



THE CORPORATION OF THE CITY OF MARKHAM
101 Town Centre Boulevard
Anthony Roman Centre
Markham, Ontario
L3R 9W3

REQUEST FOR TENDER

091-T-24

MARKHAM VILLAGE COMMUNITY CENTRE ICE PAD REPLACEMENT

CLOSING TIME: Friday, April 26th, 2024 @ 3:00 P.M.

MANDATORY SITE MEETING: Tuesday, April 9th, 2024 @ 10:00 A.M.
Markham Village Community Centre
6041 Hwy 7, Markham, ON L3P 3A7

DOCUMENT PICK-UP

This document is available for purchase at <https://markham.bidsandtenders.ca> for the non-refundable sum of \$25.00 (including H.S.T.). If you require assistance, please contact 1-800-594-4798 (8:00 a.m. - 5:00 p.m. EST) or support@bidsandtenders.ca.

BID SUBMISSION

The Corporation of the City of Markham shall **ONLY** accept **ELECTRONIC BID SUBMISSIONS** submitted through the City's Bidding System website. Bid submissions submitted and/or received by any other method shall be rejected, unless the City has instructed otherwise by published Addendum.

All Bids must be submitted electronically only via the Bidding System, no later than the specified Closing Time. Late Bids will not be accepted by the City's Bidding System.

Bidders are cautioned that the timing of Bid submission is based on when the Bid is RECEIVED by the Bidding System, not when a Bid is submitted by a Bidder, as Bid transmission can be delayed in an "Internet Traffic Jam" due to file transfer size, transmission speed, etc.

This procurement is subject to the Canadian Free Trade Agreement (CFTA).

PROCUREMENT REPRESENTATIVE

Hassan Madar, Senior Buyer, Procurement Services Department
Phone: 905-477-7000, Ext. 2177 Email: hmadar@markham.ca

NOTE: Bid questions and submissions are to be submitted through the Bidding System.

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ATTACHMENTS:

General Terms and Conditions – Contractor
City's Health & Safety Documents
Markham - Village Arena-IFT (Drawings)
Markham Village Arena - Ice Pad Replacement – Specifications

SCHEDULE A – BID FORMS

The following sections of the Bid Form are required to be completed by the Bidder:

Schedule of Prices

- Credit Card Acceptance
- Payment Terms
- Bid Price (Excluding Taxes)
- Provisional Items Price (Excluding Taxes)
- Cash Allowance (Excluding Taxes)
- Summary Table

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References

- Reference List
- Unresolved Litigation

Subcontractors

- Relevant Subcontractor List

Declarations

Note: Schedule A above is an electronic section that needs to be inputted on <https://markham.bidsandtenders.ca> in order to create a Bid submission. The inclusion of this section in this bid document is for preview purposes only.

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1 PROJECT DESCRIPTION

The Markham Village Community Centre was constructed in 1978 and is located at the corner of Hwy 48 and Hwy 7 – 6041 Hwy 7. The Community Centre is approximately 35,000sq.ft. The building amenities include an Arena, multi-purpose rooms, and a teaching kitchen. The Markham Village Community Centre offers a wide variety of programs such as learn to skate, public skate, summer camps and it is home to the Markham Skate club.

The City is soliciting Bids for the replacement of the arena concrete pad, header pipe system, arena boards and rubber flooring at Markham Village Community Centre.

The project will be completed in three (3) phases:

Phase 1: to remove and replace the existing arena concrete pad and associated header piping system.

Phase 2: to remove and replace the existing arena boards and frames.

Phase 3: To remove and replace the existing rubber flooring surrounding the arena and in all associated arena change-rooms.

2 SPECIFICATIONS AND SCOPE OF WORK

Please refer to the attached project specifications.

The Specifications and Scope of Work (collectively, the “Work”) for this project are as set out in this Request for Quotation, as may be amended by addendum issued by the City.

3 GENERAL CONDITIONS OF THE CONTRACT

3.1. SUCCESSFUL BIDDERS RESPONSIBILITIES AND CONTROL OF THE WORK

- 3.1.1 The Successful Bidder shall have complete control of the Work and shall effectively direct and supervise the Work so as to ensure conformance with the Contract Documents;
- 3.1.2 The Successful Bidder shall be solely responsible for construction means, methods, techniques, sequences and procedures and for coordinating the various parts of the Work under the Contract;
- 3.1.3 The Successful Bidder shall perform its work in a good and workmanlike manner and in accordance with the drawings and specifications of the Contract;
- 3.1.4 The Successful Bidder shall provide competent supervision and Key Personnel with the requisite skill and expertise to perform the Work;
- 3.1.5 The Successful Bidder shall employ suitable equipment and Key Personnel to verify the Work was deployed/installed/implemented per the Contract Documents; and,
- 3.1.6 The Successful Bidder 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 safety legislation.

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4 CONTRACT

By submitting a completed Bid Form, the Bidder agrees to be bound by the terms and conditions of this Request for Tender and the following: The City's General Terms and Conditions (attached hereto) and the City's Purchasing By-law # 2017-8, which can be found on the City's website:

<https://www.markham.ca/wps/portal/home/business/bids-tenders/bylaw-terms-and-conditions/05-by-law-terms-and-conditions>

All capitalized terms used herein and not otherwise defined shall have the meanings assigned in the City's *General Terms and Conditions*.

The evaluation of the Bid prices will be based on the **Bid Price (Excluding Taxes) set out in the "Summary Table"**. **Submission of the Bid Price (Excluding Taxes) in the Summary Table is a MANDATORY requirement of this Request for Tender. The failure by a Bidder to submit the Bid Price (Excluding Taxes) shall result in the Bid being rejected as non-compliant.**

The Bidder agrees that this Request for Tender, the City's *General Terms and Conditions (Parts I and III)*, the Successful Bidder's submission, the Purchase Order, and any other written agreement between the City and the Successful Bidder regarding the Work shall form the Contract between the City and the Successful Bidder.

5 CONTRACT TERM & WARRANTY

- 5.1 The Warranty Period for improper workmanship and defective Materials is one (1) year from the Work completion date.
- 5.2 All the Work must be completed by September 30th, 2024 ("Contract Time") unless otherwise specified in the Contract.

Note: It is the Successful Bidder's responsibility to maintain insurance documentation until the end of the warranty period and forward updates to the Procurement Division prior to the expiry date.

6 VENDOR PERFORMANCE EVALUATION

The performance of the Successful Bidder will be evaluated at the completion of the Work based on the criteria and metrics outlined in the City of Markham's "Vendor Performance Management" procedures. The City's Project Manager will use a pre-determined scorecard to ensure an objective assessment of a Vendor's or Service Provider's performance, by applying established evaluation criteria such as: Quality, Project Management (Health and Safety, Schedule Management, Communications), cost control (budget management) and performance of product during warranty period.

Performance evaluation may be used to provide feedback to the Vendor/Service Provider; to provide the Vendor/Service Provider with the opportunity to implement performance

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improvements during the Contract; and to justify an award or non-award of future Contracts by the City in accordance with the terms of the City of Markham’s “Vendor Performance Management” procedures. Continued incidence of non-compliance can be reflected in the Vendor/Service Provider’s performance evaluation and may affect the ability to work for the City in the future.

7 ANTICIPATED SCHEDULE

It is anticipated that the procurement process will be administered as follows:

Release Date	Wednesday, March 27 th , 2024 @ 3:00 P.M.
Mandatory Site Meeting	Tuesday, April 9 th , 2024 @ 10:00 A.M.
Deadline for Submitting Questions	Wednesday, April 17 th , 2024 @ 3:00 P.M.
Deadline for Responding to Questions	Friday, April 19 th , 2024 @ 3:00 P.M.
Closing date and time	Friday, April 26 th , 2024 @ 3:00 P.M.
Award timeframe	May, 2024
Estimated project initiation	May-June, 2024
Work Completion	September 30 th , 2024

Note: Although every effort will be made to adhere to this schedule, the City, in its sole discretion, reserves the right to change the dates without notification as and when required. This schedule is for information purposes only and is not to be relied upon.

8 MANDATORY SITE MEETING

A mandatory site meeting has been scheduled on Tuesday, April 9th, 2024 at 10:00 A.M., convening at Markham Village Community Centre, 6041 Hwy. 7, Markham, ON LP 3A7.

Only those Bidders whose attendance is registered at the site meeting by the City will be permitted to submit a Bid in response to this Request for Quotation.

Subsequent site visits must be coordinated with the project manager Luke Hilts – 905-477-7000 ext. 3325.

9 WORK SCHEDULE & HOURS OF WORK

- 9.1. The Contractor shall be responsible to coordinate and execute continuous service utilizing sufficient workers on all Work under this Contract.
- 9.2. Regular work hours for the duration of the Work are between 7:00 a.m. and 7:00 p.m., Monday to Friday, excluding holidays;
- 9.3. Written approval from the Project Manager is required to work at any other time;
- 9.4. Additional access to the facility can be coordinated with the Project Manager. The City will NOT be responsible for any overtime payments or any additional costs should the Contractor perform night and weekend work.

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10 CONTRACTOR'S RESPONSIBILITY

- 10.11 Mobilization, demobilization, site safety, administration, site clean-up, warranties, general requirements, barriers, temporary works, protection, signage, traffic control, coordination, etc.;
- 10.12 All damage to the facility and site caused by the Work must be repaired by the Contractor at no additional expense to the City;
- 10.13 At no time during performance of the Work are fire routes to be obstructed;
- 10.14 It is the responsibility of all contractors to take accurate measurement of all areas prior to submitting a bid. The City will not be responsible for any errors or omissions. Contractors can contact the facility coordinator\supervisor to arrange an appointment to assess the environment;

All work areas must be cleaned and left in a tidy/safe condition at the end of each work day.

11 CITY OF MARKHAM CONTRACTOR'S SAFETY PROGRAM

- 11.1. The successful Bidder must comply with the City of Markham's Contractor Safety program including (as a minimum):
- 11.2. Provision of a properly completed Contractor Safety Pre-Start Submission Checklist and supporting documentation;
- 11.3. Attendance by the successful bidder to the Contractor Pre-Start Safety Meeting;
- 11.4. All other requirements of the City's Contractor Safety Program that pertain to this project will be communicated by the City's Project Manager to the successful bidder prior to commencement of the project;
- 11.5. Compliance by the Contractor is mandatory.
- 11.6. Once a contract is awarded, failure to comply with any aspect of the City's Contractor Safety Program, or any observation by the City or Ministry of Labour of a health and safety legislative violation on the part of the Contractor is fair and reasonable grounds, on the part of the City, to terminate the contract without penalty to the City.

Refer to The City of Markham Health and Safety Program.

12 SUSTAINABILITY

- 12.1. The City is committed to buying environmentally sustainable solutions. Please consider this initiative when submitting your Bid;
- 12.2. The Contractor shall keep the Work site clean and hazard-free throughout the Work period, and shall provide for proper storage, removal and disposal of garbage;
- 12.3. All debris shall be transported to an authorized dump, waste treatment site or recycling facility by the Contractor, and disposed of in accordance with applicable by-laws, laws and regulations (all at the Contractor's expense);
- 12.4. The City reserves the right to approve of the disposal site and method of disposal;
- 12.5. Complete the work in a manner to minimize waste materials.

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13 CONTRACTOR QUALIFICATIONS

- 13.1 All work in placing and finishing of the concrete slab must be completed by an experience contractor. The Bidder shall submit a minimum of five (5) projects of similar scale, completed in the last 5 years, technology and complexity. Provide reference criteria as outlined in CCDC-11. Preference will be given to contractors with municipal experience;
- 13.2 The Contractor shall submit references for the Concrete Floor finisher. This subcontractor must have completed at least 5 arena concrete pads in the last 5 years. The submission is to include a list of past experience with ice pads and a minimum 3 references.

14 SUBCONTRACTOR QUALIFICATIONS

- 14.1 Execute work of this Section only by a Subcontractor who has adequate plant, equipment and skilled tradesmen to perform it expeditiously and is known to have been responsible for satisfactory installations similar to that specified during a period of at least 5 years;
- 14.2 The following dasher board installers have been pre-approved and must be used on this project:
 - ❖ Athletic Sports Systems
 Phone: 519-747-1856
 Fax: 519-747-3959
 Waterloo ON
 - ❖ Sound Barriers
 Phone: 905-678-7465
 Fax: 905-678-7460
 Mississauga, ON
 - ❖ Riley Manufacturing
 Phone: 519-539-4830
 Fax: 519-539-5006
 Woodstock ON
- 14.3 Materials and products shall be manufactured by a company continuously and regularly employed in the manufacture of similar material for a period of at least 10 years; and which can show evidence of these materials being satisfactorily used on at least six (6) projects of similar size, scope and type within such a period. At least three (3) of the projects shall have been in successful use for 5 years or longer;
- 14.4 Other Approved Manufacturers Arena board system shall be provided by an approved manufacturing firm having satisfactory experience in manufacturing and installing arena boards, using persons trained and skilled in the type of work required for both manufacturing and installing. Alternatives to the above listed dasher board installers must be submitted before the question deadline stated within the procurement request and must provide evidence of at least ten (10) installations identical in construction and features to the following specification, each with a minimum of five (5) years' operating successfully prior to bid date. A list of these installations including arena name, contacts, address and telephone numbers must be

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included with requests for prior approval. A sample panel showing how the system is manufactured, including all features listed in this specification, must be submitted and approved prior to bid;

- 14.5 Steel framed dasher board systems are not an acceptable alternate for this scope of work.

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15 INSTRUCTIONS FOR BID BOND AND AGREEMENT TO BOND

- 15.1 Bid Bond and Agreement to Bond must be submitted with your electronic bid submission in the Bidding System in the bid submission file labeled “Bid Bond” and “Agreement to Bond”.
- 15.2 Bid Bond and Agreement to Bond shall be in digital format only. Please refer to the information for this type of Bid Bond found on the Surety Association Canada’s website. The information on this site includes the following:
- A list of third parties that provide online surety digital bond services such as Mobile Bonds or Xenex. The City does not endorse or promote any third party digital bond service provider.
 - An industry checklist which Digital Bonds provided should meet.
- 15.3 All instruction details for accessing authentication should be included with the uploaded Bond.
- 15.4 All Bonds must be issued by a surety company licensed to issue surety bonds in the Province of Ontario.
- 15.5 If the City is unable to verify the Bid Bond and/or Agreement to Bond requirements, upon request by the City, the Bidder shall be given five (5) business days to remedy the verification to the City’s satisfaction, otherwise Bidders will be disqualified.

16 BID BOND

A Bid Bond **must be submitted with the Bid** in the amount of ONE HUNDRED FORTY THOUSAND DOLLARS (\$140,000.00). Bid Bonds must be irrevocable and open for bid acceptance for at least ninety (90) days from the date Closing Time.

If a Bid is accepted and the Bidder fails to accept a Purchase Order for the Work, or provide the other necessary bonds or documents required after the award of the Contract, the Bid Bond may be enforced by the City.

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17 AGREEMENT TO BOND

We, the Undersigned, hereby undertake and agree with The Corporation of the City of Markham to become bound as Surety for _____

(Bidder)

for the written Bid submitted by the Bidder to the City dated _____,
(Date)

for _____
(Tender Document Name and Number)

and any subsequent Purchase Order (Collectively, the "Contract") for the Performance Bond and Labour and Materials Bond in an amount equal to **50%** percent each of the **Total Bid Price (including taxes)** for the prompt and proper performance of the Work specified in the Contract. If our Principal's Bid is accepted by you, such Performance Bond and Labour and Materials bond is to provide for a warranty / maintenance period of ***One (1) Year from the substantial completion of the Work.***

As witness our corporate seal, testified by the hand of the proper officer thereunto duly authorized.

DATED this _____ day of _____.

(Name of Surety)

(Address)

(Signature)

(Name: please print)

(Title)

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18 PERFORMANCE BOND/LABOUR AND MATERIALS BOND

After award of the Contract to the Successful Bidder and prior to the issuance of a Purchase Order, the Successful Bidder shall provide a Performance Bond and a Labour and Materials Bond, in an amount specified in this Request for Tender, and in a form acceptable to the City (in its sole discretion).

The Performance Bond and Labour and Materials Bond shall be provided at the Bidder's cost, in favour of the City of Markham, in order to secure the due and faithful performance of the Contract during the initial term and any renewal term.

Each of the Performance Bond and Labour and Materials Bond shall be for **50%** if the **Total Bid Price (including taxes)**. If the Successful Bidder fails to meet the requirements of this section within ten (10) business days of receipt of the award letter, the City of Markham shall (in its sole discretion) cancel the award and enforce the Bid Bond.

Should the Successful Bidder, in the performance of the Contract, fail to fulfill any of the requirements of the Contract, the Performance Bond and the Labour and Materials Bond may be enforced by the City.

NOTE:

The following forms are required for completion by the Successful Bidder:

- **Form 31 - Labour and Material Bond**

<http://ontariocourtforms.on.ca/static/media/uploads/courtforms/cla/31/form31-rev0119-fil-en.doc>

- **Form 32 - Performance Bond**

<http://ontariocourtforms.on.ca/static/media/uploads/courtforms/cla/32/form32-rev0119-fil-en.doc>

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19 AMENDMENTS TO THE CITY'S GENERAL TERMS AND CONDITIONS

The following amendments shall apply to the City's *General Terms and Conditions* for the purposes of this Request for Tender:

Delete: Part III, Section 16.1(c) (Professional Liability Insurance), as follows:

(c) Professional Liability Insurance, in a minimum amount of \$1,000,000.00 inclusive per claim and \$2,000,000.00 in the aggregate for each policy period. Upon completion of the Warranty Period the policy shall remain in force for twelve (12) months.

GENERAL TERMS AND CONDITIONS - CONTRACTOR

PART I – DEFINITIONS

The terms below shall have the following meanings:

“**Bid**” means the offer of a Bidder to furnish goods or services in response to a Quotation issued by the City.

“**Bidder**” means any individual, corporation or other person submitting a response to a Quotation issued by the City. “**Bid Form**” means the “Bid Form” section of the Quotation, which must be completed by the Bidder and include the Bid Price and the signature of the authorized signing representative(s) of the Bidder.

“**Bid Price**” means the total bid price for the Work as specified in the Bid, EXCLUDING all applicable taxes.

“**Bidding System**” means the City’s online web-based solution for issuing solicitations and/or receiving online bid submissions and posting bid results.

“**Business Days**” means a day other than a Saturday, Sunday, statutory holiday or other holiday that is observed by the City.

“**City**” means The Corporation of the City of Markham, and shall include any elected official, director, officer, employee or agent of the City who has been authorized to act on its behalf.

“**Closing Time**” means the date and time that all Bids must be received by the City as specified in the Quotation.

“**Competent Person**” means a person who is qualified because of knowledge, experience and training to organize the Work and its performance, is familiar with the *Occupational Health and Safety Act*, R.S.O. 1990, c. O.1 and Regulations, as amended, that apply to the Work, and has knowledge of any potential or actual danger to health or safety in the workplace. “**Conflict of Interest**” means a situation in which the personal, private or commercial interests of a Bidder, Contractor or Subcontractor (or their directors, officers, employees, or agents) conflict with the interests of the City.

“**Contract**” means the legally binding agreement between the City and the Successful Bidder, which agreement is comprised of the Quotation, the Bid, the Purchase Order and any other written agreement between the City and the Successful Bidder regarding the Work, unless otherwise specified in the Quotation.

“**Contract Award**” means the notice in writing (signed by a duly authorized representative of the City) that a Bidder has been selected as the Successful Bidder for the purposes of a Quotation.

“**Contractor**” means the Successful Bidder which has been awarded the Contract by the City for the Work.

“**Council**” means the Council of The Corporation of the City of Markham.

“**Deliverables**” means all services, materials, plans, designs, drawings, data, products, equipment, devices, hardware, software or other deliverables created, developed, prepared or provided by or on behalf of the Contractor in connection with the Work or the Contractor’s obligations under the Contract.

“**General Terms and Conditions**” mean the City’s *General Terms and Conditions*, as may be revised by the City from time to time.

“**Purchase Order**” means the form of purchase order used by the City to procure goods and/or services.

“**Purchasing By-law**” means the by-law enacted by Council with respect to the procurement of goods and/or services by the City, which by-law may be revised by Council from time to time.

“**Quotation**” means a request for quotation, request for proposal, request for tender, request for pre-qualification, expression of interest (and any addenda thereto issued by the City) or other document by which Bids are solicited by the City.

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“**Successful Bidder**” means the Bidder which has been awarded the Contract by the City for the Work.

“**Subcontractor**” means the individual, corporation or other person engaged by the Contractor to complete a portion of the Work.

“**Total Bid Price**” means the total bid price for the Work as specified in the Bid, INCLUDING all applicable taxes.

“**Work**” means the labour, materials, products, equipment and/or services specified in the Quotation and, upon Contract Award, required to complete the requirements of the Contract.

PART II – INSTRUCTIONS TO BIDDERS

1. QUOTATION PROCESS

By submitting a Bid in response to a Quotation, the Bidder agrees to be bound by the terms and conditions of the Quotation and the City’s *General Terms and Conditions* and *Purchasing By-Law* #2017-8, which can be found on the City’s website:

<https://www.markham.ca/wps/portal/home/business/bids-tenders/bylaw-terms-and-conditions/05-by-law-terms-and-conditions> or from the City.

2. MANDATORY REQUIREMENTS

The failure by a Bidder to comply with any requirement of a Quotation which is identified as “MANDATORY” shall result in the Bid being rejected as non-compliant.

3. MANDATORY SITE MEETING

If a Quotation indicates that a MANDATORY site meeting shall be held, all Bidders must attend the site meeting (on the date and time indicated) and register with the City's representative. Failure to attend and register shall result in the Bid being rejected as non-compliant.

4. BIDDER’S RESPONSIBILITY

4.1 It is the Bidder’s responsibility to examine all components of the Quotation, including all appendices, schedules, forms and addenda, and to seek clarification of any requirement that they consider unclear before submitting a Bid. The failure of any Bidder to examine any component of the Quotation or to seek clarification shall not relieve the Bidder of any obligation with respect to their Bid or any Contract awarded based on their Bid.

4.2 Should a Bidder find discrepancies in or omissions from the Quotation, or have any questions regarding a Quotation, the Bidder shall direct all inquiries to the designated City staff specified on the Quotation cover page. No oral interpretations shall be effective to modify any provisions of the Quotation. Only written addenda issued by the City shall modify the Quotation.

4.3 It is the Bidder’s responsibility to review the Work site and to include in their Bid any items that might have been missed from the specifications that would reasonably be considered part of the specifications. The Bidder shall take into account all obstacles that may be faced during the Work when setting prices in the Bid.

5. ADDENDA

5.1 The City reserves the right, in its sole discretion, to revise the Quotation *prior to* the Closing Time. If the City exercises this right, the revisions shall be by addendum forwarded through the Bidding

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System or to the email address provided. The addendum shall form part of the Quotation upon issuance by the City.

- 5.2 It is the responsibility of the Bidder to confirm that they have received all addendums that have been issued by the City. Bidders should check on line at <https://markham.bidsandtenders.ca> or contact the City prior to submitting their Bid.

6. CONFIDENTIALITY

All correspondence, documentation and information provided by the City to Bidders in connection with a Quotation;

- (a) are and shall remain the property of the City,
- (b) shall be treated by Bidders as confidential, and
- (c) shall not be used for any purpose other than for replying to the Quotation and completing the requirements of the Contract.

7. BID SUBMISSION

- 7.1 The City shall not be liable for, nor reimburse any Bidder for, costs incurred in the preparation and/or submission of a Bid.
- 7.2 Bidders are required to disclose in their Bid any real or potential Conflict of Interest.
- 7.3 Bidders are required to disclose in their Bid a list of all proposed Subcontractors. The City reserves the right, in its sole discretion, to accept or reject any or all Subcontractors proposed in a Bid (and any subsequent changes thereto). Upon request, Bidders shall provide evidence satisfactory to the City (as determined by the City in its sole discretion) that the proposed Subcontractors have the qualifications, experience and resources to complete the Work.
- 7.4 If a Quotation requires the submission of paper copy of the Bids:
- (a) The Bid shall be legible, written in ink or typed. Any erasures, overwriting or strike-outs should be initialed by the person(s) signing on behalf of the Bidder.
 - (b) Bids shall be submitted in a sealed envelope, with a submission label clearly identifying the Bid number and project description.
 - (c) The Bid Form shall bear the legal name and signature of the authorized signing representative(s) of the Bidder. If a joint Bid is submitted, the Bid Form shall be signed on behalf of each of the Bidders and, if the authorized signing representative for both Bidders is one individual, such individual shall sign separately on behalf of each Bidder.
 - (d) Bids shall be in the possession of the City, date and time stamped no later than the Closing Time. Bids received by the City after the Closing Time shall NOT be accepted and shall be returned unopened to the Bidders.
 - (e) The use of mail or courier for delivery of a Bid shall be at the risk of the Bidder. Bids submitted by email or other telecommunications shall not be accepted, unless otherwise specified in the Quotation.
- 7.5 If a Quotation requires the submission of Bids through the Bidding System:
- (a) Bids shall be received by the Bidding System, no later than the Closing Time.
 Bidders are cautioned that the timing of their Bid submission is based on when the Bid is

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RECEIVED by the Bidding System, **not** when a Bid is submitted by the Bidder, as Bid

transmission can be delayed by an “Internet traffic jam” due to file transfer size, transmission speed etc. Bidders should allow sufficient time to upload their Bid submission and attachment(s) and to resolve any issues that may arise. The Closing Time shall be determined by the City’s Bidding System web clock.

- (b) Where, in the sole opinion of the City, the Bidding System has experienced or is experiencing an issue affecting the receipt of Bids, or there is a failure of the underlying infrastructure, the City may extend the Closing Time without prior notice. As soon as practicable in the circumstances, the City will notify Bidders that the Closing Time has been extended. Once the issue has been resolved, the City shall notify Bidders of the new Closing Time via an addendum released through the Bidding System.
 - (c) Bidders should contact the City, at least twenty-four (24) hours prior to the Closing Time, if they encounter any problems. The Bidding System will send a confirmation email to the Bidder advising that their Bid was submitted successfully. Bidders should contact the City immediately if they do not receive a confirmation email.
 - (d) To ensure receipt of the latest information and updates via email regarding a Quotation, or if a Bidder has obtained a Quotation from a third party, the onus is on the Bidder to create a Bidding System Vendor account and register as a “Plan Taker” for the Quotation opportunity at <https://markham.bidsandtenders.ca>.
- 7.6 Adjustments by any method to a Bid already submitted shall **NOT** be considered. A Bidder desiring to make adjustments to a Bid shall submit a revised Bid prior to the Closing Time.
- 7.7 Bids shall be irrevocable and valid for acceptance by the City for a period of NINETY (90) Business Days from the Closing Time, unless otherwise specified in the Quotation.
- 7.8 Disclosure of information submitted to the City in connection with a Quotation is subject to the *Municipal Freedom of Information and Protection of Privacy Act (“MFIPPA”)*. Bidders should clearly indicate in their Bid which parts, if any, are exempt from disclosure under MFIPPA.

8. BID PRICE

- 8.1 The quantities referenced in a Quotation are estimates only and shall be used as a basis for calculating the Bid Price. These quantities are not guaranteed to be accurate and are furnished without any liability to the City. The City reserves the right, in its sole discretion, to increase or decrease quantities as required. Payment shall be based on actual quantities ordered, received and accepted for use by the City.
- 8.2 The Bid Price shall include all labour, materials, products, equipment, services, cash allowances, costs, expenses, disbursements, duties, overhead and profit required to complete the Work, with the unit price for each Work item detailed in the Bid (if required by the Quotation).
- 8.3 If a Quotation requires the submission of paper copy of the Bids and in the event of an ambiguity, discrepancy or mathematical error in the prices set out in the Bid, the City shall have the right, in its sole discretion, to resolve such ambiguity, discrepancy or mathematical error in accordance with the following:
 - (a) In the event of an ambiguity or discrepancy between the lump sum price and the unit price for any Work item (“Unit Price Error”), the unit price shall prevail. Extensions, sub-totals and

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totals shall be corrected accordingly, and adjustments resulting from the correction shall be applied to the Bid Price and Total Bid Price.

- (b) In the event of an ambiguity, discrepancy or mathematical error other than described in Section 8.3(a) above:
 - (i) the Bid Price shall prevail over all other prices contained in the Bid (including, without limitation, the Total Bid Price) (collectively, the “Summary Prices”), and the Bid Price shall be capable of acceptance by the City; and
 - (ii) the City reserves the right (in its sole discretion) to seek clarification from the Successful Bidder regarding any such ambiguity, discrepancy or mathematical error in the Summary Prices, to correct such ambiguity, discrepancy or mathematical error in the Summary Prices (as confirmed by the Successful Bidder), and to require that the Successful Bidder initial such corrected ambiguity, discrepancy or mathematical error.
- 8.4 In the event that the City exercises any of its rights under Section 8.3 above:
- (a) The Bid Price shall NOT be considered uncertain, erroneous, non-compliant or incapable of acceptance by the City; and
 - (b) The Bid shall NOT be considered non-compliant or incapable of acceptance by the City.

9. BLACK-OUT PERIOD

To ensure that the City’s procurement process is fair, open and transparent to all Bidders, there shall be no communication between the City and Bidders during a Quotation process, except as specified in the Quotation. Any communication between a Bidder and City staff or Council (other than as specified in the Quotation) may result in the Bid being rejected as non-compliant.

10. BID OPENING

“Requests for Tenders” and “Requests for Proposals” shall be opened at a public meeting at the Markham Civic Centre, 101 City Centre Boulevard, Markham, Ontario. The Bid opening shall be done in public approximately fifteen (15) minutes after the Closing Time. For “Requests for Tenders”, only the Bid Price shall be read out. For “Requests for Proposals”, only the names of the Bidders shall be read out.

If a Quotation requires the submission of Bids through the Bidding System, , a public Bid opening will not be held. The names of the Bidders and the unverified Bid Price shall be posted on the City’s Bidding System on the same day as the Closing Time.

All Bid prices are subject to review and verification by the City

11. WITHDRAWAL OF BIDS PRIOR TO THE CLOSING TIME

Paper copy Bid Withdrawal

- 11.1 A Bidder may request that their Bid be withdrawn. The withdrawal shall be allowed if the request is received by the City prior to the Closing Time. Withdrawal requests shall be made in writing by an authorized representative of the Bidder and should be directed to the designated City staff specified on the Quotation cover page. Telephone requests shall NOT be considered.
- 11.2 Bids confirmed by the City as withdrawn prior to the Closing Time shall be returned unopened to the Bidder.
- 11.3 The withdrawal of a Bid does not disqualify a Bidder from submitting another Bid for the same Quotation prior to the Closing Time.

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- 11.4 If more than one Bid is submitted by the same Bidder for the same Quotation and no withdrawal notice has been received by the City prior to the Closing Time, the Bid bearing the latest date and time shall be considered the intended Bid. All earlier Bids shall be considered void and shall be returned unopened to the Bidder.

Bidding System Bid Withdrawal

- 11.5 If more than one Bid is submitted by the same Bidder for the same Quotation, the Bid received by the Bidding System bearing the latest date and time shall be considered the intended Bid.

12. WITHDRAWAL OF BIDS DURING PUBLIC BID OPENING

- 12.1 In some instances, the Bids for more than one Quotation are opened at the same public meeting. At such public meeting, at the conclusion of the reading out of Bids for the first Quotation, the low Bidder on that Quotation may withdraw any of their remaining Bids relative to those other Quotations which have not yet been opened by advising the City's representative. The City's representative shall read out the Bidder's name and announce that the Bid has been withdrawn.

- 12.2 Bids withdrawn under this procedure cannot be reinstated.

13. WITHDRAWAL OF BIDS AFTER THE CLOSING TIME

Withdrawal requests received after the Quotation Closing Time shall NOT be permitted.

14. NOTICE

- 14.1 Every notice, including any addendum, that the City may be required to give to the Bidder *prior to* the Closing Time shall be deemed to have been properly given if forwarded through the Bidding System or to the email address provided when the Quotation was downloaded from Biddingo.com or obtained from the City. Bidders are requested to acknowledge receipt of addenda as indicated in the Quotation.

- 14.2 Every notice, including any addendum, that the City may be required to give to the Bidder *after* the Closing Time shall be deemed to have been properly given if forwarded by the Bidding System or by email to the address provided in the Bid.

15. ACCEPTANCE / REJECTION OF BIDS

- 15.1 The City reserves the right, in its sole discretion, and without incurring any liability whatsoever, to accept or reject any or all Bids, or to cancel the Quotation process at any time, without cause, if deemed in the best interests of the City to do so.

- 15.2 Unless otherwise specified in the Quotation, Bids which are qualified or restricted by any statement added to the Bid or a covering letter shall be rejected as non-compliant.

- 15.3 Any Bid which is incomplete, illegible, which contains alterations not called for, fails to comply with the requirements of the Quotation, or is otherwise irregular in any way (collectively, "Irregularities"), may be rejected as non-compliant by the City. The City reserves the right, in its sole discretion, to waive minor Irregularities and seek clarification from the Bidder regarding such minor Irregularities.

- 15.4 The City reserves the right, in its sole discretion, to ask for clarification regarding or to solicit additional information regarding any information included in a Bid, or (except for MANDATORY requirements) to request that a Bidder provide information not included in the Bid.

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15.5 If the City is unable to verify bonding requirements, upon request by the City, the Bidder shall be given five (5) business days to remedy the verification to the City's satisfaction.

16. DISQUALIFIED VENDORS

The City, in its sole discretion, may disqualify a vendor from participation in a Quotation process, or place a vendor's name on a list of disqualified vendors for a period of two (2) years on the basis of documented poor performance, non-performance, Conflict of Interest (including, without limitation, involvement in any litigation or contractual dispute with the City), or failure to accept a Contract Award. This information may be obtained from within the City or through reference checks. A written notice of the decision shall be provided to the vendor by the City. From and after the delivery of such notice, the disqualified vendor shall not be eligible to participate in any Quotation process, or to provide goods or services to the City for so long as the supplier remains on the list of disqualified vendors (as applicable). After the two (2) year period referred to above, disqualified vendors, who are otherwise in good standing, may request that their name be removed from the list. Removal of names from the list shall be at the sole discretion of the City.

17. CONTRACT AWARD

17.1 The award of a Contract is based on the best value for the City based upon quality, service and price. The award is subject to the City's budget restrictions, limitations and approvals.

17.2 The City reserves the right, in its sole discretion, to negotiate with the lowest priced Bidder / highest ranked Bidder (as applicable, and whose reference checks meet or exceed the expectation of the City in accordance with Section 17.4 below) in the event that the Bid Prices submitted by the Bidders exceed the City's budget. If an acceptable contract cannot be concluded with such Bidder, the City reserves the right to negotiate a contract acceptable to the City with the next lowest priced Bidder(s) / highest ranked Bidder(s) (as applicable) in succession.

17.3 The City reserves the right, in its sole discretion, to award in whole or in part (including, without limitation, by part, item or group of items), or to award to more than one Bidder.

17.4 The City reserves the right, in its sole discretion, not to award to the lowest priced Bidder, the highest ranked Bidder or to any Bidder whose reference checks do not meet or exceed the expectations of the City (as determined by the City in its sole discretion) regarding past performance, timely project completion, health and safety performance, experience, qualifications, financial standing, appropriate manpower, equipment and/or facilities, or any other criteria deemed necessary by the City to meet the requirements of the Quotation.

17.5 The acceptance of a Bid and Contract Award to the Successful Bidder shall be indicated by notice in writing signed by a duly authorized representative of the City. No other act of the City shall constitute the acceptance of a Bid and Contract Award.

17.6 Upon acceptance of a Bid and Contract Award by the City, and upon submission by the Successful Bidder of all documents required by the Quotation, a Purchase Order shall be issued to the Successful Bidder.

17.7 In the event that the Successful Bidder fails to accept the Contract Award or fails to submit to the City all documents required by the Quotation within ten (10) Business Days of notification, the City may, in its sole discretion:

- (a) Grant additional time to fulfill the requirement; or
- (b) Cancel the Contract Award, award to another Bidder which meets the Quotation requirements, and exercise any remedies available to the City (including, without limitation, forfeiture of any bid deposit or enforcement of any bid bond).

