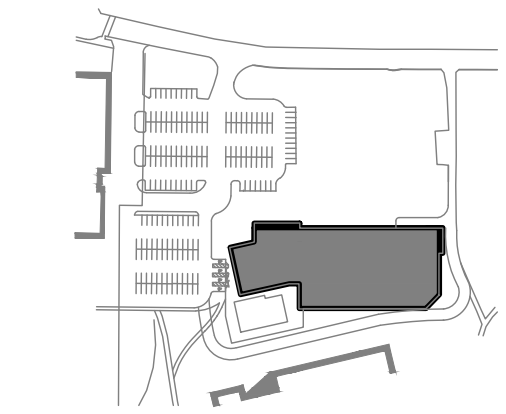
THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF NEW BRUNSWICK HAS MADE FOR THE YEAR 2021
SIGNATURE
No. 2325
DATE: 10/04/2023
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF NEW BRUNSWICK

NO.	REVISION	DATE
0	TRN ISSUED FOR TENDER	2023.04.10

PROJECT NAME:
SIMMONS SPORTS CENTRE
ARENA & POOL REPLACEMENT
CHARLOTTETOWN
SUBJECT:

PROJECT NO.: 21111
DRAWN BY: T.M.
CHECKED BY: S.S.
SCALE: AS INDICATED

LEVEL 1 ARENA
FLOOR PLAN -
DOMESTIC WATER



1 M2.08 BASEMENT FLOOR PLAN - DOMESTIC WATER

SHEET SIZE: 36"x48"



2 M2.08 LEVEL 1 FRONT ADDITION FLOOR PLAN - DOMESTIC WATER

SCALE: 1:100

GENERAL PLUMBING NOTES:
1. ALL FIXTURES TO BE C/W FIXTURE STOPS ON ALL DCW, DHW AND TEMPERED WATER (TW) LINES.
2. PROVIDE ACCESS PANELS AT ALL VALVE LOCATIONS WHERE REQUIRED. CONFIRM RATINGS WITH ARCHITECTURAL.

THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF PRINCE EDWARD ISLAND
Scale: Simonman No. 2325
DATE: 10/04/2023
LICENSED PROFESSIONAL ENGINEER
PROVINCE OF PRINCE EDWARD ISLAND

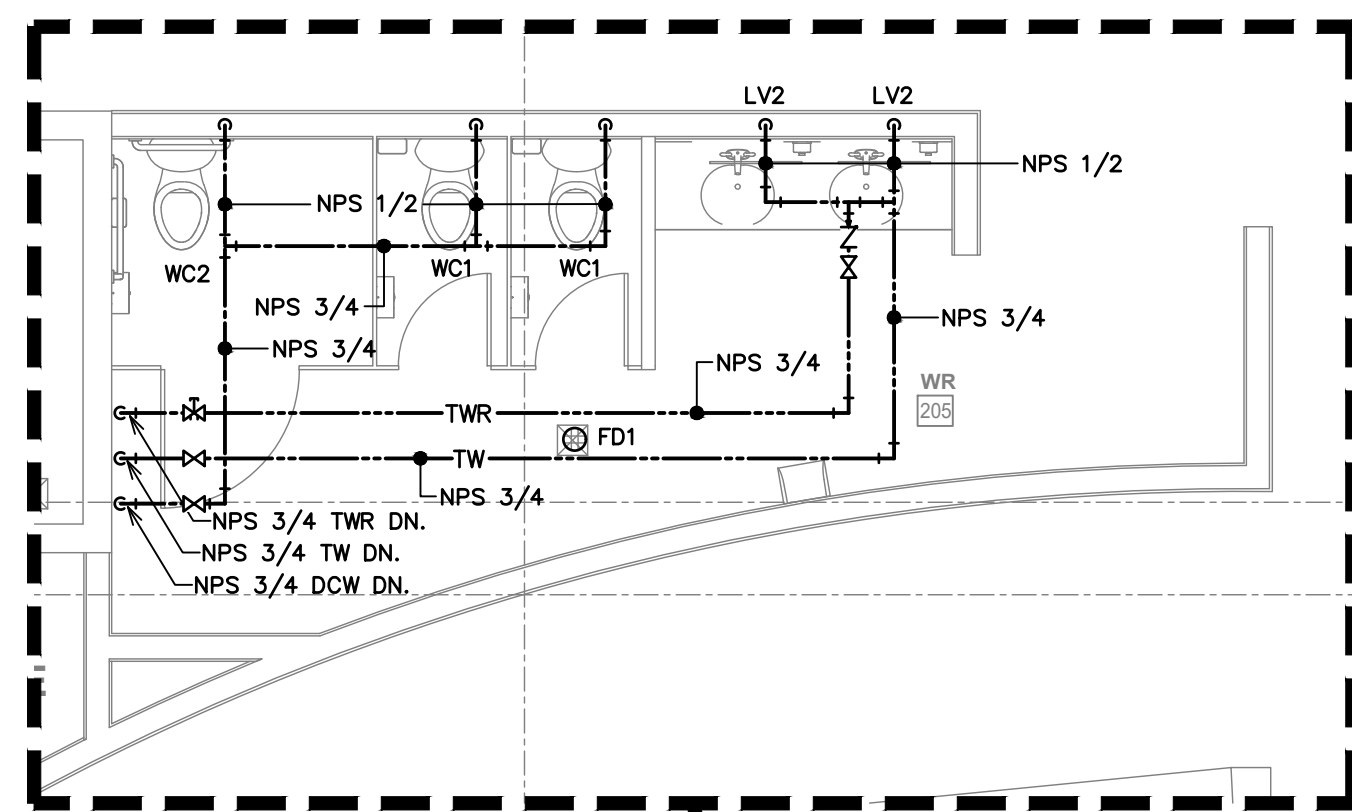
NO.	TRF ISSUED FOR TENDER	2023.04.10
1	REVISION	DATE

PROJECT NAME:
SIMMONS SPORTS CENTRE
ARENA & POOL REPLACEMENT
CHARLOTTETOWN
SUBJECT:

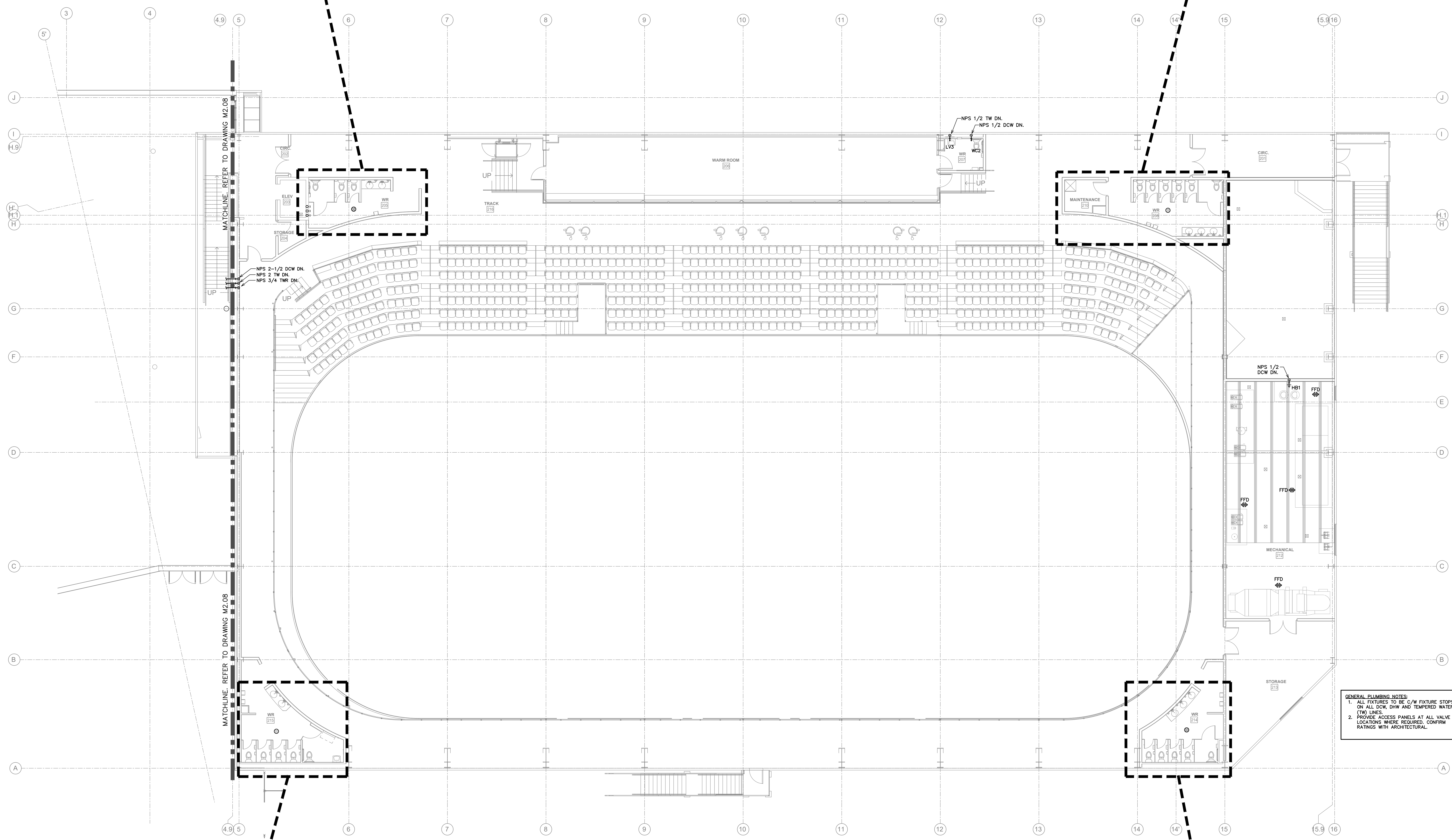
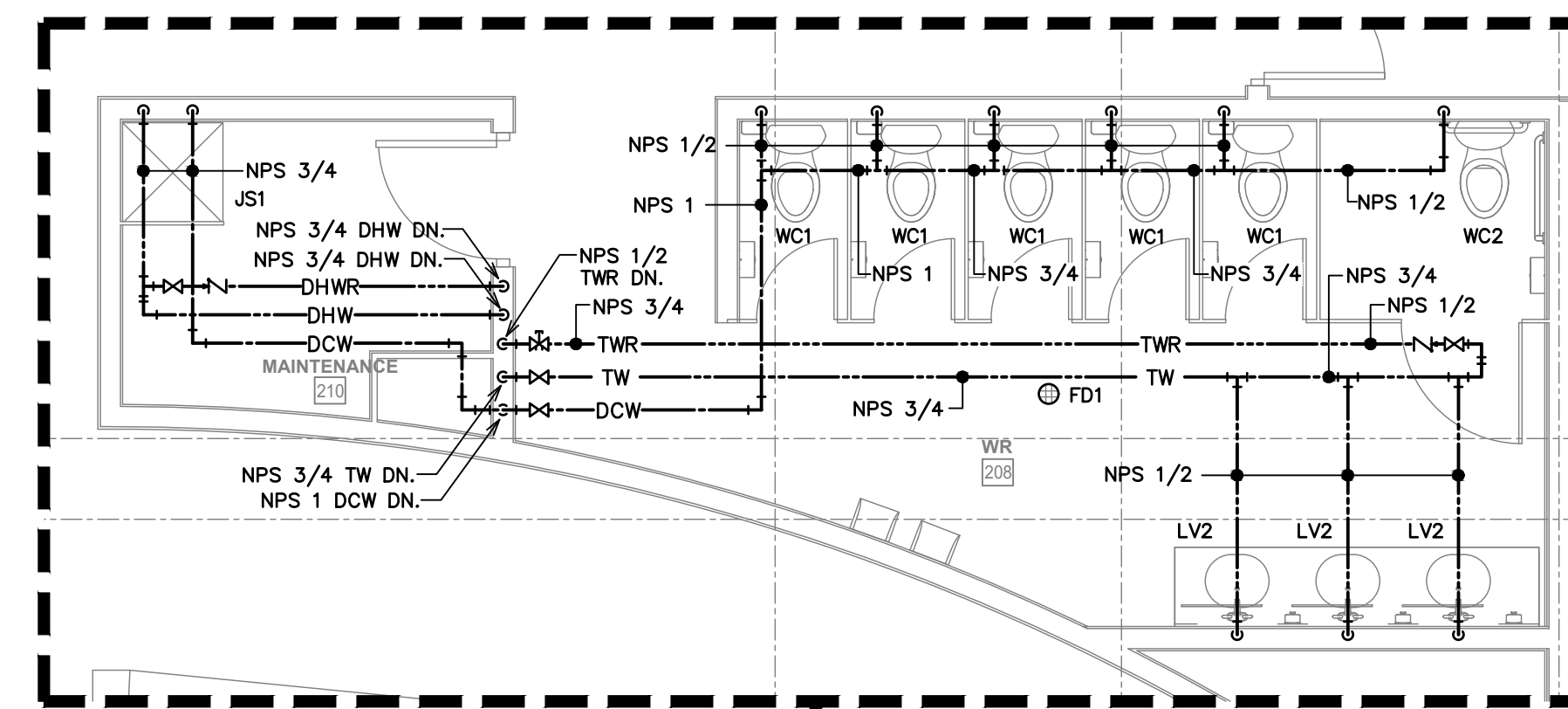
PROJECT NO.: 21111
DRAWN BY: K.C.S.
CHECKED BY: S.S.
SCALE: AS INDICATED