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18. NO LIABILITY

The City, its affiliates, elected officials, directors, officers, employees and agents shall not be liable (in contract, tort or otherwise) for any costs, expenses, losses or damages incurred, sustained or suffered by any Bidder or any third party, prior or subsequent to, or by reason of the acceptance or rejection by the City of any Bid, by reason of any award decision (or delay thereof) by the City, by reason of the cancellation of the Quotation process, or by reason of the exercise by the City of any of its rights specified in the Quotation or the City's *General Terms and Conditions*.

PART III – CONTRACT TERMS AND CONDITIONS

1. CONTRACT

- 1.1 The Contract shall be governed by and construed in accordance with the laws of the Province of Ontario and the federal laws of Canada applicable therein.
- 1.2 The Contract shall consist of the following (collectively, the “Contract Documents”), unless otherwise specified in the Quotation;
 - (a) Purchase Order,
 - (b) Bid,
 - (c) Quotation,
 - (d) the City's *General Terms and Conditions*, and
 - (e) any other written agreement between the parties regarding the Work.
- 1.3 In the event of a conflict or inconsistency *among* the Contract Documents, the provision in the document first listed above shall prevail, unless otherwise expressly provided in any Contract Document.
- 1.4 In the event of a conflict or inconsistency *within* the Contract Documents, the order of priority of documents, from highest to lowest, shall be:
 - (a) Supplementary Conditions;
 - (b) General Conditions of the Contract;
 - (c) Specifications;
 - (d) Contract Drawings;
 - (e) City of Markham Engineering Criteria and Standard Drawings;
 - (f) Special Provisions;
 - (g) Ontario Provincial Standard Drawings; and
 - (h) Ontario Provincial Standard – General Conditions of the Contract.

2. CONTRACT TERM

The term of the Contract shall be as specified in the Contract, unless otherwise extended or amended by mutual written agreement of the City and the Contractor (“Contract Term”). Notwithstanding the expiry of the Contract Term, the terms and conditions of the Contract shall continue to apply during the Warranty Period.

3. WORK

- 3.1 The Work shall start and be completed as set out in the Contract, unless otherwise extended or amended by mutual written agreement of the City and the Contractor. Unless otherwise specified in the Contract, Work shall start within five (5) Business Days after issuance of a Purchase Order, and shall be carried out on a continuous basis until final completion of the Work.

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- 3.2 The Contractor shall make no change or alteration to the Work, or perform any additional work without the City's prior, written approval.

4. CONTRACTOR'S RESPONSIBILITY

- 4.1 The Contractor shall comply with all federal, provincial and municipal laws and regulations applicable to the Work.
- 4.2 The Contractor shall obtain all permits and licenses required to perform the Work, and shall not do or suffer to be done anything in violation of any such permits and/or licenses.
- 4.3 The Contractor shall bear the risk and responsibility of any loss, damage or expense of any nature or kind whatsoever to the Work or to the Contractor arising from strikes or labour disputes, other than such loss, damage or expense caused by the failure of the City to meet its obligations under the Contract.
- 4.4 The Contractor shall bear the risk and responsibility of any equipment, tools, or supplies delivered to any site or facility by or on behalf of the Contractor, prior to, during or after carrying out the Work, unless otherwise expressly provided in the Contract.
- 4.5 The Contractor shall ensure that all persons employed or engaged by the Contract to perform the Work, when using any City buildings, premises, equipment, hardware or software, shall comply with all security policies, regulations or directives relating to such buildings, premises, equipment, hardware or software.
- 4.6 The Contractor shall furnish all personnel required to perform the Work, and all such personnel shall be competent and qualified to perform the Work. Where specific personnel have been proposed by the Contractor for the performance of the Work, and have been accepted by the City, such personnel shall not be replaced with other personnel without the prior written consent of the City, such consent not to be unreasonably withheld.

5. HEALTH AND SAFETY

The Contractor shall comply with the City's health and safety policies, the *Occupational Health and Safety Act*, R.S.O. 1990, c. O.1 and Regulations, as amended, and all applicable industry standards for the Work.

6. CODE OF ETHICS

- 6.1 The Code of Purchasing Ethics published by the Supply Chain Management Association (SCMA) and the National Institute of Government Purchasing (NIGP) Code of Ethics shall apply to all purchases of goods and/or services by the City. SMAC's Code of Ethics can be found at www.scma.com. NIGP's Code of Ethics can be found at www.nigp.org
- 6.2 The Contractor shall read, understand and conduct itself according to the Values "Honesty/Integrity, Professionalism, Responsible Management, Serving the Public Interest and Conformity to the Laws..." as outlined in the SMAC Code of Ethics. Failure to do so shall result in the termination of the Contract and exclusion from future Quotations.

7. RECORDS

The Contractor shall maintain at all times, detailed and accurate records of all transactions relating to the Contract. The City reserves the right, in its sole discretion, to inspect and audit the books, payrolls,

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accounts and records of the Contractor at any time during the Contract Term, and at any time thereafter, as required by the City. The Contractor shall supply certified copies of payrolls and any other records required by the City. The City shall provide the Contractor 48 hours prior written notice of its requirement for such audit or certified copies.

8. INDEPENDENT CONTRACTORS

The relationship of the City and the Contractor is one of independent contractors. Nothing contained in the Contract is intended to place the City and the Contractor in the relationship of partners, joint ventures, principal-agent, or employer-employee, and neither the City nor the Contractor shall have any right to obligate or bind the other party in any manner whatsoever. The Contractor is responsible for all legally required employer and employee contribution and deductions, compensation and benefits for itself and its personnel.

9. SUBCONTRACTORS

- 9.1 The Contractor shall not assign or sublet the Contract (or any part thereof) or subcontract any portion of the Work without the prior written consent of the City.
- 9.2 No Subcontractor shall, under any circumstances, relieve the Contractor of its liabilities and obligations under the Contract. Should any Subcontractor fail to perform the Work in a satisfactory manner, the City may, in its sole discretion, require the Contractor to replace such Subcontractor.
- 9.3 The City shall have no obligation to deal directly with any Subcontractor. The Contractor shall be solely responsible for the payment of all amounts owing to Subcontractors. The Contractor shall coordinate the provision of the products and/or services by Subcontractors in a manner acceptable to the City, and shall ensure that Subcontractors comply with the terms and conditions of the Contract. The Contractor shall be liable to the City for all costs or damages arising from the acts, omissions, negligence or willful misconduct of Subcontractors.

10. CONFLICT OF INTEREST

If, during the Contract Term, a Conflict of Interest (or the appearance of same) arises, or the Contractor is retained by another client giving rise to a potential Conflict of Interest, the Contractor shall immediately inform the City. If a Conflict of Interest is deemed to exist by the City, the Contractor shall (if required by the City) take such steps as are necessary to remove the Conflict of Interest to the satisfaction of the City, failing which the City may, in its sole discretion, terminate the Contract.

11. PRIVACY

The Contractor agrees and acknowledges that the City is bound by the *Municipal Freedom of Information and Protection of Privacy Act*, R.S.O. 1990, c. M.56, as amended, and any other Provincial or Federal privacy legislation that may be in effect during the Contract Term (collectively "Privacy Legislation"). The Contractor agrees to be bound by the Privacy Legislation, and agrees that it shall not directly or indirectly disclose, distribute or use any Personal Information provided to it by the City, without obtaining the prior written consent of the City. "Personal Information" means information which relates to an individual and allows that individual to be identified, and includes any information defined from time to time as "personal information" under any Privacy Legislation.

12. CONFIDENTIALITY

- 12.1 "City Confidential Information" means;

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- (a) Personal Information, confidential, secret or proprietary information, including data, technical information, financial information, business information (including business plans, strategies and practices) of the City which is disclosed to or obtained by the Contractor in connection with the Contract, and
- (b) all information related to the operations of the City which comes to the attention of the Contractor in the course of performing the Work, but excludes any such information which;
 - (i) is or becomes publicly available,
 - (ii) is already rightfully in the possession of the Contractor and not subject to any pre-existing obligation of confidentiality,
 - (iii) is independently developed by the Contractor outside the scope of the Contract, or (iv) is rightfully obtained by the Contractor from third parties.

12.2 The Contractor shall protect the City Confidential Information at all times and in the same manner as the Contractor protects the confidentiality of its own proprietary and confidential information, but in no event with less than a reasonable standard of care. The Contractor shall not, without the prior written consent of the City, disclose City Confidential Information to any person nor use City Confidential Information for any purpose other than for the benefit of the City in connection with the Work.

13. OWNERSHIP OF DELIVERABLES

- 13.1 Unless otherwise expressly provided in the Contract, the City shall have all ownership rights in and to all originally developed Deliverables, vesting in the City immediately upon their creation and at every stage of their development. The Contractor hereby assigns to the City all right, title and interest (including, without limitation, copyright and other intellectual property rights) in and to such Deliverables, and the Contractor expressly waives the Contractor's moral rights in respect of such Deliverables. The Contractor shall provide reasonable assistance to the City in the preparation of all documents necessary to evidence the City's ownership rights in and to such Deliverables (including, without limitation, obtaining a waiver of moral rights from all authors).
- 13.2 If the Deliverables contain any pre-existing materials owned or licensed by the Contractor that are incorporated into the Deliverables ("Contractor Materials"), the Contractor hereby grants to the City a perpetual, non-transferrable, non-exclusive, royalty-free licence to use the Contractor Materials to the extent reasonably necessary or convenient to receive or enjoy the benefits of the Deliverables.

14. WARRANTY

- 14.1 The Contractor represents and warrants that the Work shall be performed in a professional and workmanlike manner, in accordance with applicable industry standards.
- 14.2 The Contractor represents and warrants that the Deliverables;
- (a) shall be in accordance with the requirements specified in the Contract and with all applicable laws, bylaws, regulations and standards,
 - (b) shall function or otherwise perform in accordance with the features, functional and technical specifications provided in the Contract, and
 - (c) shall in no way infringe or violate the intellectual property rights of any person.
- 14.3 The Contractor represents and warrants that if at any time prior to one year (or such longer warranty/guarantee period specified in the Contract) after completion of the Work (the "Warranty Period"), the Deliverables or any part of the Work becomes defective or is deficient or fails due to defect in design, material or workmanship, or otherwise fails to meet the requirements of the

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Contract, then the Contractor, upon request by the City, shall make good every such defect, deficiency or failure at the Contractor's cost and expense.

15. INDEMNITY

The Contractor shall indemnify and hold harmless the City (and its affiliates, elected officials, directors, officers, employees and agents) (collectively, the "Indemnified Parties") from and against all actions, suits, claims, demands, liens, proceedings and judgments which may be brought against or made upon the Indemnified Parties, and against all liabilities, damages, losses, costs, charges and expenses (including legal expenses) which may be incurred, sustained or suffered by the Indemnified Parties, resulting from or arising out of the infringement (actual or alleged) by the Deliverables of the intellectual property rights of any person, or the acts or omissions of the Contractor (its Subcontractors, agents or employees) in connection with the Contract or the performance of the Work.

16. INSURANCE

16.1 The Contractor shall purchase and maintain in force, at their own expense (including the payment of all deductibles), during the Contract Term and the Warranty Period (unless otherwise stated), the following policies of insurance underwritten by insurers licensed to conduct business in the Province of Ontario and satisfactory to the City (unless otherwise specified in the Contract):

- (a) Commercial General Liability Insurance policy shall include coverage for but not limited to Bodily Injury, Person Injury, Property Damage and Contractual Liability with a minimum amount of \$2,000,000.00 for each occurrence, and include:
 - (i) an endorsement certifying that the **The Corporation of the City of Markham** is included as an additional insured;
 - (ii) a cross liability clause;
 - (iii) non-owned automobile coverage including legal liability for damage to hired automobiles; and,
 - (iv) an exception to the pollution liability exclusion for Hostile Fire, or an endorsement adding back in coverage for Hostile Fires where there exists an absolute pollution exclusion.
- (b) Automobile Policy for all licensed Motor Vehicles owned or leased by the Contractor in a minimum amount of \$2,000,000.00 for each occurrence.
- (c) Professional Liability Insurance, in a minimum amount of \$1,000,000.00 inclusive per claim and \$2,000,000.00 in the aggregate for each policy period. Upon completion of the Warranty Period the policy shall remain in force for twelve (12) months.

The policies shall be-endorsed to the effect that such insurance policies shall not be altered, cancelled or allowed to expire without thirty (30) days advance written notice to the City. All policies shall apply as primary and not as excess of any insurance available to the City.

Upon request by the City, the Contractor shall furnish the City with a certificate of insurance (in a form satisfactory to the City, in its sole discretion) confirming that the Contractor has in place the required insurance.

If applicable, and based upon the operations of the sub-consultant, sections 16.1 a & b. shall apply in the same manner to any sub-contractor as it would to the Contractor. Further, it is the Contractor's

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obligation to ensure that the sub-contractor is aware of these obligations. Upon request, the Contractor shall provide to the City confirmation of the sub-contractor's insurance.

- 16.2 The Contractor shall furnish the City with a certificate of insurance (in a form satisfactory to the City, in its sole discretion) confirming that the Contractor has in place the above-mentioned insurance policies. The certificate of insurance shall also contain an endorsement to the effect that such insurance policies shall not be altered, cancelled or allowed to expire without thirty (30) days advance written notice to the City.

17. DEFAULT AND TERMINATION

17.1 Any of the following shall be considered to be an "Act of Default" by the Contractor:

- (a) Failure to comply with the terms and conditions of the Contract, and such failure is not remedied within ten (10) calendar days after written notice of such failure by the City.
- (b) Breach of Section 11 (Privacy) or Section 12 (Confidentiality).
- (c) Assignment, transfer, conveyance, sublet, or disposition of the Contract or the Contractor's right, title, or interest therein to any person without the prior written consent of the City.
- (d) Failure to comply with all federal, provincial and municipal laws and regulations applicable to the Work.
- (e) Commencement of any proceeding under bankruptcy, creditor protection or similar law in respect of the Contractor, or appointment of a receiver, receiver-manager or liquidator in respect of the Contractor.

17.2 Where an Act of Default occurs, the City reserves the right, in its sole discretion and upon providing written notice to the Contractor, to immediately invoke any applicable bond(s) and/or terminate the Contract.

17.3 The City reserves the right, in its sole discretion, to terminate the Contract, in whole or in part, without cause, upon providing thirty (30) days prior written notice to the Contractor.

17.4 Upon receipt of a notice of termination hereunder, the Contractor shall immediately cease performance of the Work (unless otherwise directed by the City in writing) and promptly remove all Contractor and Subcontractor equipment from the City's property.

17.5. In the event of termination hereunder, the City shall not incur any liability whatsoever to the Contractor except for payment for the goods and/or services that have been satisfactorily delivered or performed by the Contractor up to the effective date of termination.

18. FORCE MAJEURE

Neither the City nor the Contractor shall be liable for default or delay in the performance of obligations under the Contract due to causes beyond the reasonable control of (and not due to the fault or negligence of) the party affected, including, without limitation, natural disasters, plagues, epidemics, war, insurgence, terrorism, and power outages. The Contractor shall give the City prompt written notice when any such cause has or appears likely to delay deliveries and/or performance of the Work, and shall take appropriate action to avoid or minimize such delay. If any such default or delay threatens to impair the Contractor's ability to meet delivery requirements for materials, supplies and/or services, the City shall have the right,

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without any liability to the Contractor, to terminate the portion or portions of the Contract so affected upon written notice to the Contractor.

19. TRANSPORTATION AND DELIVERY

All prices shall include transportation and delivery charges and customs duties fully prepaid by the Contractor to any specified destination within the corporate limits of the City. The F.O.B. point shall be the destination specified in the Contract.

20. PURCHASE ORDER/INVOICES

The Purchase Order number shall appear on all documentation relating to the Contract, including, but not limited to, invoices and delivery/packing slips. Invoices that do not include the applicable Purchase Order number, item number and order description shall not be processed, and shall be returned to the Contractor until the appropriate information is provided. All invoices shall be forwarded to Accounts Payable, City of Markham, 101 City Centre Boulevard, Markham, Ontario.

21. PAYMENT

21.1 Unless otherwise specified in the Contract, all prices shall be in Canadian dollars and payment shall be made to the Contractor twenty-eight (28) calendar days after Receipt of Proper Invoice by the City. Where applicable, taxes shall be shown separately.

21.2 The Contractor shall invoice the City monthly on a time and expense basis, charging the goods/services/actual hours/disbursements, as applicable, incurred each month up to the Contract amount. If the Work involves a fixed fee contract, the fees payable shall not exceed the fixed fee amount, unless the City has provided prior written approval. If the Work involves progress payments, the invoice schedule shall be based on the Work schedule and milestones as outlined in the Contract. The Contractor, when invoicing for expenses, shall provide receipt for those expenses.

21.3 Where there is a question of non-performance by the Contractor, the disputed portion of the invoice may be withheld by the City. In the event that the City is entitled to a discount for prompt payment, the withholding of payment as provided herein shall not deprive the City from taking such discount.

21.4 In the event that an invoice amount is determined to be in error by the City (or the City's payment certifier) after payment is made to the Contractor, the City shall notify the Contractor in writing, and the Contractor shall make a correction adjustment on the next invoice.

21.4 For the purposes of this Section 21, "**Proper Invoice**" means a written bill or other request for payment in respect of Work supplied under the Contract, which shall contain the following information:

- (a) Contractor's name and address, and name, title, telephone number and mailing address of the person to whom payment is to be sent.
- (b) The date of the Proper Invoice and the period during which the Work was supplied. Payment shall be made only for Work supplied prior to the date of the Proper Invoice.
- (c) Information identifying the authority, in the Contract or otherwise, under which the Work was supplied (Contract number, or as otherwise required by the Contract).
- (d) A description, including quantity where appropriate, of the Work that was supplied.
- (e) The amount payable for the Work that was supplied, and the payment terms (sub-totals, totals, holdback and taxes to be separately shown on invoice).
- (f) Contractor HST Registration Number.
- (g) City of Markham Purchase Order Number.
- (h) City of Markham Project Manager / Department.

21.5 For the purposes of this Section 21, “**Receipt of Proper Invoice**” means the date that a Proper Invoice is received by the City, which date shall be deemed to be: (a) if sent by mail or personal delivery, the date received at the address specified by the Contract, provided that if such day is not a Business Day, then receipt shall be deemed to be the Business Day next following such day (“Delivery Date”); and (b) if sent by electronic communication, the date of transmission, provided that if such day is not a Business Day or if it is received after the end of normal business hours on the date of transmission, then it shall be deemed to have been received at the opening of business on the first Business Day next following the transmission (“Transmission Date”); and (c) the later of the date of the Proper Invoice and the Delivery Date or Transmission Date (as applicable).

22. SALES TAX

The City is subject to payment of sales and excise taxes imposed by the Federal and Provincial Governments. Should there be any approved variation in any tax or duty imposed by the Province of Ontario or the Government of Canada which becomes directly applicable to the goods/services to be purchased during the Contract Term, the Contractor and the City mutually agree to allow the appropriate increase or decrease in the prices as of the date they become effective. The onus is on the Contractor to bring to the City’s attention any such changes. All Provincial and Federal taxes shall be shown separately on the applicable invoice.

23. ACCESSIBILITY STANDARDS FOR CUSTOMER SERVICE

23.1 In accordance with Ontario Regulation 429/07, Accessibility Standards for Customer Service Sect. 6, every provider of goods and services shall ensure that every person who deals with members of the public or participates in the developing of the service providers’ policies, practices and procedures governing the provision of goods and services to members of the public, shall be trained on the following:

- (a) How to interact and communicate with persons with various types of disability.
- (b) How to interact with persons with disabilities who use assistive devices or require the assistance of a guide animal, or a support person.
- (c) How to use equipment that is available on the premises that may help in the provision of goods or services.
- (d) What to do if a person with a particular type of disability is having difficulty accessing the provider's goods or services.
- (e) Information on the policies, practices and procedures governing the provision of goods and services to people with disabilities.

23.2 Contractors that provide customer service on behalf of the City shall meet the requirements of Ontario Regulation 429/07 with regard to training. A document describing the training policy, a summary of the contents of the training and details of training dates and attendees shall be submitted to the City upon request. The following website may be referenced for the purposes of training:
<http://www.mcsc.gov.on.ca/mcsc/serve-ability/splash.html>.

24. CONSTRUCTION ACT

Where the *Construction Act*, R.S.O. 1990, c. C.30, as amended, (the “Act”) and the regulations thereto (the “Regulations”) apply to the Contract, the following sections shall be applicable unless otherwise specified in the Contract Documents:

- (a) **Labour and Material Payment Bond.** Upon Contract Award, the Contractor shall provide the City with a labour and material payment bond, in the form prescribed by the Regulations, that,
 - (i) is of an insurer licensed under the *Insurance Act* to write surety and fidelity insurance;

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- (ii) has a coverage limit of at least 50 per cent of the Bid Price, or such other percentage of the Bid Price as may be prescribed; and
- (iii) extends protection to subcontractors and persons supplying labour or materials to the improvement.

The labour and material bond may set out the claims process applicable in respect of the bond.

- (b) Performance Bond.** Upon Contract Award, the Contractor shall provide the City with a performance bond, in form prescribed by the Regulations, that,

- (i) is of an insurer licensed under the *Insurance Act* to write surety and fidelity insurance; and
- (ii) has a coverage limit of at least 50 per cent of the Bid Price, or such other percentage of the Bid Price as may be prescribed.

The performance bond may set out the claims process applicable in respect of the bond.

- (c) Basic Holdback.** The City shall retain a holdback (“Basic Holdback”) equal to 10 per cent of the price of the services or materials as they are actually supplied under the Contract until all liens that may be claimed against the Basic Holdback have expired or been satisfied, discharged or otherwise provided for in accordance with the Act.

- (d) Holdback for Finishing Work.** Where the Contract is certified to be substantially performed by the City, but services or materials remain to be supplied to complete the Work, the City shall retain, from the date of the Certificate of Substantial Performance a separate holdback (“Finishing Holdback”) equal to 10 per cent of the price of the remaining services or materials as they are actually supplied under the Contract, until all liens that may be claimed against the holdback have expired or been satisfied, discharged or otherwise provided for in accordance with the Act.

- (e) Contract Substantially Performed.**

- (i) When the Contract has been substantially performed (in accordance with the Act), the Contractor shall apply to the City to certify substantial performance. A “Statutory Declaration” (in a form acceptable by the City, declaring that that all accounts for labour, subcontracts, products, services, and construction machinery and equipment which have been incurred by the Contractor in the performance of the Work have been paid) and a Workplace Safety and Insurance Board “Certificate of Clearance” (in a form acceptable by the City) shall accompany the application.
- (ii) If the City is in agreement that the Work has been substantially performed, a “Certificate of Substantial Performance” (in the form required by the Regulations) shall be signed and issued to the Contractor within seven (7) days of signing.
- (iii) The Contractor shall publish a copy of the “Certificate of Substantial Performance” in a construction trade newspaper (as that term is defined in the Regulations), and provide suitable evidence of the publication to the City.
- (iv) The City shall retain, from the date of the Certificate of Substantial Performance, a Finishing Holdback equal to 10 per cent of the price of the services or materials that remain to be supplied to complete the Work.

- (f) Contract Deemed Completed.** When the Contract is deemed to be completed (in accordance with the Act), the Contractor shall apply to the City to certify completion. A “Statutory Declaration” (in a form acceptable by the City, declaring that that all accounts for labour, subcontracts, products, services, and construction machinery and equipment which have been incurred by the Contractor in the performance of the Work have been paid) and a Workplace Safety and Insurance Board “Certificate of Clearance” (in a form acceptable by the City) shall accompany the application.

- (g) **Payment of Basic Holdback.** Subject to subsection 24(i) below, upon certification of substantial performance of the Contract by the City and expiration of the sixty (60) day period following publication of the Certificate of Substantial Performance, and provided there are no lien claims (or all lien claims have been satisfied, discharged or otherwise provided in accordance with the Act), the City shall make payment of the Basic Holdback, so as to discharge all claims in respect of that holdback.
- (h) **Payment of Finishing Holdback.** Subject to subsection 24(i) below, upon certification of completion of the Contract by the City and expiration of the sixty (60) day period following the date of certification, and provided there are no lien claims (or all lien claims have been satisfied, discharged or otherwise provided for in accordance with the Act), the City shall make payment of the Finishing Holdback, so as to discharge all claims in respect of that holdback.
- (i) **Non-payment of Holdback.** The City may refuse to pay some or all of the Basic Holdback or Finishing Holdback amount the City is required to pay, if,
 - (i) the City publishes a notice in the prescribed form specifying the amount of the holdback that the City refuses to pay, and the notice is published in the manner set out in the Regulations no later than 40 days after the date on which,
 - (A) the applicable certification or declaration of substantial performance is published, or
 - (B) if no certification or declaration of substantial performance is published, the date on which the Contract is completed, abandoned or terminated; and
 - (ii) the City notifies, in accordance with the Regulations, if any, the Contractor of the publication of the notice.
- (j) **Contract Termination.** In the event that the Contract is terminated, for any reason, the Contractor shall publish, in the manner set out in the Regulations, a notice of the termination in the prescribed form.
- (k) **Adjudication.** Either the City or the Contractor may refer to adjudication a dispute with the other party to the Contract, in accordance with the adjudication procedure set out in the *Construction Act*, R.S.O. 1990, c. C.30, and *O.Reg.306/18*.

25. GENERAL INSTRUCTIONS FOR WORK ON CITY PROPERTY

- 25.1 The Contractor shall keep one copy of the Contract at the Work site.
- 25.2 The Contractor shall coordinate all Work with the City's representatives to ensure minimum disruption of public service and inconvenience to occupants of and visitors to public buildings.
- 25.3 The Contractor shall ensure that there is no interference with the use of and safe passage to and from public buildings, public sidewalks and roads without the prior written approval of the City. Material shall not be stored in or obstruct roadways, sidewalks or passageways without the prior written approval of the City. The Contractor shall not interfere with or damage privately or publicly-owned adjacent property.
- 25.4 Prior to and during the performance of the Work, the Contractor shall establish the location of existing utility lines, and shall ensure that same are protected and maintained.
- 25.5 Where alterations are necessary, the Contractor shall ensure that new and old Work shall be joined, cut, removed, patched, repaired or finished in a professional and workmanlike manner to the satisfaction of the City.

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- 25.6 The Contractor shall provide and maintain temporary facilities and services required to carry out the Work. All such temporary facilities and services shall be removed by the Contractor upon completion of the Work.
- 25.7 The Contractor shall only use new products unless otherwise specified in the Contract. The Contractor shall deliver and store material and equipment to manufacturers' instructions, with manufacturers' labels and seals intact. When material or equipment is specified by standard or performance specifications, the Contractor shall, upon request by the City, obtain from the manufacturer an independent testing laboratory report, stating that the material or equipment meets or exceeds specified requirements.
- 25.8 The Contractor shall keep the Work site clean and hazard-free throughout the Work period, and shall provide for proper storage, removal and disposal of garbage. All debris shall be transported to an authorized dump, waste treatment site or recycling facility by the Contractor, and disposed of in accordance with applicable by-laws, laws and regulations (all at the Contractor's expense).
- 25.9 The Contractor shall make such explorations and probes as are necessary to ascertain any protective measures required before proceeding with demolition and removal.
- 25.10 The Contractor shall protect existing structures, furnishings and persons by providing and maintaining adequate temporary protective coverings during the performance of the Work. The Contractor shall be responsible for any injury to persons, damage to existing structures and furnishings as a result of the Work. Any damage occurring as a result of the Work shall be repaired or replaced by the Contractor at the Contractor's expense and to the satisfaction of the City (in its sole discretion).
- 25.11 The Contractor shall provide and maintain adequate fire protection in accordance with the regulations and requirements of the City's Fire and Emergency Services Department.
- 25.12 The Contractor shall provide and arrange for traffic control where necessary for delivery of materials, removal of garbage, or any other activity related to the Work as required by applicable by-laws, laws and regulations.
- 25.13 The Contractor shall take the necessary precautions to keep dust, dirt and noise to an acceptable level, as directed by the City or as required by applicable by-laws, laws and regulations.
- 25.14 The Contractor shall provide suitable protection for all entrances and exit ways into all buildings, all fresh air intakes, telephone, hydro, and mechanical rooms, elevators shafts and all plumbing, against dust, dirt, water and fumes.
- 25.15 The Contractor shall provide canvas tarps from ground to roof for all entrance and exit ways, floors, walls and all standing fixtures against spillage of materials and/or damage during the Work period.
- 25.16 The Contractor shall not store materials or use a truck or other equipment in a manner which would load the structure beyond its design capacity.
- 25.17 The Contractor shall ensure that all persons employed or engaged by the Contractor to perform the Work use designated existing sanitary facilities and not undress, use profane language or make coarse gestures while on City property.
- 25.18 The Contractor shall be responsible for and take every precaution reasonable in the circumstances for the protection of all workers associated with the Work (whether employed by the Contractor, the City or a third party), and for the protection of all other persons. The Contractor shall ensure that all persons employed or engaged by the Contractor to perform the Work are supervised by a Competent Person and trained to perform the specific tasks of their jobs in a healthy and safe manner, and that documentation to support such training remains current during the Work period.

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- 25.19 The Contractor shall ensure that all tools, equipment and machinery brought to the Work site shall be used, stored and maintained properly in accordance with applicable laws, regulations and industry standards.
- 25.20 The Contractor shall ensure that all materials brought to the Work site shall be used, stored, handled, transported and disposed of properly in accordance with applicable laws, regulations and industry standards. All materials delivered to the City or used in conjunction with the Work shall have applicable Material Safety Data Sheets in accordance with Workplace Hazardous Materials Information Systems (“WHMIS”) regulations in the Province of Ontario. Applicable Material Safety Data Sheets shall be available for inspection at the Work site at all times while such materials are present.
- 25.21 The Contractor shall notify the City of all hazardous materials delivered to the City or used in conjunction with the Work, including without limitation, all products controlled federally and/or provincially under WHMIS or Transportation of Dangerous Goods regulations, and all designated substances as defined in the *Occupational Health and Safety Act*, R.S.O. 1990, c. O.1 and Regulations.

28 April 2023




The City's strategic plan, "**Building Markham's Future Together**" states that "We will foster a safe and healthy work environment". The City of Markham (the City) holds employee physical and psychological health, safety and wellbeing as integral to the success of the Municipality as a whole. Therefore, the City is committed to maintaining a healthy and safe workplace by engaging all employees in enhancing their well-being and preventing occupational injury and illness through timely and effective hazard recognition, assessment and control activities.

Workplace injuries and illnesses are preventable. To achieve the goal of an injury and illness free workplace, the active participation and support of the Chief Administrative Officer, Commissioners, Directors, Managers, Supervisors, Employees and Unions is required. To that end, the City maintains a Health and Safety Management System (HSMS) to achieve the following objectives:

- Prevention of occupational injuries and illnesses, including less visible injuries and illnesses such as those that relate to psychological health and ergonomics.
- Recognition, assessment and control of health and safety hazards including steps to address and reasonably control the risk of violence and harassment in the workplace;
- Development and communication of health and safety policies and programs (including standards, procedures, guidelines and instructions) that support the safety, psychological and physical health and wellbeing of employees;
- Provision of training and instruction to staff in applicable legislation, safe work procedures, and hazard identification and reporting;
- Identification, communication and support of the health and safety rights, roles and responsibilities of all employees;
- Awareness by all employees of their responsibility to work safely and to report all hazardous conditions in a timely manner;
- Prohibition of reprisal against employees for exercising their legislated rights;
- Appointment of competent persons as managers and supervisors who are held accountable for the health and safety of all employees under their supervision;
- Support of managers and supervisors in fulfilling their health and safety responsibilities;
- Confirmation that the City's expectations regarding health and safety are communicated to and met by contractors, subcontractors and suppliers while working at City facilities and worksites; and
- Annual review of the HSMS, including this policy, health and safety incident statistics and other relevant information, in order to ensure system sustainability as well as effectiveness of the HSMS in preventing workplace injuries and illnesses.

In order for the City's HSMS to be effective, staff must work together at all levels of the organization to ensure that the intent of this policy is fulfilled. Commitment to psychological health and wellness and the prevention of injuries and illnesses through a robust internal responsibility system, in which all employees work together to identify and eliminate or control hazards, must form an essential part of this organization's culture and each employee's day-to-day activities.

<div></div> <div>Andy Taylor</div> <div>Chief Administrative Officer</div>					
<div></div> <div>Trinela Cane</div> <div>Commissioner</div> <div>Corporate Services</div>	<div></div> <div>Bryan Frois</div> <div>Sr. Manager</div> <div>Executive</div> <div>Operations, Strategic Initiatives & Communications</div>	<div></div> <div>Adam Grant</div> <div>Fire Chief</div>	<div></div> <div>Arvin Prasad</div> <div>Commissioner</div> <div>Development Services</div>	<div></div> <div>Claudia Storto</div> <div>City Solicitor & Director of People Services</div>	<div></div> <div>Eddy Wu</div> <div>Acting Commissioner</div> <div>Community Services</div>
<div></div> <div>Sumon Archarjee</div> <div>Chief Information Officer</div>	<div></div> <div>Frank Clarizio</div> <div>Director Engineering</div>		<div></div> <div>Mary Creighton</div> <div>Director Recreation Services</div>	<div></div> <div>Stephanie DiPerna</div> <div>Director Building Standards</div>	
<div></div> <div>Chris Rickett</div> <div>Director Economic Growth, Culture & Entrepreneurship</div>	<div></div> <div>Giulio Cescato</div> <div>Director Planning & Urban Design</div>		<div></div> <div>Kimberley Kitteringham</div> <div>Director Legislative Services</div>	<div></div> <div>Alice Lam</div> <div>Director Operations</div>	

 Mark Visser Acting Treasurer	 Graham Seaman Director Sustainability & Asset Management	 Eddy Wu Director Environmental Services
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PROJECT PRE-START HEALTH & SAFETY MEETING CHECKLIST

During the pre-start meeting held on _____, the following City of Markham health & safety expectations were communicated to those present.

“Constructor” means any of constructor, contractor or general contractor for the purpose of this document.