LEVEL 1 (B) & BASEMENT
FLOOR PLANS -
DOMESTIC WATER

WASHROOM ENLARGEMENT SCALE 1:50



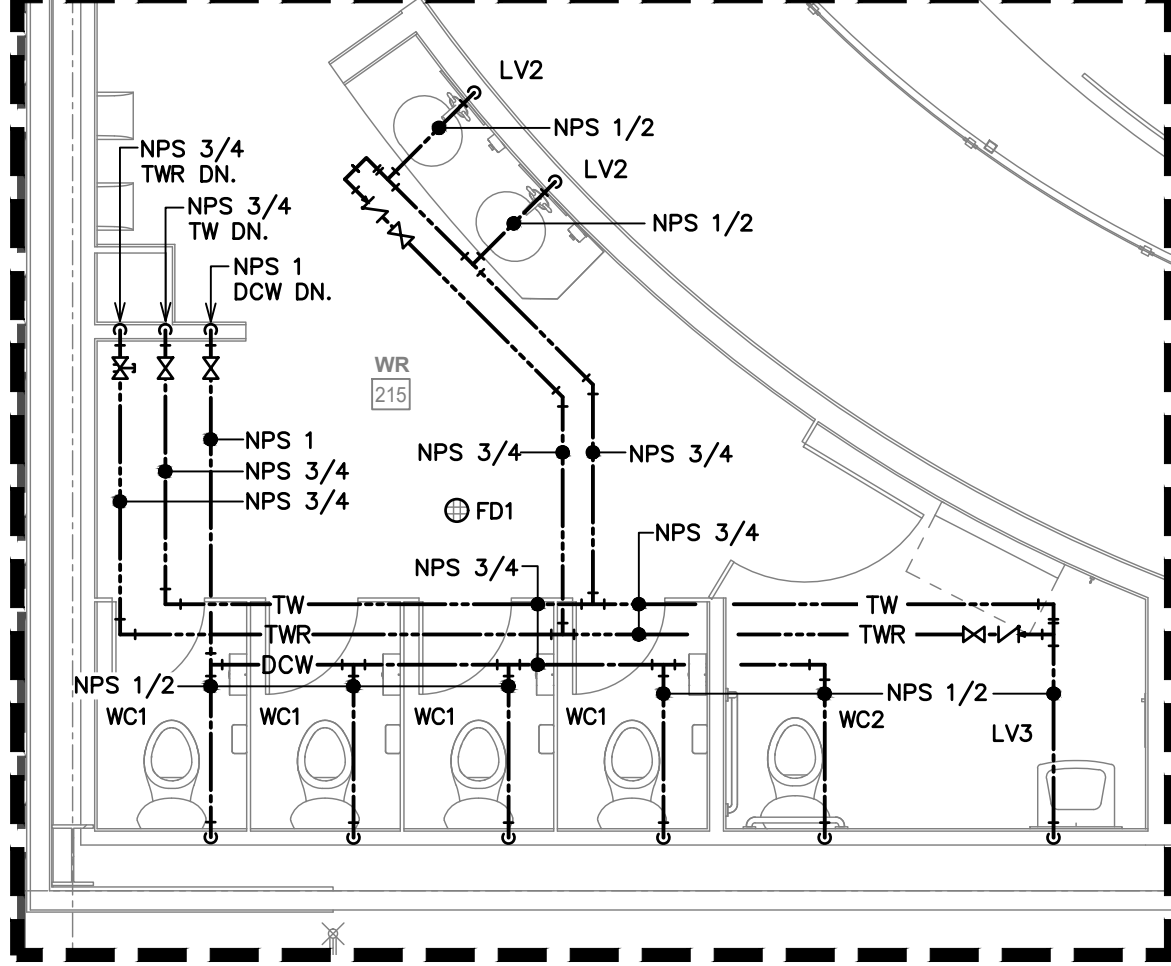
WASHROOM ENLARGEMENT SCALE 1:50



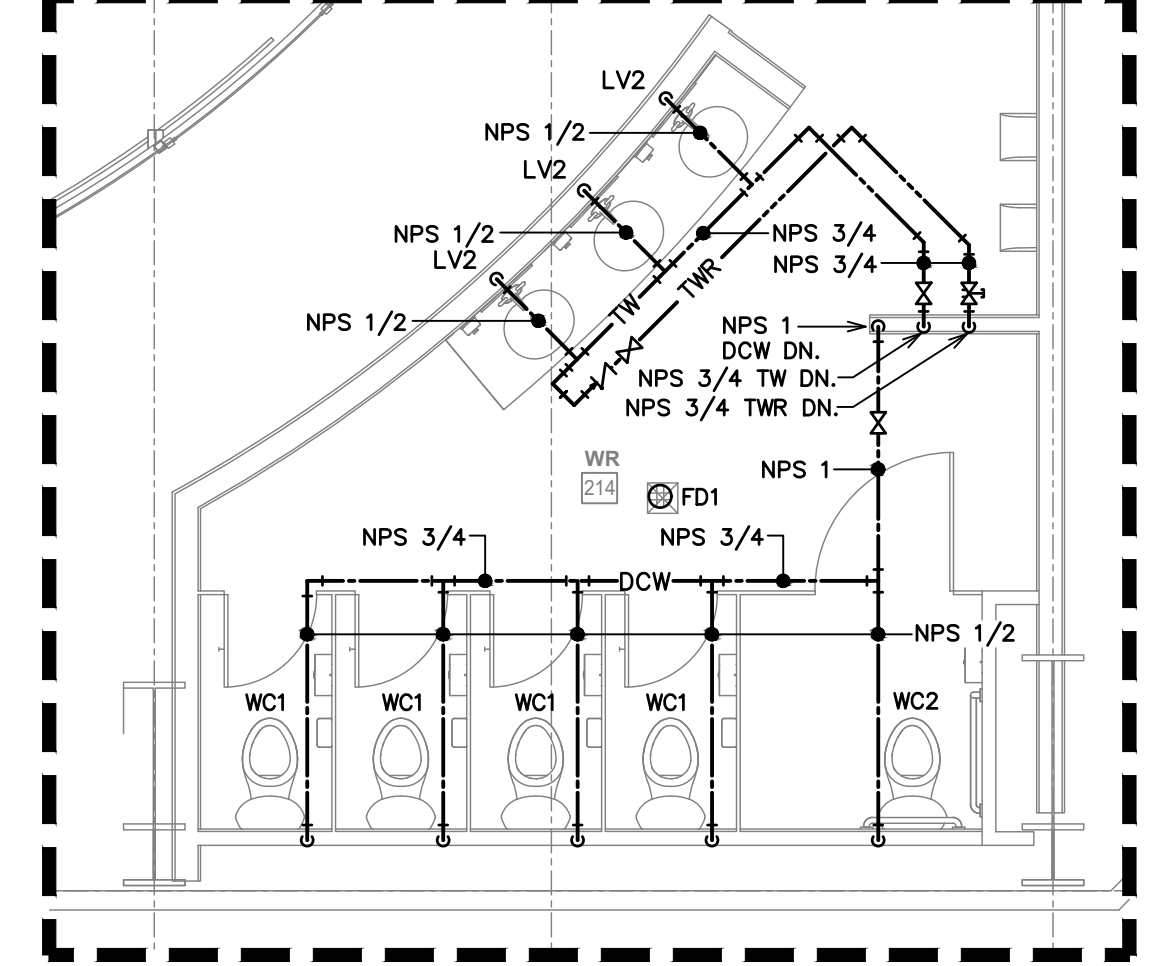
MATCHLINE REFER TO DRAWING M2.08

MATCHLINE REFER TO DRAWING M2.08

GENERAL PLUMBING NOTES:
 1. ALL FIXTURES TO BE 6"/W FIXTURE STOPS ON ALL DCW, DHW AND TEMPERED WATER (TW) LINES.
 2. PROVIDE ACCESS PANELS AT ALL VALVE LOCATIONS WHERE REQUIRED. CONFIRM RATINGS WITH ARCHITECTURAL.



WASHROOM ENLARGEMENT SCALE 1:50



WASHROOM ENLARGEMENT SCALE 1:50

CLIENT

CHARLOTTETOWN

KEY PLAN

CONSULTANT

DSRA

1 800 420 8990 | 1000 Spring Garden Street, 8th Floor
 1 902 420 9400 | Halifax, Nova Scotia, CAN. B3J 1G7

McW Maricor

77 VAUGHAN HARBOUR BLVD. SUITE 200
 MONCTON, NB E1C 0K2
 BUS: 506 857 8880 FAX: 506 859 8393
 WWW.MCW.COM ENG. REG. NO. 16211004

THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF PRINCE EDWARD ISLAND
 No. 2325
 DATE: 10/04/2023
 LICENSED PROFESSIONAL ENGINEER
 PROVINCE OF PRINCE EDWARD ISLAND

NO.	TRK ISSUED FOR TENDER	2023.04.10
1	REVISION	DATE

PROJECT NAME:
 SIMMONS SPORTS CENTRE
 ARENA & POOL REPLACEMENT
 CHARLOTTETOWN
 SUBJECT:

PROJECT NO.: 21111
 DRAWN BY: T.M.
 CHECKED BY: S.S.
 SCALE: AS INDICATED

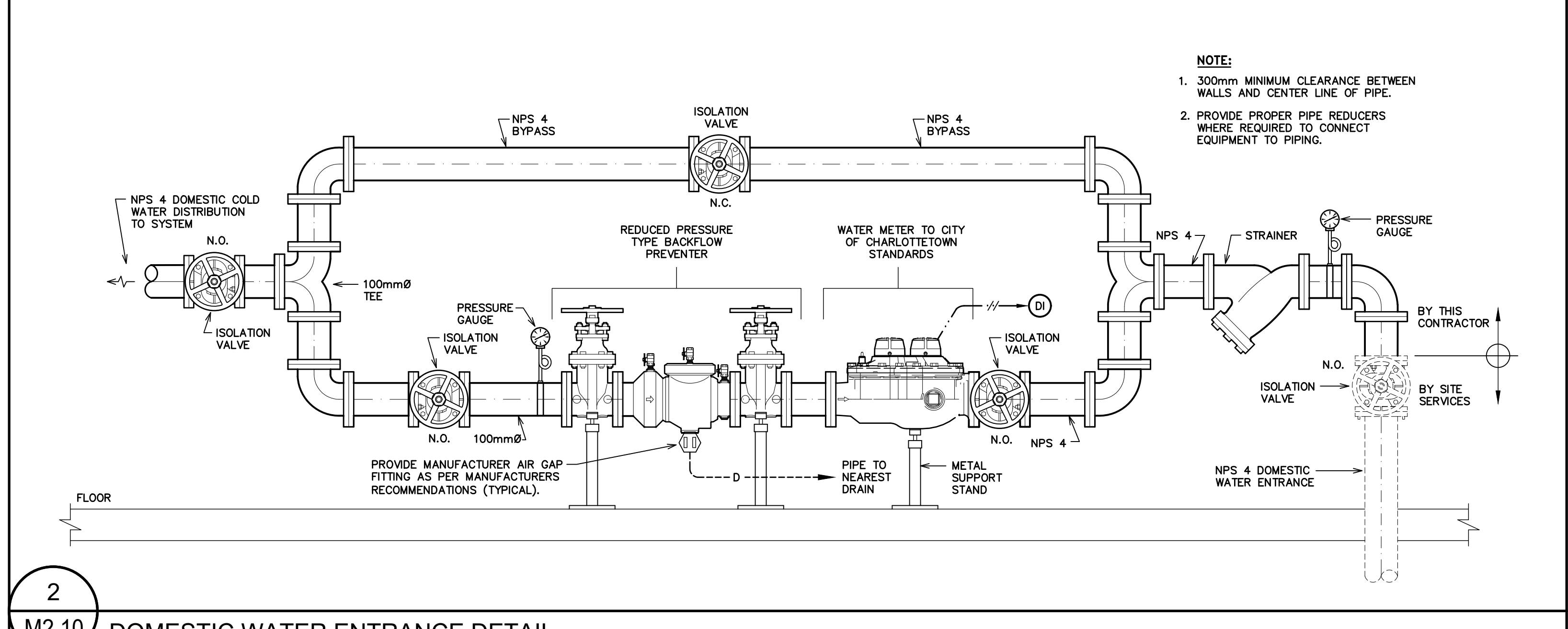
LEVEL 2 ARENA
 FLOOR PLAN -
 DOMESTIC WATER

PLUMBING FIXTURE SCHEDULE									
FIXTURE			FAUCET/FLUSH VALVE		PIPING CONNECTIONS				DESCRIPTION / ACCESSORIES
TAG	PRODUCT CATEGORY	MANUFACTURER & MODEL	DHW	DCW	WASTE	VENT	ACCESSORIES		
WC1	WATER CLOSET	AMERICAN STANDARD 248760.020	-	25	75	38	SEAT: CENTRO FAST-N-LOCK 150S750CSFE-001, FOR ELONGATED BOWL, LESS SEAT COVER, OPEN FRONT, WHITE FINISH, POLYPROPYLENE SUPPLY: MCGUIRE LPH1582		
WC2	BARRIER FREE WATER CLOSET	AMERICAN STANDARD 248760.020	-	25	75	38	SEAT: CENTRO 150S750CS-001, FOR ELONGATED BOWL, LESS SEAT COVER, OPEN FRONT, WHITE FINISH, POLYPROPYLENE SUPPLY: MCGUIRE LPH1582		
LV1	WALL HUNG LAVATORY	AMERICAN STANDARD 0955123CC.020 0955920CC.020	12	12	38	32	DESCRIPTION: VITREOUS CHINA, WALL-HUNG, LAVATORY, WHITE FINISH, SINGLE HOLE WITH EXTRA HOLE ON RIGHT HAND, 127 mm (5") DEEP, 394 mm (15-1/2") LONG, 540 mm (21-1/4") WIDE, 152 mm (6") HIGH, 540 mm (21-1/4") WIDE, REAR OVERFLOW, EVERLEARN ANTIMICROBIAL SURFACE, FAUCET LEDE WITH RECESSED SELF-DRAINING DECK FOR FAUCET, FAUCET BRASS CONSTRUCTION, MECHANICAL MIXING VALVE, CAST BRASS, CHROME-PLATED FINISH, OPEN GRID 10 PLUG, 7/32" (0.5 mm) Ø HOLES SIZE, 17 GAUGE, 32 mm (1-1/4") Ø TAILPIPE DIAMETER, 17 GAUGE, 1752 mm (67") LONG, BRASS LOOKOUT, HEAVY RUBBER BASIN WASHER FIBER TRICK WASH, ASME A112.18.2 CSA B125.2, CSA COMPLIANT LEAD FREE, CHROME-PLATED FINISH, LAVATORY SUPPLY, N3 - 76 mm (3") LONG RIGID HORIZONTAL, NIPPLES HEAVY CAST BRASS, ADJUSTABLE P-TRAP, 32 mm (1-1/4") X 32 mm (1-1/4") SIZE, 292 mm (11-1/2") DISTANCE, WITH CLEANOUT FLUG, STEEL SHALLOW FLANGE, NEOPRENE GASKET, SUPRNITS, 17 GAUGE SEAMLESS TUBULAR WALL BEND ACCESSORIES: FAUCET AND FLUSH VALVE POWER KIT: SLOAN EAF-70A / MIXING VALVE: SLOAN MIX-60-A / FIXTURE DRAIN: MCGUIRE 155A / SUPPLY: MCGUIRE LPH170NS / P-TRAP: MCGUIRE 8872C CARRIER: WATS CA-411		
LV2	OVAL COUNTERTOP LAVATORY	AMERICAN STANDARD 0313000.020	12	12	38	32	VITREOUS CHINA, COUNTERTOP MOUNTED, LAVATORY, WHITE FINISH, SINGLE HOLE WITH EXTRA HOLE ON RIGHT HAND, 127 mm (5") DEEP, 438 mm (17-1/4") LONG, 337 mm (13-1/4") WIDE, 178 mm (7") HIGH, 408 mm (16") WIDE, FRONT OVERFLOW BRASS CONSTRUCTION, MECHANICAL MIXING VALVE FOR FAUCET, CAST BRASS, CHROME-PLATED FINISH, OPEN GRID 10 PLUG, 7/32" (0.5 mm) Ø HOLES SIZE, 17 GAUGE, 32 mm (1-1/4") Ø TAILPIPE DIAMETER, 17 GAUGE, 1752 mm (67") LONG, BRASS LOOKOUT, HEAVY RUBBER BASIN WASHER FIBER TRICK WASH, ASME A112.18.2 CSA B125.2, CSA COMPLIANT LEAD FREE, CHROME-PLATED FINISH, LAVATORY SUPPLY, N3 - 76 mm (3") LONG RIGID HORIZONTAL, NIPPLES HEAVY CAST BRASS, ADJUSTABLE P-TRAP, 32 mm (1-1/4") X 32 mm (1-1/4") SIZE, 292 mm (11-1/2") DISTANCE, WITH CLEANOUT FLUG, STEEL SHALLOW FLANGE, NEOPRENE GASKET, SUPRNITS, 17 GAUGE SEAMLESS TUBULAR WALL BEND ACCESSORIES: FAUCET AND FLUSH VALVE POWER KIT: SLOAN EAF-70A / MIXING VALVE: SLOAN MIX-60-A / FIXTURE DRAIN: MCGUIRE 155A / SUPPLY: MCGUIRE LPH170NS / P-TRAP: MCGUIRE 8872C CARRIER: WATS CA-411		
LV3	BARRIER FREE WALL HUNG LAVATORY	AMERICAN STANDARD 0955001EC.020 0955920CC.020	12	12	38	32	DESCRIPTION: VITREOUS CHINA, WALL-HUNG, LAVATORY, WHITE FINISH, SINGLE HOLE CENTERSET, 127 mm (5") DEEP, 394 mm (15-1/2") LONG, 540 mm (21-1/4") WIDE, 152 mm (6") HIGH, 540 mm (21-1/4") WIDE, REAR OVERFLOW, EVERLEARN ANTIMICROBIAL SURFACE, FAUCET LEDE WITH RECESSED SELF-DRAINING DECK FOR FAUCET, FAUCET BRASS CONSTRUCTION, MECHANICAL MIXING VALVE, CAST BRASS, CHROME-PLATED FINISH, OPEN GRID 10 PLUG, 7/32" (0.5 mm) Ø HOLES SIZE, 17 GAUGE, 32 mm (1-1/4") Ø TAILPIPE DIAMETER, 17 GAUGE, 1752 mm (67") LONG, BRASS LOOKOUT, HEAVY RUBBER BASIN WASHER FIBER TRICK WASH, ASME A112.18.2 CSA B125.2, CSA COMPLIANT LEAD FREE, CHROME-PLATED FINISH, LAVATORY SUPPLY, N3 - 76 mm (3") LONG RIGID HORIZONTAL, NIPPLES HEAVY CAST BRASS, ADJUSTABLE P-TRAP, 32 mm (1-1/4") X 32 mm (1-1/4") SIZE, 292 mm (11-1/2") DISTANCE, WITH CLEANOUT FLUG, STEEL SHALLOW FLANGE, NEOPRENE GASKET, SUPRNITS, 17 GAUGE SEAMLESS TUBULAR WALL BEND ACCESSORIES: FAUCET AND FLUSH VALVE POWER KIT: SLOAN EAF-70A / MIXING VALVE: SLOAN MIX-60-A / FIXTURE DRAIN: MCGUIRE 155A / SUPPLY: MCGUIRE LPH170NS / P-TRAP: MCGUIRE 8872C CARRIER: WATS CA-411		
SH1	SHOWER	ACORN 1741A0A-EV51	20	20	75	38	14 GAUGE TYPE 304 STAINLESS STEEL, EXPOSED SURFACES SHALL HAVE A SATIN FINISH, WALL SHOWER, PNEUMATICALLY OPERATED, AIR-CONTROLLED METERING VALVE HAVING PUSH-BUTTON WITH LESS THAN 5 LBS FORCE, -3/8" MASTER-TRAJ (ELECTRONIC), SINGLE TEMP		
SH2	BARRIER FREE SHOWER	ACORN 1741A0A-EV51	20	20	75	38	14 GAUGE TYPE 304 STAINLESS STEEL, EXPOSED SURFACES SHALL HAVE A SATIN FINISH, WALL SHOWER, PNEUMATICALLY OPERATED, AIR-CONTROLLED METERING VALVE HAVING PUSH-BUTTON WITH LESS THAN 5 LBS FORCE, -3/8" MASTER-TRAJ (ELECTRONIC), SINGLE TEMP		
JS1	JANITOR SERVICE SINK	FIAT T583000501	20	20	75	38	PRECAST TERRAZZO, 610 MM (24") ALUMINUM BUMPER GUARD, 457 MM (18") BUMPER GUARD CONSTRUCTED OF ALUMINUM WITH VINYL INSERT (123B824), HOSE AND HOSE BRACKET (832AA), SERVICE FAUCET ADAPTER SET OF TWO (2), EXTENDS HOOD-UP OF SERVICE FAUCET FROM 191 TO 216 MM (7-1/2" TO 8-1/2") (834AA), MOP HANGER (8890C), 610 X 610 MM (24" X 24") WALL GUARDS, TWO (2) 610 X 305 MM (24" X 12") STAINLESS STEEL PANELS PLUS CORNER BRACKET (MS224AA), 76 MM (3") GASKET DRAIN CONNECTOR WITH 51 MM (2") HOLE (G003C), FLOOR MOUNTED		
EW1	EMERGENCY EYEWASH	GUARDIAN G1750P	20	20	32	-	FLOOR MOUNTED, ABS OR STAINLESS STEEL, EYE/FACE WASH, 11-3/4" DIAMETER ORANGE ABS PLASTIC, TWO SPRAY HEADS WITH A FLIP-UP DUST COVER, INTERNAL FLOW CONTROL AND FILTER ON EACH SPRAY HEAD		
EW2	EMERGENCY EYEWASH	GUARDIAN G1750P	20	20	32	-	WALL-HUNG, ABS PLASTIC, EYE/FACE WASH WITH PLASTIC BOWL, CORROSION RESISTANT POWDER COATED FINISH, ORANGE BOWL, 283 MM (11-1/8") Ø BOWL SIZE, TWO FS-130 SPRAY HEADS WITH FLIP UP DUST COVER EACH, 13 MM (1/2") Ø I.P.S. CHROME-PLATED BRASS STAY OPEN BALL VALVE, 13 MM (1/2") Ø NPT FEMALE INLET, 32 MM (1-1/4") Ø NPT FEMALE OUTLET, HEAVY DUTY CAST ALUMINUM WALL BRACKET, ABS COMPLIANT		
KS1	STAINLESS STEEL DOUBLE KITCHEN SINK	FRANKE COMMERCIAL D8610-1	12	12	38	38	STAINLESS STEEL, COUNTERTOP MOUNTED, LEFT BOWL IS 254 MM (10") DEEP AND RIGHT BOWL IS 254 MM (10") DEEP		
KS2	STAINLESS STEEL KITCHEN SINK	FRANKE COMMERCIAL S7310-1	12	12	38	38	STAINLESS STEEL, COUNTERTOP MOUNTED, 254 MM (10") DEEP		
HB1	EXTERIOR HOSE BIBB	-	12	-	-	-	C/W. TRAP PRIMER CONNECTION		
FD1	ROUND FLOOR DRAIN	-	-	75	50	-	C/W. TRAP PRIMER CONNECTION		
FD2	ROUND FLOOR DRAIN	-	-	100	50	-	C/W. TRAP PRIMER CONNECTION		
FD3	SQUARE HEAVY DUTY FLOOR DRAIN	-	-	100	50	-	C/W. TRAP PRIMER CONNECTION		
FD4	ROUND FLOOR DRAIN	-	-	150	50	-	C/W. TRAP PRIMER CONNECTION		
FFD	FUNNEL FLOOR DRAIN	-	-	75	38	-	C/W. TRAP PRIMER CONNECTION AND RAISED LIP		
HD1	HUB DRAIN (SPRINKLER ROOM)	-	-	150	50	-	C/W. TRAP PRIMER CONNECTION		
RD1	ROOF DRAIN	-	-	100	-	-	C/W. ALUMINUM DOME AND UNDERDECK CLAMP		
RD2	ROOF DRAIN	-	-	150	-	-	C/W. ALUMINUM DOME AND UNDERDECK CLAMP		
T01	8FT TRENCH DRAIN	ZURN, Z882-Z-E1-U4-BCC, TRENCH BODY, AT 8 FT.	-	-	100	50	C/W. TRAP PRIMER CONNECTION		
T02	12FT TRENCH DRAIN	ZURN, Z882-Z-E1-U4-BCC, TRENCH BODY, AT 12 FT.	-	-	100	50	C/W. TRAP PRIMER CONNECTION		
SP1	ELEVATOR SUMP PIT PUMP (SUBMERSIBLE TYPE)	LIBERTY 290 SERIES 3/4 HP	1	-	-	TBD	C/W 3"50' CORD & PLUG		
TM-1	MIXING VALVE	LAUKER SERIES 66-125	50	50	-	-	INSTALL AS PER MANUFACTURER'S RECOMMENDATIONS		
EXP-1	DHW EXPANSION TANK	AMTROL ST-80VC	32	-	-	-	INSTALL AS PER MANUFACTURER'S RECOMMENDATIONS		