	Green sections are to be completed by all Contractors and Constructors
	Yellow sections are to be completed by Constructors only
	Blue sections are to be completed by Contractors only

Scope of work, location & contract number:	Estimated duration of project: (from – to)
Constructor for this Project	Contractor for this project:
OR	
<input type="checkbox"/> The Contractor has submitted a job safety plan (JSP) for the work to be performed	
<input type="checkbox"/> There will be sub-contractors / trades working on this project (list): _____ _____ _____	
<input type="checkbox"/> All pertinent information discussed at this meeting will be shared by the Constructor/Contractor with all sub-contractors / trades and others present at the worksite as well as the JSP.	
Inspectors, Engineers, Architects that will be present onsite during the project: (list)	
<input type="checkbox"/> City's Contractor Pre- start Submissions Checklist has been completed and submitted along with required documentation as described on the checklist	
<input type="checkbox"/> The Constructor for the project, named above, shall ensure that all health and safety legislative requirements are met for this project including but not limited to the Occupational Health and Safety Act and Regulation 213. Number of workers that will be present on the project: _____ per shift _____ over the duration of the project Site Supervisor / Foreperson: _____ (5 or more workers present). <input type="checkbox"/> The supervisor named shall comply with all requirements specified in Regulation 213 <input type="checkbox"/> The supervisor's weekly inspection is documented Health and Safety Representatives: (list name of representative and employer)	
<input type="checkbox"/> All required permits have been obtained and a copy provided to the City Project Manager for this project including: <input type="checkbox"/> Municipal Consent (Utilities) <input type="checkbox"/> Occupancy Permits (all other)	

Check All High Risk Tasks that will be performed as a part of the scope of work for this project:

- ☐ Confined space entry ☐ Work in roadways ☐ Creating excavations / trenches
☐ Work in excavations / trenches ☐ Work at heights >3M
☐ Work at heights < 3M:

Ladder styles to be used: ☐ straight ☐ extension ☐ step ☐ platform ladder ☐ none

☐ Operation of motor vehicle onsite: list: _____

☐ Operation of construction or other heavy equipment (such as cranes, forklift trucks) (list: _____)

☐ Lockout - Tagout ☐ Hot Work – if checked, City HW Permits to be used ☐ Yes or ☐ No, for the following reason: _____

☐ Work with WHMIS Hazardous Products or other Hazardous Chemical: (list) _____
 Note: if a hazardous product will be brought on site, the SDS must be provided to the Project Manager

☐ Other high risk task(s) or activities (list / describe: _____)

☐ Energized Electrical Work <50Volts ☐ Energized Electrical Work 50 Volts to 600Volts ☐ Energized Electrical Work >600Volts

If energized electrical work is being performed, justification as follows:

- ☐ de-energizing introduces additional or increased hazard
☐ task being performed is not feasible in a de-energized state (due to equipment design or operational limitations)
☐ for energized electrical work <50V, there will be no increased exposure to electrical burns or explosion due to electric arcs

If energized electrical work is being performed:

- ☐ an *energized electrical work permit* has been completed for the work or appropriate written safe work instructions have been provided;
☐ PPE will be provided to and used by the worker(s) performing the energized electrical work

Designated Substance Assessment is complete and all designated substance present at the worksite have been communicated to the contractor by the City (or designate)	<input type="checkbox"/>	Designated Substances on site are (list):
The contractor is qualified to work on / near the identified designated substances	<input type="checkbox"/>	
All hazards that relate to this project have been identified, communicated to workers and controlled appropriately (engineering, safe work instructions, orientation training, PPE, etc.)	<input type="checkbox"/>	<u>Confirmed by:</u>

<p>The Site Foreman/Supervisor will ensure that any worker that does not appear to be in a "fit to work" conditions, is not permitted to operate equipment or otherwise perform work. This may be due to use of a substance such as alcohol, marijuana, medication or may be due to fatigue or medical condition.</p>	<input type="checkbox"/>	
<p>An emergency plan has been developed to address all potential emergencies that could occur on site, including fire, explosion, medical, etc.</p> <p>If emergency exits or routes will be blocked, a contingency plan or route is in place. Same for fire panels, sprinklers, extinguishers.</p>	<input type="checkbox"/> <input type="checkbox"/>	
<p>A current copy of the City of Markham Health & Safety Policy has been forwarded to the Contractor and the Contractor has read and understands it.</p>	<input type="checkbox"/>	
<p>The Contractor understands his/her responsibilities and accountabilities under federal and provincial health and safety and criminal law. The contractor is in no way absolved from these legal responsibilities regardless of any submissions to the City of Markham or any discussions.</p> <p>The purpose of the pre-start submissions checklist and this checklist is to communicate the City's expectations regarding contractor safety.</p> <p>The City does not take responsibility for evaluating the quality of safety training provided by the Contractor or Subcontractor to their employees; that is the responsibility of the Contractor or Subcontractor. The City seeks to confirm that training is in place for the hazards associated with this project and job site.</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<p>The Contractor shall ensure that all federal and provincial laws are followed by supervisors and workers working on site, whether they work for the contractor, subcontractor or other.</p> <p>If the City representative (Project Manager or Senior Health & Safety Specialist) observes that health and safety rules and legal requirements are not being upheld or other hazardous condition exist at the worksite that could result in serious injury, the City representative may stop the work without penalty.</p> <p>Work shall not continue until the hazard is corrected.</p>	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
<p>Qualified 1st Aid providers will be on site at all times during work</p>	<input type="checkbox"/>	

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Other Discussion:

Representative(s) for the Contractor, Sub-Contractor: (use additional pages if required)

Name	Signature	Company	Date

City of Markham Project Manager: (use additional pages if required)

		Corporation of the City of Markham	
		Corporation of the City of Markham	
		Corporation of the City of Markham	
Name	Signature	Company	Date

Distribution: Original to be retained in project file, Copies to contractor, purchasing department, facility manager and Senior Health & Safety Specialist.



CONTRACTOR SAFETY PROGRAM
PRE-START CONFIRMATION OF LEGISLATIVE COMPLIANCE
AND DOCUMENT SUBMISSIONS CHECKLIST

Contract / Project No.:
Project Description:
City of Markham Representative for this project:

PART I: GENERAL LEGISLATIVE COMPLIANCE:

On behalf of _____ (referred to as 'The Company'), I confirm that the
(insert name of company)

following information is true and correct:

The Company has forwarded the records indicated (✓) in Section 1 and will make available the records indicated (✓) in Section 2.

The Company has read and understands the City of Markham's General Terms & Conditions. The Company has received a copy of the City of Markham's Health & Safety Policy and understands the City of Markham's expectations regarding health and safety as it relates to performance of work on this project. These expectations are described in (but not limited to) the City Contractor Safety information package. The Company will ensure that all persons brought on site by the Company or our sub-contractors (including our employees and subcontractors) abide by the City of Markham's health and safety rules as well as all legislative requirements.

The Company has been provided a list of all designated substances and other hazardous materials present at the work site.

If work in confined space(s) is being performed, the Company understands that the Company must complete either the 'Coordination Document' (for multiple employer entries) or the 'Single Contractor Acknowledgement of Compliance' form.

If hot work is being performed, the Company understands that the Company must follow (or exceed the requirements of) the City's Hot Work Program, including completion and timely submission of hot work permits to the City Project Manager.

If electrical work is being performed, the Company understands that the Company must meet or exceed the requirements of the City's Electrical Safety Program. This includes Lockout-Tagout-Verify as required.

The Company has endeavored to ensure that ergonomic aspects of the tasks performed have been considered in order to prevent or reduce ergonomic injuries in the workplace.

The Company understands that this document and all associated submissions do not waive our legal obligations under the Occupational Health & Safety Act (referred to as 'the Act'), Regulations or any other legislation.



CONTRACTOR SAFETY PROGRAM
PRE-START CONFIRMATION OF LEGISLATIVE COMPLIANCE
AND DOCUMENT SUBMISSIONS CHECKLIST

The Company will ensure that all supervisors (as defined in the Act), workers and sub-contractors fulfill their legal responsibilities per the Act, Regulations and other applicable legislation and that supervisors understand and will comply with the following City of Markham expectations:

- A job hazard analysis has been completed and a job safety plan developed in relation to this project and the scope of work
- Onsite supervisor will ensure that a daily inspection of the work site is completed and a record of those inspections is made available to the City of Markham on request.
- Onsite Supervisor will engage all workers on site in regular safety talks and make available a record of attendance on request by the City of Markham.
- Onsite supervisor will ensure all workers work in compliance with the Act & Regulations and City of Markham policies and procedures.
- Onsite supervisor will ensure that a City of Markham 'Contractor Report of Accident / Incident' is completed for any accidents, incidents, threats or acts of violence, damage to property or other hazardous act that occurs during the project work; the completed report must be forwarded to the City of Markham representative for the project within 24 hours of the incident. In the event of a critical injury or fatality, the onsite supervisor shall immediately contact the City of Markham representative for the project and the Senior Health & Safety Specialist (Nancy Myles, 905-477-7000 x3440)

PART II: TRAINING & DOCUMENTATION SUBMISSION REQUIREMENTS:

Complete all sections of the following checklist. For items checked in "Part A: Training", check all training from the list that applies to the scope of work being performed. Note that mandatory training for all workers are indicated by an asterisk (*) and are checked. For all other trainings checked, attach proof of training for all employees who will perform the related work during the project. Note: training matrices submitted as proof of training must indicate - as a minimum - worker name, type of training, date of training and training expiry date.

<u>PART A: TRAINING</u>	To be Submitted
WHMIS General (all onsite workers)	✓
WHMIS Specific (all onsite workers)	✓
Basic Safety Awareness Training for Workers (per Regulation 297)	✓
Basic Safety Awareness Training for Supervisors (per Regulation 297)	✓
Transportation of Dangerous Goods (if products listed in TDG Regulations are transported to / within / from the City of Markham)	
Confined Space for all workers working in / entering areas identified as confined spaces	
Work at Heights (per Regulation 297)	
Aerial Work Platforms / Elevated Working Platforms	
Ladder Safety	
Scaffold Safety	



CONTRACTOR SAFETY PROGRAM
PRE-START CONFIRMATION OF LEGISLATIVE COMPLIANCE
AND DOCUMENT SUBMISSIONS CHECKLIST

Designated Substances – Handling, Use, Storage, Protective Measures & Disposal of applicable Designated Substances or other hazardous materials (PCB's, mould, etc.)	
Driver Safety	
Construction and other Heavy Equipment	
Cranes / Hoists / Rigging	
Mobile Equipment, Machinery - Powered Industrial Vehicles (forklift truck, etc.)	
Specific Vehicle / Equipment Training not listed above	
1 st Aid / CPR for all 1 st Aid Providers onsite	✓
Traffic Control / Traffic Protection / Work in Roadways / Book 7	
Trenching	
Lock out / Tag out	
Electrical Safety / Electrical Certification or Licensing	
Hot Work	
Hazardous waste disposal specific to the hazardous material being disposed of	
Safe Outdoor work in seasonal extreme temperatures (summer / winter as appropriate)	
Health & safety program, policy and procedures review for your company	
Basic Ergonomic Principles for Safe performance of work	
Supervisor due diligence (for all site supervisors)	
PART B: PROOF OF COMPANY HEALTH AND SAFETY LEGISLATIVE COMPLIANCE: ATTACH THE DOCUMENTS INDICATED TO THIS FORM WHEN COMPLETED	To be Submitted
Documentation indicating: <ul style="list-style-type: none"> number of WSIB lost work day claims this year (to date) and the past 2 years number of critical injuries this year (to date) and the past 2 years number of Ministry of Labour orders issued this year (to date) and the past 2 years 	
Current WSIB Clearance Certificate (Schedule 1) or Letter of Good Standing (Schedule 2)	
Form 1000 - "Registration of Constructors and Employers Engaged in Construction" completed by City of Markham, contractors and subcontractors (also to be posted at the project)	
"Notice of Project" completed and filed with the local MOL Office (also to be posted at the project)	
List of all Controlled Products / Designated Substances / Other Hazardous Materials brought onsite (include a description of their use in the project) – MSDS for each must be available on project site.	
Company Health & Safety Policy Statement and Program Extract / Summary	
PART C: THE FOLLOWING RECORDS ARE TO BE MADE AVAILABLE TO THE CITY ON REQUEST	
All applicable licenses, certificates and training records pertaining to qualification to perform the work but not listed above for each worker on site (includes: driver abstracts and licences, electrical and millwrights licensing, steam fitting, welder CWB tickets, supervisor training records etc.)	
Inspection, preventive maintenance and repair records for all machinery, equipment and vehicles brought on site. (including rented / leased equipment)	
Job Specific Hazard Training & General Safety Training records not listed above for each worker	
All pertinent Health & Safety Procedures for the scope of work.	
Assessment(s) of the potential for violence or harassment in the workplace, related policy and records of employee training for the prevention of violence and harassment.	

Distribution: Original to be retained in project file, copy to facility manager if applicable and Senior Health & Safety Specialist if requested.

Representative for the Contractor:

The above information is true and correct. I have authority to represent the Company named below for the purpose of completing this document for the project described here.

Name	Signature	Company	Date



CONTRACTOR SAFETY PROGRAM
CONTRACTOR JOB HAZARD ASSESSMENT & SAFETY PLAN

Contractors must submit a Job Safety Plan (JSP) for the work they will perform on behalf of the City. The JSP must be based on a thorough assessment of the actual and potential hazards that pose a risk to health and safety of all those present including the Contractor's workers, City employees and members of the public. A copy of the JSP must be submitted to the City Project Manager before the work is started. If the work or hazards change, a new JSP must be submitted.

This form may be used for the purpose of documenting the JSP. If another form is to be used, it must be pre-approved by the City Project Manager or Senior Health & Safety Specialist. The JSP will be used by the City's Project Manager to monitor the work on site.

PART A: TO BE COMPLETED BY THE CITY PROJECT MANAGER FOR THIS PROJECT/WORK.		
City Project Manager Name	Cell Phone	Date
Contract/PO/Release No.	Contractor Name	
Expected Duration of Project	Location of Project	
Description of Project		
Indicate if any of the following designated substances are present at the worksite. Review the City's Designated Substance Assessment Report for the building / site in order to identify all designated substances present. <u>Circle all that are present</u>		
Arsenic	Asbestos	Benzene
Lead	Mercury	Silica
<u>Description:</u> (for all those circled, describe the specific location, condition and if it is expected that it will be disturbed or otherwise impact the work or workers present for the project)		
<hr/>		
<hr/>		
<hr/>		
<input type="checkbox"/> Additional pages are attached.		
List all known / potential hazards at the worksite, that are present before the project starts or will be introduced independent of the Contractor's work but that that may impact the work / workers present for the project. (For further guidance refer to the "Contractor Job Hazard Assessment and Safety Plan" guide)		
<hr/>		
<hr/>		
<hr/>		
<hr/>		
<hr/>		
<hr/>		
<input type="checkbox"/> Additional pages are attached.		
<input type="checkbox"/> Pre-job / pre-start walk-thru of the jobsite has been conducted with the Contractor		
<input type="checkbox"/> The City Project Manager will ensure that City staff who work in or attend the worksite are trained and competent to be in attendance in the area.		



CONTRACTOR SAFETY PROGRAM
CONTRACTOR JOB HAZARD ASSESSMENT & SAFETY PLAN

PART B: TO BE COMPLETED BY THE **CONTRACTOR'S REPRESENTATIVE, WHO WILL ACT AS SITE SUPERVISOR***, OVERSEEING THE WORK AND WILL BE ONSITE FOR THE DURATION OF THE PROJECT – OR DESIGNATE.
(*SUPERVISOR AS DEFINED BY THE OCCUPATIONAL HEALTH & SAFETY ACT).

Prepared by:	Cell Phone:	Date:
Primary Contractor Name:		
Contract/ PO / Release No.	Expected Duration of Project	
Location of Project		
Brief Description of Project		
Required Permits: (list all required permits and frequency of completion – a copy of all required permits must be provided to the City Project Manager on a timely basis)		
Site Supervision:		
<input type="checkbox"/> The Contractor shall ensure that all federal and provincial laws are followed by supervisors and workers working on site, whether they work for the contractor, subcontractor or other.		
List all Competent Persons* who will be supervising* any aspect of work on the project: (*Competent Person" and "Supervisor" as defined by the Occupational Health & Safety Act)		
<u>Competent Person / Supervisor</u> _____ _____ _____	<u>Area of Competency</u> _____ _____ _____	<u>Cell Phone</u> _____ _____ _____
<input type="checkbox"/> Worksite inspections will be conducted daily to ensure hazards are identified and controlled appropriately, including housekeeping and fire prevention concerns, etc.		
Emergency Contact Information		
1 st Aid Provider onsite:	Police / Fire / EMS: 9-1-1	
Joint Health & Safety Representative onsite:	Ministry of Labour: 1-877-202-0008	
<input type="checkbox"/> City Project Manager for this project will be called by the worksite Supervisor (or designate) if a serious injury occurs at the worksite. <input type="checkbox"/> A City Contractor Incident form will be completed and sent to the Project Manager within 24 hours for all incident resulting in injury. <input type="checkbox"/> The City Project Manager will be advised by the worksite Supervisor (or designate) if the Ministry of Labour attends the worksite for any reason. A copy of any Ministry of Labour field visit report, field investigation report or any other MOL report that is issued to the Contractor for the worksite or work will be forwarded to the City Project Manager, including any orders issued by the Ministry of Labour. Same for TSSA attendance at the site.		
Closest Hospital: (name, address, directions)		
<input type="checkbox"/> Map attached		
<input type="checkbox"/> 1 st Aid Supplies will be available onsite	<input type="checkbox"/> All workers onsite will be advised of this emergency information	



CONTRACTOR SAFETY PROGRAM
CONTRACTOR JOB HAZARD ASSESSMENT & SAFETY PLAN

List all Sub-contractors and their scope of work:
Subcontractor #1: (Name of firm, Contact Name, Cell Phone#, Scope of Work)
Subcontractor #2: (Name of firm, Contact Name, Cell Phone#, Scope of Work)
Subcontractor #3: (Name of firm, Contact Name, Cell Phone#, Scope of Work)
Actual / Potential Hazards of the Job / Project:
Vehicles /Equipment / Machinery to be used onsite: _____
WHMIS Controlled Products to be used onsite: (attach SDS sheet for each) _____
<input type="checkbox"/> Workers who will be working with these controlled products onsite have been trained in the specific safe handling, use and storage of them.
<input type="checkbox"/> These controlled products will be stored safely while onsite.
Work Activities / Tasks Hazard Assessment: Break down the scope of work by work activity. For each activity, describe the <u>hazards</u> associated with the work and the <u>control measures</u> that will be put in place to reduce the risk of injury or harmful health exposure to an acceptable level. (If additional space is required, add pages)
1. Work Activity/ Tasks: _____ Hazards: _____ Control Measures: _____ <input type="checkbox"/> There is a written safe work procedure in place for this activity
2. Work Activity/ Tasks: _____ Hazards: _____ Control Measures: _____ <input type="checkbox"/> There is a written safe work procedure in place for this activity
3. Work Activity / Tasks: _____ Hazards: _____ Control Measures: _____ <input type="checkbox"/> There is a written safe work procedure in place for this activity
4. Work Activity / Tasks: _____ Hazards: _____ Control Measures: _____ <input type="checkbox"/> There is a written safe work procedure in place for this activity
5. Work Activity / Tasks: _____ Hazards: _____ Control Measures: _____ <input type="checkbox"/> There is a written safe work procedure in place for this activity
6. Work Activity / Tasks: _____ Hazards: _____ Control Measures: _____ <input type="checkbox"/> There is a written safe work procedure in place for this activity

Training, Licensing & Certification Requirements: Based on the hazard assessment above, describe the training required for staff who will be present onsite. ***The Contractor is responsible to maintain records of training to reflect required training. For sub-contractors, the Contractor must confirm that training is current.***

All workers onsite: _____

Subcontractors: _____

Specific Tasks / Job Positions: _____

Required Personal Protective Equipment:

All workers / persons onsite: _____

Task / Area Specific Equipment: (describe the PPE and where/when it is required) _____

☐ Page attached

Other Protective Equipment (other than PPE) to perform the Work

☐ Page attached

Other Control Measures:

<u>Hazard</u>	<u>Control Measure</u>

Additional Control Measures to Protect Other Workers & Members of the Public:

Employee Information and Awareness - JSP

- ☐ All workers onsite will be provided a worksite orientation including being made aware of all known hazards relating to this project and worksite including the information contained in this JSP; this information will be provided to them before they start work on the site.
- ☐ On an ongoing basis, where the Contractor becomes aware of a health or safety hazard, this information will be provided to workers onsite in a timely manner.

PART C: TO BE COMPLETED BY CITY PROJECT MANAGER AND CONTRACTOR REPRESENTATIVE

This JSP does not replace the Contractor's responsibility to comply with all applicable legislation including the Ontario Occupational Health & Safety Act and Regulations, Canada's Criminal Code, Ontario Fire Code, etc. The Contractor is responsible to address all health or safety concerns that arise out of the Contractor's work, in a timely and effective manner. Where City staff are aware of a health or safety concern related to this project, they will bring the concern to the attention of the Contractor. However, if the City representative (Project Manager, Senior Health and Safety Specialist, Supervisor or designate) observe or are made aware that health and safety rules or legislative requirements are being contravened or other hazardous condition exists at the worksite and a serious risk to health or safety exists, the City representative has the authority to and will stop the work without penalty.

If the Contractor observes non-compliance on the part of City staff, the Contractor is to reporting it to the City as soon as possible (City Project Manager, Senior Health and Safety Specialist or other City Contact).

Representative for the Contractor:

Name (print)_____
Signature_____
Date

City Representative (Project Manager) for this project:

Name (print)_____
Signature_____
Date



CONSTRUCTOR & CONTRACTOR SAFETY PROGRAM HEALTH & SAFETY INCIDENT INVOLVING CONSTRUCTOR OR CONTRACTOR

To be completed immediately following any incident that impacts the health and/or safety of person(s). To be completed by the General Contractor/site supervisor/foreman and forwarded, within 12 hours of the incident, to the City of Markham Project Manager, City Facility Manager (if applicable) and the City Senior Health & Safety Specialist (email: nmyles@markham.ca or fax: 905-479-7774).

Note: The City Project Manager, Facility Manager (if applicable) & Senior Health & Safety Specialist shall be notified immediately in the event of critical injury to a person, exposure or other event that causes the Ministry of Labour to attend (random inspections that do not result in the issuance of orders is exempt)

City of Markham Project Identification			
City of Markham Project Manager Contact			
General Contractor (if applicable)			
Contractor / Subcontractor (as applicable)			
Type of Incident: (check all that apply) <input type="checkbox"/> Injury to person(s)* <input type="checkbox"/> Exposure of person(s)* to harmful material, chemical, gas *if injury/exposure to person indicate: (check all that apply) <ul style="list-style-type: none">• Name of Injured/ Exposed Person(s): _____• 2. <input type="checkbox"/> your employee <input type="checkbox"/> City of Markham employee <input type="checkbox"/> member of public <input type="checkbox"/> other: _____• 3. <input type="checkbox"/> Critical Injury. Was it reported to MOL: <input type="checkbox"/> YES, date: _____ <input type="checkbox"/> NO, reason for not reporting: _____ <input type="checkbox"/> Report of violence or threat of violence <input type="checkbox"/> Vehicle or Heavy Equipment Accident <input type="checkbox"/> Damage to property, equipment, machinery			
<input type="checkbox"/> MOL attendance at site. Were orders issued? <input type="checkbox"/> YES (attach) <input type="checkbox"/> NO			
Date & Time of Incident (indicate am/pm)			
Location of Incident (include: facility name, address, site description, and exact location at site/facility)			
Witnesses:	Name	Address	Phone



CONSTRUCTOR & CONTRACTOR SAFETY PROGRAM
HEALTH & SAFETY INCIDENT INVOLVING
CONSTRUCTOR OR CONTRACTOR

Incident Description: (include all pertinent details such as position of persons, equipment / machinery present, weather, weights, distances, sizes, volumes, and a step-by-step description of events) (use additional pages if required)

☐ additional pages attached

☐ pictures attached

☐ MOL orders attached

Immediate Impact:

☐ Injury/Exposure to person.

Describe injury (including body part and side) _____

Attention Required: ☐ 1st Aid only ☐ Medical Assistance ☐ Critical Injury ☐ Fatality ☐ WSIB Reportable

As a result of the injury, will employee be absent from work for their next scheduled shift?

☐ Yes

☐ No

☐ Not Applicable

☐ Damage to vehicle, equipment, machinery or property. Describe: _____

Root Cause

Corrective Action(s)
(include person responsible and timeline)

Person Completing this Report
(include: company, position, name,
signature)

City of Markham Use only

Contractor Incident No.:

Project Manager:

Received by Project
Manager (date and time):

Reviewed by Project Manager
(sign and date):

Comments by Project Manager: (* also complete "follow up" section below)

Reviewed by Senior Health &
Safety Specialist (sign and
date):

Comments by Senior Health & Safety Specialist:

* **Follow Up:** (to be completed by Project Manager)

Was a "Contractor Health & Safety Incident Follow Up" meeting held?

☐ YES – Date: _____ (attach completed "Contractor Health & Safety Incident / Event Report & Corrective Action Follow Up" form)

☐ NO - Reason for not holding meeting? _____

Forwarded to: (list all)

☐ Department Manager: _____ ☐ Director: _____ ☐ Commissioner: _____

Contractor Health & Safety Incident / Event Corrective Action Follow Up Meeting Checklist

To be completed by the City Project Manager or Senior Health & Safety Specialist at the corrective action follow-up meeting to be held after an incident or other event that results in (or has the potential to result in) critical injury, serious injury, MOL order issuance, unsafe condition or other health and safety concern held by the City involving a constructor, general contractor, contractor, or subcontractor.

Project Identification & Location:				Contractor Incident No.:	
Contractor Contact:			<input type="checkbox"/> Pre-start Submissions Checklist Attached <input type="checkbox"/> Pre-start Safety Meeting Checklist Attached <input type="checkbox"/> MOL Report Attached		
Incident Date & Time:			Project Closing Date:		
Describe the Incident:					
Ministry of Labour present: <input type="checkbox"/> YES <input type="checkbox"/> NO If yes, reason for presence: <input type="checkbox"/> Random Site Inspection <input type="checkbox"/> Targeted Site Inspection (describe): _____ <input type="checkbox"/> Critical Injury Investigation (date of CI): _____ <input type="checkbox"/> Worker Complaint <input type="checkbox"/> Other Investigation (describe): _____ <input type="checkbox"/> Other: _____					
*MOL Report / Orders issued: <input type="checkbox"/> NO <input type="checkbox"/> YES If 'yes', to whom: _____ Acknowledgement of Compliance forwarded on: _____					
*Note: if MOL issued report, orders, etc. – a copy must be attached to this form					
Identified Legislative Violation(s) , Hazard(s), Concern(s):					
Identification of Violation(s) of Corporate Contractor Safety Expectations:					
Corrective Action(s)					
Concern & Action		Person Responsible	Due Date	Confirmation Date	Confirmed by

Follow Up Site Audit: Performed by: Date & Time: Findings:				
Check Any/All High Risk Tasks involved in above: <div style="display: flex; justify-content: space-between;"> <div style="width: 48%;"> <input type="checkbox"/> Confined Space Entry <input type="checkbox"/> Work on Ladders / Scaffolds / AWP Equipment <input type="checkbox"/> De-energized Electrical (Lockout-Tagout) <input type="checkbox"/> Electrical Work 50 Volts to 600Volts <input type="checkbox"/> Hot Work <input type="checkbox"/> Work with Controlled Products or other Hazardous Chemical: (list) _____ <input type="checkbox"/> Other (describe) _____ </div> <div style="width: 48%;"> <input type="checkbox"/> Work at Heights (>3M) <input type="checkbox"/> Operation of Vehicles or other Mobile Equipment <input type="checkbox"/> Electrical Work <50Volts <input type="checkbox"/> Electrical Work >600Volts <input type="checkbox"/> Machines requiring guarding </div> </div>				
Other Discussion:				
Representative for the Contractor:				
Name	Signature	Company	Date	
City of Markham Project Manager:			Senior Health & Safety Specialist:	
			Nancy Myles	
Name	Signature	Date	Name	Signature
Date				

Distribution: Original to be retained in project file, Copies to contractor, purchasing department, facility manager and Senior Health & Safety Specialist.



THE CORPORATION OF THE CITY OF MARKHAM

**REQUEST FOR TENDER
PD 24023**

**Markham Village Community Centre
Arena Ice Pad Replacement
6041 York Highway 7, Markham, Ontario**

Prepared for:

**THE CORPORATION OF THE CITY OF MARKHAM
101 Town Centre Boulevard, Markham, Ontario L3R 9W3**

Closing Date: April 2024



Document Prepared By:
Kalos Engineering Inc.
300 York Boulevard
Hamilton, Ontario L8R 3K6
Tel: (905) 333-9119

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APPENDICES**GENERAL CONDITIONS**

- : Canadian Standard Construction Document,
CCDC2 (2008) (Not Bound in this Specification)

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DIVISION 3 - CONCRETE

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DIVISION 9 - FINISHES

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END OF SECTION 00100

LIST OF DRAWINGS

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Drawing 0.01	Title Page and General Notes	February 2024
Drawing 1.01	Ground Floor - Removals Plan	February 2024
Drawing 1.02	Ground Floor Plan	February 2024
Drawing 1.03	Flooring Plan	February 2024
Drawing 1.04	Players Bench Details	February 2024
Drawing 1.05	Viewing Platform Plan & Details	February 2024
Drawing 2.01	Sections and Details I	February 2024
Drawing 2.02	Sections and Details II	February 2024
Drawing R1.01	Legend & Details	February 2024
Drawing R2.01	Rink Cold Floor Plan - Demolition	February 2024
Drawing R2.02	Rink Heating Floor Plan - Demolition	February 2024
Drawing R3.01	Rink Cold Floor Plan – Renovation	February 2024

PART 1 - GENERAL

1.1 General Remarks

- .1 This Section is to be considered as additional to and complimentary with the General Conditions of the Contract which shall govern the Work of the Contractor and all Sub-contractors where applicable and shall be carefully read and adhered to.
- .2 In the event of conflict Section GC 1.1.7 of the General Conditions shall govern.

1.2 Examination of the Site

- .1 Each Contractor shall examine the site prior to submission of a tender. No extras will be allowed for additional work due to lack of labour or equipment or difficulties encountered which could have been foreseen by close inspection of the site.
- .2 Each contractor shall examine all areas, surfaces and materials on which or to which he is required to work, prior to commencement of each phase of his contract. Any conditions found unsatisfactory shall be reported to the general contractor who shall make all the necessary alterations to such unsatisfactory conditions. Failure to report unsatisfactory conditions prior to commencement of the sub-trades work will be construed as evidence that all conditions are satisfactory and the responsibility for perfect shall rest solely with the sub-contractor, without recourse to others.
- .3 Unscheduled site visits are not permitted. The Bidder must arrange for any subsequent inspections with the Owner.

1.3 Examination of Documents

- .1 Failure to report omissions, ambiguities and contradictions contained in the documents prior to tender closing shall render the trade involved responsible to comply with the Consultant's interpretation at the time of construction.

1.4 Error and Omissions

- .1 This Contractor shall make good all materials omitted by sub-contractor at their expense and shall ensure that the completed work includes material and workmanship as drawn and specified or intended, implied or otherwise necessary for satisfactory completion. Any errors in the drawings and specifications not reported in writing at the time of tendering will be assumed to be allowed for by this contractor and no extras will be accepted for extra work incurred due to errors or omissions.

1.5 Permits

- .1 Permits pertaining to particular trades shall be paid for by the particular sub-trade concerned. Comply with all regulations of all public authorities having jurisdiction.
- .2 The Building Permit has been applied for and paid outside of this contract. The contractor is responsible for all other permits.

1.6 Contractor Omissions

- .1 Any additional work required by consultants to clarify work already indicated in documents or to correct an error by contractors may result in consultant's time to be charged back to the contractor at the consultant's hourly rate.

PART 2 - DEFINITIONS

- .1 Contract Time
Add "All time limits stated in the *Contract Documents* are of the essence of the Contract"
- .2 Add new definitions
- " 21 Syntax
Wherever the words or phrases in the left-hand column are used throughout the *Contract Documents*, they shall be understood, unless context provides otherwise, to mean the words or phrases in the right-hand column:
approved – approved by the Consultant
satisfactory – satisfactory to the Consultant
directed – directed by the Consultant
submit – submit to the Consultant
make good – make good to the Consultant's satisfaction
permitted – permitted by the Consultant
inspected – inspected by the Consultant
designated – designated by the Consultant
as indicated – as indicated on the drawings, material and finishing schedules"

GENERAL CONDITIONS OF THE STIPULATED PRICE CONTRACT

PART 1 GENERAL PROVISIONS

GC 1.1 CONTRACT DOCUMENTS

1. Paragraph 1.1.6: Add “The *Contractor* is responsible for all work required in the *Contract* regardless of Division in the specifications. Such Division shall not obligate the *Consultant* or *Owner* to arbitrate to establish limits of responsibility between *Contractor* and *Subcontractor*.”
2. Add new sub-paragraphs 1.1.7.5 and 1.1.7.6
 - “1.1.7.5 In case of discrepancies, noted materials and annotations shall take precedence over graphic indications in the *Contract Documents*.”
 - “1.1.7.6 Should reference standards and specifications conflict with the Project Specifications, the Project Specification shall govern. Should reference standards and specifications conflict with each other and if reference specifications conflict with Project Specifications, the more stringent requirement shall govern.”
3. Paragraph 1.1.8: Delete in its entirety and substitute:
 - “1.1.8 The consultant shall furnish to the *Contractor* without charge, 10 copies of the *Contract Documents*, exclusive of those required by jurisdictional authorities and the executed *Contract Documents*. Additional copies will be furnished to the *Contractor* at the *Consultant’s* cost of reproduction, handling and sales taxes.”
4. Add new paragraph:
 - “1.1.13 The *Contract Documents* shall be signed in quadruplicate by the *Owner* and *Contractor*.”

PART 2 ADMINISTRATION OF THE CONTRACT

GC 2.2 ROLE OF THE CONSULTANT

5. Paragraph 2.2.6: Add the word “schedules” after the word “techniques”.
6. Paragraph 2.2.6: At the end of the second sentence add “or to adhere to the construction schedule.”
7. Add new paragraph:
 - “2.2.19 Verbal instructions, regardless of their source, will not be binding to the Contract.”

PART 3 EXECUTION OF THE WORK

GC 3.1 CONTROL OF THE WORK

8. Paragraph 3.1.2: Add the word “schedules after the word “techniques”.

GC 3.5 CONSTRUCTION SCHEDULE

9. Paragraph 3.5.1.1: Delete “prior to the first application for payment” and substitute “before the Work commences and updated with each meetings minutes.”

10. Add new paragraph:

“3.5.1.4 Once approved this schedule shall not be altered without approval from the *Owner* and *Consultant*.”

GC 3.7 SUBCONTRACTORS AND SUPPLIERS

11. Paragraph 3.7.2: Add “*Contractor* shall not change those *Subcontractors* and *Suppliers* so identified without written permission of the *Owner*.”

GC 4.1 CASH ALLOWANCES

12. Delete paragraph 4.1.4 in its entirety and substitute new paragraph 4.1.4:

“4.1.4 Where the actual cost of the Work under any cash allowance exceeds the amount of the allowance, any unexpected amounts from other cash allowances shall be reallocated, at the *Consultant’s* direction, to cover the shortfall, and, in that case, there shall be no additional amount added to the *Contract Price* for overhead and profit. Only where the actual cost of the Work under all cash allowances exceeds the total amount of all cash allowances shall the *Contractor* be compensated for the excess incurred and substantiated, plus an amount for overhead and profit on the excess incurred and substantiated, plus an amount for overhead and profit on the excess only, as set out in the *Contract Documents*.”

13. Delete paragraph 4.1.5 in its entirety and substitute new paragraph 4.1.5:

“4.1.5 The net amount of any unexpended cash allowances, after providing for any reallocations as contemplated in paragraph 4.1.4, shall be deducted from the *Contract Price* by *Change Order* without any adjustment for the *Contractor’s* overhead and profit on such amount.”

14. Add new paragraph 4.1.8:

“4.1.8 The *Owner* reserves the right to call, or to have the *Contractor* call, for the competitive bids for portions of the Work, to be paid for from cash allowances.”

PART 5 PAYMENT

GC 5.1 FINANCING INFORMATION REQUIRED OF THE OWNER

15. General Condition 5.1: Delete in its entirety.

GC 5.2 APPLICATIONS FOR PROGRESS PAYMENT

16. Add new paragraph:

“5.2.8 After the first application, the *Contractor* shall attach to all applications for payment, a statutory declarations, using CCDC form 9A-2001, that all accounts for labour, subcontracts, products, construction machinery and equipment, and other indebtedness which may have been incurred by the *Contractor* 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, are paid up to the last invoice.”

GC 5.5 PAYMENT OF HOLDBACK UPON SUBSTANTIAL PERFORMANCE OF THE WORK

17. Paragraph 5.5.3: Delete in its entirety.

GC 5.7 FINAL PAYMENT

18. Paragraph 5.7.4, second line: Delete “5 days” and substitute “10 days”.

19. **SC 30** Add new paragraph

“5.7.5 The application for final payment will not be approved or processed by the Owner until a copy of all disposal site receipts have been submitted to the Owner’s Representative, as outlined in the Designated Substances and Hazardous Materials Remedial Action Plan.”

PART 6 CHANGES IN THE WORK

GC 6.2 CHANGE ORDER

20. Add new paragraph:

“6.2.3 The value of a change shall be determined in one or more of the following methods as directed by the *Consultant*:

- .1 by estimate and acceptance of a lump sum.
- .2 by unit prices as set out in the *Contract* or subsequently agreed upon, which shall include overhead, profit, and other reasonable charges of the *Contractor* which shall be the total cost to the *Owner*. Adjustment to the *Contract Price* shall be based on net quantity difference from original quantity.
- .3 by actual credits and cost to the *Owner*. Where additional work is required, the cost to the *Owner* shall be the actual cost plus a percentage covering overhead and profit, after all credits included in the change have been deducted.