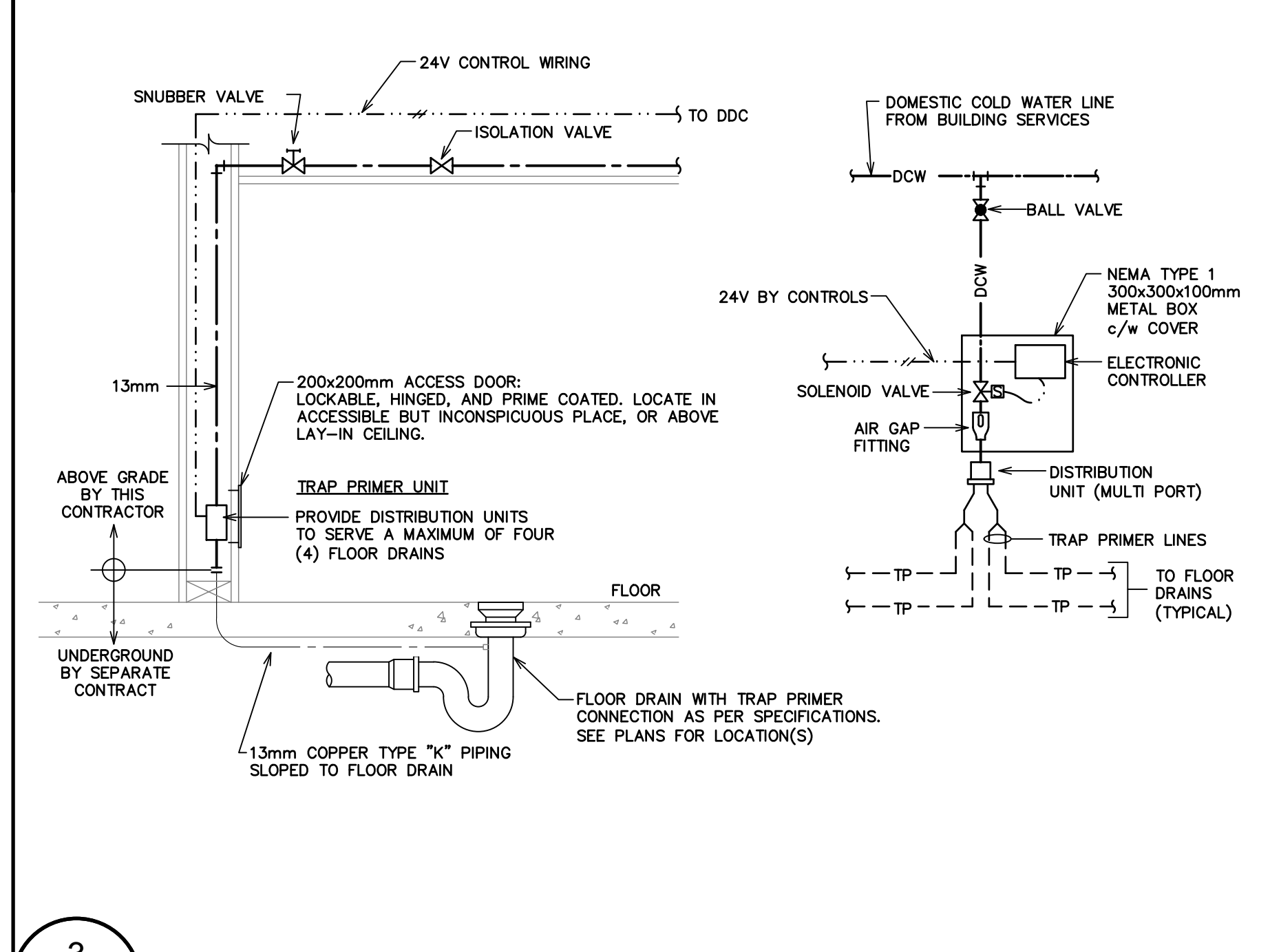
PUMP SCHEDULE								
TAG	SERVICE	FLUID	FLOW (GPM)	HEAD (KPa)	ELECTRICS		NOTES	
					V	HP		
RP-1	DHW	POTABLE	15	25	120	1	0.25	-
RP-2	DHW	POTABLE	15	25	120	1	0.75	-
RP-3	TR	POTABLE	15	25	120	1	0.75	-

DHW TANK SCHEDULE								
TAG	DESCRIPTION	LOCATION	FLUID	VOL. (GAL)	CAPACITY (KW)	ELECTRICS		NOTES
						V	HP	
DHW-1	DOMESTIC HOT WATER TANK	KITCHEN	DOMESTIC WATER	60	24	600	3	-

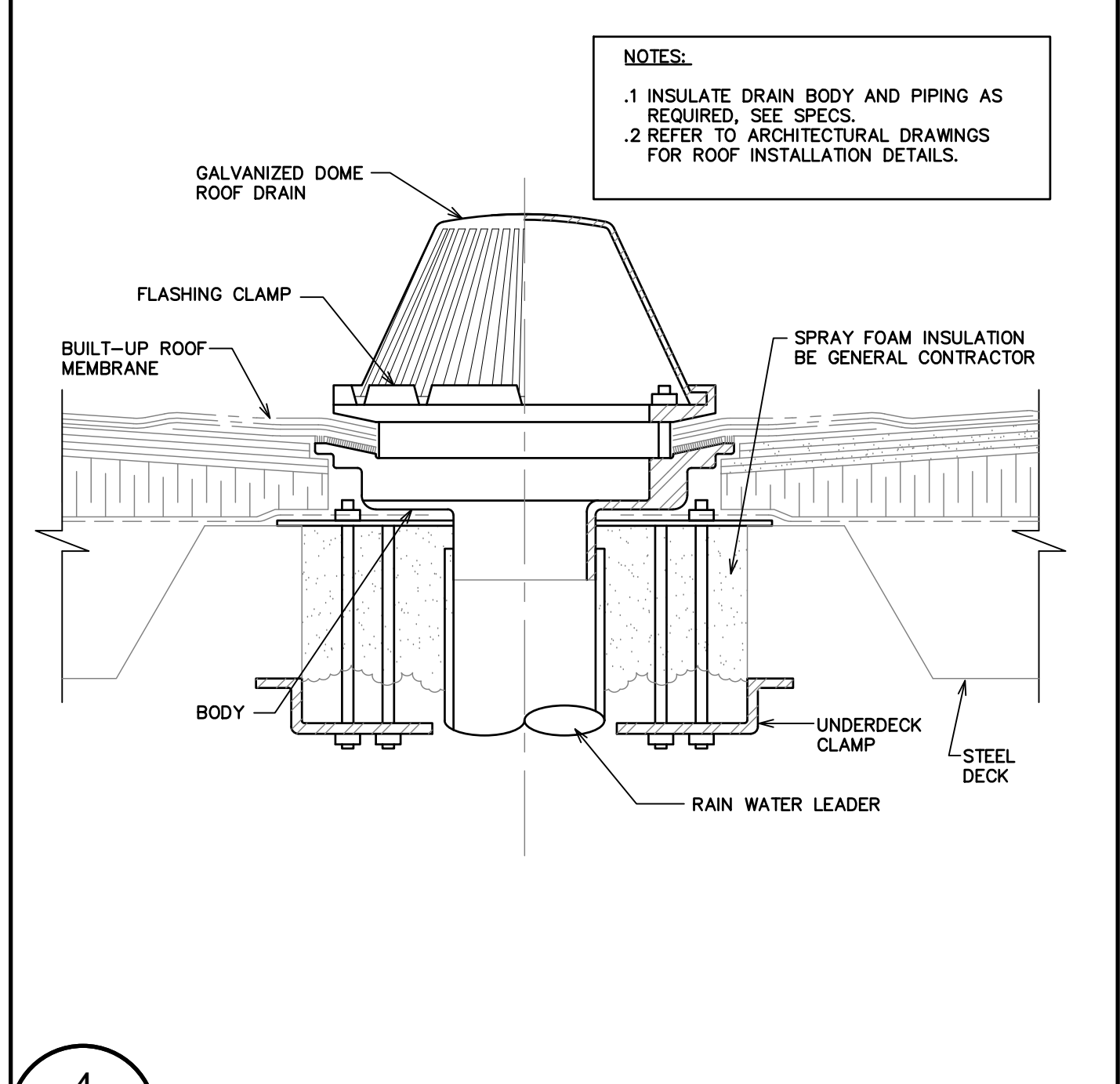
1 M2.10 MECHANICAL SCHEDULES



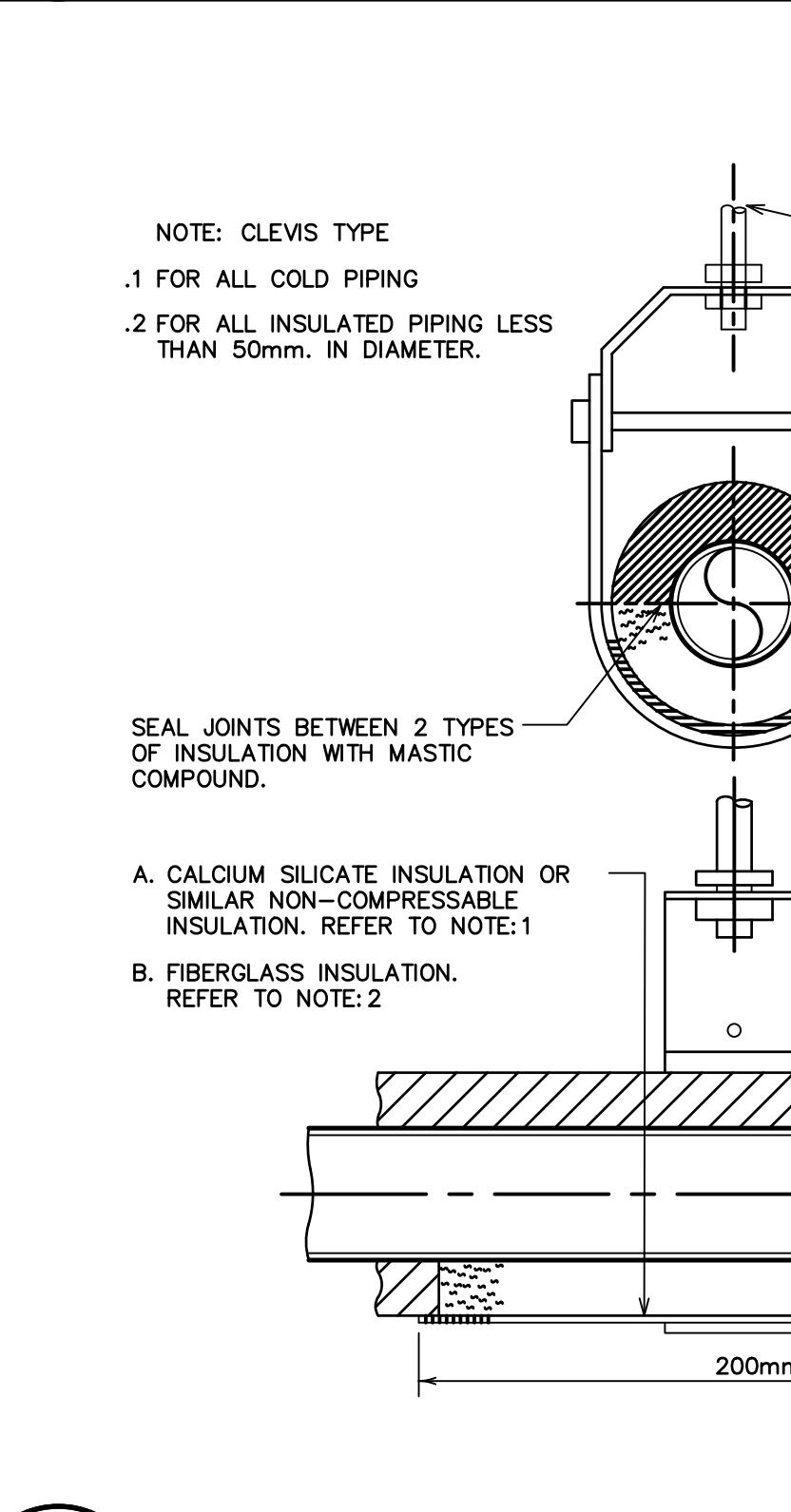
2 M2.10 DOMESTIC WATER ENTRANCE DETAIL



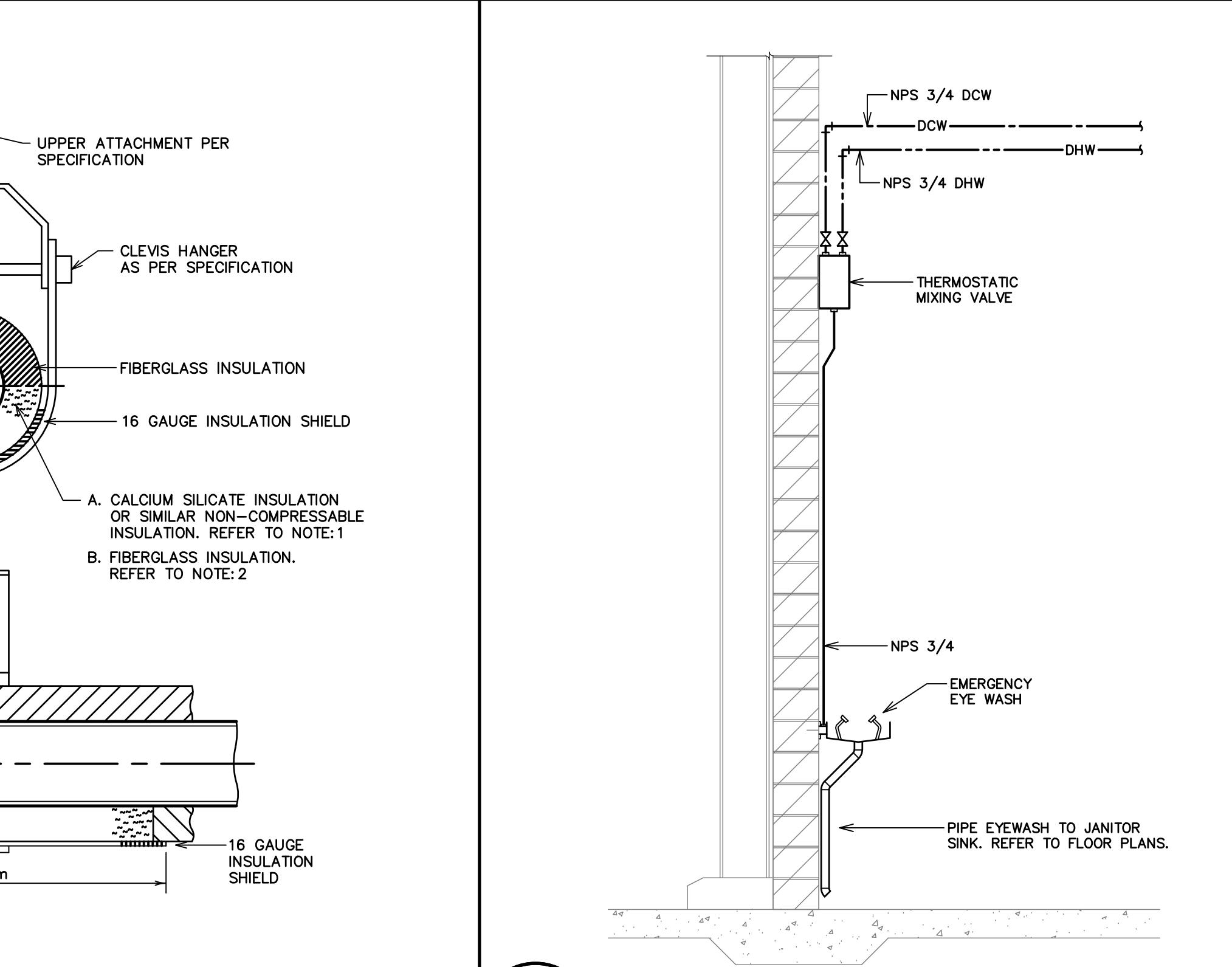
3 M2.10 TYPICAL TRAP PRIMER INSTALLATION DETAIL



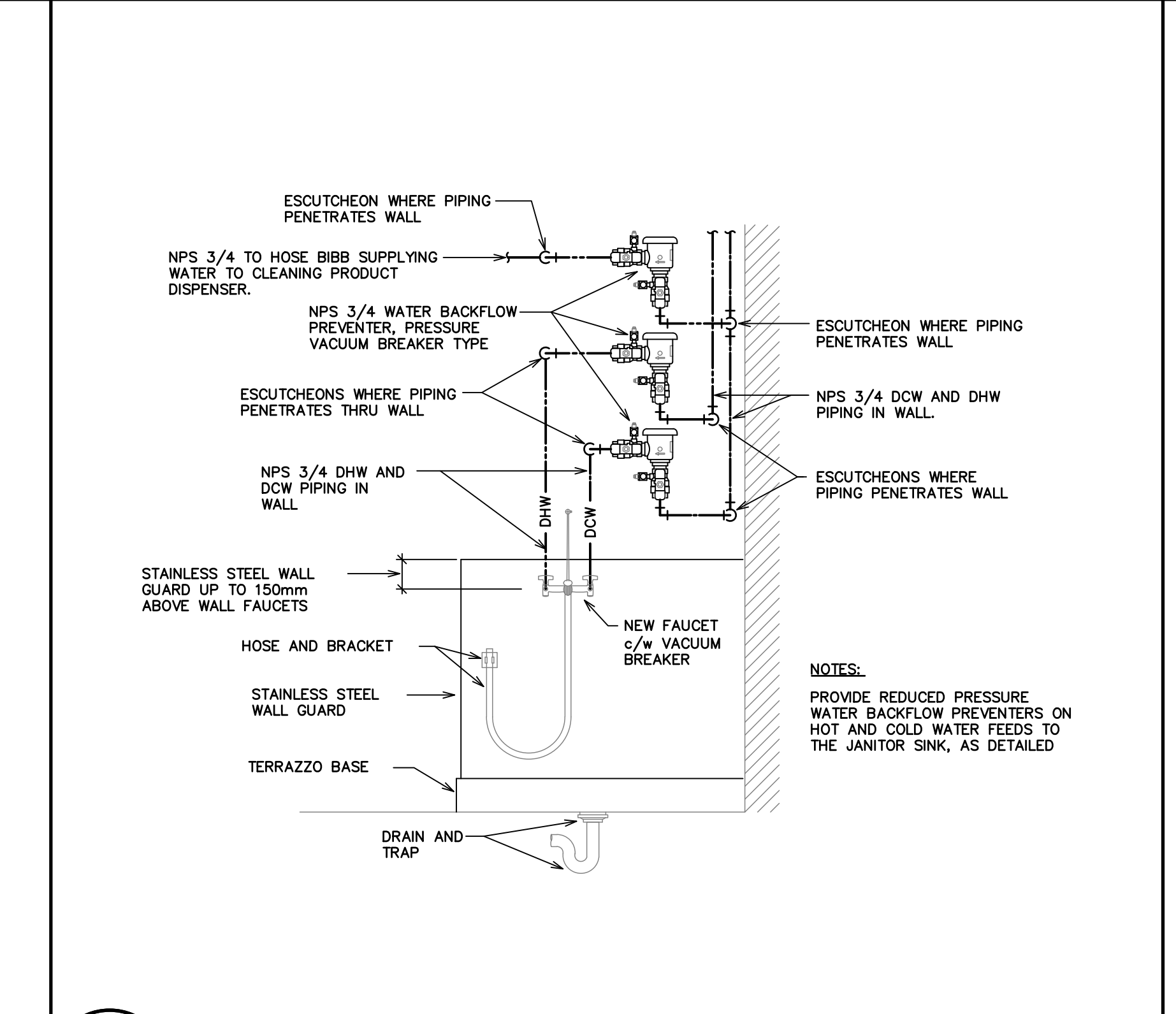
4 M2.10 TYP. ROOF DRAIN INSTALLATION DETAIL