The following percentage fee for overhead and profit shall be applied to additional work:

- .1 On work performed by the *Contractor's* own forces, the *Contractor* may charge a maximum of 10% combined percentage for overhead and profit;
- .2 On work performed by *Subcontractors*, the *Subcontractors* may charge a maximum of 10% combined percentage for overhead and profit. The *Contractor* may charge a maximum of 5% combined percentage for overhead and profit on work performed by the *Subcontractors*.

GC 6.3 CHANGE DIRECTIVE

21. Add new paragraph

“6.2.6.4 The *Contractor's* fee shall be a maximum of 10 percent combined percentage for overhead and profit on work performed by the *Contractor's* own forces. On Work performed by *Subcontractors*, the *Subcontractor's* fee shall be a maximum of 10 percent combined percentage for overhead and profit. The *Contractor's* fee on work performed by *Subcontractors* shall be

a maximum of 5 percent, combined percentage on overhead and profit”

22. Paragraphs 6.3.7.5 and 6.3.7.6, “tools”, “*Construction Equipment*” and “hand tools” shall only include those that have a new purchase value that is greater than \$500.00.

PART 7 DEFAULT NOTICE

GC 7.1 OWNER’S RIGHT TO PERFORM THE WORK, STOP THE WORK OR TERMINATE THE CONTRACT

23. Paragraph 7.1.2: Add “Without limiting what is stated above, the *Contractor* will be considered to have failed to comply with the requirements of the Contract to a substantial degree if the *Contractor* fails to maintain in force the insurance required to be maintained by the *Contractor* under this Contract or is not in compliance with GC 10.4 WORKERS’ COMPENSATION.”

GC 7.2 CONTRACTOR’S RIGHT TO STOP THE WORK OR TERMINATE THE CONTRACT

24. Paragraph 7.2.3.1: Delete in its entirety.
25. Paragraph 7.2.3.4: Delete “except for GC 5.1 – FINANCING INFORMATION REQUIRED OF THE OWNER”.

PART 9 PROTECTION OF PERSONS AND PROPERTY

GC 9.3 TOXIC AND HAZARDOUS SUBSTANCES AND MATERIALS

26. **SC 43** Add new paragraph:

“9.3.2.3 provide the Contractor with a copy of the Designated Substance and Hazardous Materials Assessment and a copy of the Designated Substance and Hazardous Materials Remedial Action Plan.”

- SC 49** Paragraph 9.3.8: Delete in its entirety and substitute:

“9.3.8 The Contractor shall indemnify and hold harmless the Owner, the Consultants, their agents and employees, from and against claims, demands, losses, costs, damages, actions, suits, or proceedings arising out of or resulting from exposure to, or presence of, toxic and hazardous substances or materials which were at the Place of Work prior to the Contractor commencing the Work.”

GC 9.4 CONSTRUCTION SAFETY

27. Add new paragraph:

- “9.4.2 The *Contractor* shall indemnify and hold harmless the *Owner* and the *Consultant*, their agents and employees from and against claims, demands losses, costs, damages, actions suits or proceedings by third parties that arise out of, or are attributed to, the *Contractor’s* safety performance.”

PART 10 GOVERNING REGULATIONS

GC 10.2 LAWS, NOTICES, PERMITS, AND FEES

28. **SC 50** Add new paragraph:

- “10.2.6 The Contractor shall be responsible for any and all fees associated with the disposal of all materials resulting from the Work.”

GC 10.4 WORKERS COMPENSATION

29. **SC 51** Add new paragraph:

- “10.4.3 The Workers Compensation certificate must clearly indicate an endorsement for the Wrecking and Structural Demolition of Buildings.”

PART 11 INSURANCE AND CONTRACT SECURITY

GC 11.1 INSURANCE

30. **SC 55** Add new paragraph:

“11.1.1.5 **Building Demolition Insurance:**

The insurance policy must endorse the Demolition of Building and must be clearly indicated on the certificate of insurance. All premiums in respect to such policy shall be paid by the Contractor.”

PART 12 INDEMNIFICATION – WAIVER – WARRANTY**GC 12.3 WARRANTY**

31. Add new paragraphs:

- “12.3.7 The *Contractor* shall commence to correct any deficiency within two working days after receiving a notice in writing from the *Owner* or the *Consultant*, and complete the Work as expeditiously as possible, except that in case the deficiency would prevent maintaining security or keep basic Upgrades essential to the ongoing business of the *Owner* and/or his tenants, operational as designed, all necessary corrections and/or installation of temporary replacements shall be carried out immediately as an emergency service. Should the *Contractor* fail to provide this emergency service within 24 hours of a request made in writing during the normal business hours of the *Contractor*, the *Owner* is authorized to carry out all necessary repairs or replacements at the *Contractor's* expense.”
- “12.3.8 The carrying out of replacement work and making good of defects shall be executed at times convenient to the *Owner* and this may require work outside of normal working hours at the *Contractor's* expense.”

END OF SECTION 00820

1.1 Contract Documents

- .1 Work will be performed under one contract; bound by the Agreement between Owner and Contractor, Canadian Standard Construction Document - CCDC 2-2020 Stipulated Price Contract.

2.1 General Conditions

- .1 The General Conditions of the Stipulated Price Contract, Standard Construction Document - CCDC 2-2020, and the Supplementary General Conditions, Section 00820 shall form an integral part of this Specification.

3.1 General Requirements

- .1 All provisions of each Section of Division 1 shall apply to all other Divisions and Sections of the Specification.

4.1 Other Contractors

- .1 Separate Contracts for Work on this project, as noted in Section 01020 - Owner Supplied Equipment and Work and as let by the Owner, shall be co-ordinated by this Contractor within the Work of his Contract.
- .2 Interpretation of the limits of all Separate Contracts shall be the responsibility of the Consultant.
- .3 All Contractors performing Work for the Owner under a Separate Contract shall be responsible for providing insurance in conformance with Article GC 11.1 Insurance of the General Conditions of the Contract.

END OF SECTION 01000

1.1 Description of Work

- .1 All Work described in the Specifications, Schedules and Drawings or referred to in the Contract Documents, shall be governed by the General Conditions & Supplementary General Conditions of the Stipulated Price Contract - CCDC 2-2020.
- .2 All Work described in Division I includes, but is not restricted to, the following requirements for setting out procedures, administration, standards, approvals, general construction safety/protection of property and people.
- .3 Work in these Specifications is divided into descriptive Sections which are not intended to indemnify absolute contractual limits between the Contractor and his Subcontractors, nor between Subcontractors or Suppliers. The Contractor shall be responsible for organizing all division of labour and supply of materials necessary and essential to complete the Project in all its parts, to provide a total enclosure and protection from weather of interior spaces, and as established in the General Conditions of the Contract.

2.1 Work Performed by Owner

- .1 As specified in Section 01020.

3.1 Work Covered By Contract Documents

- .1 Work of this Contract comprises the construction of all works required and as shown for a complete project, including but not limited to the following. This is applicable to the Markham Village Community Centre Arena: -
 - .1 Remove and dispose existing ice slab and insulation,
 - .2 Remove and reinstall the dasherboard system,
 - .3 Remove and replace refrigeration header (buried),
 - .4 Install level sand and under slab insulation,
 - .5 Supply and install slab reinforcing,
 - .6 Supply and install new refrigerant piping including header,
 - .7 Mechanical and refrigeration improvements,
 - .8 Place new concrete slab,
 - .9 Assist in plant start up and cooling down of new slab,
 - .10 Replace sports flooring in corridor, bleachers and in change rooms,
 - .11 All work as shown on the Drawings and as specified.

4.1 Soils Investigation

- .1 A soils investigation of the slab area was not been completed.
- .2 Contaminated soil shall be dealt with under the terms of the General Conditions of the Contract. Should toxic or hazardous materials be unearthed, notify the Soils Testing Engineer and Consultant immediately,

cease Work in the area and carry out containment, excavation and removal at the direction of the Consultant.

- .3 The Bidder shall make allowances in his schedule for material testing. The Bidder will not be compensated for lost time of waiting time while testing and/or decisions are being made.

5.1 Codes Reference Standards, Regulatory Agencies and Specifications

- .1 Perform all Work in accordance with all requirements of the Construction Safety Act, latest edition, of the Province of Ontario, as well as all other applicable regulations of jurisdictional authorities.
- .2 Meet or exceed requirements of contract documents, specified standards, codes and referenced documents.
- .3 Remedial Work required to review and/or correct Work installed, covered, buried and not inspected shall be carried out at the Contractors expense.
- .4 Unless the edition date is specified, consider that references to manufacturer's and published codes, standards and specifications are made to the latest edition, (revision) approved by the issuing organization, current at the date of this Specification.
- .5 Reference standards and specifications are quoted in this Specification to establish minimum standards. Work which in quality exceeds these minimum standards shall be considered to conform.
- .6 Should the Contract Documents conflict with quoted reference standards or specifications, the General Conditions of the Contract shall govern.
- .7 Where reference is made to manufacturer's directions, instructions, inspections or specifications, they shall include full information on storing, handling, preparing, mixing, installing, erecting, applying, anchoring or other matters concerning the materials pertinent to their use and their relationship to materials with which they are incorporated.

6.1 Documents Required

- .1 Maintain at job site, one copy each of the following:-
 - .1 Contract Drawings/Specifications/Addenda.
 - .2 Copy of Approved Current Work Schedule.
 - .3 Building Permit/Drawings. Construction Record Drawings.
 - .4 Field Instructions and Site Inspection Reports.
 - .5 Notices of Change and Change Orders.
 - .6 Reviewed, Stamped Shop Drawings and Schedule.
 - .7 Independent Inspection and Field Test Reports.
 - .8 Authority Inspection Permits, Reports and Certificates.

7.1 Work Schedule

- .1 Provide to the Consultant, within five (5) working days after Contract award, a construction schedule showing anticipated progress stages, sequencing, milestone dates, delivery dates and final completion of Work within time period required by Contract Documents.
- .2 Provide to the Consultant, prior to the first Project Site Meeting a shop drawing schedule showing the discipline, received date, schedule required date, and status of each shop drawing to be provided.
- .3 Provide updated schedules on a monthly basis to permit the Consultant to evaluate and communicate to the Owner the status of Work for future Progress Billing purposes. Payments will not be approved until schedules are received and approved. Should there be slippage of schedule, a plan to reacquire schedule must be submitted to the Consultant.

8.1 Site Meetings/Progress Records

- .1 As specified in Section 01200.
- .2 Interim monthly reviews of Work Progress, based on the current Work Schedule, will be conducted by the Consultant, Project Manager, Consultants, and Contractor and any necessary corrections to the schedule shall be noted and updated by Contractor in conjunction with all subtrades and suppliers to the satisfaction of the Consultant, Project Manager at least once every thirty (30) working days. Copies of the updated schedule shall be submitted to the Consultant, Project Manager for their review and comments.

9.1 Approval of Work

- .1 Where reference is made to jurisdictional authorities, it shall mean all authorities who have within their constituted powers the right to enforce the laws of the place of building.
- .2 Where reference is made in these Specifications that Work is to proceed or to meet the approval of jurisdictional authorities, Consultant or others, such approval shall be in writing.

10.1 Work During Non-Business Hours

- .1 The Contractor is cautioned that the Consultant, Project Manager and/or Sub-Consultants, cannot be committed to site attendance at the site except for normal working hours i.e., Monday to Friday 7:00 am to 6:00 p.m. excluding holidays. All and any Work performed during such times, requiring either the presence of the, Project Manager, Consultants, Owner or other Authorities, and carried out without their specific written prior approval, shall be performed solely at the General Contractor's

responsibility.

- .2 Notify the Consultant, Project Manager at least ninety-six (96) hours in advance of Work at night (7:00 p.m. to 6:00 a.m.) on weekdays, Saturdays, Sundays and Statutory or declared holidays. Undertake no work during the foregoing times without the Consultant's, Project Manager's written approval.
- .3 Any work that results in a disruption of the facility must be coordinated at least two weeks in advance with the Owner and Consultant. Disruptions must occur when there are no events scheduled in the facility or may occur outside regular working hours. The owner will not entertain requests for extra as a result of such events. Contractor must plan and account for such events in base bid.

11.1 Project Co-ordination

- .1 Assume full responsibility for the co-ordination and co-operation of all trades.
- .2 Employ a qualified superintendent who shall:-
 - .1 Be on the site at all times and control all Work throughout.
 - .2 Have full authority to act on the Consultant's instructions.
 - .3 Have full knowledge of Construction and this Project in particular.
 - .4 Not be changed without prior approval of the Consultant.
- .3 Co-ordinate all service terminations with appropriate Authorities.

12.1 Workmen, Suppliers and Subcontractors

- .1 Assign Work only to workmen, suppliers and Subcontractors who have complete knowledge, not only of the conditions of this Specification, but of jurisdictional requirements, reference standards and specifications.
- .2 Give preference to use of local workmen, suppliers and Subcontractors wherever possible.

13.1 Co-operation and Co-ordination of Subcontractor's Work

- .1 Co-ordinate all construction components in each area and on which subsequent Work depends to facilitate mutual progress, and to prevent conflict between parts of the Work performed by all trades.
- .2 The Contractor shall ensure that each of his Subcontractors make known to him, and to other Subcontractors, the environmental and surface conditions required for the execution of the Subcontractor's Work, and the sequence of other's Work required for installation of the Subcontractor's Work.
- .3 The Contractor shall ensure that each Subcontractor, before he

commences his Work, fully understands the site requirements and conditions preceding and subsequent to his Work, and that each Subcontractor execute his preparatory Work properly as required by the Subcontractors whose Work depends upon it.

- .4 Subcontractors/Suppliers who give installation information in error, or too late to incorporate in the Work, shall be responsible for having any and all Work carried out which was thereby additionally made necessary to correct the situation.
- .5 Remove Work which has been installed in error, incorrectly or substituted without approval and which is unsatisfactory for subsequent Work immediately at no additional expense to the Owner.
- .6 The Contractor shall ensure that setting drawings, templates, and all other information necessary for the location and installation of materials, holes, sleeves, inserts, anchors, accessories, fastenings, connections, and access panels are provided by each Subcontractor whose Work requires co-operative location and installation by other Subcontractors.
- .7 Schedule delivery of materials, supplied by one Subcontractor to be installed by another, well in advance of commencement of the installation.

14.1 Contractor's Use of Site

- .1 Do not unreasonably encumber site with materials or equipment. Remove all materials from site as they accumulate daily.
- .2 Use of site is limited and restricted to the areas for work and storage as shown on the drawings and as designated by the Consultant and as approved by the Owner.
- .3 Restore, at completion of Work, all adjacent property, surfaces, sidewalks, etc. to original condition of commencement of work to satisfaction of the Consultant.

15.1 Access to Site

- .1 The Contractor shall direct and control access and delivery of all construction materials and equipment onto and within the site. He shall provide flagmen and guards as required.
- .2 The Contractor shall be completely responsible for delivery vehicles, and materials and equipment while they are on the site, and shall pay all costs for their immediate removal or relocation should they impede the access of others.
- .3 City staff will require access to the refrigeration room for daily operation of facility. Accommodations must be made to allow access to staff and possibly external contractors in order to maintain operation to the rest of the

facility. In emergency situations the Contractor may need to relinquish control of this area until the facility is back to normal operation.

16.1 Parking

- .1 Parking shall be allowed only with the prior approval and in authorized areas as agreed to and directed by the Consultant.
- .2 Construction vehicles must not disrupt daily activities without prior approval.

17.1 Access for Equipment

- .1 Fitments and other equipment shall be made up in sections of such size as can be easily transported in and through the building to the final location without alteration or damage to the building.
- .2 Should it become necessary at any time during the execution of the Work to move materials and/or equipment which have been temporarily placed, when so directed by the, make arrangements with those who are furnishing such materials and equipment to move them or cause them to be moved to a different location as directed without additional charge.

18.1 Setting out of Work

- .1 The Contractor shall establish necessary lines, levels, and provide batter boards or other means to control the accurate positioning of all elements of work.
- .2 The Contractor shall verify all existing grades, property lines and levels shown on the Drawings.
- .3 Before commencing installation of Work, verify that it is laid out accurately in accordance with intent of Drawings and that positions, levels and clearances to adjacent Work are maintained. If Work is installed in wrong location, rectify it before construction continues.
- .4 The Contractor shall furnish to the Consultant, certification from a licensed Ontario Land Surveyor that the Building and other parts of the work are located in accordance with the Contract requirements. Setting out of Work shall be in conformity with the Municipal Setback requirements. The Surveyor's Certification shall represent an independent and disinterested verification of the Contractor's layout work. The Surveyor shall promptly verify and certify the lines and levels of any part of the work at any time it may be deemed necessary by the Consultant. Any deviation from the drawings shall be reported to the Consultant in writing within twenty-four (24) hours of discovery.

19.1 Examination of Site Before Execution of Work

- .1 Examine site, and ensure that each Subcontractor whose Work is related to

site conditions has examined it, so that all are fully informed on all particulars, which affect Work thereon and at the place of building, and in order that construction proceeds competently and expeditiously.

- .2 Examine completed Work, Work in progress, and Work yet to be carried out by others under other Sections of the Specifications.
- .3 Verify dimensions of completed Work in place before fabrication of Work to be incorporated with it.
- .4 Verify that previously executed Work and surfaces are satisfactory for installation or application, or both, and that performance of subsequent Work will not be affected. Commencement of Work shall constitute acceptance of site conditions and surfaces as satisfactory.
- .5 The Contractor is responsible for a pre-construction survey of the existing facility and surrounding site to limit liability. This survey must be provided to the Owner.
- .6 Report to Consultant any and all defects in previously completed Work which will affect the scheduling and quality of all subsequent Work.
- .7 No allowance will be made for difficulties encountered in the Work which were in existence or could have been anticipated at the time the Work was tendered.
- .8 No allowance will be made for difficulties encountered in the Work which are a result of the lack of co-operation/co-ordination on the part of the Contractor of any of his Trades or Suppliers.

20.1 Protection of Work, Property and Persons

- .1 Work shall include necessary methods, materials and construction to ensure that no damage or harm to Work, materials, property and persons results from the Work of this Contract. Temporary facilities relating to protection are specified in Section 01500. Schedule the work so that security and safety is maintained at all times.
- .2 Keep excavations Work free of water at all times. Pump dry as required.
- .3 Remove snow and ice immediately from building. Carefully remove snow and ice from all finished roof areas.
- .4 Keep surfaces on which finish materials will be applied free from grease, oil and other contamination which would be detrimental in any way to the application of finish materials.
- .5 Protect finish surfaces of completed Work from damage by restriction of access or by use of physical means suitable to the material and surface location. Establish with each Subcontractor the suitability of such protection

in each case.

- .6 Give constant close supervision to roofing following installation, during the time they are temporarily protected or exposed to ensure that no damage occurs to them before completion of building. Provide protection especially against damage from traffic or Work performed on top of completed roofing when temperature is over 80°F.
- .7 Locate, identify and protect existing services from damages. If necessary, relocate active services to ensure that they function continuously in safety and without risk of damage. Any damage caused to existing services and/or property shall be made good at the Contractor's expense.
- .8 Do not damage landscaped areas by piling of surplus soil over them, by dumping of debris over them or compacting the soil within the drip line of the trees/shrubs.
- .9 Special precautions to be taken to protect all existing planting on the site. Do not damage or cut root systems of existing trees; stockpile any surplus material over them or use trees for anchorage. Remove only those trees or shrubs which are designated to be removed and/or replanted. Protect, and if damaged make good, adjacent property.
- .10 Assume full responsibility for the provision of all protection against rain, wind, snow, ice, storms, frost, heat and vandalism so as to maintain work area free from injury or damage.
- .11 Notify the Consultant should the job be closed down for any reason and assume full responsibility, for providing adequate protection, security, etc. during the shutdown.
- .12 The Contractor is cautioned to use appropriate demolition methods in order to fully protect all existing structure. Do not carry out any work in a manner that will endanger any structural members, services.
- .13 Take all necessary precautions to protect the occupants, the public, passersby and adjoining property against flying dust and debris.

21.1 Fire Prevention and Safety

- .1 The Contractor shall enforce fire protection methods of good housekeeping, and adherence to local and underwriter's fire regulations. Provide ULC approved fire extinguishers, and other fire fighting services and equipment except where more explicit requirements are specified as the responsibility of individual Subcontractors.
- .2 Erection of hoarding must be in compliance with the building code, fire code. Ensure that sprinklers, fire alarms, exiting, etc for the facility are not compromised. Contractor will be responsible for applying for any permits or

meeting the requirements of the applicable codes.

- .3 Maintain clear emergency exit paths for personnel at all times.
- .4 Use only fire-resistant tarpaulins and similar protective covering on site.
- .5 Ensure that each Subcontractor stores his volatile waste in approved closed containers and removes them from premises daily.

22.1 Public Protection

- .1 When necessary, the Contractor must post a flagman who will be responsible for safety and direction of pedestrian traffic past the site.
- .2 Maintain existing exiting routes and access from the existing premises.

23.1 Provisions for Traffic

- .1 Particular effort shall be applied to the safety of pedestrian flow past the site. Any activity which has potential for interference with pedestrian flow shall first be approved by the Consultant. Provide temporary guide barriers, signage and flagmen as required for safe and efficient control of pedestrian flow.

24.1 Mud Tracking

- .1 The Contractor shall take all steps necessary to prevent the tracking of mud beyond the site and assume all responsibilities for the tracking of mud, dirt and debris resulting from his operations, beyond the site and shall pay all costs necessary for the clean-up resulting from this operation.
- .2 Clean up must happen daily to the satisfaction of the City.

25.1 Dust Control

- .1 The Contractor shall take such steps as may be required to prevent dust nuisance resulting from his operations from spreading beyond the site.
- .2 Where the work requires the sawing or grinding of concrete, blades and grinders of the wet type shall be used together with sufficient water to prevent the incidence of dust. The cost of all such preventative measures shall be borne by the Contractor.
- .3 The contractor shall complete a full cleaning of the facility at project completion.

26.1 Security

- .1 The contractor shall provide secure, solid closures to any opening which will not be able to be closed in with the new construction due to any circumstances which may arise.

- .2 Ensure that the site security is operating at all times construction is proceeding and that the temporary site enclosure is secured at the end of each day's work.

27.1 Salvage and Disposal

- .1 Items of antiquity, including coin, art, anthropology, etc. which are on the site at the time of signing of Contract, which are uncovered or unearthed during the construction, shall remain the property of the Owner and shall be turned over to him immediately and without prejudice.
- .2 Unless otherwise specified, salvaged material which will not to be reused within the new construction, surplus materials and construction debris shall become property of Contractor. The Contractor shall pay all associated costs and arrange for the safe removal and disposal away from site.

28.1 Fastenings

- .1 Work of each Subcontractor shall include necessary fastenings, anchors, inserts, attachment accessories and adhesives. Where installation part of Work of other Subcontractor, locate devices and co-operate with them as required.
- .2 Install Work with fastenings or adhesives in sufficient quantity to provide permanent secure anchorage of materials, constructions, components and equipment. Space anchors within limits of load-bearing or shear capacity.
- .3 Space exposed fastenings evenly and in an organized pattern. Keep number to a minimum. For exposed fastenings use metal of same material, texture, colour and finish as metal on which they occur.
- .4 Repair of existing surfaces as a result of temporary fastening are the responsibility of the contractor.

29.1 Concealment of Pipes, Ducts and Wiring

- .1 Conceal all pipes, ducts and wiring in floor, wall and ceiling construction of finished areas wherever possible. If any doubt arises as to the means of concealment, or the intention of the Contract Documents in this connection, request clarification from the Consultant before proceeding with that portion of the Work.
- .2 Where necessary, mechanical and electrical Work shall be laid out well in advance of concrete pouring and furring erection so that provision may be made for proper concealment. All such Work shall be tested, inspected and pipe covering applied where applicable before being concealed.

30.1 Cutting, Fitting, Patching and Replacement

- .1 Before cutting, drilling or sleeving of any structural load-bearing elements

within the project, obtain the Consultant's approval. Do not endanger Work or property by cutting, digging or similar activities. Do not cut or alter the Work of others unless approved by the Consultant, Sub-Consultant or Sub-Contractor whose Work is being altered.

- .2 Cutting, drilling, sleeving and patching of Work shall be done by the Subcontractor whose trade Section corresponds to the Work requiring cutting, and where located by Subcontractor who requires the Work performed for his installations; all under the direct supervision of the Contractor.
- .3 Replacement of damaged Work shall be done by the Subcontractor whose trade Section corresponds to the Work requiring patching or replacement, at the expense of the Subcontractor who causes the damage. Cut and drill with true smooth edges, and to minimal, suitable tolerances.
- .4 Patching of damaged Work shall be done by the General Contractor and it shall be his responsibility to ensure the remedial Work is carried out expeditiously, and at no expense to the Owner and to the satisfaction of the Consultant. Make patches invisible in final assembly.
- .5 Fit construction tightly to ducts, pipes and conduits to stop air movement completely. The Subcontractor whose Work penetrates an element of the building shall ensure that no movement will affect his Work, the joint is sealed and is the element is a fire separation he shall be responsible for maintaining the separation in an approved manner.

31.1 Existing Services

- .1 Where Work involves capping/cutting or relocation of existing services, carry out work at times directed by governing authorities.
- .2 Before commencing Work, establish location and extent of service lines in area of Work and notify the Consultant of findings.
- .3 Submit schedule to and obtain approval from the Consultant and Owner and 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 Record location of all new, capped or abandoned site services accurately on "Construction Record Drawings".
- .6 All rough-in to point of equipment connection is to be carried out by the Mechanical and Electrical Contractors as part of the General Contract for the Work. This Contractor shall be responsible for setting of the equipment in place and ensuring that all electrical and mechanical connections to this

equipment is carried out correctly and as required by the equipment manufacturer.

- .7 Final connection to equipment will be carried out under the Work of the General Contract for the Building Alteration and Addition.
- .8 Do not interrupt existing services except as approved by the Consultant. Give the Consultant or governing authority seven (7) days clear notice of intention to interrupt existing services.
- .9 In the event existing services are uncovered or disrupted accidentally, make complete restoration on a priority basis and provide adequate protection to avoid further disruption until diversion or alternative arrangements are made.

32.1 Cleaning

- .1 Each Subcontractor shall clean and remove from his finished Work all stains, soiling, markings, labels, scratches, spatters, droppings, and debris. He shall leave his Work and adjacent finished Work in new condition.
- .2 Ensure that only cleaning materials are used which are recommended for the purpose by both the manufacturer of the surface to be cleaned and of the cleaning material.
- .3 No debris, waste or excess material shall be burned or buried at site. Ensure that volatile fluid wastes are not disposed of in storm or sanitary sewers or in open drain courses. Do not allow waste material and debris to accumulate in an unsightly or hazardous manner. Provide containers in which to collect waste material and debris. Sprinkle dusty accumulations with water.
- .4 Ensure that cleaning operations are scheduled to prevent dust or other foreign matter affecting surfaces which are wet or tacky.
- .5 Each Subcontractor shall supply the Contractor with instructions for final cleaning of his Work, and for inclusion in Project Data Book as more exactly specified in each trade Section and in Section 01300.
- .6 Ensure that cleanup is carried out daily to provide a neat, orderly and safe site for all personnel working on the site.
- .7 The final project cleanup and cleaning of all components shall be carried out by the Contractor in accordance with Section 01700 - Project Closeout.

END OF SECTION 01005

1.1 General Conditions

- .1 Work specified, shown on the Drawings or referred to in the Contract Documents, is governed by the General Conditions and Supplementary General Conditions.
- .2 The Owner supplied equipment and items of Work, noted in these specifications and/or shown on the drawings, shall be incorporated into the Work of this Contract. This contractor shall be responsible for, as part of his contract, the co-ordination of rough-in and completion of these items of Work as they affect his Contract and scheduling. The Owner shall be responsible for approvals, payment and delivery of this portion of the Work and shall notify the Contractor of any changes in status which may affect his scheduling for the entire project.

2.1 Work Performed by Owner

- .1 Material testing during construction (paid under Cash Allowance)
- .2 Chemical testing of existing sub-surface soil for contaminants (paid under Cash Allowance).

END OF SECTION 01020

1.1 Generally

- .1 Perform all Work in or on existing building in accordance with the Specifications and Drawings and by tradesmen specializing in such work.
- .2 It is to be emphasized that all Work be performed to ensure the integrity of the design and original materials of the existing facility is to be maintained.

2.1 Owner's Use of Existing Building

- .1 The facility will remain open (community center and works garage) for the duration of the Work. As such, the contractor shall limit his work to the areas defined by the Work.
- .2 Accommodations must be made to allow access to staff and possibly external contractors in order to maintain operation to the rest of the facility. In emergency situations the Contractor may need to relinquish control of this area until the facility is back to normal operation.
- .3 The Owner shall be permitted to work within the existing building without hindrance or restrictions. No construction work will take place during the normal operating hours of the facility, which are listed in the Instructions to Bidders, unless instructed otherwise.
- .4 The Owner shall have full authority to restrict access and control security to the site and throughout the entire facility. Existing service and delivery accesses are to remain operational at all times during construction.

3.1 Contractor's Use of Existing Building

- .1 Execute work in existing building at times approved and as mutually agreeable to Owner. Prepare a schedule and give Owner sufficient notice of intention to commence work in a room or area of existing building so that he may prepare the space and determine time work may commence.
- .2 Maintain access to service and delivery entrances for use by the Owner. Maintain existing exits to provide proper and safe means of egress from all parts of existing building to open spaces at all times to the approval of the Consultant and jurisdictional authorities. Provide sufficient illumination and exit lights.
- .3 Prohibit use of existing washrooms and services in building by construction personnel unless approved by the Consultant.
- .4 The Contractor shall co-ordinate work and make all necessary arrangements with the Owner's security force to ensure that security of the building and control of access by construction personnel are maintained

while work is in progress. All costs for additional security shall be paid for by the Contractor.

- .5 The Contractor shall control and limit access of construction personnel to all areas of the existing building and ensure that construction personnel perform work only as required under the Contract and not as access to other work areas, any other purposes.
- .6 The Contractor shall maintain all existing heating, air conditioning, ventilation, fire alarm and sprinkler protection, and emergency lighting at levels normal for office requirements throughout the facility during normal business hours for the Owner.
- .7 No construction work causing oppressive noise, dust, fumes or hazards within the existing facility shall be carried out during business hours without the installation of temporary enclosures and the approval of the Owner. Execute all work as quietly as possible to achieve least disturbance to Owner.

4.1 Protection

- .1 Provide temporary dust screens and security separation at all times, to the Consultant's and Owner's satisfaction, between the Contractor's work area and the remaining operating portion of the facility and as shown on the drawings. Provide full coverings to all windows overlooking the ice pad (both levels) for the duration of the work.
- .2 Provide temporary, weather tight, dust tight and lockable partitions between existing building and all new Work. Weatherproof openings made in walls and roofs of existing building, immediately they are opened.
- .3 Protection of existing building elements, in particular roofs, air barriers and waterproofing membranes shall be substantial enough to prevent any damage as a result of traffic over, or falling objects penetrating them.
- .4 Protection of all property shall include but not be limited to equipment, furniture plantings, walkways and adjacent property other similar items whether included and noted on the drawings or not. Take all precautions to ensure that no structural damage is caused to the existing building and adjacent structures by demolition and alteration work, or by new construction.

5.1 Removal of Existing Work and Salvage

- .1 Ensure during removal that materials, components and similar items to be reused are protected from damage. Provide all necessary supports, wrappings and other means to protect surfaces, materials and components

that are to be removed or remain in place.

- .2 Relocation of existing equipment shall be carried out and co-ordinated by this Contractor unless noted otherwise. The Contractor shall ensure that all material and tradesmen necessary for the disconnection and reconnection of equipment to be removed and/or relocated, either by the Contractor or the Owner, shall be present at all times during this Work and shall have available all material necessary to complete the work.
- .3 Remove carefully all building elements, components, materials, and equipment noted to be relocated by the Specifications and drawings. Store and protect relocated items until built into new locations. Limit removal of items to smallest areas possible, and make good disturbed adjacent surfaces.
- .4 Remove debris and accumulated dirt from existing building immediately as it accumulates. Ensure that during removal operations through the existing building that existing work is not damaged and dirt, debris and dust are not spread.
- .5 Maintain work areas in existing building constantly broom clean to avoid tracking of dirt into adjacent areas. Immediately clean up debris resulting from work of Contract that is deposited in existing building outside of work areas. Make a daily inspection to ensure that work and construction access areas are maintained clean and undamaged as specified.
- .6 Carry out all cutting, fitting, patching, and replacement of existing components carefully in a manner to provide the least disturbance to all existing finished surfaces.

6.1 Shutdowns and Connections to Existing Services

- .1 Provide the Owner with a preliminary schedule of shutdowns of mechanical and electrical services prior to commencement of the work. Shutdowns shall be scheduled for normal working hours to cause minimum interference with normal building operations. After hours shutdowns shall take place no additional cost to the Owner. **In no case shall service interruptions affect the total building.**
- .2 Notification of any interruption or shutdown of any mechanical or electrical service shall be made in writing by the Contractor to the Consultant accompanied by a sketch or full details of the proposed interruption at least two (2) weeks in advance of such interruption.
- .3 Temporary and permanent mechanical or electrical services connections are to be made only in consultation with the appropriate governing authority and by prior arrangement. Restore all services to original condition unless

specified otherwise.

7.1 Replacement Work

- .1 Make good materials, and prepare surfaces and repair all existing and new finished surfaces damaged, or disturbed in the existing building.
- .2 Finish new surfaces flush with existing surfaces. Make junctions between existing and new or remedial work invisible. Make surfaces adjacent to one another of the same material, unit sizes, colour and texture. Review intended methods of making good with the Consultant prior to commencement of Work.

END OF SECTION 01030

1.1 Generally

- .1 Cash allowances specified shall be carried, administered and co-ordinated by the General Contractor as part of the Work of his Contract.
- .2 Include the General Contractor's charges for overhead and profit, on account of all Cash Allowances as specified, in the Contract Price in accordance with the General Conditions of the Stipulated Price Contract. Article GC 4.1 Cash Allowances and Article GC 4.2 Contingency **Allowance.**
- .3 Include with each expenditure from the appropriate Allowances, all applicable taxes as specified in the General Conditions of the Stipulated Price Contract, Article GC 10.1 - Taxes and Duties. HST is extra to the amounts carried for this work.
- .4 List all Allowances separately on each and every billing and expend Allowances only on the Consultant's agreement and written instructions.
- .5 Credit the Owner with unused portion of all Allowances in statement of reconciliation prior to the final billing for the project. The Consultant will issue a final Change Order to cover this payment.

2.1 Cash Allowances

.1 For Inspection and Testing Services Specified for:

Section 02200 : Earth Works
A Cash Allowance of Six Thousand Dollars (\$6,000.00).

.2 For Inspection and Testing Services Specified for:

Section 03300 : Cast-in-Place Concrete
A Cash Allowance of Six Thousand Dollars (\$6,000.00).

1.1 Generally

- .1 Specified prices shall be complete for the applicable work including statutory charges, overhead and profit, all duties and taxes imposed, and other related charges on account of such work.

2.1 Provisional Items

- .1 Provisional prices as noted below are to be included on the Form of Tender, shall be based on the Scope of Work described in the specifications and are to include for labour, material, delivery, handling, storage, overhead and profit and taxes of such Work measured complete in place. Expressed as an extra or credit to the sum tendered, they shall be used in calculation of the Contract Amount consistent with their acceptance or rejection by the Owners.

- .2 The Provisional Prices requested are as follows:

.1 Provisional Price No. 1

Remove and replace completely the rear wall, posts, raised platform and bench for the players benches, penalty boxes and timekeeper box completed.

END OF SECTION 01100

1.1 Administrative Documentation

- .1 The Contractor shall be responsible for arranging, collecting, compiling and maintaining on the site all current documents, reports, minutes and affidavits etc. as specified and required by the Consultant and jurisdictional authorities for their review and use.

2.1 Preconstruction Meeting

- .1 Immediately after award of Contract attend a meeting, arranged by the Consultant, with the Owner, Sub-consultants, Contractor and Refrigerant Sub-contractors to document the responsibilities and necessary activities of the Contractor, Subcontractor and Suppliers during construction, establish procedures for co-operation and co-ordination of all participants during construction and to set forth the lines of communication for all correspondence for the Project.

3.1 Project Site Meetings

- .1 Arrange for the Consultant, Owner and Subcontractors to attend Project Site Meetings to discuss project scheduling, document interpretation and contemplated revisions to the project.
- .2 Provide physical space and make arrangements for bi-weekly Project Site Meetings at times and dates mutually agreed to with the Consultant, Sub-consultants and Owner.
- .3 The Consultant shall record all minutes of meetings and forward to the Contractor for distribution to all parties involved within 48 hours of the meeting.
- .4 Arrange for Sub-Contractors representatives to attend the site meetings approximately one (1) hour after the Project Site Meeting to discuss specific items of Work which require the interpretation or clarification of the documents with the Consultant and Consultants. Provide a proposed agenda listing information, problems and concerns requiring resolution with the Consultant and/or Sub-consultants.

4.1 Site Progress Records

- .1 Maintain on the site a permanent record, in a format acceptable to the Consultant, of the progress of construction, site conditions, inspections and schedule of the Work. The record shall include:-
 - .1 Commencement and completion dates of each trades Work.
 - .2 Daily weather conditions
 - .3 Scheduling, inspections and approvals
 - .4 Status of materials, deliveries etc.

.5 Site conditions encountered.

5.1 Construction Schedule

- .1 The Contractor shall be responsible for maintaining the completion date as set out in Construction Schedule prepared, submitted and approved and shall advise the Consultant immediately if any changes to deliveries or conditions will cause delays which would affect the completion date.
- .2 The Contractor shall review the current Project Schedule with all Subcontractors and Suppliers and note any variances which have occurred since the last meeting which may affect the scheduled completion of the project.
- .3 The Contractor shall correct, revise, update and otherwise maintain the schedule during progress of construction. Provide a revised and updated schedule to the Consultant, Owner, and Subcontractors.
- .4 Contractor must maintain a Contemplated Change Orders, Change Orders, Change Directives, Site Instruction, Shop Drawings and Requests for Information log identifying status, reason, costs etc. This list must be issued with site meeting minutes.

END OF SECTION 01200

1.1 Generally

- .1 The Contractor shall be responsible for preparing, for the first project site meeting, a schedule of all requested and required submittals listing all shop drawings, samples, reports, manuals, drawings intended for submission to the Consultant.
- .2 The Contractor shall co-ordinate and distribute all submissions, to the Consultant as well as Subtrades and suppliers, to ensure that the flow of documents is performed in a timely manner to maintain the construction schedule.
- .3 All submittals specified and requested in all Sections of these Specifications shall be made by the General Contractor, directly to the Consultant. Submit copies to the Sub-Consultants and jurisdictional authorities only on the instructions or in agreement with the Consultant.
- .4 Submissions containing substitutions or alternates will be returned immediately by the Consultant or Sub-Consultants.

1.2 Construction Schedules

- .1 Submit in accordance with Section 01005.

1.3 Shop Drawings

- .1 The Consultant shall review, stamp and return the digital copy of all shop drawings marked "**No Comments**", "**Comments as Noted**" or "**Revise and Resubmit**". A copy of all shop drawings marked "**No Comments or Comments as Noted**" shall be retained at the site for the Consultant, Consultants and trades to review. Only drawings stamped "**Revise and Resubmit**" need be resubmitted. The Contractor shall be responsible for printing the reviewed shop drawings.
- .2 Submit to the Consultant one (1) digital (PDF) copy of all shop drawings for the items of Work noted throughout this Specification, and in accordance with GC 3.11 of the Agreement.
- .3 Submit shop drawings for signs, hoardings, fences, barricades, shoring and bracing, hoists, temporary supports, enclosures, stairs and similar Work specified in Division 1 when requested by the Consultant or jurisdictional authorities in accordance with their requirements.
- .4 The Owner is to be given the opportunity to review all shop drawings. Only the Consultant will provide acceptance.

- .5 The Contractor shall check, stamp, sign and make notations he considers necessary on shop drawings before each submission. Shop drawings not checked and signed will be returned without review.**
- .6 Do not proceed with Work dependent on shop drawing information until Consultant's and Contractor's review is finalized. Shop drawings marked, "No Comments" shall not relieve the Contractor of his responsibility for execution of Work in accordance with Contract Documents.
- .7 The following information shall be shown on shop drawings:-
- title, project name, date, scale, manufacturer, fabricator and installer.
 - materials, finishes, fabrication and erection dimensions.
 - clear and obvious deviations or proposed changes from drawings or specifications.
- Project specific details to indicate construction arrangement of parts, connections, anchorage, fastener type, and interconnections with other Work.
- mechanical and electrical requirements and characteristics when applicable.
 - information to verify that superimposed loads will not affect function, appearance and safety of this or related Work.
 - assumed design loadings, material specifications for load-bearing members.
 - dimensions and dimensioned locations of proposed chases, sleeves, cuts and holes in structural members.
 - Engineer's seals, calculations and notations as required.
- .8 Submit only digital (PDF) copies of shop drawings. Digital copies (only) will be returned.
- .9 Fabricate Work exactly as shown on shop drawings. If shop practice dictates revisions, revise drawings and resubmit.

1.4 Samples and Mock-Ups

- .1 Submit to Consultant samples and mock-ups for the materials noted throughout these specifications and in accordance with GC 3.11 of the Agreement.
- .2 Samples labelled to show title, project, Contractor, Manufacturer and date. Submit samples of adequate size to show the colour, texture, thickness, shape, jointing, fastening and otherwise represent the material in its intended use on this specific Project. Submit the manufacturers complete

range of samples unless the Consultant has selected one (1) or more specific types to be used.

- .3 The Materials used on this Project shall match approved samples in all aspects including quality, colour, texture and finish. Materials installed without approval of samples shall be removed and replaced at the Contractors expense.

1.5 Affidavits

- .1 Submit to the Consultant affidavits, in duplicate signed and notarized by a responsible officer of the certifying company for the specified products noted in other Sections of the Specification.

1.6 Guarantees and Warranties

- .1 Provide the extended guarantees as specified in each applicable Section of this Specification.
- .2 Extended guarantees shall commence on termination of the standard one-year guarantee granted in this Contract as specified in Article GC 12.3 - Warranty of the General Conditions, and shall be an extension of these same provisions.
- .3 Each extended guarantee shall be submitted in a format, identical to the other and as approved by Consultant.

1.7 Maintenance Manual and Operating Instructions

- .1 Submit Maintenance Manuals to the Consultant at completion of Project prior to application for Certificate of Substantial Performance. Maintenance Manual shall consist of shop drawings, extended guarantees and Project Data Book.
- .2 The Project Data Book shall
 - consist of two (2) USB (digital) copy.
 - have a title sheet, or sheets preceding data on which shall be recorded Project name, date, list of contents and Contractor's and Subcontractors' names
 - be organized into applicable Sections of Work with each section separation by hard paper dividers with plastic covered tabs marked by Section
 - contain only typed or printed information and notes, and neatly drafted drawings
 - contain Warranties/Guarantees including extended Warranties/Guarantees with the names, addresses and phone

- numbers for servicing.
- contain maintenance and operating instructions on all building, and mechanical and electrical equipment
- contain maintenance instructions as specified in various Sections and as referenced in Section 01150
- contain brochures and parts listed on all equipment sources of supply for all proprietary products used in the Work
- contain lists of supply sources for maintenance of all equipment in Project of which more detailed information is not included above
- contain finished hardware schedule
- contain charts, diagrams and reports specified in Divisions 15 and 16.
- contain one (1) copy of final reviewed, stamped and signed shop drawing issued for Project, on which have been recorded changes made during fabrication and installation caused by unforeseen conditions.

1.8 Extra Stock

- .1 Supply extra stock at completion of Project as specified in other Sections of this Specification.

1.9 Inspection Laboratory Reports

- .1 Submit reports in duplicate unless specified otherwise, signed by a responsible officer of the inspection and testing laboratory, for the items as specified in other Sections of the Specifications in Articles entitled, "Source Quality Control" and "Field Quality Control".

1.10 Application for Payment

- .1 Applications for Payment must be accompanied by:
 - .1 The Contractor's Statement of Payment.
 - .2 Progress Draw showing a schedule of values of various trades and for various parts of the work in a format acceptable to the Consultant.
 - .3 A Statutory Declaration, duly signed by the Contractor and all Subcontractors, stating that all Subcontractors and suppliers have been paid to date and that there are no liens outstanding or filed.
 - .4 Letter of Good Standing from Workers' Compensation Board.

1.11 Construction Record Drawings:

- .1 The Contractor will be provided with two sets of prints to be used as Record Drawings on which he shall mark clearly "IN RED, IN A NEAT AND LEGIBLE MANNER", all deviations from the Contract Documents in the Work as constructed, caused by site conditions and including

Consultant originated changes, Contractor/Sub-Contractor originated changes, Site Instructions, Supplementary Instructions, Addenda, instructions by correspondence and Jurisdiction authority approvals. Carefully record location of concealed elements which are required for maintenance, alteration work, and building additions, including elements of foundation, horizontal and vertical location of utilities and appurtenances, location of internal utilities concealed in construction, and all field changes of dimension and detail. Eradicate all obsolete information.

- .2 Maintain record drawings in good condition, available at all times for inspection by Consultant's site representatives, and do not use for construction purposes.

END OF SECTION 01300

1.1 General Requirements

- .1 Division 1, General Requirements, is a part of this Section and shall apply as if repeated here.

2.1 Inspection

- .1 The materials furnished by the Contractor shall be inspected by the Contractor and Inspection/Testing Agency at the source, time of delivery and at such other times as requested by the Consultants.
- .2 The review of the information covering materials and equipment by the Consultants shall in no way release the Contractor or Inspection/Testing Agency from his responsibility for the proper design, installation and performance of any material, equipment or arrangement or from the liability to replace same should it prove defective or deficient.

3.1 Inspections by Owner

- .1 The inspection and testing for all earthwork including subgrade, bearing surfaces, granular fill and cast-in-place concrete shall be carried out by the Owners own forces in accordance with this Specification.
- .2 The Owner shall pay all costs associated with the testing/inspections carried out by their own forces (under cash allowance).
- .3 The Contractor shall ensure that the testing/inspection is carried out in conformance with these specifications including samples, reporting, etc.

4.1 Independent Inspection Agencies

- .1 Independent Inspection/Testing Agencies will be engaged by the Consultant for the purpose of inspecting and/or testing portions of Work as outlined in the specifications.
- .2 Cost of such services for each portion of the Work noted, shall be paid for by the Contractor as part of the Cash Allowance specified under Section 01050. Do not expend such allowances without approval of the Consultant.
- .3 The Contractor shall ensure that the inspection/testing is carried out in conformance with these specifications, including sampling and reports.
- .4 Equipment required for executing inspection and testing by the appointed agencies shall be provided by them for their specific use.
- .5 Employment of Inspection/Testing Agencies does not relax the responsibility of the Contractor to perform the Work in accordance with the

Contract Documents.

- .6 If defects are revealed during inspection and/or testing, the appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defects and irregularities as advised by the Consultant at no cost to the Owner.
- .7 Allow Inspection/Testing Agencies access to the Work, offsite manufacturing and fabrication plants. Co-operate to provide reasonable facilities for such access.

5.1 Procedures

- .1 Prepare schedule of testing to be given to testing company. Notify the appropriate agency and Consultant a minimum of two (2) working days in advance of the requirement for tests, in order that attendance arrangements can be made.
- .2 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 the Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient to store and cure test samples.

6.1 Rejected Work

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

7.1 Reports

- .1 Reports shall contain the following information:
 - .1 Date and time of inspection or test.
 - .2 Weather conditions and ambient air temperatures during the

- inspection.
 - .3 Testing method employed by proper standard reference and specific paragraph or other detailed information as applicable.
 - .4 Inspection description and details and other relevant information.
 - .5 Test results in detail, complete with applicable graphs and other clarifying documents and information.
 - .6 Printed name and signature of person having conducted inspection or test, and name, title and signature of Supervisor having verified the report.
- .2 Inspection and Testing Agency shall provide written report for each inspection and test made, one (1) copy to the Consultants; two (2) copies to the Contractor direct, who shall forward one (1) copy to the Sub-Contractor, supplier or manufacturer concerned and two (2) copies for the data books.

8.1 Tests and Mix Designs

- .1 Furnish test results and mix designs as requested and required.

9.1 Pre-pour Meeting

- .1 The contractor to schedule a meeting with all relevant trades, consultants and owner's representatives prior to placing the concrete for the ice pad. This meeting shall review all procedures, material, backup plans, testing, quality control, line testing and schedule.

END OF SECTION 01400

1.1 Generally

- .1 Work shall include temporary facilities and controls required as construction aids or by jurisdictional authorities, or as otherwise specified. Install to meet needs of construction as Work progresses. Maintain during use, remove at completion of need and make good adjacent Work and property affected by their installation.
- .2 Work shall include fixed or portable structures as shown and as required for storage, offices, washrooms, etc. as required for safety, security and to meet the needs of the construction project and the Owner as otherwise specified. Access/use of the facility washrooms is not permitted.
- .3 Temporary facilities shall include provisions for construction safety as required by the Construction Safety Act of the Province of Ontario, as well as all other applicable regulations of jurisdictional authorities.
- .4 Construct temporary Work of new materials unless use of second-hand materials is approved by the Consultant.
- .5 Ensure that structural, mechanical and electrical characteristics of temporary facilities are suitable and adequate for use intended. Be responsible that no harm is caused to persons and property by failure of temporary facilities because of placing, location, stability, protection, structural sufficiency, removal or any other cause.
- .6 Prepare shop drawings and specifications of temporary Work, and submit for approval if required by jurisdictional authorities and to the Consultant in accordance with Section 01300.
- .7 Pay all costs for any and all temporary facilities and controls including, but not limited to, permits, transportation, set-up, maintenance and leases.

2.1 Construction Aids

- .1 Erect scaffolding independent of building walls, and remove promptly when no longer required. Do not allow scaffolds to interfere with continuing "Work".
- .2 Each user of scaffolding which is not his own shall be responsible for its examination and testing before using it. He shall make it secure if necessary, or shall notify the Contractor in writing that he will not commence Work until it is made secure; otherwise, he will be held responsible for accidents and acceptance of the scaffolding.
- .3 Work shall include temporary enclosure for building as required to protect it, in its entirety or in its parts, against the elements, to maintain

environmental conditions required for Work within the enclosure, and to prevent damage to materials stored within. Design enclosures to withstand wind pressures required for the building by jurisdictional authorities. Use structural framing of building for support of temporary enclosure framing only upon verification that the load limits of the building frame will not be exceeded, and upon approval of the Consultant. Keep surfaces of enclosures free of snow and ice to avoid overloading of building structure. Erect enclosures to allow complete accessibility for installation of materials during the time enclosures remain in place.

3.1 Protective Fences, Devices, Barricades

- .1 Install temporary constructions to ensure protection to the public, premises and all personnel as specified other Sections of this Specification and the General Conditions of the Contract.
- .2 Work shall include barricades for traffic control, and to prevent damaging traffic over finished areas, sidewalk and curb protection, as well as safety barricades, hoardings and otherwise as may be required.
- .3 **Erect protective hoarding/enclosure around the work area and as depicted on the drawings to protect the adjacent area from debris, dust and noise. The enclosure shall be dust tight and maintained as such for the duration of construction. Access to City staff (to refrigeration room etc) must be accommodated. Additional, access to all required exit must be maintained. Verify all items to be protected with the Consultant prior to commencement of work.**

4.1 Security

- .1 Maintain security of construction site by control of access through enclosing fences during times Work is in progress, and by locking hardware otherwise.
- .2 Maintain security at all times construction is shut down because of a strike or a lockout, or for whatever reason the project is unoccupied.

5.1 Temporary Water, Electricity, Heat, Lighting

- .1 The provision of water, electricity, heat and lighting required for construction of the facilities, for the duration of the project with be available from the building.
- .2 The Contractor shall supply electric power for all construction purposes. Make connections available to any part of the Work within distance of a 100'-0" extension. Provide power at temporary storage sheds and field office and classroom facility.

- .3 Make connections for electric power for construction purposes (not heating or welding) at only the main switchboard, after it is installed. Feed from a separate sub-feed switch.
- .4 Temporary electric service shall include distribution conductors and necessary components. Provide a power centre for miscellaneous tools and equipment with weatherproof distribution box, a minimum of four 20 Amp grounded outlets, and circuit breaker protection for each outlet.
- .5 The Contractor shall heat building during construction to maintain temperature for working surface, and during conditions required by all specified materials. Use only heating methods approved by the Consultant and jurisdictional authorities. Salamanders will not be permitted.
- .6 **Provide lighting for:**
 - emergency evacuation, safety and security throughout the Project at intensity levels required for jurisdictional authorities
 - performance of Work throughout areas as required, evenly distributed, and at intensities to ensure that proper installations and applications are achieved
 - performance of finishing Work in areas as required, evenly distributed and of an intensity of at least 15 foot candles.
- .7 Make arrangements for connections to water, sewer, gas, electric and telephone utilities as required for temporary use during construction. Pay connection and disconnection charges, and for use of services required by construction.
- .8 Temporary office or lunch location for the contractor shall be in a trailer outside and is the contractor's responsibility to maintain.

6.1 Dust Control

- .1 Prevent spread of dust beyond the construction site by wetting or by other means approved by the Consultant. Provide coverings for bleachers to protect from dust. A thorough cleaning of all areas including roof structure, where dust may collect shall be completed at the end of the project.

END OF SECTION 01500

1.1 Construction Safety Measures

- .1 Observe and enforce construction safety measures required by National Building Code 1985, Part 8, Provincial Government, Workers' Compensation Board and municipal statutes and authorities.
- .2 In event of conflict between any provisions of above authorities, the most stringent provision governs.

2.1 Fire Protection

- .1 Eliminate fire hazards and prevent damage to work, materials, equipment and other property, both public and private.
- .2 Provide and maintain in working order, adequate temporary Underwriters' labelled fire extinguishers and locate in prominent positions, to the approval of authorities having jurisdiction.

3.1 First Aid

- .1 Provide and maintain on the site in a clean, orderly condition, completely equipped first aid facilities which shall be readily accessible at all times to all employees.
- .2 Designate certain employees who are properly instructed to be in charge of first aid. At least one such employee shall always be available on the site while work is being carried on.
- .3 A telephone call list for summoning aid, such as doctors, ambulances, Pulmotors, and rescue squads from outside sources shall be conspicuously posted.

4.1 Overloading

- .1 Ensure no part of Work is subjected to a load which will endanger its safety or will cause deformation.

5.1 Falsework

- .1 Design and construct falsework in accordance with CSA S269.1-16 (R2021).

6.1 Disposal of Wastes

- .1 Do not bury rubbish and 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.
- .3 Fires and burning of rubbish on the site shall not be permitted.

7.1 Pollution Control

- .1 Control emissions from equipment and plant to local authorities' emission requirements.
- .2 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.
- .3 The contractor shall take appropriate precaution for activities generating excessive levels of noise. These works are to be scheduled outside of facility operating hours as directed by City staff.

8.1 Toxic and Hazardous Waste

- .1 Prior to commencement of Work, ensure that all reasonable precautions have been taken to determine if toxic or hazardous substances are present on the site.
- .2 Address unforeseen conditions expeditiously and report to the Consultant, jurisdiction having authority, immediately, any conditions found on the site.
- .3 Do not bury any waste material on the site which could be deemed to be considered toxic or hazardous.

END OF SECTION 01510

1.1 Generally

- .1 Reference to material and equipment includes all products to be incorporated into the Work as specified in these Specifications, and which may otherwise referred to as materials, equipment, components and similar terms or more broadly as products. Obtain specified products from suppliers in the same locality as the Project insofar as possible without prejudice to the scheduling of the project.
- .2 Products for use in the Project and on which the tender was based shall be in production at that time, with a precise model and shop drawings available for viewing.
- .3 Where equivalent products are specified, or where alternatives are proposed, these products claimed by the Contractor as equivalent shall be listed on the tender form and be comparable in construction, type, function, quality, performance and appearance, as determined by the Consultant. Where specified equivalents noted in the base tendered price, are accepted for incorporation into the Work, they shall be subject to final approval by the Consultant for suitability on this project.
- .4 Products delivered to the Project site for incorporation into the Work, shall be considered the property of the Owner and shall not be removed from the site without written authorization from the Owner.
- .5 Do not install permanently incorporated labels, trademarks and nameplates in visible locations unless required for operating instructions or by jurisdictional authorities.

2.1 Specified Products

- .1 Products specified by manufacturer's name, brand name or catalogue reference shall be the basis of the bid and shall be supplied for the Work **without exception in any detail, subject to allowable substitution as specified.** Where several proprietary products are specified, any one of the several shall be acceptable.
- .2 For products specified by reference standards, the onus shall be on the supplier to establish that such products meet reference standard requirements. The Consultant may require affidavits from the supplier, as specified, to prove compliance. Products exceeding minimum requirements established by reference standards will be accepted for the Work if such products are compatible with and harmless to Work with which they are incorporated.

3.1 Approval of Products

- .1 Wherever in this Specification it is specified that products shall meet approval of jurisdictional authorities, Underwriters, Consultants or others, such approval shall be in writing.

4.1 Substitution of Products During Progress of Work

- .1 **No substitution for products shall be permitted. If the specified product cannot be delivered to maintain construction schedule and if the delay is caused by conditions beyond the Contractor's, Sub-Contractors or Suppliers control, the Contractor shall notify the Consultant immediately that alternate materials are requested to be reviewed.**
- .2 **Substituted materials installed, without the approval of the Consultant, shall be removed and all costs associated with the correction of the Work, including all Costs incurred by the Owner, Consultant and Sub-Consultants, shall be the responsibility of the Contractor.**
- .3 Obtain approval for substitutions from the Consultant. Application for approval of substitutions shall be made only by Contractor. Process proposals for substituted Work in accordance with procedures established for changes in the Work.
- .4 Submit, with request for substitution, documentary evidence that substituted products are equal to, or superior to, approved products, and a comparison of price and delivery factors for each product.
- .5 It shall be the responsibility of the Contractor to ensure that substituted products can be both physically and dimensionally incorporated in the Work with no loss of intended function, performance or space. The Contractor shall be responsible for additional installation costs required by incorporation of substituted products and for adaptations made otherwise necessary to ensure that above requirements are satisfied.

5.1 Product Handling

- .1 Manufacture, pack, ship, deliver and store products so that no damage occurs to structural qualities and finish appearance, not in any other way detrimental to their function or appearance, or both.
- .2 Ensure that products, while transported, stored or installed, are not exposed to an environment which would increase their moisture content beyond the maximum specified.

- .3 Schedule early delivery of products to enable Work to be executed without delay. Before delivery, arrange for receiving at site.
- .4 Deliver package products, and store until use, with manufacturer's seals and labels intact.
- .5 Label packaged products to describe contents, quantity and other information as specified.
- .6 Product handling requirements may be repeated, and additional requirements specified, in other Sections.

6.1 Storage and Protection

- .1 Store products on site or in storage sheds with secure protection against all harmful environmental conditions. Prevent damage, adulteration, staining and soiling of materials while stored.
- .2 Store manufactured products in accordance with manufacturer's instructions, when such instructions are attached to products or submitted by him.
- .3 Store steel, lumber, masonry units, and similar products on platforms raised clear of ground. Store finished products under cover at all times.
- .4 All damaged products will be rejected for use, and thereupon shall be immediately removed from site.
- .5 Store and handle flammable liquids and other hazardous materials in approved safety containers and as otherwise prescribed by safety authorities. Store no flammable liquids or other hazardous materials in bulk within the Project.
- .6 All damaged products will be rejected for use and thereupon shall be immediately removed from site.
- .7 Storage and special protection requirements may be repeated and additional requirements specified, in other Sections.

7.1 Defective Products and Work

- .1 Products and Work found defective; not in accordance with the Specifications; or defaced or injured through negligence of the Contractor, his employees or Subcontractors, or by fire, weather or any other cause shall be rejected.
- .2 Remove rejected products and Work from the premises immediately.

- .3 Replace rejected products and Work with satisfactory products with no delay after rejection. Previous inspection and payments shall not relieve the Contractor from the obligation of providing sound and satisfactory Work in compliance with this Specification.
- .4 Costs for replacement of defective material installed shall be the responsibility of the Contractor.

END OF SECTION 01600

1.1 Final Cleaning

- .1 Before final inspection, replace all material damaged during construction or which is otherwise defective, marred or deficient.
- .2 In addition to requirements for cleaning-up specified in the General Conditions of the Contract and as specified in the various sections of the Specifications, the Work by the Contractor shall include one (1) final cleaning by skilled cleaning specialists prior to Substantial Completion of the project and Occupancy by the Owner.
- .3 Final cleaning shall remove dust, stains, paint spots, soil, grease, fingerprints and accumulations of construction materials in accordance with manufacturers instructions for each material. This Work shall include but not be limited to:
 - : remove temporary protections and make good defects before commencement of final cleaning.
 - : washing of exterior and interior concrete floors.
 - : cleaning and polishing of glass.
 - : wiping, dusting and washing as necessary of floors, walls and ceilings.
- .4 Maintain final cleaned state of the project, or portions thereof, until Owner has taken possession of project.
- .5 Cleaning shall include all areas of the facility affected by construction including top of beams and roof structure where dust raised during construction may have settled.

2.1 Demonstration of Systems

- .1 Each Subcontractor shall give a complete demonstration in the presence of the Owner of the operation of all systems and equipment installations once they are complete and when the Consultant is advised that the building is to be handed over to the Owner. Responsible personnel from the Subcontractors whose Work is being demonstrated shall be present as required at these demonstrations.

3.1 Construction Record Drawings

- .1 Record, on white prints, Work constructed differently than shown on Contract Documents. Record all changes in the Work caused by site conditions; by Owner, Consultant, Sub-Consultants, Contractor and Sub-contractors originated changes; and by site instructions, supplementary instructions, field orders, change orders, addenda, correspondence and directions of jurisdictional authorities. Accurately record location of

concealed structure and mechanical and electrical services, piping, conduits, pull boxes, junction boxes and similar Work not clearly in view, the position of which is required for maintenance, alteration Work and future additions. Do not conceal critical Work until its location has been recorded.

- .2 Make records in a neat and legibly printed manner with a non-smudging medium.
- .3 Identify each record drawing as "Project Record Copy", maintain drawings in good condition, do not use them for construction purposes and make available to the Consultant at all times.
- .4 Provide one hard copy of construction record drawings plus one (1) USB (digital) copy.

4.1 Substantial Completion Certificate

- .1 The following articles, in addition to those set forth under the General Conditions of the Contract, are to be submitted to the Consultant before issuance of the **Substantial Performance Certificate**.
- .2 **General**
 - .1 Building Permit Copy of Drawings and Specifications, Building Permit, and all other permits/inspection approvals/documentation received during the course of construction from all Authorities.
 - .2 Verification of Fire Alarm, Emergency Lighting and Sprinkler System
 - .3 Copies of all Independent inspection reports as specified.
 - .4 Construction Record Drawings.
 - .5 Maintenance Manuals and Operating Instructions.
 - .6 Copies of all Warranties and Manufacturers inspection reports.
 - .7 Preliminary Deficiency List prepared by the Contractor for review by all trades and the Consultant and Sub-Consultants.
- .3 **Section 15 - Refrigeration**
 - .1 Construction Record Drawings.
 - .2 Maintenance Manuals and Operating Instructions.
 - .3 Certificate of Verification of system.
 - .4 Plumbing, Hydro, Gas and all other inspection permits and documentation.

5.1 Final Documentation

- .1 Provide the following documentation as applicable before completion will be declared:
 - .1 Adjusted and reconciled cash allowances.

- .2 Written statement of completion from Contractor and all other declarations as requested by the Consultant.
- .3 Original copy of newspaper listing, as required under the Construction Act.
- .4 Abstract of title from Registrar of Land Registration and/or Certificate of Encumbrances at termination of lien period.

6.1 Final Inspection and Close-Out

- .1 Arrange for, conduct and document final inspections, close-out and take-over at completion of Work of this Specification in accordance with procedures described in OAA/OGCA TAKE-OVER PROCEDURES, OAA/OGCA Document No. 100, December 12, 2007.

PART 1 – GENERAL

1.1 General Requirements

- .1 Division 1, General Requirements is a part of this Section and shall apply as if repeated here.

1.2 Work in Other Sections

- .1 Related Work Specified in Other Sections:

Section 01030	:	Work in Existing Building
Section 01500	:	Temporary Facilities and Controls
Section 02200	:	Earthwork
Section 03300	:	Cast-in-Place Concrete
Division 17	:	Refrigeration

1.3 Qualifications

- .1 Execute work of this Section only by a firm who specializes in such work, has adequate equipment and skilled tradesmen to perform it expeditiously, and is known to have been responsible for demolition work similar to that specified, during a period of at least the last five years.

1.4 Requirements of Regulatory Agencies

- .1 Perform demolition work in accordance with latest edition requirements of CSA S350-M1980 (latest edition), the Fire Protection Act and the Occupational Health and Safety Act and Regulations for Construction Projects of the Province of Ontario, Section 01005 General Instructions of the specifications and as otherwise required by jurisdictional authorities to save persons and property from harm resulting from work of this Section.

1.5 Salvage and Disposal of Materials

- .1 Assume responsibility for demolition and removal of elements noted to be removed or altered in the condition they are at time notified of award of demolition contract.
- .2 All excess materials resulting from the demolition necessary for the project, except as specified or noted on the drawings, shall become the property of the Contractor who shall remove the same as quickly as possible to his designated disposal area. The retention of materials on the site for sale or salvage purposes is forbidden. Burning of materials and/or debris on the site is strictly forbidden.

- .3 Remove, clean, store, and protect all specified salvage items until required to be built into the project.
- .4 Remove debris daily, immediately as it accumulates. Do not overload trucks and otherwise take means to prevent spillage during travel.
- .5 The Owner will undertake testing of existing services and subsoil below the ice pad. The Contractor shall make arrangement in his schedule to accommodate this time. Testing shall include but not limited to pressure testing of heat system piping, sampling of piping and chemical testing for contaminants.

1.6 Access to Site

- .1 Provide for complete and safe access at all times to the building for the Owner and the public to the areas designated for continuous operations by the Owner.
- .2 Do not impede pedestrian or vehicular traffic on public ways within or adjacent to the premises by Work in progress or stored materials.

PART 2 - PRODUCTS

Not Applicable

PART 3 - EXECUTION

3.1 Examination

- .1 Before commencing any demolition Work, ensure in examination of the site that all possible factors concerning the demolition have been investigated, and in particular the following are known:-
 - .1 Methods and means available for material handling, disposal, storage and transportation.
 - .2 Method of construction of structures, fixtures and services to be demolished.
 - .3 Disconnection of services to all fixtures completed.
 - .4 Hoarding and temporary barriers installation completed.
- .2 Review demolition Work to be performed in its entirety with the Consultant. Do not proceed without his approval of demolition methods which will be used.

3.2 Special Protection

- .1 Ensure that adjacent private and public properties, both within and without the premises, are protected from damage resulting from work of this Section. Protection shall consist of fences, barricades, signs, and substantial constructions to provide physical protection. Property shall include, but not be limited by, structures and their finishes and appurtenances; site improvements; trees, planting and landscaping; furnishings, fixtures, hardware and equipment.
- .2 Protect existing items designated to remain and materials designated for salvage. In event of damage, immediately replace such items or make repairs to approval of Consultant and at no additional cost to the Owner.
- .3 Post danger signs in conspicuous locations to warn persons that demolition is in progress. Barricade all access by unauthorized persons to areas in which demolition is in progress.

3.3 Existing Services

- .1 Verify the location of all existing services within the project boundary prior to commencing work. Arrange and pay for the disconnection, capping and plugging of all gas, water, sewer, hydro, telephone and other services to the buildings at the property line. In each case, the utility company involved shall be notified in advance, and its approval obtained before commencing that portion of the work.
- .2 Do not interrupt existing services except as approved by the Consultant. Give the Consultant seven (7) days clear notice of intention to interrupt existing services. In the event existing services are uncovered or disrupted accidentally, make complete restoration on a priority basis and provide adequate protection to avoid further disruption until diversion or alternative arrangements are made.

3.4 Schedule of Salvage & Relocation

- .1 Ensure that the specifications and drawings are referred to for the complete extent of this Work. Carry out all salvage under the supervision of the applicable Subcontractor whose Work includes the reinstallation of that specific product.
- .2 Elements noted to be removed, relocated and reinstalled shall include but not be limited to the following:-

3.5 Restoration

- .1 Remove hoarding, barricades and other temporary construction on completion of demolition.

- .2 Reinstall areas immediately adjacent to the work to match the condition of adjacent undisturbed work. Backfill all excavations and compact to provide uniform, even surface.

END OF SECTION 02110

PART 1 - GENERAL

1.1 Section Includes

- .1 Division 1, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2 Work In Other Sections

- .1 Related Work Specified in Other Sections
 - Section 02200 : Excavation
 - Section 03200 : Concrete Reinforcement
 - Section 03300 : Cast-in-Place Concrete

1.3 Reference Standards

- .1 Do concrete formwork in accordance with:
 - CAN/CSA-A23.1-19: Concrete Materials and Methods of Concrete Construction
 - CAN/CSA-A23.2-19: Test Methods and Standard Practices for Concrete

1.4 Co-ordination

- .1 Install anchors, sleeves, bolts, inserts, drains, expansion joint components and other items supplied under other sections of the specifications required to be built into, anchored to, or passing through concrete work, in co-ordination with the other trades.
- .2 Supply templates for setting all anchorages required for the buildings and shelters.

1.5 Design of Formwork

- .1 Assume full responsibility for the complete structural design and construction of formwork including shoring and bracing to resist vertical and horizontal loads due to the weight of wet concrete, self weight of forms, wind, fluid pressure of concrete, and other forces arising from equipment used in placing the concrete.

PART 2 - PRODUCTS

2.1 Materials

- .1 Formwork Lumber: Plywood and wood formwork materials to CAN/CSA-A23.1/A23.2. Formwork materials used on site shall be new and acceptable to the Consultant, prior to erection. Panels shall be fabricated for use as form panels, finished one side, with sealed edges and a

- minimum thickness of 17mm. Panels shall be smooth and free from defects which would show up on concrete surfaces exposed to view.
- .2 Form Coating: Formaseal as manufactured by Master Builders for wood forms.
 - .3 Form Stripping Agent: CPD colourless non-staining odourless or as recommended by manufacturer of form liner.
 - .4 Joint Tape: non staining, water impermeable, self releasing, where required.
 - .5 Form Ties: removable or snap-off metal ties, fixed or adjustable length, free of devices leaving holes larger than 25 mm dia. in concrete surface, and not leaving metal closer than 25 mm to the surface of the concrete for walls. Snap tie length shall suit wall thickness as noted on drawings.
 - .6 Tie Hole Plugs: 25 mm dia. tapered PVC hole plugs.
 - .7 `Form Ties/Supports: External clamping devices to retain form tight, uniform and easily removable around all columns.

PART 3 - EXECUTION

3.1 Erection

- .1 Verify lines, levels and column centres before proceeding with formwork and ensure dimensions agree with drawings.
- .2 Construct forms to produce finished concrete conforming to shape, dimensions, locations and levels indicated within tolerances required by CAN/CSA-A23.1, and to produce acceptable finish where exposed.
- .3 Construct falsework in accordance with CAN/CSA-S269.3.
- .4 Obtain approval from soils testing engineer for bearing surfaces prior to erection of forms.
- .5 Obtain Consultant's approval for use of earth forms.
- .6 Hand trim sides and bottoms and remove loose earth from earth forms before placing concrete.
- .7 Align form joints and make watertight. Keep form joints to minimum.
- .8 Use (25) mm chamfer strips on external corners of beams, joints,

columns, walls etc., exposed to view.