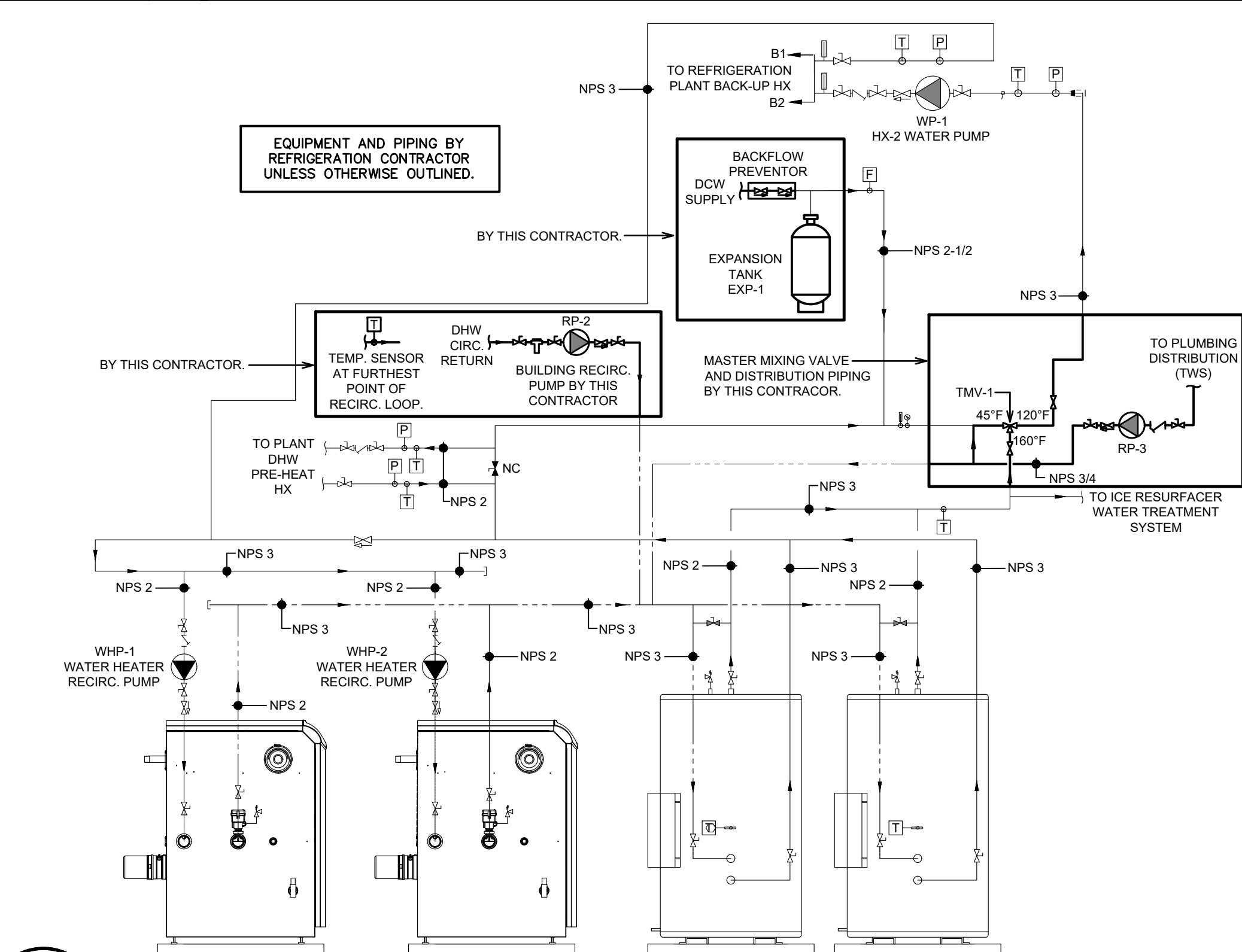
5 M2.10 PIPE HANGER DETAIL



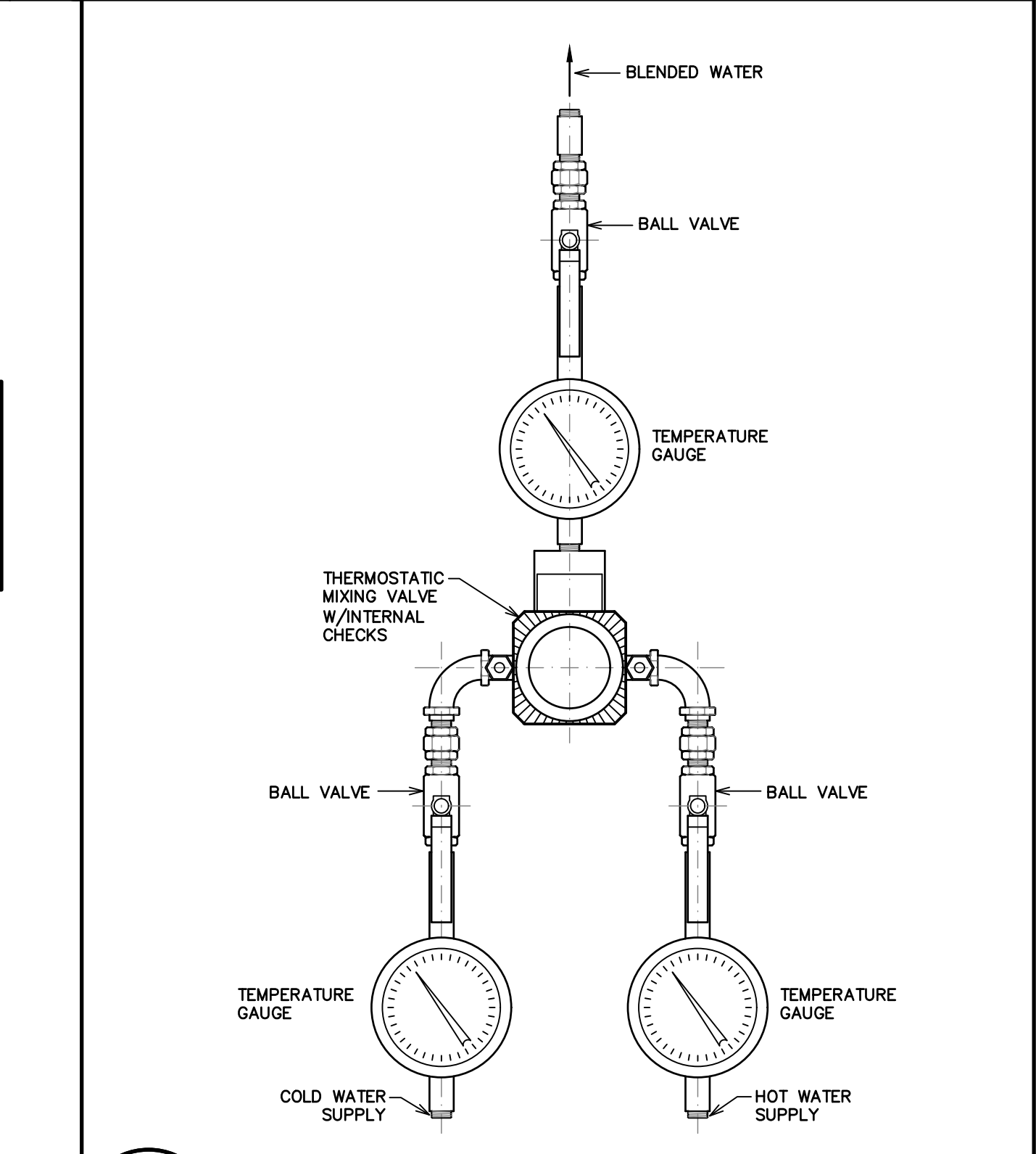
6 M2.10 EMERGENCY EYEWASH DETAIL



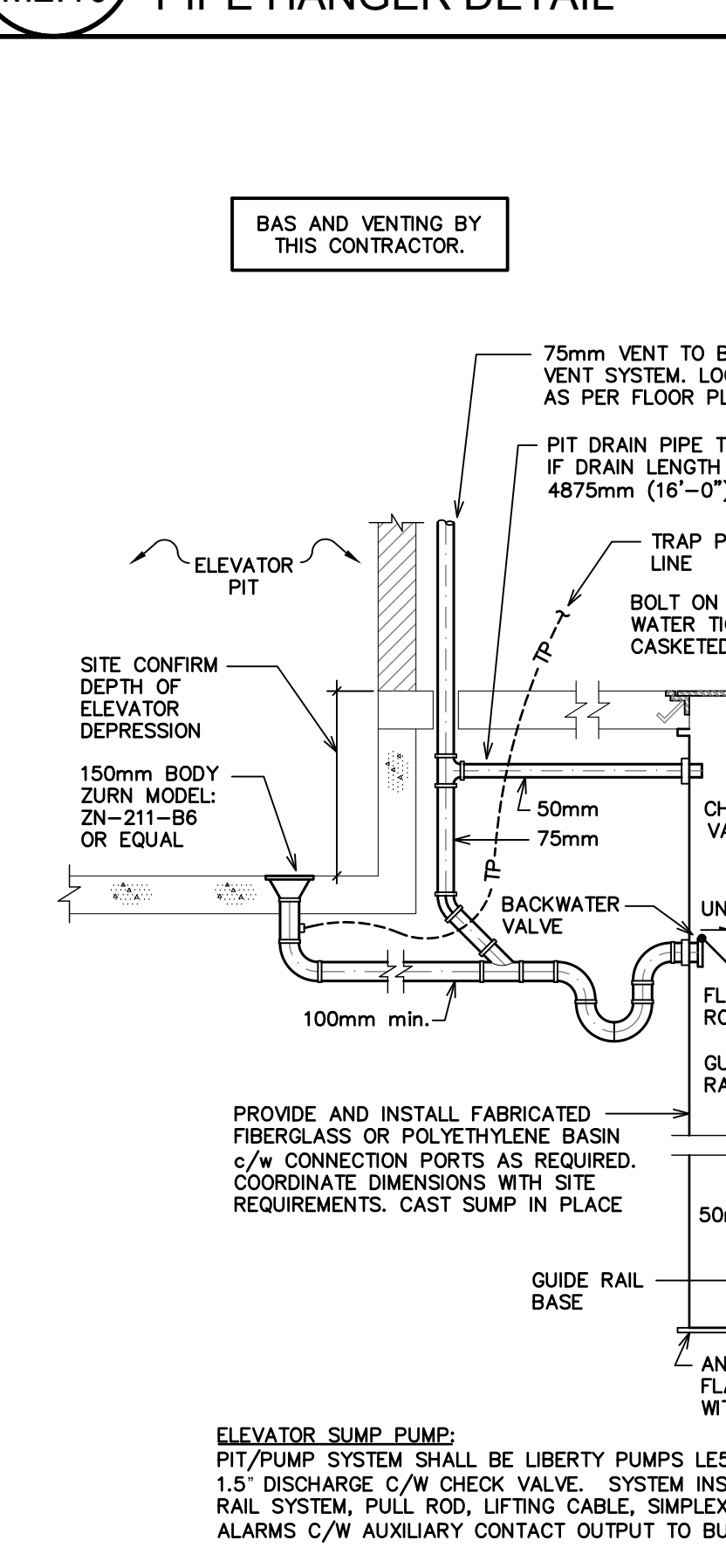
7 M2.10 JANITORS SINK INSTALLATION DETAIL



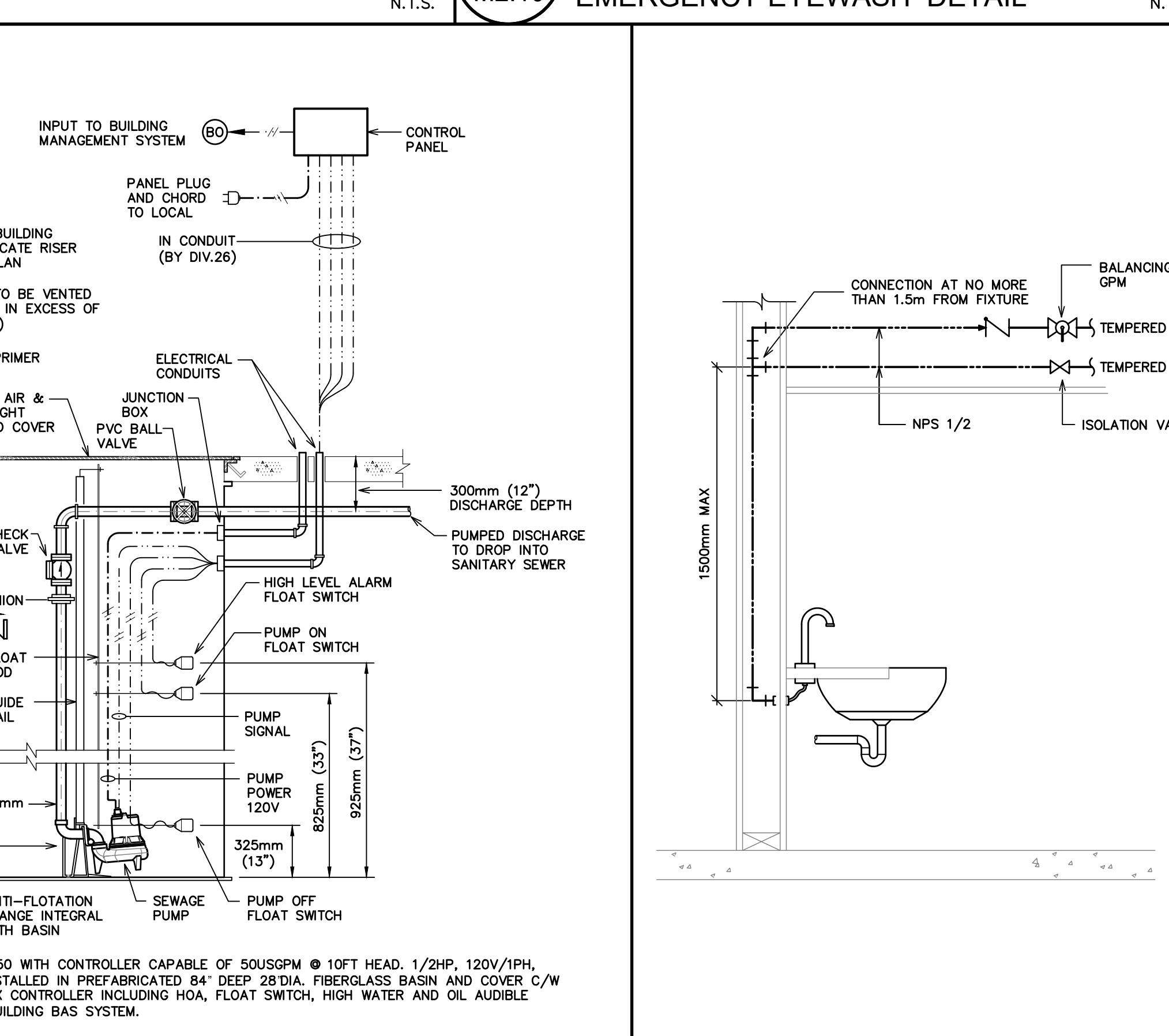
8 M2.10 DOMESTIC HOT WATER SCHEMATIC



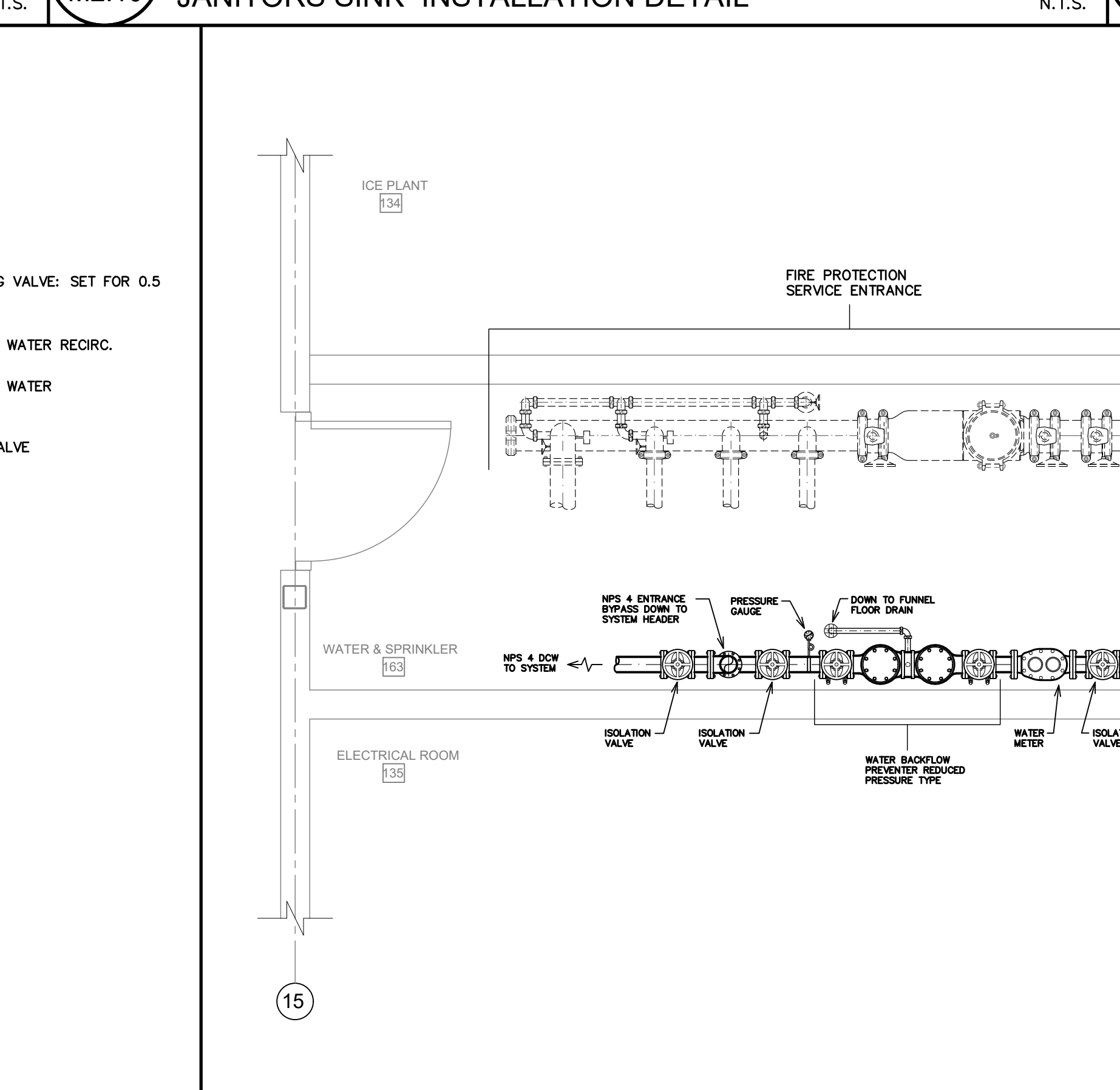
9 M2.10 THERMOSTATIC MIXING VALVE DETAIL