- .9 Form chases, slots, openings, drips, recesses, expansion and control joints as indicated.
- .10 Provide blocking and anchorage for hollow metal frames set to be cast into forms.
- .11 Clean formwork in accordance with CAN/CSA-A23.1 before placing concrete.
- .12 Forms shall remain in place for a minimum duration of 48 hours for footings, curbs, etc. and all other non self-supporting structural components.
- .13 Re-use of formwork and falsework subject to requirements of CAN/CSA-A23.1.
- .14 Be responsible for the safety of the structure, both before and after the removal of forms, until the concrete has reached its specified 28 day strength.
- .15 When forms are stripped during the curing period, cure and protect the exposed concrete in accordance with Section 03300.
- .16 Movement and displacement of formwork during construction, variations in excess of specified tolerances and marked and disfigured surfaces that cannot be repaired by specified methods will be considered defective work performed by this Section.
- .17 Reconstruct defective formwork and replace concrete and reinforcement placed in defective formwork at no additional cost to the Owner.

END OF SECTION 03100

PART 1 - GENERAL

1.1 Section Includes

1. Division 1, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2 Work In Other Sections

1. Related Work Specified in Other Sections

Section 03100	:	Concrete Formwork
Section 03300	:	Cast-in-Place Concrete

1.3 Reference Standards

Do reinforcing work in accordance with:

CSA-A23.1-19: Concrete Materials and Methods of Concrete Construction

CSA A23.2-19: Test Methods and Standard Practices for Concrete

CSA G30.3-M1983 (R1998): Cold-Drawn Steel Wire for Concrete Reinforcement

CSA G30.18-21: Carbon Steel Bars for Concrete Reinforcement

ACI 315-2004 (SP66): Detailing Manual

ACI 315R-04: Manual of Structural and Placing Drawings for Reinforced Concrete Structures

CSA W186-21: Welding of Reinforcing Bars in Reinforced Concrete Construction

1.4 Shop Drawings

- .1 Submit shop drawings in accordance with Section 01300.
- .2 Indicate bar sizes, spacing, location and quantities of reinforcement, mesh, mechanical splices, chairs, spacers and hangers with identifying code marks to permit correct placement without reference to structural drawings; (to Reinforcing Steel Manual of Standard Practice - Metric Supplement 1992 by Reinforcing Steel Institute of Ontario).
- .3 Detail placement of reinforcing where special conditions occur.
- .4 Design and detail lap lengths and bar development lengths to CSA-A23.3, unless otherwise indicated.

1.5 Substitutes

- .1 Substitution of different size bars permitted only upon written approval of the Consultant.

PART 2 - PRODUCTS

2.1 Materials

- .1 Reinforcing Steel: billet steel, deformed bars to CAN/CSA G30.18, unless indicated otherwise. Use Grade 400R bars for all reinforcing unless noted otherwise, to sizes as shown on the drawings.
- .2 Welded Wire Fabrics: Where no reinforcement is shown, provide 152 x 152 MW 18.7 x MW 18.7 (6" x 6" x 6/6) welded wire fabric at 37mm (1½ ") below the finished surface of slabs on grade or walks, or toppings 62mm (2½ ") in thickness or greater. Lap ends and sides of fabric in accordance with requirements of CSA Standard CAN/CSA-A23.1, but in any event, not less than 300mm (12").
- .3 Provide 102 x 102 MW 18.7 x MW 18.7 (4" x 4" x 6/6) welded wire fabric for the top layer of reinforcing in the ice pad. Provide a minimum 1 cell (150mm) lap on all edges. Stagger sheets to avoid long lines of overlap.

PART 3 - EXECUTION

3.2 Fabrication

- .1 Fabricate reinforcing in accordance with CSA-A23.1.
- .2 Obtain Consultant's approval for locations of reinforcement splices other than shown on steel placing drawings.
- .3 Ship bundles of bar reinforcement, clearly identified in accordance with bar list.

3.3 Storage of Reinforcing

- .1 Reinforcing shall be stored off the ground to keep it free from dirt and to maintain its fabricated form.

3.4 Field Bending

- .1 Do not field bend reinforcement except where indicated or authorized by the Consultant.

- .2 When field bending is authorized, bend without heat, applying a slow and steady pressure.
- .3 Replace bars which develop cracks or splits.

3.5 Placing

- .1 Place reinforcing steel as indicated on reviewed shop drawings and in accordance with CSA-A23.1.
- .2 Obtain Consultant's approval of reinforcing steel and position.
- .3 Locate reinforcing bars to provide proper concrete cover. Reinforcing cover will be carefully inspected by the Consultant, and reinforcing with inadequate cover will not be acceptable.
- .4 Fold all the wires behind bars, away from form faces.
- .5 Modify bars on site to accommodate box-outs, inserts, etc., as directed by the Consultant.

3.6 Field Cutting of Reinforcing

- .1 Field cut reinforcing bars only where permitted by the Consultant.

END OF SECTION 03200

PART 1 - GENERAL

1.1 Section Includes

1. Division 1, General Requirements, is a part of this section and shall apply as if repeated here.

1.2 Work In Other Sections

1. Related Work Specified in Other Sections
Section 02200 : Earthwork
Section 05500 : Miscellaneous Metal
Section 06100 : Rough Carpentry
Division 15 : Mechanical

1.3 Reference Standards

CSA-A23.1-19 – Concrete Materials and Methods of Concrete Construction
CSA A23.2-19 – Test Methods and Standard Practices for Concrete
CAN/CSA A3000-98 A3000-18 Cementitious Materials Compendium
CAN/CSA-A362-93: Blended Hydraulic Cement

1.4 Samples

1. At least (3) weeks prior to commencing work, inform the Consultant of the proposed mix design and proposed source of ready mixed concrete.
2. A sample of the finishes shall be prepared and remain as the minimum acceptable standard for the project.

1.5 Certificates

1. Provide certification that plant, equipment, and materials to be used in concrete comply with requirements of CSA-A23.1.
2. Provide certification that mix proportions selected will produce concrete of specified quality and yield and that strength will comply with CSA-A23.1.

1.6 Quality Assurance

1. The Contractor shall employ an independent inspection and testing company to carry out all testing and inspection as required. The Consultant will appoint the inspection and testing company. The cost of inspection and testing shall be paid by the Owner, as specified in Division 1.

2. Samples and methods of moulding shall conform to the requirements of CSA-A23.2.
3. Additional testing shall be made if there is a distinct change in job conditions or if required by the Consultant or the authority having jurisdiction.
4. Compression tests shall be performed in accordance with CSA-A23.2 and good practice.
5. Failure to meet strength requirements will result in rejection of materials, strengthening or replacement of those portions that failed to develop the specified strength.
6. Concrete slump shall be tested at time that cylinders are cast and at such other times deemed necessary.
7. The addition of water and admixtures on the site is hereby prohibited and unacceptable for the project.

1.7 Submittals

1. Submit shop drawings in accordance with Section 01300 Submittals.

PART 2 – PRODUCTS

2.1 Materials

- .1 Formwork: As specified in Section 03100.
- .2 Reinforcing Steel: As specified in Section 03200.
- .3 Portland Cement: to CAN/CSA-A5/A8/A362.
- .4 Water: to CSA-A23.1.
- .5 Aggregates: To CSA-A23.1. Coarse aggregates to be normal density.
- .6 Air Entraining Admixture: To CAN/CSA-A23.5.
- .7 Chemical Admixtures: To CAN/CSA-A23.56 water reducing type WN. Consultant to approve accelerating or set retarding admixtures during cold and hot weather placing.
- .8 Non-Shrink Grout: Sika M-Bed Superflow or approved equal.

- .9 Premoulded Membrane: Shall be Sealtight 7100-312 (PMPC), W. R. Meadows.
- .10 Floor Hardener: Ashford Formula by Curecrete Chemical Company. Application shall be by flood method, after minimum 10 days cure of the ice slab. Saturate the surface with the Ashford Formula using a low-pressure, high-volume sprayer. Keep the entire surface glistening wet with Ashford Formula for a minimum 30 minutes. After the 30 minute application period, use a broom or mop to remove any puddles or concentrations of the Ashford Formula from the slab.

2.2 Concrete Mixes

- .1 Proportion normal density concrete in accordance with CSA A23.1, to give following properties for concrete in foundation walls, footings and any other unspecified concrete:
 - .1 Cement: Type GU Portland cement, minimum 325 kg/m³
 - .2 Maximum 25% slag cement content
 - .3 Minimum compressive strength at 28 days: 25 MPa.
 - .4 Nominal size of coarse aggregate: 20 mm.
 - .5 Slump at time and point of discharge: 50 to 100 mm.
 - .6 Air content: 0 to 3%.
- .2 Proportion normal density concrete in accordance with CSA-A23.1, to give following properties: for concrete in slabs-on-grade:
 - .1 Cement: Type 10 Portland cement, minimum 325 kg/m³
 - .2 Maximum 25% slag cement content
 - .3 Minimum compressive strength at 28 days: 32 MPa.
 - .4 Nominal size of coarse aggregate: 20 mm.
 - .5 Slump at time and point of discharge: 60 to 100 mm.
 - .6 Air content: 0 - 3% maximum.
- .3 Proportion normal density concrete in accordance with CSA-A23.1, to give following properties: for concrete ice pad:
 - .1 Cement: Type GU Portland cement, minimum 275 kg/m³
 - .2 Maximum 25% slag cement content
 - .3 Minimum compressive strength at 28 days: 32 MPa.
 - .4 Nominal size of coarse aggregate: 20 mm.
 - .5 Slump at time and point of discharge: 120 to 150 mm.
 - .6 Slump at time and point of placement: 150 to 180 mm.
 - .7 Adjust application of superplasticizer to account for length of pumping.
 - .8 Air content: 0 - 3% maximum.
 - .9 Water/cement ratio 0.45.
- .4 Do not change job mix formula without prior approval of the Consultant.

- .5 In addition to 28 day strength tests, 7 days test may be carried out. If average strength at 7 days is less than 70% of specified 28 day strength, check mix at once and adjust to ensure required strength is obtained.

PART 3 - EXECUTION

3.1 Contractor Qualification

- .1 All work in placing and finishing of the concrete slab must be completed by an experienced contractor. The Bidder shall submit a minimum of five (5) projects of similar scale, completed in the last 5 years, technology and complexity. Provide reference criteria as outlined in CCDC-11. Preference will be given to contractors with municipal experience.
- .2 The Contractor shall submit references for the Concrete Floor finisher. This subcontractor must have completed at least 5 arena concrete pads in the last 5 years. The submission is to include a list of past experience with ice pads and a minimum 3 references:

3.2 Workmanship

- .1 All concrete shall be as set forth in CSA-A23.1 and shall be composed of cement, fine and coarse aggregates and water.
- .2 Concrete shall be delivered and discharged within 1½ hours after the introduction of the mixing water at the batch plant.
- .3 Mixing, placing, compaction, curing, hot and cold weather protection shall conform to CSA-A23.1. Use power vibrators in sufficient number and in location and duration to the Consultant's complete satisfaction as required.
- .4 Obtain the Consultant's approval before placing concrete. Provide 24 hour notice prior to placing of concrete.
- .5 Pumping of concrete is permitted only after approval of equipment and mix.
- .6 Ensure reinforcement and inserts are not disturbed during concrete placement in order to maintain proper coverage.
- .7 Prior to placing of concrete obtain the Consultant's approval of proposed method for protection of concrete during placing and curing in adverse weather.
- .8 Maintain accurate records of poured concrete items to indicate date, location of pour, quality, air temperature and test samples taken.

- .9 Do not place load upon new concrete until authorized by the Consultant.

3.3 Inserts

- .1 Co-ordinate and verify that the Electrical Contractor has set all ducts, boxes and other inserts and openings as indicated or specified elsewhere. Sleeves and openings greater than 100 x 100 mm not indicated on structural or civil drawings must be approved by the Consultant.
- .2 Coordinate with refrigerant contractor and Owner for all inserts including but not limited to temperatures sensors, dasherboard inserts and goal net inserts.
- .3 Do not eliminate or displace reinforcement to accommodate inserts or hardware. If inserts cannot be located as specified, obtain approval of all modifications from the Consultant before placing of concrete.

3.4 Finishing

- .1 Provide steel trowel finish on all concrete surfaces to in accordance with Section 03350.

3.5 Curing and Protection

- .1 Cure and protect newly finished slabs and steps in accordance with CSA-A23.1, Section 21.
- .2 Coat exterior slabs, curbs with curing compound and leave for 30 days. Apply sealer after curing period has expired.
- .3 Cure finished concrete surfaces in a manner which will leave the surface with a uniform appearance and with a minimum of discolouration after drying. Ensure that curing compounds are compatible with adhesives for finishes to be applied later.
- .4 Curing for the arena slab shall include a flood cure, maintained in place for 7 days from time of pour. Dam all edges to retain the water. Replenish the water regularly to maintain a constant level of water at least 12mm.
- .5 Circulate cold water through the refrigerant piping for the first 48 hours after placement.
- .6 For all concrete slabs that are to remain exposed, curing compound is to be applied at a rate required for use as a sealer/hardener, in accordance with the manufacturer's instructions.

3.6 Field Quality Control

- .1 Inspection and testing of concrete and concrete materials will be carried out by a Testing Laboratory designated by the Consultant in accordance with CSA-A23.1.
- .2 The Consultant will take additional test cylinders during cold weather concreting. Cure cylinders on job site under same conditions as concrete which they represent.
- .3 Cast a minimum of 4 sets of 5 cylinders. Cylinder breaks to be as follows:
 - 1 of each at 3 days
 - 1 of each at 7 days
 - 1 of each at 21 days
 - Final 2 of each at 28 days.
- .4 Inspection or testing by Consultant will not augment or replace contractor quality control nor relieve him of his contractual responsibility.

3.7 Tolerances

- .1 Cast-in-Place concrete shall be constructed within the dimensional tolerances specified in CSA-A23.1, as specified elsewhere in this section. Concrete floor slabs shall be constructed as moderately flat slabs and within the tolerances listed below.
- .2 Conform in line, level and plumbness to the following tolerances. These are maximum values.
- .3 Variation from level or from grades shown in ice slab:

:	In any 3m (10')	-	3 mm (1/8")
:	Overall	-	6 mm (1/4")
- .4 Variation from level or from grades shown in floors grade:

:	In any 3m (10')	-	3 mm (1/8")
:	In any bay up to 6m (20')	-	6 mm (1/4")
:	In any 12m (40')	-	12 mm (1/2")
- .5 Variation in size and location of sleeves, floor open and the like and in location of bolts, inserts and fastenings:

:		-	6 mm (1/4")
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- .6 Variation in location of bolts, inserts, sleeves and fastenings when in group:

:		-	3 mm (1/8")
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- .7 Variation in cross-section of slabs, walls and piers:
- | | | | |
|---|-------------------|---|-------------|
| : | Maximum oversize | - | 3 mm (1/8") |
| : | Maximum undersize | - | 3 mm (1/8") |
- .8 There shall be no variations from required level at junction of walls and floors.
- .9 Where drains occur, floors shall be properly and uniformly sloped to allow complete drainage of the area.
- .10 Rink slab surface to conform to the following tolerances per CSA-A23.1, Table 16, for a moderately flat floor:
- .1 Straight-edge Tolerance: ± 5 mm
 - .2 Floor Flatness, F_F : 30
 - .3 Floor Levelness, F_L : 20
 - .4 Waviness Index, SWI: 3mm
- .11 No rink slab surface elevation shall vary from the specified datum elevation by more than ± 5 mm.
- .12 Upon completion, the Contractor shall complete a topographic survey of the ice pad in a maximum 3m x 3m grid
- .13 The Contractor shall grind down all high spots in the rink slab surface as required to meet the specified height tolerances.

3.8 Pull Down Procedure

- .1 Commence pull down of ice slab no sooner than 28 days after placement of ice slab.
- .2 Verify concrete strength has been attained prior to commencing pull down
- .3 Pull down slab temperature as follows:
- Pull down to 32 degrees F over 24 hours and hold for 24 hours
 - Pull down 3 deg F each day and hold for 24 hours
 - Pull down to progress as noted above until temperature of slab reaches Owner optimum temperature to make ice (16 to 18 deg F)
 - Logs to be kept and signed each day by both Contractor and the Owner

3.9 Defective Concrete

- .1 Concrete is defective when:
- .1 Containing visible honeycombing or embedded debris.
 - .2 Concrete damaged by freezing or which is unsatisfactory due to placement at too high a temperature.

- .3 Average 28 day strength of any three consecutive strength tests is less than specified minimum 28 day strength.
 - .4 Any 28 day strength test result in less than 88% of specified minimum 28 day strength.
 - .5 Cracking occurs in locations other than at control and construction joints.
 - .6 Curing is not carried out strictly according to the specifications.
- .2 Remove and reconstruct in entirety any defective concrete footing, slabs, walls as directed by the Consultant.

3.10 Cold Weather Protection

- .1 Refer to CSA Standards CSA-A23.1 and CSA-A23.2 Provisions and Publications. Include for tarped heated enclosures - no non-freeze additives such as calcium will be tolerated on this project.

END OF SECTION 03300

PART 1 - GENERAL

1.1 General Requirements

- .1 Division 1, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2 Work in Other Sections

.1 Related Work Specified in Other Sections

Section 03100	:	Concrete Formwork
Section 03300	:	Cast-in-Place Concrete
Section 06100	:	Rough Carpentry
Division 15	:	Mechanical

1.3 Qualification

- .1 The work of this Section shall be carried out by an established concrete finishing company having a proven record of satisfactory workmanship for a period of at least 5 years prior to this contract and approved by the Consultant.
- .2 The Contractor shall submit references for the Concrete Floor finisher. This subcontractor must have completed at least 5 arena concrete pads in the last 5 years. The submission is to include a list of past experience with ice pads and a minimum 3 references:

1.4 Scope of Work

- .1 Supply all materials, labour and service to provide acceptable finishes to all concrete floors, exterior slabs and exterior steps where indicated or required.
- .2 Supply all labour, materials and equipment necessary and as required to provide acceptable finishes for all concrete floor slabs, exterior concrete sidewalks, aprons, steps, traffic deck and exposed concrete retaining walls where noted on drawings and specified herein.

1.5 Reference Standards

CSA-A23.1-19: Concrete Materials and Methods of Concrete Construction
CSA-A23.2-19: Test Methods and Standard Practices for Concrete

PART 2 - PRODUCTS

2.1 Materials

- .1 Concrete Mixes: As specified in Section 03300.
- .2 Curing and Sealing Compounds: As specified in Section 03300.
- .3 Concrete Hardeners: As specified in Section 03300.
- .4 Formwork: As specified in Section 03100.
- .5 Admixtures: As specified in Section 03300.
- .6 Retarders: As specified in Section 03300.

PART 3 - EXECUTION

3.1 Curing and Protection

- .1 Cure, seal and protect newly finished slabs and steps in accordance with CSA-A23.1, Section 21, and as specified in Section 03300.

3.2 Concrete Finishing

- .1 General: Finish surfaces of all concrete in a manner acceptable for the installation of finished floor materials or if exposed in a manner acceptable to the Consultant.
- .2 Broom Finish: Concrete floor surfaces, which are to receive quarry, ceramic tile or precast terrazzo, and exterior sidewalks and concrete paving Type 1 shall have a fine broom finish after trowelling.
- .3 Steel Trowel Finish: All interior concrete floors, and concrete curbs which are to receive special flooring, resilient flooring or remain exposed, shall have steel trowel finish. After surfaces have been floated, steel trowel with machine trowels to produce a smooth, dense, hard surfaces with close surface tolerances.
- .4 Control Joints: Sawcut control joints as shown on drawings. Maximum spacing of control joints 3000mm in each direction. Co-ordinate locations with finished floor control joints. Sawcut joints within 24 hours of placing and to a depth as detailed on drawings.

END OF SECTION 03350

PART 1 - GENERAL

1.1 General Requirements

- .1 Division 1, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2 Work in Other Sections

- .1 Related Work Specified in Other Sections
Section 03300 : Cast-in-Place Concrete

1.3 References

CSA O121-17 (r2022): Douglas Fir Plywood
CSA O141-23: Softwood Lumber
CSA O151-17 (R2022): Canadian Softwood Plywood
ASTM A325M - 14 Standard Specification for Structural Bolts, Steel, Heat Treated
830 MPa Minimum Tensile Strength
CAN/CSA G164-M92 (R2023): Hot Dip Galvanizing of Irregularly Shaped Articles

1.4 Source Quality

- .1 Lumber identification: by grade stamp of an agency certified by Canadian Lumber Standards Accreditation Board.
- .2 Plywood identification: by grade mark in accordance with applicable CSA standards.

1.5 Shop Drawings

- .1 Submit shop drawings in accordance with Section 01300 Submittals.
- .2 Submit sepia and one copy of checked Shop Drawings to the Engineer for examination, giving complete information necessary for the fabrication of the various members and components of the structure, including material specifications and the location, type and size of all connections.
- .3 Erection Drawings shall show sizes and locations of all members and give complete location and details for setting anchor bolts and levelling plates. The elevations of all bearing plates shall be clearly shown.

PART 2 - PRODUCTS

2.1 Lumber Material

- .1 General: Lumber shall be spruce/pine/fir number 1 and 2 grades, unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards in the ratio of 67% and 33% respectively: -
 - .1 CSA 0141-1970.
 - .2 NLGA Standard Grading Rules for Canadian Lumber, 1980 edition revised according to Supplement No. 1, 1981.
- .2 Plywood: Douglas Fir (DF), spruce plywood conforming to CSA 0121-M1978, standard construction, tongue and groove to thickness shown on drawings. Minimum thickness 15 mm unless noted otherwise.
- .3 Fasteners: Proprietary fasteners toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacture. Use stainless steel or galvanized to CSA G164-M1981 fasteners for all exterior fastening and for any damp or moist areas.
- .4 Wood Preservative: Surface-applied wood preservative: clear copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.
- .5 Furring, blocking, nailing strips, grounds, rough bucks: Spruce, pine, douglas fir, S25 type, standard grade, nominal sizes unless noted. All material shall be pressure treated where concealed or installed exterior to the building or built into masonry, concrete or roofs.
 - .1 S2S is acceptable.
 - .2 Board sizes: "Standard" or better grade.
 - .3 Dimension sizes: "Standard" light framing or better grade.
- .6 Floor/Roof Sheathing: Tongue and groove spruce or fir plywood to thickness shown on drawings, minimum 15mm unless noted otherwise.
- .7 Material shall be straight, sawn square, true, dressed four sides properly sized, shaped to correct dimensions from nominal sizes noted on Drawings.

PART 3 - EXECUTION

3.1 Furring and Blocking

- .1 Install furring and blocking as required to all space-out and support as required for the project.

- .2 Align and plumb faces of furring and blocking to tolerance of 1:600.

3.2 Nailing Strips, Grounds and Rough Bucks

- .1 Install rough bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .2 Install rough bucks, nailers, framing and linings to wall supports, openings as noted for support of lockers, shelving, chalkboards, tackboards, chair rail, cabinets, millwork, washroom accessories and other accessories to be mounted on drywall partitions.

3.3 Fasteners

- .1 Frame, anchor, fasten, tie and brace members to provide necessary strength and rigidity.
- .2 Countersink bolts where necessary to provide clearance for other work.

3.4 Surface-Applied Wood Preservative

- .1 Treat all surfaces including cut ends of material with wood preservative before installation.
- .2 Apply preservative by dipping, or by brush to completely saturate and maintain wet film on surface, for minimum 3 minute soak on lumber and one minute soak on plywood.
- .3 Re-treat surfaces exposed by cutting, trimming or boring with liberal brush application of preservative before installation.

3.5 Installation

- .1 Lay out work carefully and to accommodate work of others. Cut and fit accurately. Erect in position indicated by drawings. Align, level, square, plumb, and secure work permanently in place. Brace work temporarily as required. Join work only over solid bracing.
- .2 Bore holes true to line and to same size as bolts. Drive bolts into place for snug fit, and use plates or washers for bolthead and nut bearings. Turn up bolts and lag screws tightly when installed, and again just before concealed by other work or at completion of work.
- .3 Co-operate with work of other Sections to ensure that unity of actions will ensure orderly progress to meet construction schedule.

- .4 Provide anchors, bolts and inserts, required for attachment of the work of this Section, to those performing the work of other Sections and who are responsible for their installation.
- .5 Work shall include rough hardware such as nails, bolts, nuts, washers, screws, clips, hangers, connectors, and strap iron required for installation of work and all operating hardware required on work of this Section for temporary use.
- .6 Do not attach work by wood plugs or blocking in concrete or masonry. Use lead shields, expansion shields, concrete nails, or similar methods only as approved by the Consultant.
- .7 Do not regard grounds, blocking, furring, and such other fastening provisions as shown on Drawings as exact or complete. Provide required provisions for fastening, located and secured to suit site conditions, and adequate for intended support.
- .8 Cut fastening work into lengths as long as practicable and with square ends. Erect work plumb, in true planes, and fastened rigidly in place.
- .9 Grounds around openings in cavity wall systems, under sills and thresholds to provide continuous support shall be 50 mm (2") minimum thickness, preservative treated.
- .10 All members shall be accurately cut to length, angle and be true to line to assure tight joints.
- .11 Correct alignment and plumb must be maintained until specified lateral bracing is installed. Cutting and altering of trusses is not permitted except by approval by the Engineer. Heavy concentrated loads must not be placed on top of trusses until permanent bracing and decking have been installed. In any event, these temporary loads must not exceed the truss design loads.

3.6 Special Protection

- .1 When it is required that wood maintain dimensional stability and tolerances to ensure accurate installation of later work, store and install it only in dry areas, and where no further installation of moist materials is contemplated.

END OF SECTION 06100

PART 1 - GENERAL

1.1 General Requirements

- .1 Division 1, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2 Work in Other Sections

- .1 Related Work Specified in Other Sections
Division 15 : Mechanical

1.3 Environmental Conditions

- .1 Apply sealants only to completely dry surfaces. Sealant and substrate materials to be minimum 5°C surface temperature. Should it become necessary to apply sealants below 5°C, consult sealant manufacturer and follow their recommendations.

1.4 Submittals

- .1 Submit samples to the Consultant for approval of each specified type of compound to be used together with the recommended primers and joint filler or fillers proposed to be used. Provide samples of available colours for selection by the Consultant.

1.5 Protection

- .1 Mask adjacent surfaces with masking tape prior to priming and caulking. Remove tape after joint has been tooled.

1.6 Warranty

- .1 Contractor hereby warrants that the work of this Section will not leak, crack, crumble, melt, shrink, run, lose adhesion or stain adjacent surfaces, and remain free from defects in material and workmanship for a period of three years from the date of the Work Certificate of Total Performance.

PART 2 - PRODUCTS

2.1 Materials

- .1 Primers: type recommended by sealant manufacturer for the appropriate sealant and corresponding substrate.

- .2 Joint fillers: Polyethylene, urethane, neoprene or vinyl: extruded closed cell foam, Shore A hardness 20, tensile strength 140 to 200 kPa.
- .3 Bond breaker: pressure sensitive plastic tape, which will not bond to sealants.
- .4 Joint cleaners: non-corrosive, non-staining type, recommended by sealant manufacturer and compatible with joint forming materials.
- .5 Sealants: Colour of sealant as selected by Consultant.
- .6 Sealants:
 - Type A: Multi-component, chemical cured to meet specified requirements of CAN2 192-M80, such as Dymeric, as manufactured by Tremco (Canada) Ltd. Use at all exterior building joints, floor, wall and masonry joint locations, except where another type is specified.
 - Type B: Acrylic solvent release, one part sealant. To meet specified requirements of CGSB 19-GP-5M, such as Mono, by Tremco (Canada) Ltd. Use at interior joints between windows, door frames and screen frames.
 - Type C: Silicone sealant. One part sealant; to meet specified requirements of CGSB 19-GP-9Ma, such as Proglaze, by Tremco (Canada) Ltd. Sealant for fixtures, vanity tops, and where mildew resistant is required.

PART 3 - EXECUTION

3.1 Preparation

- .1 Remove dust, paint, loose mortar and other foreign matter. Dry joint surfaces.
- .2 Remove rust, mill scale and coatings from ferrous metals by wire brush, grinding or sandblasting.
- .3 Remove oil, grease and other coatings from non-ferrous metals with joint cleaner.
- .4 Prepare concrete, masonry, glazed and vitreous surfaces to sealant manufacturer's instructions.
- .5 Examine joint sizes and correct to achieve depth ratio 1/2 of joint width with minimum width and depth of 6 mm, maximum width 25 mm.

- .6 Install joint filler to achieve correct joint depth. Install joint backing in joints. Joint backing shall be oversized to remain under 28% compression within the joint, 15 -6°C (20°F) and set back from the surface 9mm (3/8") to 12.5mm (1/2") to facilitate sealant bead thickness specified.
- .7 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .8 Apply bond breaker tape where required to manufacturer's instructions.
- .9 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

3.2 Application

- .1 Apply sealants, primers, joint fillers and bond breakers to manufacturer's instructions. Apply sealant using gun with proper size nozzle. Use sufficient pressure to fill voids and joints solid. Superficial pointing with skin bead is not acceptable.
- .2 All caulking shall be completed before adjacent surfaces, required to be painted, are painted.
- .3 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities. Neatly tool surface to a slight concave joint.
- .4 Apply sealant to joints between window or door frames to adjacent building components, around perimeter of every external opening, to control joints in masonry walls and between masonry and structural steel, to fixtures and millwork and walls, and as required exterior and interior to ensure a tight building.
- .5 Ensure that caulking is finished between structural members to be painted and all adjacent surfaces prior to painting.
- .6 Exposed caulking compound shall be smooth, free from ridges, wrinkles, air pockets and embedded impurities.
- .7 Clean adjacent surfaces immediately and leave work neat and clean. Remove excess sealant and droppings using recommended cleaners as work progresses. Remove masking after tooling of joints. Finished surfaces damaged due to this work shall be replaced to the satisfaction of the Consultant without extra cost to the Owner.

END OF SECTION 07900

PART 1 - GENERAL

1.1 General Requirements

- .1 Division 1, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2 Work in Other Sections

.1 Related Work Specified in Other Sections

Section 03300	:	Cast-in-Place Concrete
Section 05500	:	Miscellaneous Metal

1.3 Examination

- .1 Examine floor surfaces to ensure that they are clean, level and free from cracks, ridges, dusting, scaling and carbonation. Report to the Consultant in writing of any conditions which might preclude a satisfactory installation.

1.4 Submittals

- .1 Samples: Submit samples of each specified flooring, base and accessory material in accordance with Section 01300.
- .2 Maintenance Instructions: Submit maintenance instructions in accordance with Section 01300 for incorporation in Project Data Book.
- .3 Extra Stock: Deliver to Owner on completion of work, and as they direct, 1% of the quantity of flooring installed (minimum one (1) box), of each material and colour, in labelled packages.

1.5 Maintenance

- .1 Submit two copies of a maintenance manual, giving specific warnings of any maintenance practice or materials which may damage or stain the resilient flooring.

PART 2 - PRODUCTS

2.1 Materials

- .1 Corridor Covering: Mondo Ramflex tile – 900mm x 900mm x 9.5mm, allow two colours (border and field).
- .2 Adhesive: Two part urethane.

PART 3 - EXECUTION

3.1 Preparation

- .1 Clean all surfaces to receive flooring of all grease, oil, paint and other foreign material, before beginning work. Fill all cracks and hollows with materials approved by the Consultant. Remove all existing floor and existing adhesives.
- .2 Prior to the installation of the flooring, concrete slabs shall be tested for excessive moisture content by a method acceptable to the Consultant, the manufacturer and the Contractor.
- .3 Concrete slabs shall be minimum 28 days old before commencing installation.
- .4 Ensure that surfaces and material are at a minimum temperature of between 18°C and 32°C (65°F and 90°F) for 24 hours before, during and for 72 hours after installation.
- .5 Thoroughly clean sub-floors of any substance deleterious to the bond of the adhesive.

3.2 Installation

- .1 Apply primer, adhesive, flooring and base materials in accordance with manufacturer's recommendations.
- .2 Apply adhesives evenly with notched trowel. Lay flooring to good contact with close, even joints, finish surfaces in true, even plane and perfectly smooth. Roll evenly with 150 lb. roller immediately after laying, in both directions, to ensure uniform adhesion and to remove air pockets.
- .3 Accurately scribe around walls, columns, floor outlets and other floor penetrations.
- .4 Each type of material used shall be from one manufacturer throughout the work and material in each area shall be of the same production run.
- .5 Install edge strips at all unprotected edges of resilient flooring and at junction of other floor finish.
- .6 Finish flooring in door openings, if not continuous and where no threshold exists, against the strike side of the door stop unless otherwise noted or directed.
- .7 Remove any adhesive from the surface of the flooring as the work

progresses and upon completion.

- .8 Protect newly laid flooring from construction traffic for a period of four to seven days to allow the flooring to bond firmly. Upon completion, leave floors clean, smooth and free from buckles, cracks and projecting edges.
- .9 Colour pattern to match to be provided by Consultant.

END OF SECTION 09700

PART 1 - GENERAL

1.1 General Requirements

- .1 Division 1, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2 Quality Assurance

- .1 **Qualifications:** Execute work of this Section only by a Contractor who has adequate equipment and skilled tradesmen to perform work expeditiously, and is known to have been responsible for satisfactory work similar to that specified during a period of at least the immediate past five years.
- .2 **Requirements of Regulatory Agencies:** Coatings shall meet fire hazard classification requirements of jurisdictional authorities for each material in each installation location as applicable.

1.3 Submittals

- .1 **Samples**
 - : Submit 216mm x 280mm (8½" x 11") samples at least 30 days before materials are required; labelled to indicate finish, formula, colour name, number, sheen and gloss units.
 - : Each specified colour in each specified finish coat material.
 - : Each non-standard colour in each specified coat material.
 - : Each natural wood finish on each specified wood species.
- .2 **Extra Stock:** Deliver to Owner on completion of work, and as he directs, sealed containers of each finish painting material applied, and in each colour. Label each container as for original including mixing formula. Provide one quart of extra stock when less than 45 litres (10 gallons) are used for project, 4.5 litres (1 gallon) of extra stock when 45 to 182 litres (10 to 40 gallons) are used, and 9 litres (2 gallons) of extra stock when 182 litres (40 gallons) are used.

1.4 Product Delivery, Storage and Handling

- .1 Deliver to site each container sealed and labelled with manufacturer's name, catalogue number or brand name, colour, formulation type, reducing instructions and reference standard specification number if applicable.
- .2 Store only acceptable project materials at site and in an area specifically set aside for purpose that is locked, ventilated, maintained at a temperature of over 4°C (40°F) and protected from

direct rays of sun.

- .3 Ensure that health and fire regulations are complied with in storage area. Provide carbon dioxide fire extinguishers of 9 kg (20 lbs) minimum capacity in each storage area while materials are contained within.
- .4 On each container, for materials requiring a fire hazard classification, attach an Underwriter's label verifying that the material is listed under their label service, and giving the hazard classification.

1.5 Examination

- .1 Verify that specified environmental conditions are ensured before commencing work.
- .2 Ensure that surfaces to receive finishing materials are satisfactory for specified materials; will not adversely affect execution, permanence or quality of work.
- .3 Test all surfaces for moisture content with an electronic moisture meter, and concrete, masonry and plaster surfaces for acid-alkali balance.
- .4 Maintain at site at all times until work is completed a moisture meter, hygrometer and thermometer to verify surface and environmental conditions.
- .5 Apply finishing materials only when air and surface temperatures exceed 4°C (40°F), except for
 - 7°C for latex paint at interior locations
 - 10°C for latex paint at exterior locations
 - 21°C for lacquers and enamels.
- .6 Do not apply exterior finishes in direct sunlight that raises surface temperatures above that for proper application and drying, nor in rainy, foggy or windy weather.
- .7 Do not apply finishes when relative humidity is over 85%, when condensation has formed or is likely to form, nor immediately following rain, frost or dew.
- .8 Do not paint on plaster, drywall, pipe insulation or masonry surfaces that contain over 12% moisture, nor on wood that contains over 15%.

1.6 Protection

- .1 Cover or mask surfaces adjacent to those receiving treatment and finishing to protect work of others from damage and soil. Mask instructions and specification plates attached to equipment being painted.
- .2 Take particular care in storage and mixing areas that floors are protected by tarpaulins and metal pans.
- .3 Place cloths and other disposable finishing materials that are fire hazard, in closed metal containers containing water and remove from building every night.
- .4 Co-ordinate with the appropriate trades for the removal from finished surfaces, storage and reinstallation after finish work is completed for finish hardware, switch and receptacle plates, escutcheons, luminaire frames and similar items.
- .5 Post "NO SMOKING" signs and ensure that spark-proof electrical equipment is used in areas where flammable painting materials are being applied.
- .6 Post "WET PAINT" signs throughout freshly finished areas and remove when finishes are dry.

PART 2 - PRODUCTS

2.1 Materials

- .1 Paint materials listed in latest edition of MPI Approved Products List (APL) are acceptable for use on this project.

Approved Products: Benjamin Moore or Sherwin Williams.
- .2 Paint materials for paint systems: to be products of single manufacturer.
- .3 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, to be as follows:
 - .1 Be water-based , water clean-up.
 - .2 Be non-flammable biodegradable.
 - .3 Be manufactured without compounds which contribute to ozone depletion in upper atmosphere.
 - .4 Be manufactured without compounds which contribute to smog in the lower atmosphere.

- .5 Do not contain methylene chloride, chlorinated hydrocarbons, toxic metal pigments.
- .4 Water-borne surface coatings must be manufactured and transported in a manner that steps of processes, including disposal of waste products arising therefrom, will meet requirements of applicable governmental acts, by-laws and regulations including, for facilities located in Canada, Fisheries Act and Canadian Environmental Protection Act (CEPA).
- .5 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .6 Water-borne surface coatings and recycled water-borne surface coatings must have flash point of 61.0 degrees C or greater.
- .7 Recycled water-borne surface coatings must contain 50 % post-consumer material by volume.
- .8 Recycled water-borne surface coatings must not contain:
 - .1 Lead in excess of 600.0 ppm weight/weight total solids.
 - .2 Mercury in excess of 50.0ppm weight/weight total product.
 - .3 Cadmium in excess of 1.0ppm weight/weight total product.
 - .4 Hexavalent chromium in excess of 3.0 ppm weight/weight total product.
 - .5 Organochlorines or polychlorinated biphenyls (PCBS) in excess of 1.0 ppm weight/weight total product.

2.2 Colours

- .1 Consultant will provide Colour Schedule after Contract award.
- .2 Colour schedule will be based upon selection of five base colours and three accent colours. No more than eight colours will be selected for entire project and no more than three colours will be selected in each area.
- .3 Selection of colours will be from manufacturers full range of colours.
- .4 Where specific products are available in restricted range of colours, selection will be based on limited range.
- .5 Second coat in three coat system to be tinted slightly lighter colour than top coat to show visible difference between coats.

2.3 Mixing and Tinting

- .1 Perform colour tinting operations prior to delivery of paint to site. On-site tinting of painting materials is allowed only with Consultant's written permission.
- .2 Mix paste, powder or catalyzed paint mixes in accordance with manufacturer's written instructions.
- .3 Add thinner to paint manufacturer's recommendations. Do not use kerosene or organic solvents to thin water-based paints.
- .4 Thin paint for spraying according in accordance with paint manufacturer's instructions. If directions are not on container, obtain instructions in writing from manufacturer and provide copy of instructions to Consultant.
- .5 Re-mix paint in containers prior to and during application to ensure break-up of lumps, complete dispersion of settled pigment, and colour and gloss uniformity.

2.4 Mixing and Tinting

- .1 Paint gloss: defined as sheen rating of applied paint, in accordance with following values:

Gloss Level Units @ 60 Units @ 85 Category/ Degrees/
Degrees/
G1 - matte 0 to 5 max. 10 finish
G2 - velvet 0 to 10 10 to 35 finish
G3 - eggshell 10 to 25 10 to 35 finish
G4 - satin 20 to 35 min. 35 finish
G5 - 35 to 70 semi-gloss finish
G6 - gloss 70 to 85 finish
G7 - high > 85 gloss finish
- .2 Gloss level ratings of painted surfaces as noted by Owner.

2.5 Interior Painting Systems

- .1 Wood and Metal: including doors, door and window frames, casings, mouldings, etc.
 - .1 High performance architectural latex semi-gloss finish.
- .2 Plaster and Gypsum Board: gypsum wallboard, drywall, "sheet rock type material", etc., and textured finishes
 - .1 Latex eggshell finish (over latex sealer).

- .3 Plaster and Gypsum Board, Concrete ceilings
 - .1 Latex Flat finish
 - .2 Mix specified paste or powder coatings or those that are field-catalysed at job, to meet specified requirements of manufacturer.

PART 3 - EXECUTION

3.1 Preparation

- .1 Generally
 - : Remove from surfaces grease, oil, dirt, dust, ridges and other soil and materials that would adversely affect the adhesion or appearance of finish coatings.
 - : Finish, patch and smooth surfaces to remove cracks, holes, ridges and similar blemishes.
 - : Touch-up damaged prime coats on shop primed metals with same priming material.
 - : Neutralize highly alkaline surfaces with a neutralizing wash of 4% solution of zinc sulphate. Substitute 4% solution of tetrapotassium pyrophosphate for surfaces to receive latex paints. Brush off residue before painting.
 - : Scrub mildewed surfaces with a solution of tri-sodium phosphate, bleach with a solution of one part sodium hypochlorite (Javex) to three parts of water and rinse with clear water.
 - : Remove finishing hardware, electrical plates, accessories and similar removable fittings on surfaces to be finished. Mask any other work that is not removable.
- .2 Metal Surfaces
 - : Unprimed Steel: Remove, weld flux and scale with scrapers, wire brushes, wire power wheels, sandblasting, chipping or grinding as may be required. Finish surfaces smooth and remove weld flux alkali contamination with phosphoric acid solution. Wash with solvent.
 - : Primed Steel: Before touch-up of prime paint smooth out surface irregularities; clean weld joints, bolts, nuts and damaged areas with phosphoric acid solution; and wash with solvent.
 - : Galvanized Steel: Wash thoroughly with mineral spirits and wipe dry with completely clean cloths. Phosphatize surfaces in accordance with CGSB Specification 31-GP-116, or apply one coat of etch specified.

.3 Concrete and Masonry

- : Remove residue of form oil from concrete with xylol.
- : Fill minor holes and cracks in concrete, cement plaster and concrete masonry with Portland cement grout. Match patches to texture of adjacent surfaces.
- : Remove dirt, scale, loose mortar and similar foreign matter by brushing.
- : Remove oil and grease with a washing of tri-sodium phosphate solution followed by a thorough rinsing with water.
- : Remove efflorescence by dry brushing; or, if required, by washing with dilute muriatic solution of one part commercial muriatic acid to 20 parts water, followed by a commercial rinse with a drenching by clear water.
- : Wire brush concrete generally. Etch very smooth concrete, such as floors, with application of a solution of one part commercial muriatic acid (31.45%) to three parts of water by volume. Apply at rate of one gallon solution for each 4.5 to 9.0 square metres (50 to 100 square feet) of surface. When foaming action is finished, flush surfaces clean of cement laitance with high pressure water.

.4 Wood

- : Sand finish surfaces smooth with No. 00 sandpaper.
- : Clean soiled surfaces with an alcohol wash.
- : Wipe off dust and other loose dirt, or vacuum clean before application of coatings.
- : Seal knots, pitch and sapwood with two coats of orange shellac, or an application of special sealer.
- : After prime coat is dry and sanded, fill nail and screw holes and cracks with wood filler or with putty for interior work and caulking compound for exterior work. Colour fillers to match wood or stain if surfaces are given clear final coatings. Smooth, sand and prime fillers when set.
- : Wash down glue-laminated members that have been sealed, with solvent.

.5 Drywall

- : Fill minor holes and depressions, caused by accidental damage, with drywall joint cement and sand smooth when it is set, taking care not to raise nap of paper cover.

3.2 Application

.1 Generally

- : Before commencing work, arrange for a site meeting at which conditions of surfaces and possible adaptations to suit, and use of materials and application procedures shall be discussed between Contractor, Painting Subcontractor, Consultant and representatives of materials manufacturers.
- : Do not paint caulked joints.
- : Remove spatters of finish materials from adjacent surfaces including glass, before they set up.

.2 Priming and Back priming

- : Back prime exterior and interior woodwork, frames, fitments and similar work as soon as it is delivered and before installed. Use exterior primer compatible to finish coat for exterior work and enamel undercoat for interior work to receive paint or enamel finishes. Prevent primer from running over faces.
- : Back prime exterior and interior woodwork receiving clear finishes with gloss varnish reduced 25% by mineral spirits.
- : Prime tops and bottoms of painted wood doors with enamel undercoater. Remove doors to prime finish.
- : Prime alkaline surfaces with alkali resistant primer.
- : Brush out and force primers into grain of wood, and into crevices, cracks and joints in all materials.

.3 Painting

- : Apply paint by brush or rollers. Spray paint only when requested or approved by Consultant, and in areas restricted and approved by him.
- : Use only brushes for enamels and varnishes, and for painting wood.
- : Touch up visible suction spots on dried primer and ensure that they are sealed before application of second coat. Repeat on second coat if still visible.
- : Vary colour of intermediate coats by 10% to 25% from succeeding coat shades.

.4 Pipes, Equipment, Conduits and Ducts

- : Finish all exposed pipes including insulation to match exposed piping in existing building. Provide identification/directional stickers for all pipes in sufficient quantities.
- : Finish all exposed ductwork and electrical conduit to match the wall or ceiling surface to which it is installed.
- : Refer to mechanical and electrical drawings for extent of

work.

- : Finish all pumps and all equipment which is not prefinished.
Finish all equipment bases, isolators, etc.

3.3 Field Quality Control

- .1 Arrange for periodic visits to site by paint manufacturers' representatives while work is in progress. On each visit he shall verify that specified materials and methods are used, and that procedures agreed upon at the initial site meeting are followed.

3.4 Adjustment and Cleaning

- .1 Touch up and finish minor defective work. Refinish entire wall, ceiling or similar surfaces where finish is damaged or not acceptable.
- .2 Leave storage and mixing areas clean and in same condition as equivalent spaces in project.

3.5 Painting and Finishing Schedule

.1 Generally

- : Work of this Section shall include finishing all surfaces for which a finish formula is specified and as called for in the Room Finish Schedule.
- : Unless otherwise specified or indicated on Drawings and Schedules, finish pipes, ducts, conduit, equipment, panels, fitments, services, structure, attachments, accessories, prime coated hardware or similar appurtenances on or near finished surfaces to match finish of the surface.
- : Finish edges and tops of trim, projecting ledges, fitments, cupboards and similar work to match adjacent surfaces, whether or not they are above or beyond sight lines.
- : Finish interiors of alcoves, recesses, closets, cupboards, fitments and similar spaces to match adjacent surfaces unless otherwise indicated.

3.6 Restoration

- .1 Clean and re-install all hardware items removed before undertaking painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashings on exposed surfaces that were not painted. Remove smears and spatter immediately as operations progress, using compatible solvent.

- .4 Protect freshly completed surfaces from paint droppings and dust to approval of Consultant. Avoid scuffing newly applied paint.
- .5 Restore areas used for storage, cleaning, mixing and handling of paint to clean condition as approved by Consultant.

END OF SECTION 09900

PART 1 - GENERAL

1.1 General Requirements

- .1 Division 1, General Requirements, is a part of this Section and shall apply as if repeated here.

1.2 Work in Other Sections

.1 Related Work Specified in Other Sections

Section 03300	:	Cast-in-Place Concrete
Section 05500	:	Miscellaneous Metal
Section 06100	:	Rough Carpentry
Division 23	:	Refrigeration

1.3 Qualifications

- .1 Execute work of this Section only by a Subcontractor who has adequate plant, equipment and skilled tradesmen to perform it expeditiously and is known to have been responsible for satisfactory installations similar to that specified during a period of at least 5 years.

- .2 The following dasherboard installers have been pre-approved and must be used on this project:

Athletic Sports Systems

Phone: 519-747-1856 Fax: 519-747-3959 Waterloo ON

Sound Barriers

Phone: 905-678-7465 Fax: 905-678-7460 Mississauga, ON

Riley Manufacturing

Phone: 519-539-4830 Fax: 519-539-5006 Woodstock ON

- .3 Materials and products shall be manufactured by a company continuously and regularly employed in the manufacture of similar material for a period of at least 10 years; and which can show evidence of these materials being satisfactorily used on at least six (6) projects of similar size, scope and type within such a period. At least three (3) of the projects shall have been in successful use for 5 years or longer.
- .4 Other Approved Manufacturers
Arena board system shall be provided by an approved manufacturing firm having satisfactory experience in manufacturing and installing arena boards, using persons trained and skilled in the type of work required for both manufacturing and installing. Alternatives to the above listed dasher

board installers must be submitted before the question deadline stated within the procurement request and must provide evidence of at least ten (10) installations identical in construction and features to the following specification, each with a minimum of five (5) years' operating successfully prior to bid date. A list of these installations including arena name, contacts, address and telephone numbers must be included with requests for prior approval. A sample panel showing how the system is manufactured, including all features listed in this specification, must be submitted and approved prior to bid.

- .5 Steel framed dasherboard systems are not an acceptable alternate for this scope of work.

1.4 **Dasherboard System Description**

- .1 On completion of installation, supply three copies of instructions (PDF digital copy on USB stick) covering removal and replacement of panel system, reglazing, adjustments and other relevant operating and maintenance data.
- .2 Provide "As Built" drawings showing overall layout of the boards and glass (PDF copy on USB stick).

1.5 **Equipment**

- .1 Supply of floor inserts for hockey.

1.6 **Alternates**

- .1 Products of other manufacturers may also be approved as equal to those specified, providing detailed proposals are submitted as an alternate and listed on the tender form. Alternates submitted are subject to acceptance or rejection by the Consultant.

1.7 **Guarantees**

- .1 Submit a labour and material extended guarantee for defective work, which shall include but not be restricted to surface blemishes, leakage, delamination, undue expansion, deformation, failure to stay in place and deterioration of components, for a period of ten (10) years dating from acceptance of the Owner.

1.8 **Submittals**

- .1 Submit record drawings in accordance with Section 01300.

- .2 Shop drawings shall be submitted by manufacturer. Drawings shall be submitted to Contractor, Engineer, Architect or Owner for approval prior to actual fabrication of materials.
- .3 Shop drawings shall show, in appropriate scale, dimensions, details of arena board system, glazing assemblies, methods of joining, fastening, joint locations, methods of anchoring, sizes of anchorage's, glazing details and glazing methods, hardware, details of other pertinent components of the work, and adjacent constructions to which work of this Section will be attached.
- .4 Shop drawings shall indicate dimensioned layout and placement drawings for installation of floor anchors.
- .5 Submit samples of materials, finishes and colors for review.

1.9 **Product Delivery, Storage and Handling**

- .1 Store materials off site where directed and store off ground, under cover, protected from weather and construction activities.
- .2 Deliver materials to job in manner insuring installation continuity.
- .3 Store and handle to insure against racking, distortion, staining or other physical damage.
- .4 Deliver to site only sufficient amount of materials which may be safely installed or stored on the site at a given time.

1.10 **Co-ordination**

- .1 The work of this Section requires close co-ordination between the general contractor, mechanical and electrical contractor. It is the responsibility of this contractor to ensure that all setting templates and location drawings are followed and reviewed by other trades whose work proceeds the work of this Section.

PART 2 - PRODUCTS

2.0 Rink Dimensions

- .1 Rink size shall be as shown on the drawings. Size shall be field verified by manufacturer.

2.1 Materials

- .1 Aluminum Extrusions: ASTM B221, 6005-T5 or T6 alloy and temper
- .2 High Density Polyethylene (HDPE): High impact, integrally colour, high-density polyethylene, bright white and other colours as specified.
- .3 Sealants: Colour to match base kick strip as recommended by the manufacturer.
- .4 Floor Inserts: Meg-Nets, Model No. CH-44 for nets Model No. DM3.

2.2 Fabrication

- .1 As far as practical, execute fitting and assembly in the shop with the various parts or assemblies ready for erection at the project site.
- .2 Accurately fit together all joints, corners and intersections. Match components carefully to produce continuity of line and design.
- .3 Provide devices for anchoring the assemblies to the substrate with adjustment to permit correct and accurate alignment.
- .4 Fabricate anchoring devices required to secure the work of this Section. Supply anchors and layout drawing.
- .5 System components shall be numbered for ease of installation, disassembly, and reinstallation.

2.3 System Description for Base Bid Requirements

A. Arena Panels

- .1 Arena panels shall be factory prefabricated in demountable sections. The design of all panels whether straight, curved or in which a gate is located shall be similar. Each panel to be 1067mm in height and shall be made of extruded structural aluminum box sections assembled into frames using high strength fasteners. Aluminum to be mill finish. Frames shall allow for fastening of the HDPE facing and anchoring at base. Ensure flush mating of the HDPE facing at arena panel joints.
- .2 Typical sections shall consist of a minimum two vertical posts and three horizontal stringers. Frames shall be connected end to end with heavy duty, 16mm bolts and shall be connected to rink slab/perimeter concrete structure with minimum 16mm threaded rods and nuts or bolts, cast into the perimeter concrete.

- .3 Cladding: Panels to be clad with 12mm white High-Density Polyethylene (HDPE) facing the full height of each panel, and with 12mm colour impregnated HDPE cap rail and 200 mm high kickplate, colour to be selected from standard options (red, blue, yellow and gold). Both edges of cap rail shall have a smooth and radiused edge. Top edge of kick plate to have a radiused edge. Reprocessed polyethylene is not acceptable. Where acrylic shielding is specified, the cap rail shall be routed to accept shielding. Sill channels are not acceptable.
- .4 The HDPE facing shall be attached to the arena board framing with 6 mm diameter screws. Screws to be zinc-plated except for bottom row of kickplate, which is to be stainless steel. Heads of screws shall be painted to color match the facing, kick plate or top cap as appropriate, or if stainless steel, may be left unpainted. Spacing of the screws shall not exceed 225 mm on centre.
- .5 Colour extensions of red and blue game lines shall be color HDPE strips inlaid flush to the HDPE facing and inlaid flush to the HDPE kickplate in conformance with rink layout requirements per governing bodies.
- .6 Backer Panel (Standard)
 - .1 Install 10mm thick HDPE around entire perimeter of the rink with standard hardware as shown on the drawings.
 - .2 Height of backer panel to be full height on entire perimeter of the rink (or as shown on drawings).
 - .3 Backer panel shall be attached to the arena board framing with 6 mm diameter screws. Screws to be zinc-plated. Heads of screws shall be painted to color match the backer panel.
- .7 Advertising Panels
 - .1 Provide 3mm x2440mm w x 840mm flush-mounted Clear Lexan "Advertising Panels" incorporated into the panels as shown on the drawings.
 - .2 Panels must have bullnose edging and rounded corners to minimize errant puck bounces and potential player injury.
 - .3 Panels are supplied as predrilled and countersunk with flathead screws with special hi-lo thread to provide a safe and secure attachment.
- .8 Stainless Steel Gate Hardware
 - .1 Provide stainless steel gate latches and hinges.

B. Players, Penalty, and Officials' Boxes/Benches/Floors

- .1 Boxes shall consist of arena board enclosures similar to rink arena boards.
- .2 Boxes shall consist of two (2) team boxes, two (2) penalty boxes and one (1) officials' / timekeeper's box; located as indicated on drawings. Provide clear roof cover on the penalty box.
- .3 Interior finish of boxes shall be of similar construction as ice-side of arena boards, utilizing 12mm thick HDPE, to height of mid-stringer on front side (to provide a water bottle shelf), full height on other sides. Framing shall be similar construction as arena boards.
- .4 Player boxes shall be approximately as shown on the drawings. Access via two 900mm wide gates per box on ice side and one gate at the side of each box, as indicated on drawings.
- .5 Penalty boxes shall be approximately as indicated on drawings, with access via one gate on ice side.
- .6 Timekeepers' box shall be approximately as indicated on drawings, and with two side panels, one to each penalty box or as indicated on drawings. TK Table with supports, 400mm x full width of box, as shown on drawings, with bottom pencil holder.
- .7 Benches shall be full length in player boxes and full box width in penalty boxes. Benches shall be a nominal 240mm deep. Benches shall be extruded anodized aluminum with the seating surface being clad with 12.7mm HDPE. Benches to be mounted on pedestals at 560mm above floor. Bench pedestals shall be of a minimum 6mm aluminum base plate with 38mm x 75mm aluminum post. Bench pedestal locations to be positioned along the length of the bench as required.
- .8 Provide 140mm high raised wood framed floors, with 20mm plywood and 20mm rubber mat as shown on drawings.

Plywood: CSA O121, Douglas Fir plywood, exterior waterproof type, Grade G/Solid (Canadian Standard), or Product Standard PS-1, Douglas Fir plywood, exterior waterproof type (American Standard).
- .9 Provide coaches walkways, 200mm high with 20mm rubber mat on top and exposed sides covered with 10mm white HDPE. Walkway shall be 460mm deep.
- .10 Provide clear roof covering over timekeeper box.

C. Spectator Shielding

- .1 Provide 12mm "Arena Ready" clear tempered glass at the sides at a height of 1830mm above the top of the boards, as per drawings. Height shown is above cap rail.
- .2 Provide 16mm "Arena Ready" tempered glass at the ends and radius corners at a height of 1830mm above the top of the boards, as per drawings. Height shown is above cap rail.

Tempered Safety Glass:

Clear, colourless, fully toughened, heat tempered safety glass. The roll-wave distortion shall not exceed 0.127 mm (0.005") from peak to valley. Each piece of tempered glass shall bear the stamp of approval from a certified testing facility, proving the glass meets standards such as:

ANSI Z97.1-2009 Class A;
CPSC 16 CFR 1201 Category II;
CAN/CGSB 12.1-M90;
ASTM C1048; or
CAN/CGSB-12.1, Type 2

The stamp shall be in a location that will be visible and legible after boards and shielding are installed.

Note: ASTM & ANSI are American reference standards; CPSC & CAN/CGSB are Canadian reference standards.

- .3 Shielding shall not be installed in front of the player's boxes. Shielding shall be installed on sides and back of player's, penalty and timer's box and in front of penalty and timerkeeper's boxes.
- .4 An 85mm diameter speaker hole shall be provided in shielding in front of the timekeeper's boxes.

D. Spectator Shielding Supports

- .1 Provision for attachment of shielding glazing to the vertical supports shall be by means of an extruded, mill finish aluminum "Quick Release" shield support. This aluminum support shall run continuously to within 300mm of the top of the glazing; an extruded face plate will slot into aluminum support with no screws. Plastic "U" shaped gaskets protect the glass edges. At the gates only, the support is a two piece with a screw-applied face plate. The shield support system must facilitate the replacement of shields from the ice side without requiring additional support or securing of the adjacent shields.

- .2 Shielding and supports shall be designed for easy removal without tools for events when arena boards will remain in place but shielding and shielding supports are to be removed, including the gates.
- .3 Provide an easily replaceable protective corner bumper pad shall be provided to a height of not less than 900mm above boards.
- .4 Equipment gates shall be double gates with a 3050mm. Each leaf should be 1525mm wide.

E. Gates

- .1 Access and Machine gates in locations as shown on drawings, with one piece 25mm and 38mm) thick replaceable White HDPE Thresholds. Access gates shall be built into standard 2440mm sections and shall be 914mm wide, left or right-hand swing. Gate latch shall be a single latch type. Double access gates shall be double gates incorporated into a standard 2438mm panel, with locking hardware similar to equipment gates. All gate latches and hinges to be zinc plated.
- .2 Players gates shall be built into standard 2440 mm sections and shall be 760 mm wide, left- or right-hand swing. Gate latch to be a single latch type.
- .3 Provide a flush mounted push-button latch release in the cap rail on the ice entrance gates where shields would otherwise prevent latch operation. The push-button shall be designed to be simple to operate from both sides of the shielding (suitable for opening gates with hockey glove on hand), yet prevent accidental opening.
- .4 Each equipment gate unit shall be equipped with Heavy Duty Adjustable Hinges with built in adjustment features that simplifies alignment and installation and one locking clamp or sliding bar and two retractable flush bolts into the threshold or floor.
- .5 Each equipment gate unit shall be equipped with adjustable heavy-duty spring-loaded casters with the direction of travel fixed to the arc of the door.
- .6 Provide "Gate Levelling Screws" at all gate locations (the gates can be realigned with the ice in).
- .7 Quantity and size of gates to be shown in drawings.

F. Board Anchors

- .1 All arena boards shall be tightly fastened to the perimeter slab by means of zinc plated bolts or threaded rods and nuts. Anchors: Galvanized Steel or Zinc plated, permanent drilled on site anchor bolt system for securing to

concrete substrate. Threaded rod and nuts for perimeter curb installation.

- .2 For precast anchors, the dasher board manufacturer shall provide a supervisor on site during the concrete pour to ensure anchor integrity.

G. Spare Components

- .1 Supply, in addition to quantities required for the Work, extra materials and products to the owner:
 - .1 Fifty (50) additional painted screws of each colour required for fastening of HDPE facings.
 - .2 Fifty (50) additional painted screws of each colour required for fastening of ad panels.
 - .3 Two (2) extra pieces of facing, cap rail (straight and curved) and kickplate.
 - .4 Three (3) extra pieces of each standard size piece of tempered glass for the ends and sides.
 - .5 Three (3) extra pieces of 1830mm and 2440mm x nominal 12mm acrylic to handle all special sizes of glass.

PART 3 - EXECUTION

3.1 Examination

- .1 Before commencing erection and installation, examine the work of other Sections to which the work of this Section will be attached.
- .2 Report immediately in writing to the Contractor/Engineer, all discrepancies in accuracy and suitability, conditions that will adversely affect the installation and permanency of the work of this Section.

3.2 Installation of Dasherboard System

A. General

- .1 Provide a complete installation of the board system by the manufacturer or manufacturer approved dealer in accordance with the drawings and specifications.
- .2 Installation shall be in strict conformance with the manufacturer's requirements and instructions.

B. Adjusting

- .1 Upon completion of the Work of this Section, inspect, test and adjust installation
- .2 Test all operable elements and ensure easy and smooth operation.

- .3 Upon completion of installation do a general clean-up.

C. Protective Netting

- .1 Existing protective netting remain in place. Contractor to roll up and protect as required. Reinstall once dasherboard glass is installed. Provide additional netting as shown on the drawings. Provide all requisite hardware for a complete installation. Make any adjustment as required to account for changes in glass height.
- .2 Netting shall be fastened to the shielding supports in such a way to prevent pucks from falling outside the rink area.
- .3 Netting hardware package to include beam clamps, cables and miscellaneous hardware required for a complete installation. Supplement existing hardware as required for a complete installation.
- .4 Netting colour to match existing.

D. Cleaning

- .1 Final cleaning to be carried out as part of General Conditions.

END OF SECTION 011500

SECTION 17000	REFRIGERATION SPECIFICATION INDEX
SECTION 17001	REFRIGERATION DESIGN AND BUILD REQUIREMENTS
SECTION 17010	REFRIGERATION GENERAL REQUIREMENTS
SECTION 17015	DEMOLITION AND RENOVATION
SECTION 17051	PIPE WELDING
SECTION 17061	BASES, HANGERS AND SUPPORTS
SECTION 17075	MECHANICAL IDENTIFICATION
SECTION 17081	THERMAL INSULATION FOR PIPING
SECTION 17125	FLEXIBLE CONNECTIONS, EXPANSION JOINTS, ANCHORS AND GUIDES
SECTION 17161	RINK PIPING
SECTION 17183	HYDRONIC SYSTEMS: STEEL
SECTION 17188	WATER TREATMENT
	END OF SECTION

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1 GENERAL REQUIREMENTS

1. Supply and install all necessary labour and material to provide a complete and operational refrigeration system and new all year ice surface. The contractor must examine all drawings, and specifications in order to determine a clear and concise scope of work.
2. Be responsible for the installation of all equipment, materials, and accessories and the labour required in the completion of this contract to the full satisfaction and acceptance of the Owner and Consultant. Misinterpretation of the scope of work will not relieve this Contractor of responsibility.
3. **The contractor must design the refrigeration systems and provide to the owner and their consultants a set of complete refrigeration drawings and specifications for review. These drawings must bear the stamp of a professional engineer licensed by the P.E.O. Proof of the Engineer's Professional Liability Insurance must be provided to the owner. Heating and cooling calculations shall be included with submission. Owner and/or consultant requested changes must be complete by the contractor and resubmitted until they are accepted.**
4. Scope of Work
 - .1 Replace two cold rink floor complete with underfloor cooling and heating loops.
 - .2 Remove header in trench. Provide new buried header.
 - .3 Remove header back to refrigeration room.
 - .4 Dispose all existing brine and glycol in the system. Provide and guarantee new brine and glycol in the system.
 - .5 Start up and make operable the entire system.
5. The design engineer shall submit biweekly inspection reports during the course of construction and submit to the owner, consultant, and building official. Upon completion, submit final review certificate.
6. The installation shall meet all Provincial, Municipal, local, and Fire Marshall requirements, regulation, codes and by-laws in force in the area of the project.
7. The installations shall meet standards and include commercial grade products with proper service and support in the area.
8. All materials and quality of workmanship must be first class meeting industry standards to the acceptance of owner and consultants.
9. Provide all necessary notices, obtain all necessary permits, and pay all fees in order that the work may be carried out. Each Contractor shall finish any certificates necessary as evidence that the work installed conforms with the laws and regulations of all authorities having jurisdiction.
10. In the event that changes or alterations are required by authorized inspectors, these changes shall be made at the Contractor's expense.

11. Special equipment which does not have a standard CSA label shall be inspected by the Special Inspection Department of the HEPC and the Approval Certificate shall be submitted to the Consultant as soon as possible. All costs and fees for inspections shall be borne by this Contractor. Indicate date of site visit on the submitted quote.
12. Visit and examine the site and the local conditions affecting this work prior to tender closing. No allowances will be made later for any expense incurred from existing site conditions. Indicate date of site visit on the submitted quote.
13. Notify other Contractors on the project of all openings, recesses, hangers, pipe and duct runs or other provisions to enable the other trades to co-operate and make the necessary provisions for the work involved. Cutting of openings shall be the responsibility of the Contractor requiring the openings. Failure to comply with these requirements on the part of any Contractor will make them responsible for the cost of changes to any work required to rectify the situation.
14. Submit composite drawings as required of locations where there is possibility of conflict with the work of other trades. Indicate exact locations and elevations of pipes, ducts, conduits, etc., obtained from field measurements.
15. All materials and equipment used in the contract shall be new and the best of their respective kinds and of a uniform manufacture throughout the work.
16. Before the installation or fabrication of any equipment is started, each Contractor must submit ten (10) copies of shop drawings for all major equipment. All shop drawings shall be submitted and reviewed prior to the approval of any payment.
17. Before final acceptance is made by the Owner this contractor is to turn over to the Owner, one set of "As Built" white prints showing the location of all piping, ducts, equipment, etc. These drawings are to incorporate all changes made during the tender/construction period.
18. Each Contractor shall provide all necessary protection for finished or unfinished work to ensure that such work or finish does not become damaged or marred during the progress of the contract.
19. All material and equipment damaged by weather or through negligence shall be removed and replaced with new material.
20. The drawings and specifications prepared by DEI & Associates Inc. are to establish a minimum standard to be met, and required arrangement requested by the owner.
- .21 Any alteration or design intent changes that the refrigeration contractor wishes to make must be identified at the time of tender.

END OF SECTION

1 General

1.1 GENERAL PROVISIONS

- .1 This section covers items common to all sections of Refrigeration Division.
- .2 Conform to Division 1 General Conditions.
- .3 Furnish labour, materials, and equipment necessary for completion of work as described in contract documents.
- .4 Unless specifically indicated, all materials and equipment provided under this contract shall be new and shall be manufactured in the project year.

1.2 INTENT

- .1 Mention herein or indication on Drawings of articles, materials, operations or methods requires: supply of each item mentioned or indicated, of quality, or subject to qualifications noted; installation according to conditions stated; and performance of each operation prescribed with furnishing of necessary labour, equipment, and incidentals for Refrigeration work.
- .2 Where used, words "Section" and "Division" shall also include other Subcontractors engaged on site to perform work to make building and site complete in all respects.
- .3 Where used, word "supply" shall mean furnishing to site in location required or directed complete with accessory parts.
- .4 Where used, word "install" shall mean secured in place and connected up for operation as noted or directed.
- .5 Where used, word "provide" shall mean supply and install as each is described above.

1.3 REGULATIONS, PERMITS AND FEES

- .1 All materials and quality of work shall meet all current and latest Provincial, Municipal and Fire Marshall requirements, regulations, codes and by-laws in force in the area of the project.
- .2 Each contractor shall give all necessary notices, obtain all necessary permits, and pay all fees in order that the work shown or specified may be carried out. Each contractor shall furnish any certificates necessary as evidence that the work installed conforms with the laws and regulations of all authorities having jurisdiction.

- .3 In the event that changes or alterations are required on completed work by authorized inspectors, these changes shall be made at the contractor's expense.
- .4 Special equipment which does not have a standard CSA label shall be inspected by the Special Inspection Department of the HEPC and the Approval Certificate shall be submitted to the Consultant as soon as possible. All costs and fees for inspections shall be borne by this contractor.
- .5 Submit a copy of all final certificates in the maintenance manuals.

1.4 DRAWINGS

- .1 Refrigeration Drawings do not show structural and related details. Take information involving accurate measurement of building from building drawings, or at building. Make, without additional charge, any necessary changes or additions to runs of piping, conduits and ducts to accommodate structural conditions. Location of pipes, ducts, conduits and other equipment may be altered by Consultant without extra charge provided change is made before installation and does not necessitate major additional material.
- .2 As work progresses and before installing piping, ductwork, heating units, registers, diffusers, fixtures and any other fittings and equipment which may interfere with interior treatment and use of building, provide detail drawings or obtain directions for exact location of such equipment and fittings.
- .3 Refrigeration Drawings indicate general location and route of pipes, ducts and conduits which are to be installed. Where required work is not shown or only shown diagrammatically, install same at maximum height in space to conserve head room (minimum 2200 mm (88") clear) and interfere as little as possible with free use of space through which they can pass. Follow building lines, conceal piping, conduits and ducts in furred spaces, ceilings and walls unless specifically shown otherwise. Install work close to structure so furring will be small as practical.
- .4 Install piping and ductwork to clear structural members and any fireproofing. Locate Refrigeration work to permit installation of specified insulation. Do not remove or damage structural fireproofing. Leave space to permit fireproofing and insulation to be inspected and repaired.
- .5 Before commencing work, check and verify all sizes, locations, grade and invert elevations, levels and dimensions to ensure proper and correct installation. Verify existing/municipal services.
- .6 Locate all equipment in such a manner as to facilitate easy and safe access to and maintenance and replacement of any part.

- .7 In every place where there is indicated space reserved for future or other equipment, leave such space clear, and install piping and other work so that necessary installation and connections can be made for any such apparatus. Obtain instructions whenever necessary for this purpose.
- .8 Relocate equipment and/or material installed but not co-ordinated with work of other Sections and/or installed incorrectly as directed, without extra charge.
- .9 Where drawings are done in metric and product not available in metric, the corresponding imperial trade size shall be utilized.

1.5 INTERFERENCE AND CO-ORDINATION DRAWINGS

- .1 Prepare interference and equipment placing drawings to ensure that all components will be properly accommodated within the constructed spaces provided.
- .2 Prepare drawings to indicate co-ordination and methods of installation of a system with other systems where their relationship is critical. Ensure that all details of equipment apparatus, and connections are co-ordinated.
- .3 Ensure that clearances required by jurisdictional authorities and clearances for proper maintenance are indicated on drawings.
- .4 Upon consultant's request submit copies of interference drawings to consultant.
- .5 Due to the nature of the building and the complexity of the building systems provide the following:
 - .1 Interference drawings, showing coordination of architectural, structural, mechanical, refrigeration and electrical systems for the consultant's review prior to fabrication.
 - .2 Detailed layout drawings, clearly showing fasteners and hangers.
- .6 Provide CAD drawings (minimum release AutoCAD 2007) in addition to hard copies.