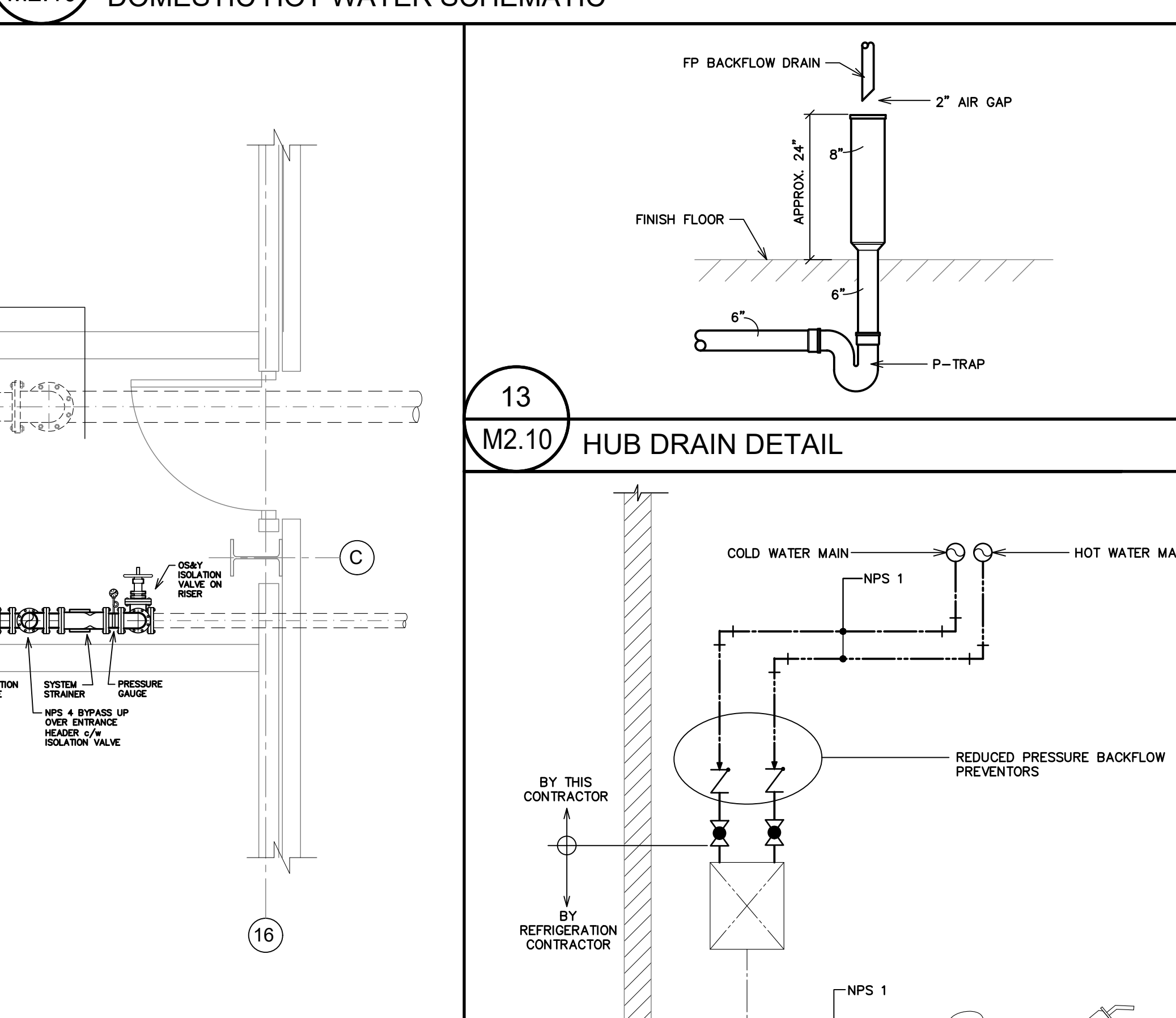
10 M2.10 ELEVATOR SUMP PIT DETAIL



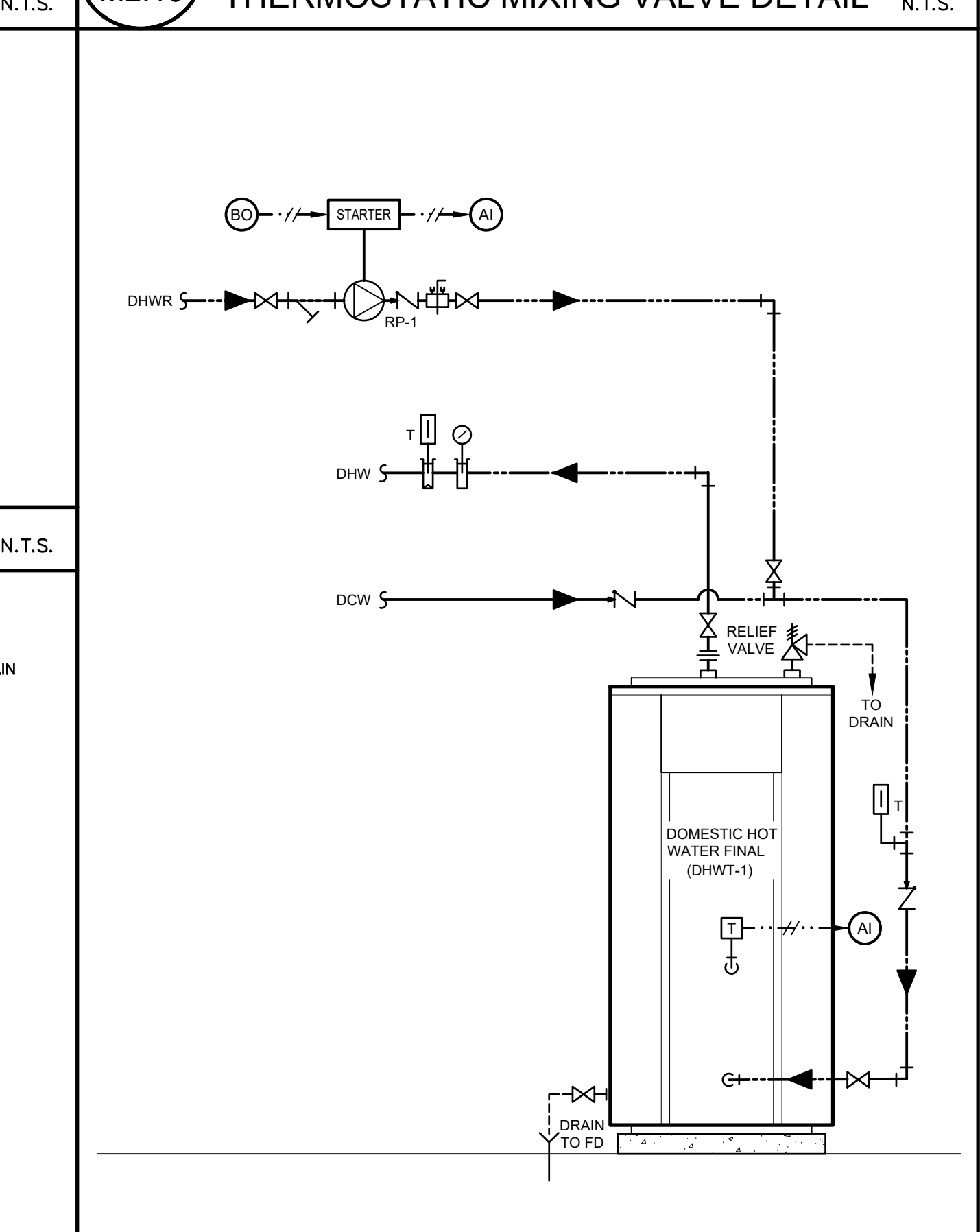
11 M2.10 RECIRC. PIPING TO FIXTURE DETAIL



12 M2.10 DOMESTIC SERVICE ENTRANCE DETAIL



14 M2.10 ZAMBONI FILL STATION DETAIL



15 M2.10 DOM. HOT WATER TANK DETAIL

10 M2.10 ELEVATOR SUMP PIT DETAIL

11 M2.10 RECIRC. PIPING TO FIXTURE DETAIL

12 M2.10 DOMESTIC SERVICE ENTRANCE DETAIL

14 M2.10 ZAMBONI FILL STATION DETAIL

15 M2.10 DOM. HOT WATER TANK DETAIL

CLIENT

KEY PLAN

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 TEL: (506) 857-8880 FAX: (506) 859-8593
 WWW.M&W.COM CAN. INC. 16211004

10/24/2023

Scale: AS INDICATED

PROJECT NAME: SIMMONS SPORTS CENTRE ARENA & POOL REPLACEMENT

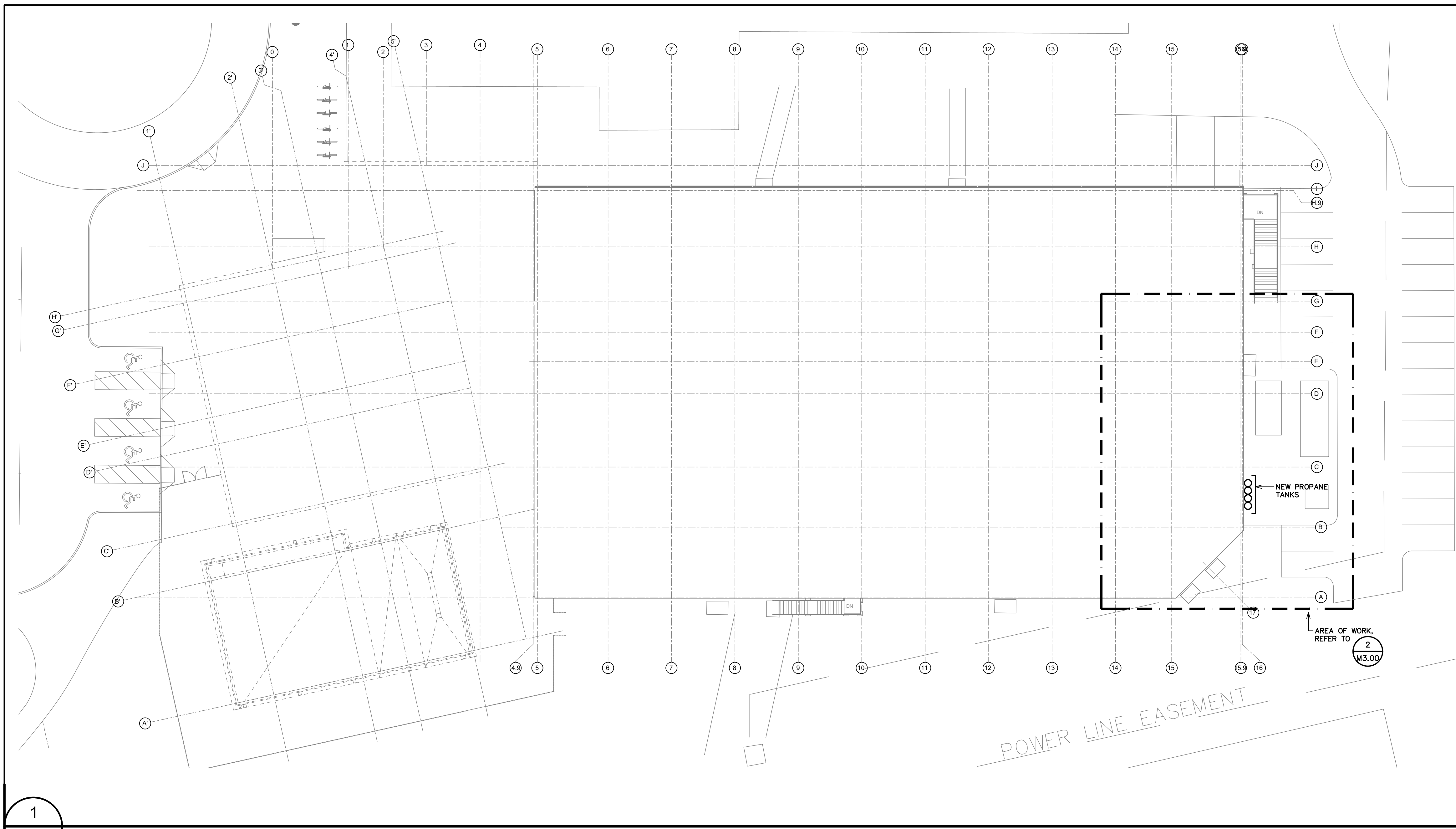
DRAWN BY: K.C.S.

CHECKED BY: S.S.

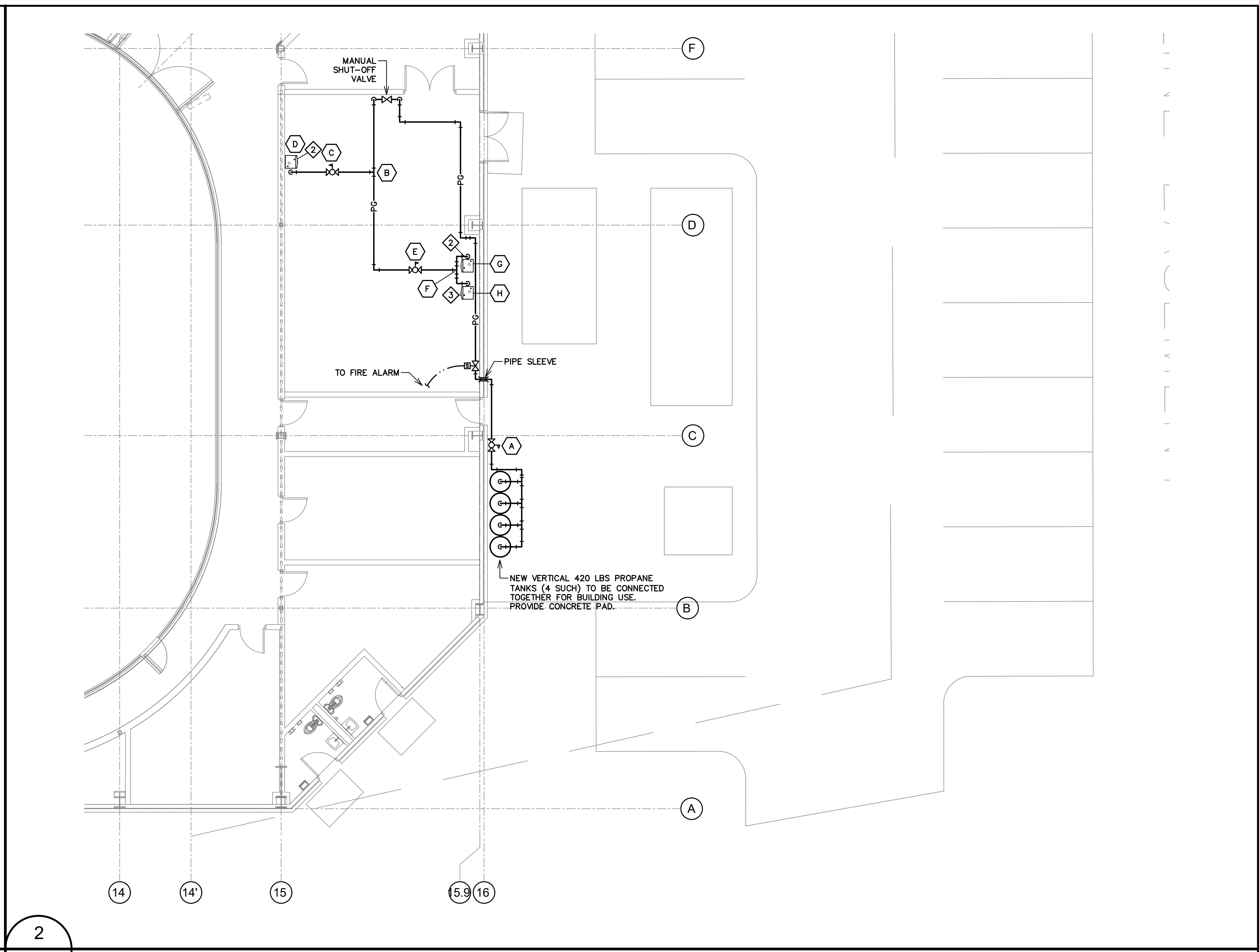
SCALE: AS INDICATED

DETAILS - PLUMBING

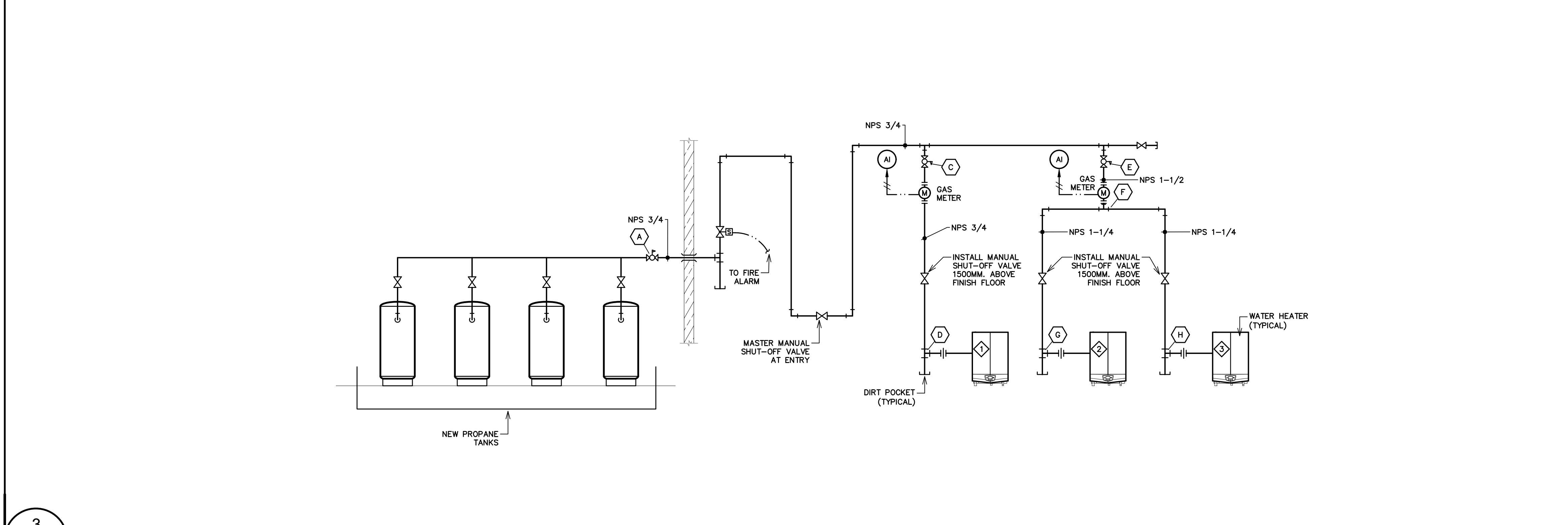
M2.10



1 M3.00 SITE PLAN SCALE 1:250



2 M3.00 ENLARGEMENT - PROPANE GAS PIPING SCALE 1:100



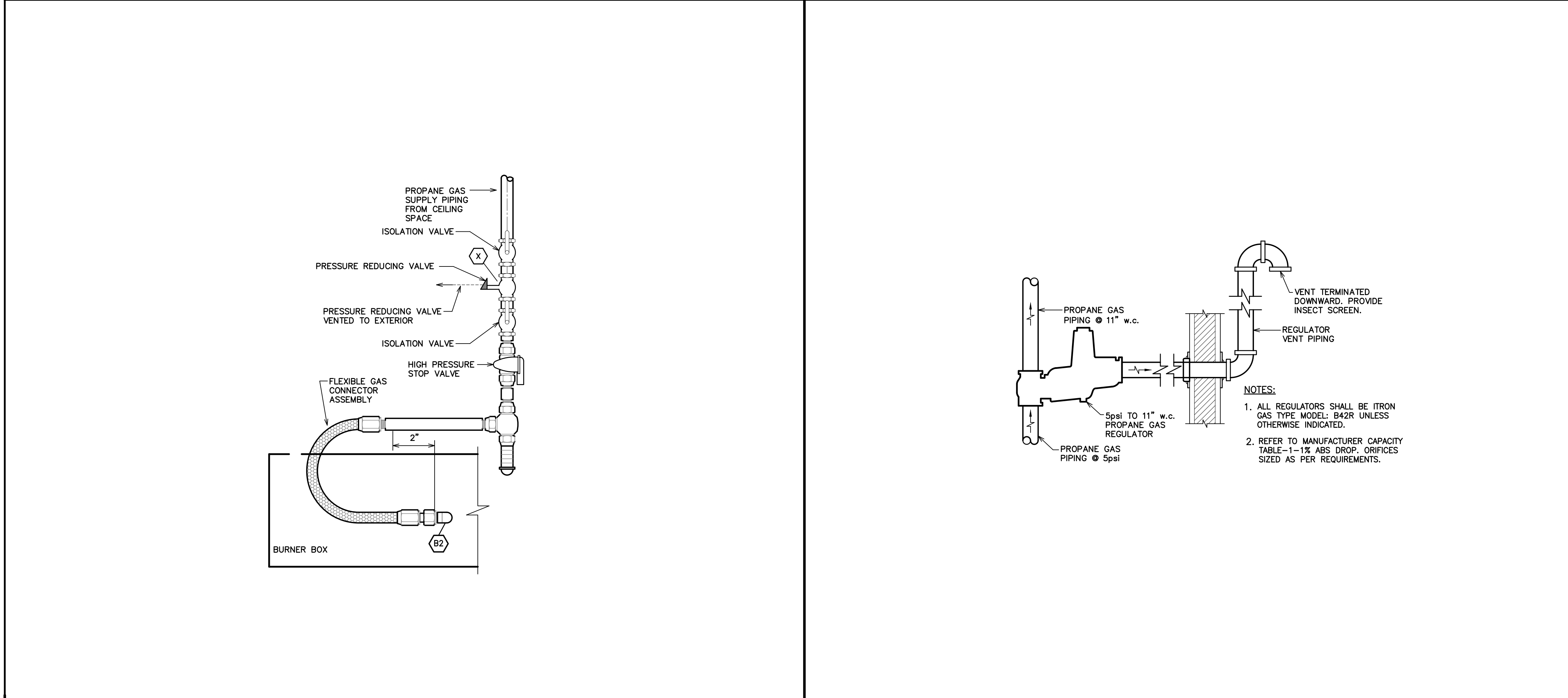
3 M3.00 PROPANE PIPING SCHEMATIC N.T.S.

EQUIPMENT LOAD TABLE					
LOAD NUMBER	LOAD TYPE	LOAD LOCATION	MANUFACTURE	MODEL	LOAD (MBH)
1	WATER HEATER	ICE PLANT	REFER TO SPECIFICATION	REFER TO SPECIFICATION	792
2	WATER HEATER	ICE PLANT	REFER TO SPECIFICATION	REFER TO SPECIFICATION	792
3	WATER HEATER	ICE PLANT	REFER TO SPECIFICATION	REFER TO SPECIFICATION	274

PIPE SIZE CALCS: SECOND STAGE - 5 PSIG				
PIPE SECTION	PROPANE GAS LOAD (MBH)	EQUIVALENT LENGTH (FT.)	MINIMUM SIZE	PLAN SIZE
A - E	1858	125	3/4	3/4
A - D	1858	75	3/4	3/4
B - E	1584	30	3/4	3/4
B - C	274	15	3/4	3/4

PIPE SIZE CALCS: FIRST STAGE - 11 WC				
PIPE SECTION	PROPANE GAS LOAD (MBH)	EQUIVALENT LENGTH (FT.)	MINIMUM SIZE	PLAN SIZE
C - D	274	20	3/4	3/4
E - F	1584	30	1-1/2	1-1/2
F - G	792	30	1-1/4	1-1/4
E - H	792	30	1-1/4	1-1/4

4 M3.00 PIPING SIZING SCHEDULE



5 M3.00 CONNECTION DETAIL N.T.S. 6 M3.00 TYPICAL RELIEF VENT DETAIL N.T.S.

- GENERAL NOTES:**
- ALL PROPANE GAS WORK TO BE COMPLETED IN ACCORDANCE WITH ALL AUTHORITIES HAVING JURISDICTION, CAN/CSA B149.1-10 PROPANE GAS AND PROPANE INSTALLATION CODE, CAN/CSA B149.3 AND TO THE APPROVAL OF THE PEI DEPARTMENT OF LABOUR AND ADVANCED EDUCATION.
 - CONTRACTOR SHALL HAVE ALL REQUIRED LICENSES AND REGISTRATIONS TO PERFORM THIS WORK.
 - CONTRACTOR SHALL PAY ALL COSTS FOR INSPECTION AND REGISTRATION OF THIS SYSTEM.
 - CONTRACTOR TO PROVIDE A CERTIFICATE OF ACCEPTANCE FROM THE PEI DEPARTMENT OF LABOUR AND ADVANCED EDUCATION.
 - STEEL PIPE TO BE ASTM A53 GRADE B, SCHEDULE 40.
 - BALL VALVES TO BE PROVINCIAL CODE APPROVED. INSTALL VALVES ON ALL BRANCHES AND WHERE REQUIRED BY CODE. REPLACE ALL EXISTING BALL VALVES THAT ARE NOT IN ACCORDANCE WITH CAN/CSA-B149.1-10.
 - PRIME COAT, PAINT AND IDENTIFY PIPING IN ACCORDANCE WITH CODE CAN/CSA-B149.1-10.
 - PRESSURE TEST AND PURGE SYSTEM IN ACCORDANCE WITH THE REQUIREMENTS OF THE INSTALLATION CODE CAN/CSA-B149.1-10.
 - CONNECT TO EQUIPMENT IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
 - SLOPE PIPING TO LOW POINTS IN DIRECTION OF FLOW AND INSTALL DRIP POINT AT ALL LOW POINTS AND AT EQUIPMENT.
 - PROVIDE VENTING AS REQUIRED BY CODE AND AS PER MANUFACTURER'S INSTRUCTIONS.
 - COORDINATE WITH ALL OTHER TRADES AS REQUIRED.
 - PROPANE GAS TO BE BONDED TO GROUND WITH #6 COPPER WIRE PRIOR TO ENTERING THE BUILDING.

7 M3.00 GENERAL NOTES

CONSULTANT

CHARLOTTETOWN

KEY PLAN

CONSULTANT

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THE ASSOCIATION OF PROFESSIONAL ENGINEERS OF THE PROVINCE OF PRINCE EDWARD ISLAND

Scale: 1:100

NO. 2325

DATE: 10/04/2023

LICENSED PROFESSIONAL ENGINEER PROVINCE OF PRINCE EDWARD ISLAND

0	TRN ISSUED FOR TENDER	2023.04.10
NO.	REVISION	DATE

STAMP

PROJECT NAME:
 SIMMONS SPORTS CENTRE
 ARENA & POOL REPLACEMENT
 CHARLOTTETOWN
 PEI

SUBJECT:

PROJECT NO.: 21111

DRAWN BY: G.W.

CHECKED BY: S.S.

SCALE: AS INDICATED

PROPANE GAS PIPING