1.6 QUALITY ASSURANCE

- .1 Perform work in accordance with applicable provisions of local Plumbing Code, Gas Ordinances, and adoptions thereof for all Refrigeration systems. Provide materials and labor necessary to comply with rules, regulations, and ordinances.
- .2 In case of differences between building codes, provincial laws, local ordinances, utility company regulations, and Contract Documents, the most stringent shall govern. Promptly notify Consultant in writing of such differences.

1.7 ALTERNATES AND SUBSTITUTIONS

- .1 Throughout Refrigeration Division are lists of "Alternate Equipment" manufacturers acceptable to Consultant if their product meets characteristics of specified described equipment. Submitted Bids shall be based on the supply of named articles and or products as specified in the Bid Documents.
- .2 Each bidder may elect to use "Alternate Equipment" from lists of Alternates where listed. Include for any additional costs including all costs for revisions to electrical contract to suit Alternate used. Prices are not required in Tender for Alternates listed except where specifically noted as "Separate Price". Complete the Supplementary Tender Form.
- .3 When two or more suppliers/manufacturers are named in the Bid Documents, only one supplier/manufacturer of the products named will be acceptable; however, it is the responsibility of this Division to ensure "Alternate Equipment" fits space allocated and gives performance specified. If an "Alternate Equipment" nor "equal" specified product unit is proposed and does not fit space allotted in Consultant's opinion, supply of specified described equipment will be required without change in Contract amount. Should electrical characteristics for "alternate" or "equal" equipment differ from equipment specified it shall be the responsibility of the equipment manufacturer to pay all costs associated with the revisions to the electrical contract. Only manufacturers listed will be accepted for their product listing. All other manufacturers shall be quoted as substitution stating conditions and credit amount.
- .4 If item of material specified is unobtainable, state in Tender proposed substitute and amount added or deducted for its use. Extra monies will not be paid for substitutions after Contract has been awarded.
- .5 If pipe or item, of size or weight indicated, is unobtainable, supply next larger size or heavier weight without additional charge.

1.8 EXAMINATION

- .1 Site Inspection
 - .1 Examine premises to understand conditions, which may affect performance of work of this Division before submitting proposals for this work.
 - .2 No subsequent allowance for time or money will be considered for any consequence related to failure to examine site conditions.
- .2 Drawings:
 - .1 Refrigeration Drawings show general arrangement of piping, ductwork, equipment, etc. Follow as closely as actual building construction and work of other trades will permit.
 - .2 Consider Architectural and Structural Drawings part of this work insofar as these drawings furnish information relating to design and construction of building. These drawings take precedence over Plumbing, Mechanical,, and Fire Protection Drawings.

- .3 Because of small scale of Drawings, it is not possible to indicate all offsets, fittings, and accessories, which may be required. Investigate structural and finish conditions affecting this work and arrange work accordingly, providing such fittings, valves, and accessories required to meet conditions.
- .3 Ensure that items to be furnished fit space available. Make necessary field measurements to ascertain space requirements including those for connections and furnish and install equipment of size and shape so final installation shall suit true intent and meaning of Contract Documents. If approval is received by Addendum or Change Order to use other than originally specified items, be responsible for specified capacities and for ensuring that items to be furnished will fit space available.

1.9 SEQUENCING SCHEDULING AND COORDINATION

- .1 It is understood that while Drawings are to be followed as closely as circumstances permit, this Division will be held responsible for installation of systems according to the true intent and meaning of Contract Documents. Anything not clear or in conflict will be explained by making application to Consultant. Should conditions arise where certain changes would be advisable, secure Consultant's approval of these changes before proceeding with work.
- .2 Coordinate work of various trades in installing interrelated work. Before installation of Refrigeration items, make proper provision to avoid interferences in a manner approved by Consultant. Each Contractor shall refer to all sections of the specification for their responsibilities with other trades. Changes required in work specified in Refrigeration Division caused by neglect to do so shall be made at no cost to Owner.
- .3 Arrange pipes, ducts, and equipment to permit ready access to valves, unions, traps, starters, motors, control components, and to clear openings of doors and access panels.
- .4 Furnish and install inserts and supports required by Refrigeration Division unless otherwise noted. Furnish sleeves, inserts, supports, and equipment that are an integral part of other Divisions of the Work to Sections involved in sufficient time to be built into construction as the Work proceeds. Locate these items and see that they are properly installed. Expense resulting from improper location or installation of items above shall be borne by Refrigeration Division.
- .5 Be responsible for required excavation, backfilling, cutting, and patching incident to work of this Division and make required repairs afterwards to satisfaction of Consultant. Cut carefully to minimize necessity for repairs to existing work. Do not cut beams, columns, or trusses.
 - .1 Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials.

- .2 Each Section of this Division shall bear expense of cutting, patching, repairing, and replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.
- .3 Cutting, patching, repairing, and replacing pavements, sidewalks, roads, and curbs to permit installation of work of this Division is responsibility of Section installing work.
- .6 Adjust locations of pipes, ducts, equipment, fixtures, etc, to accommodate work from interferences anticipated and encountered. Determine exact route and location of each pipe and duct prior to fabrication.
 - .1 Make offsets, transitions, and changes in direction of pipes, ducts, and electrical raceways as required to maintain proper head room and pitch of sloping lines whether or not indicated on Drawings.
 - .2 Furnish and install traps, air vents, sanitary vents, pull boxes, etc, as required to effect these offsets, transitions, and changes in direction.
- .7 Slots and openings through floors, walls, ceilings, and roofs shall be provided by this contractor but performed by a trade specializing in this type of work. This Division shall see that they are properly located and do any cutting and patching caused by its neglect to do so.

1.10 CONTRACT BREAKDOWN

- .1 Provide breakdown of contract exclusive of HST to acceptance of consultants prior to first draw submission.
- .2 Provide labour and material cost for each item.
- .3 Breakdown shall indicate total contract amount.
- .4 Contract breakdown shall be as follows as a minimum.
 - Mobilization and shop drawings (max. \$10,000.00)
 - Demolition
 - Underfloor heating system
 - Cold floor ice system
 - System cleaning
 - Piping Insulation
 - System commissioning
 - Refrigeration contractor closeout requirements (min. of 3% but not less than \$5,000.00)
- .5 Progress claims, when submitted are to be itemized against each item of the contract breakdown, this shall be done in table form showing contract amount, work complete to date, previous draw, amount this draw and balance.

1.11 SHOP DRAWINGS AND PRODUCT DATA

- .1 Furnish complete catalog data for manufactured items of equipment to be used in the Work to Consultant for review within 30 days after award of Contract.

- .2 Provide a complete list of shop drawings to be submitted prior to first submission.
- .3 Before submitting to the Consultant, review all shop drawings to verify that the products illustrated therein conform to the Contract Documents. By this review, the Contractor agrees that it has determined and verified all field dimensions, field construction criteria, materials, catalogue numbers, and similar data and that it has checked and coordinated each shop drawing with the requirements of the work and of the Contract Documents. The Contractor's review of each shop drawings shall be indicated by stamp, date and signature of a qualified and responsible person possessing by the appropriate authorization.
- .4 Shop drawings shall be submitted by an electronic submission as per the following directions.
 - .1 State sizes, capacities, brand names, motor HP, accessories, materials, gauges, dimensions, and other pertinent information.
 - .2 List on catalog covers page numbers of submitted items.
 - .3 Underline applicable data.
 - .4 Electronic Submissions:
 - .1 Electronically submitted shop drawings shall be prepared as follows:
 - .1 Use latest software to generate PDF files of submission sheets.
 - .2 Scanned legible PDF sheets are acceptable. Image files are not acceptable.
 - .3 PDF format shall be of sufficient resolution to clearly show the finest detail.
 - .4 PDF page size shall be standardized for printing to letter size (8.5"x11"), portrait with no additional formatting required by the consultant. Submissions requiring larger detail sheets shall not exceed 11"x17".
 - .5 Submissions shall contain multiple files according to section names as they appear in Specification.
 - .6 File names shall include consultant project number and description of shop drawing section submitted.
 - .7 Each submission shall contain an index sheet listing the products submitted, indexed in the same order as they appear in the Specification. Include associated PDF file name for each section.
 - .8 On the shop drawing use an "electronic mark" to indicate what is being provided.
 - .9 **Each file shall bear an electronic representation of the "company stamp" of the contractor. If not stamped the file submission will not be reviewed.**
 - .2 Email submissions shall include subject line to clearly identify the consultants project number and the description of the shop drawings submitted.
 - .3 Electronic attachments via email shall not exceed 10MB. For submissions larger than 10MB, multiple email messages shall be used. Denote related email messages by indicating "1 of 2" and "2 of 2" in email subject line for the case of two messages.

- .4 Electronic attachments via web links (URL) shall directly reference PDF files. Provide necessary access credentials within link or as username/password clearly identified within body of email message.
- .5 On site provide one copy of the "reviewed" shop drawings in a binder as noted above.
- .6 Contractor to print **3** copies of "reviewed" shop drawings and compile into maintenance manuals.
- .5 Additional shop drawings required by the contractor for maintenance manuals, site copies etc., shall be photocopies of the "reviewed" shop drawings. All costs to provide additional copies of shop drawings shall be borne by the contractor.
- .6 Partial submittals will not be accepted.
- .7 If material or equipment is not as specified or submittal is not complete, it will be rejected by Consultant.
- .8 Catalog data or shop drawings for equipment, which are noted as being reviewed by Consultant or his Engineer shall not supersede Contract Documents.
- .9 Review comments of Consultant shall not relieve this Division from responsibility for deviations from Contract Documents unless Consultant's attention has been called to such deviations in writing at time of submission, nor shall they relieve this Division from responsibility for errors in items submitted.
- .10 Check work described by catalog data with Contract Documents for deviations and errors.
- .11 Shop drawings and product data shall show:
 - .1 Mounting arrangements.
 - .2 Operating and maintenance clearances. e.g. access door swing spaces.
- .12 Shop drawings and product data shall be 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 as to current model production.
 - .5 Certification of compliance to applicable codes.

1.12 TESTS

- .1 Give 48 hours written notice of date for tests.
- .2 Insulate or conceal work only after testing and approval by Consultant.
- .3 Conduct tests in presence of Consultant.

- .4 Bear costs including retesting and making good.
- .5 Piping:
 - .1 General: maintain test pressure without loss for 4 h unless otherwise specified.
 - .2 Hydraulically test hydronic piping systems at 1-1/2 times system operating pressure or minimum 860 kPa, whichever is greater.
- .6 Equipment: test as specified in relevant sections.
- .7 Prior to tests, isolate all equipment or other parts which are not designed to withstand test pressures or test medium.

1.13 SYSTEM START UP

- .1 Provide adjusting testing and start up of all equipment prior to testing and balancing (TAB) specified elsewhere.
- .2 Provide consultant with written notice verifying all equipment operation and installation is complete.
- .3 Start up shall be in presence of the following: owner or representative, consultant, contractor, building automation systems (BAS) contractor, and manufacturer's representative. Each person shall witness and sign off each piece of equipment.
- .4 Simulate system start up and shut down and verify operation of each piece of equipment.
- .5 Arrange with all parties and provide 72 hours notice for start up procedure.
- .6 Arrange with building automation systems contractor to sequence all components and ensure system operation.

1.14 COMMISSIONING

- .1 Co-ordinate and direct each step of the commissioning process, and recommend acceptance or non-acceptance to the Owner/Owner's Representative.
- .2 Prepare, in writing, documentation of any deficiencies discovered during the commissioning process. Submit to consultant and Owner/Owner's Representative.
- .3 The Commissioning Process is detailed in *ASHRAE Guideline 1-1996 HVAC Commissioning Process*. The commissioning plan may be modified to reflect the actual construction schedule and design.

- .4 Provide a pre-functional test of all HVAC Refrigeration system and sub-system elements, including control devices, shall be checked for the following:
 - .1 Verify that each element has been properly installed, properly identified, and that all connections (including electrical) have been made correctly.
 - .2 Verify that each element has been checked for proper lubrication, drive rotation, belt tension, control sequence, flow direction, or other conditions which may cause damage or reduce system performance.
 - .3 Verify that tests, meter readings, and specific Refrigeration/electrical performance characteristics agree with those required by equipment or system manufacturer.
 - .4 Controls calibration to be completed in accordance with the specification.
- .5 A functional performance testing shall be done during two separate periods – one during the cooling season and one during the heating season. The first (cooling) testing period shall occur as soon after completion of installation as practical. The heating testing period shall occur as soon as weather conditions make it practical to test warm-up, zone heating and economizer functions. These tests ensure that all equipment and systems operate in accordance with design intent. The tests are dynamic tests, and test the systems through all possible modes of operation.
- .6 Reports:
 - .1 The contractor shall be responsible for recording, documenting, and maintaining detailed inspection and testing data on the test documentation reports. The data record shall be comprehensive and concise.
 - .2 All data must be recorded as soon as possible during the course of the inspection and testing.
 - .3 All documentation shall have the date, time, and names of persons participating in the inspection and testing.
 - .4 All test instruments shall be documented for valid calibration.
 - .5 The recording work sheets, inspection check lists, and Performance Testing plans must all be approved by the Engineer and the owner's representative prior to the start of the testing.
 - .6 Include all commissioning documentation in the maintenance manuals.
- .7 Refrigeration System Execution:
 - .1 Operate equipment and systems shall be tested in the presence of the owner's representative and the consultant to demonstrate compliance with specified requirements. To minimize the time of Commissioning Team members, testing shall be done in four seasonal single blocks of time insofar as possible.
 - .2 Notify the consultant, in writing, fourteen (14) days prior to tests scheduled under requirements of this Section.
 - .3 Testing shall be conducted under specified design operating conditions as recommended or approved by the consultant.
 - .4 All elements of systems shall be tested to demonstrate that total systems satisfy all requirements of these Specifications. Testing shall be accomplished on hierarchical basis. Test each piece of equipment for proper operation, followed by each sub-system, followed by entire system, followed by any inter-ties of other major systems.

- .5 All special testing materials and equipment shall be provided by the appropriate contractor.
- .6 Provide three copies of all test reports and records to the consultant.

1.15 OPERATION AND MAINTENANCE MANUAL

- .1 Provide operation and maintenance data for incorporation into manual as in submittals' requirements.
- .2 Operation and maintenance manual to be approved by, and final copies deposited with, Consultant before final inspection.
- .3 Operation data to include:
 - .1 Control schematics for each system including environmental controls.
 - .2 Description of each system and its controls.
 - .3 Description of operation of each system at various loads together with reset schedules and seasonal variances.
 - .4 Operation instruction for each system and each component.
 - .5 Description of actions to be taken in event of equipment failure.
 - .6 Valves schedule and flow diagram.
 - .7 Colour coding chart.
 - .8 Spare parts equipment list.
 - .9 Manufacturers standard or extended warranty information.
- .4 Maintenance data shall 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 data sheets with point of operation as left after commissioning is complete.
 - .2 Equipment performance verification test results.
 - .3 Special performance data as specified elsewhere.
 - .4 Testing, adjusting and balancing reports as specified in Testing, Adjusting and Balancing Section.
- .6 Miscellaneous data to include:
 - .1 Letter of contractors warranty and guarantee.
 - .2 Index sheet.
 - .3 Tabbed format for each section.
 - .4 Manufacturers approved shop drawings.
 - .5 Spare parts list and source.
 - .6 List of Manufacturers and suppliers address for each piece of equipment.

- .7 Approvals:
 - .1 Submit 1 copy of draft Operation and Maintenance Manual to Consultant for approval. Submission of individual data will not be accepted unless so directed by Consultant.
 - .2 Make changes as required and re-submit as directed by Consultant.
 - .3 Provide three (3) copies of final operation maintenance manuals as well as a pdf file of the entire approved manual on a USB stick. Only one USB stick is to be provided containing both the approved manual and Record drawings.
- .8 Additional data:
 - .1 Prepare and insert into operation and maintenance manual when need for same becomes apparent during demonstrations and instructions specified above.

1.16 AS-BUILT DRAWINGS

- .1 Site records:
 - .1 Contractor shall provide 2 sets of reproducible mechanical drawings. Provide sets of white prints as required for each phase of the work. Mark thereon all changes as work progresses and as changes occur. This shall include changes to existing mechanical systems, control systems and low voltage control wiring.
 - .2 On a weekly basis, transfer information to reproducibles, revising reproducibles to show all work as actually installed.
 - .3 Use different colour waterproof ink for each service.
 - .4 Make available for reference purposes and inspection at all times.
- .2 As-built drawings:
 - .1 Prior to start of Testing, Adjusting and Balancing (TAB), finalize production of as-built drawings.
 - .2 Identify each drawing in lower right hand corner in letters at least 3 mm (1/8") high as follows: - "AS-BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (date).
 - .3 TAB to be performed using as-built drawings.
 - .4 Submit hard copy to Consultant for approval. When returned, make corrections as directed.
 - .5 Once approved, submit completed reproducible paper as-built drawings as well as a re-cadded pdf file which include all the changes/revisions on USB stick with Operating and Maintenance Manuals.

1.17 DEMONSTRATION AND OPERATING AND MAINTENANCE INSTRUCTION

- .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 Refrigeration contractor to schedule and coordinate the demonstration all on the same day, starting at a pre-approved time and continuing consequently until complete.
- .3 Where specified elsewhere in Refrigeration Division, qualified manufacturers' representatives who are knowledgeable about the project to provide demonstrations and instructions.
- .4 Use operation and maintenance manual, record drawings, audio visual aids, etc. as part of instruction materials.
- .5 Instruction duration time requirements as specified in appropriate sections.
- .6 Where deemed necessary, Consultants may record these demonstrations on video tape for future reference.

1.18 WARRANTIES

- .1 In addition to guarantee specified in General Conditions, guarantee refrigeration systems to be free from noise in operation that may develop from failure to construct system in accordance with Contract Documents.
- .2 Provide certificates of warranty for each piece of equipment made out in favor of Owner. Clearly record "start-up" date of each piece of equipment on certificate. Include certificates as part of Operation & Maintenance Manual.
- .3 If Refrigeration sub-contractor with offices located more than 80 km (50 miles) from Project site is used, provide service/warranty work agreement for warranty period with local Refrigeration sub-contractor approved by Consultant. Include copy of service/warranty agreement in warranty section of Operation & Maintenance Manual.
- .4 Warranty period shall start from date of substantial completion.

1.19 SUBSTANTIAL PERFORMANCE

- .1 Complete the following to the satisfaction of the consultant prior to request for submission of substantial performance.
 - .1 Record Drawings.
 - .2 Maintenance Manuals
 - .3 System Start up
 - .4 Refrigeration System Commissioning
 - .5 Instructions to Owners
 - .6 Final Certificates (required prior to consultant's release of conformance letter).
 - Refrigeration Certificate of Installation.

1.20 OCCUPANCY REQUIREMENTS

- .1 The contractor shall provide the following documentation to the consultant prior to receiving occupancy. Failure to provide the proper documentation will result in the occupancy not being granted. List of required documentation:
Final Certificates (required prior to consultant's release of conformance letter).
 - Refrigeration Certificate of Installation.

1.21 TRIAL USAGE

- .1 Consultant or owner may 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 Refrigeration system

1.22 REVISION TO CONTRACT

- .1 Provide the following:
 - .1 Itemized list of material with associated costs.
 - .2 Labour rate and itemized list of labour for each item.
 - .3 Copy of manufacturers/suppliers invoice if requested.

1.23 DEFICIENCIES

- .1 During the course of construction, the consultants will monitor construction and provide written reports of work progress, discussions, and instruction to correct work.
- .2 Instruction to correct work shall be done within the work period before the next review.
- .3 The contractor shall not conceal any work until inspected.
- .4 The contractor shall expedite 100% complete rough-in work and have inspected prior to concealing services and equipment especially above ceiling.
- .5 Upon completion of the project the consultant will do a final review. Upon receiving the final inspection report, the contractor must correct and sign back the inspection report indicating the deficiencies are completed. A re-inspection will only be done once consultant receives this in writing.

1.24 EQUIPMENT INSTALLATIONS

- .1 Unions or flanges: provide for ease of maintenance and disassembly.
- .2 Space for servicing, disassembly and removal of equipment and components: provide as recommended by manufacturer or as indicated.
- .3 Equipment drains: pipe to floor drains.
- .4 Install equipment, rectangular cleanouts and similar items parallel to or perpendicular to building lines.

1.25 ANCHOR BOLTS AND TEMPLATES

- .1 Supply anchor bolts and templates for installation by other divisions.

1.26 PROTECTION OF OPENINGS

- .1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

1.27 ELECTRICAL

- .1 Electrical work to conform to Electrical Division including the following:
 - .1 Supplier and installer responsibility and related Refrigeration responsibility is indicated in Equipment Schedule on Refrigeration and/or electrical drawings
 - .2 Control wiring and conduit is specified in Electrical Division except for conduit, wiring and connections below 50 V which are related to control systems specified in Refrigeration Division. Refer to Electrical Division for quality of materials and workmanship.
 - .3 Electrically operated equipment shall be C.S.A. approved label. Special Inspection Label of Provincial Authority having jurisdiction will be accepted in lieu of C.S.A. approval. Each motor shall have an approved starter. Starter will be supplied and installed by Electrical Division unless otherwise indicated.

1.28 MOTORS

- .1 Provide high efficiency motors for Refrigeration equipment as specified.
- .2 If delivery of specified motor will delay delivery or installation of any equipment, install motor approved by Consultant for temporary use. Final acceptance of equipment will not occur until specified motor is installed.
- .3 Motors under 373 W, (1/2 hp): speed as indicated, continuous duty, built-in overload protection, resilient mount, single phase, voltage as indicated.

- .4 Motors 373 W, (1/2 hp) and larger: EEMAC Class B, Totally Enclosed Fan Cooled (TEFC) induction, speed as indicated, continuous duty, drip proof, ball bearing, maximum temperature rise 40°C (72°F), 3 phase, voltage as indicated.

1.29 GUARDS

- .1 Provide guards for unprotected devices.
- .2 Provide means to permit lubrication and use of test instruments with guards in place.
- .3 Guard for flexible coupling:
 - .1 "U" shaped, minimum 1.6 mm (16 gauge) thick galvanized mild steel.
 - .2 Securely fasten in place.
 - .3 Removable for servicing.

1.30 PIPING AND EQUIPMENT SUPPORTS

- .1 Equipment supports supplied by equipment manufacturer: specified elsewhere in Refrigeration Division.
- .2 Piping and equipment supports not supplied by equipment manufacturer: fabricate from structural grade steel meeting requirements of - Structural Steel Section. Submit structural calculations with shop drawings.
- .3 Mount base mounted equipment on chamfered edge housekeeping pads, minimum of 100 mm (4") high and 150 mm (6") larger than equipment dimensions all around. Concrete specified elsewhere.
- .4 Where housekeeping pads incorporate existing pads provide 10 mm dowels into existing pads. New pad height shall match existing.

1.31 SLEEVES

- .1 Pipe sleeves: at points where pipes pass through masonry, concrete or fire rated assemblies and as indicated. Grout sleeves in place.
- .2 Schedule 40 steel pipe.
- .3 Sleeves with annular fin continuously welded at midpoint:
 - .1 Through foundation walls.
 - .2 Where sleeve extends above finished floor.
 - .3 Through fire rated walls and floors.
- .4 Sizes: minimum 6 mm (1/4") clearance all around, between sleeve and uninsulated pipe or between sleeve and insulation.
- .5 Terminate sleeves flush with surface of concrete and masonry walls, concrete floors on grade and 25 mm (1") above other floors.

- .6 Fill voids around pipes:
 - .1 Caulk between sleeve and pipe in foundation walls and below grade floors with waterproof fire retardant non-hardening mastic.
 - .2 Where sleeves pass through walls or floors, provide space for firestopping. Where pipes/ducts pass through fire rated walls, floors and partitions, maintain fire rating integrity.
 - .3 Ensure no contact between copper tube or pipe and ferrous sleeve.
 - .4 Fill future-use sleeves with lime plaster or other easily removable filler.
 - .5 Coat exposed exterior surfaces of ferrous sleeves with heavy application of zinc rich paint to CGSB 1-GP-181M+Amdt-Mar-78.
- .7 Provide minimum 20 gauge duct sleeves where ducts pass through masonry concrete or fire rated assemblies. Maintain minimum 25 mm clearance all around or to the requirements of the authority having jurisdiction. Seal at wall as indicated.

1.32 FIRE STOPPING

- .1 This contractor shall work with all other contractors on the project in providing one common method of fire stopping all penetrations made in fire rated assemblies.
- .2 Approved fire stopping and smoke seal material in all fire separations and fire ratings within annular space between pipes, ducts, insulation and adjacent fire separation and/or fire rating.
- .3 Do not use cementious or rigid seals around penetrations for pipe, ductwork, or other Refrigeration items.
- .4 Insulated pipes and ducts: ensure integrity of insulation and vapour barrier at fire separation.
- .5 Provide materials and systems capable of maintaining effective barrier against flame, smoke and gases. Ensure continuity and integrity of fire separation.
- .6 Comply with the requirements of CAN4-S115-M35, and do not exceed opening sized for which they have been tested.
- .7 Systems to have an F or FT rating (as applicable) not less than the fire protection rating required for closures in a fire separation. Provide "fire wrap" blanket around services penetrating fire walls. Extent of blanket must correspond to ULC recommendations.
- .8 The fire stopping materials are not to shrink, slump or sag and to be free of asbestos, halogens and volatile solvents.
- .9 Firestopping materials are to consist of a component sealant applied with a conventional caulking gun and trowel.

- .10 Fire stop materials are to be capable of receiving finish materials in those areas which are exposed and scheduled to receive finishes. Exposed surfaces are to be acceptable to consultant prior to application of finish.
- .11 Firestopping shall be inspected and approved by local authority prior to concealment or enclosure.
- .12 Install material and components in accordance with ULC certification, manufacturers instructions and local authority.
- .13 Submit product literature and installation material on fire stopping in shop drawing and product data manual. Maintain copies of these on site for viewing by installers and consultant.
- .14 Manufacturer of product shall provide certification of installation. Submit letter to the consultant.
- .15 Acceptable Manufacturer:
Minnesota Mining and Manufacturing
- .16 Acceptable Alternate Manufacturers to approval of local authority:
Fryesleeve Industries Inc.
General Electric Pensil Firestop Systems
International Protective Coatings Corp.
Rectorseal Corporation (Metacaulk)
Proset Systems
3M
AD Systems
Hilti
- .17 Ensure firestop manufacturer representative performs on site inspections and certifies installation. Submit inspection reports/certification at time of substantial completion.

1.33 ESCUTCHEONS

- .1 On pipes and ductwork passing through walls, partitions, floors and ceilings in exposed finished areas and on water and drain pipes inside millwork and cabinets.
- .2 Chrome or nickel plated brass or Type 302 stainless steel, one piece type with set screws.
- .3 Outside diameter to cover opening or sleeve.
- .4 Inside diameter to fit around finished pipe.

1.34 PAINTING

- .1 Refer to Section Interior Painting and specified elsewhere.

- .2 Apply at least one coat of corrosion resistant primer paint to ferrous supports and site fabricated work.
- .3 Apply two coats of paint to exposed piping service in Refrigeration room, base colour as specified in Refrigeration Identification Section.
- .4 Prime and touch up marred finished paintwork to match original.
- .5 Restore to new condition, or replace equipment at discretion of consultant, finishes which have been damaged too extensively to be merely primed and touched up.

1.35 SPARE PARTS

- .1 Furnish spare parts in accordance with general requirements and as follows:
 - .1 One set of packing for each pump.
 - .2 One casing joint gasket for each size pump.
 - .3 One head gasket set for each heat exchanger.
 - .4 One glass for each gauge glass.
- .2 Provide list of equipment in maintenance manuals indicating corresponding spare parts required. List of spare parts to be signed off by receiving personnel.

1.36 SPECIAL TOOLS

- .1 Provide one set of special tools required to service equipment as recommended by manufacturers and in accordance with Maintenance Materials Special Tools and Spare Parts.

1.37 ACCESS DOORS

- .1 Provide access doors to concealed Refrigeration equipment for operating, inspecting, adjusting and servicing.
- .2 Flush mounted 600 x 600 mm (24" x 24") for body entry and 300 x 300 mm (12" x 12") for hand entry unless otherwise noted. Doors to open 180°, have rounded safety corners, concealed hinges, screwdriver latches and anchor straps.
- .3 Material:
 - .1 Special areas such as tiled or marble surfaces: use stainless steel with brushed satin or polished finish as directed by Consultant.
 - .2 Remaining areas: use prime coated steel.
 - .3 Fire rated areas: provide ULC listed access doors
- .4 Installation:
 - .1 Locate so that concealed items are accessible.

.2 Locate so that hand or body entry (as applicable) is achieved.

- .5 Acceptable materials:
Le Hage
Zurn
Acudor
Nailor Industries Inc.

1.38 DIELECTRIC COUPLINGS

- .1 General:
.1 To be compatible with and to suit pressure rating of piping system.
.2 Where pipes of dissimilar metals are joined.
- .2 Pipes NPS 50 mm (2") and under: isolating unions.
- .3 Pipes NPS 65 mm (2 1/2") and over: isolating flanges.

1.39 DRAIN VALVES

- .1 Locate at low points and at section isolating valves unless otherwise specified.
- .2 Minimum NPS 20 mm (3/4") unless otherwise specified: bronze, with hose end male thread and complete with cap and chain.
- .3 Drain valves on potable water systems shall be complete with vacuum breaker.

1.40 DELIVERY STORAGE & HANDLING

- .1 Follow Manufacturer's directions in delivery, storage, and protection, of equipment and materials.
- .2 Deliver equipment and material to site and tightly cover and protect against dirt, water, and chemical or mechanical injury but have readily accessible for inspection. Store items subject to moisture damage (such as controls) in dry, heated space.

1.41 REPAIRS, CUTTING, AND RESTORATION

- .1 Patch and repair walls, floors, ceilings, and roofs with materials of same quality and appearance as adjacent surfaces unless otherwise shown. Surface finishes shall exactly match existing finishes of same materials.
- .2 Each Section of this Division shall bear expense of cutting, patching, and repairing to install their work and/or replacing of work of other Sections required because of its fault, error, tardiness, or because of damage done by it.

- .3 Cutting, patching, repairing, and replacing pavements, sidewalks, roads, and curbs to permit installation of work of this Division is responsibility of Section installing work.
- .4 All patching, painting and making good of the existing walls, floors, ceilings, partitions and roof will be at the expense of this Contractor, but performed by the Contractor specializing in the type of work involved unless otherwise noted.

1.42 EXISTING SYSTEMS

- .1 Connections into existing systems to be made at time approved by Consultant. Request written approval of time when connections can be made.
- .2 Be responsible for damage to existing plant by this work.

1.43 CLEANING

- .1 Clean interior and exterior of all systems including strainers.
- .2 In preparation for final acceptance, clean and refurbish all equipment and leave in operating condition including replacement of all filters in all air and piping systems.

1.44 DISCONNECTION AND REMOVAL

- .1 Disconnect and/or remove equipment, piping, ductwork, etc. as indicated.
- .2 Cap and conceal all redundant and obsolete connections.
- .3 Provide a list of equipment to be removed to the owner, for his acceptance of same. Remove all equipment from site, which the owner does not retain.
- .4 Store equipment to be retained by owner on site where directed by consultant.

1.45 LOCATION OF EXISTING UNDERGROUND SERVICES

- .1 This contractor shall locate existing services prior to starting any work in the affected area.
- .2 This contractor shall use a video camera for the existing storm and/or sanitary drainage at the indicated connection point to confirm location, size and invert of the existing piping.

1.46 EXISTING CONCRETE SLAB X-RAY/SCANNING

- .1 This contractor shall retain the services of a qualified company to provide and X-Ray and/or scan of the existing buried services in wall and/or floors prior to starting any work in the affected area.

- .2 Failure to locate existing piping, conduit rebar, electrical etc., shall not relieve this contractor of repair of same prior to installing his service.
- .3 This contractor shall be responsible for all repairs and/or replacement of existing services caused by cutting the existing concrete slabs and/or walls.

1.47 EXCAVATING AND BACKFILLING

- .1 Provide all excavating and backfilling inside the building for pipes, drains and equipment. All backfilling shall be new clean granular 'A' fill brought in specifically for the purpose of backfilling to the underside of floor slab. All backfilling shall be compacted at intervals not more than 150 mm (6") layer to the satisfaction of the Consultant.
- .2 Bottoms of trenches shall be excavated so that the pipe will be supported on a 150 mm (6") compacted bed of clean granular 'A' fill. Provide all necessary pumping to maintain excavation free of water.
- .3 Should water be encountered during excavation, the contractor shall provide all labour and material, including all equipment required for dewatering the excavation. After the water has been removed, this Contractor shall install a 300 mm (12") base of compacted 50 mm (2") clear stone covered with filter cloth before installing backfill as detailed and/or as specified.
- .4 Be responsible for all weather protection required to install piping and/or equipment to the satisfaction of the Consultant.
- .5 Be responsible for providing all clear stone or granular 'A' material suitable for application to replace existing soil not suitable for backfilling above the 450 mm (18") bedding material.

1.48 CONFINED SPACES

- .1 Certain areas of the building may be defined as a "Confined Space". Any personnel working in these areas must have confined space training, appropriate equipment and undertake all work in conformance with appropriate codes and standards.
- .2 Refer to building documentation for any spaces deemed "Confined Space".

1.49 TSSA INSPECTION

- .1 Prior to final completion of the project, this contractor shall make application, arrange, and pay for a TSSA inspection of all piping systems and equipment installations, including, but not limited to medical gasses, refrigeration, fuel piping, compressed air, heating plant, cooling plant, and associated equipment installed under the contract.

- .2 Provide a copy of the TSSA report in the maintenance manuals for each system.

END OF SECTION

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1 General

1.1 GENERAL PROVISIONS

- .1 Conform to the General Provisions of General Requirements Section.
- .2 This project is one of a retrofit nature in part, and which will require some demolition.
- .3 Allow for all remedial work in areas indicated on the drawings and as generally defined in the relevant sections of the specifications.

1.2 SCOPE OF WORK

- .1 The scope of work is essentially the selected disconnection and/or removal of services and/or equipment, piping, etc. as indicated or required to complete the work.
- .2 Glycol in the existing cold system is to be drained and disposed. Contractor shall properly dispose of material to requirements of all local and provincial regulators and provide new glycol.

2 Products

2.1 GENERAL

- .1 This Division is to liaise with the Owners or Consultant for equipment being removed that may be suitable for reuse to that specified or handed over to the owner.
- .2 This Division to take full responsibility for any special tools or equipment required to disassemble or remove material from building.

3 Execution

3.1 GENERAL

- .1 The general requirements are indicated on the drawings and on the outline specification in Division 1.
- .2 The general execution of the demolition is to be carried out in a clean and efficient manner.
- .3 Demolition to facilitate removal of existing services or equipment or installation of new to be kept to a minimum and then restored to match existing.

- .4 All openings or holes created by removal of existing systems which are not being reused are to be patched with the same material surrounding surfaces.
- .5 All new holes and openings to facilitate systems are to be patched to match surrounding surfaces.
- .6 Protect all existing furnishings materials and equipment. Any damage occurring as a result of the work of this Division shall be repaired or replaced at the expense of this Division.
- .7 Where work involves breaking into or connecting to existing services, carry out work at times directed by the Owners in an expedient manner with minimum disruption to the facility and systems downtime.
- .8 Where unknown services are encountered, immediately advise Consultant and confirm findings in writing.
- .9 Where the location of any services has been shown on the plans, such information is not guaranteed. It is this Division's responsibility to verify locations, invert elevations, etc., immediately after moving on site. Should for any reason the information obtained necessitates changes in procedure or design, advise the Consultant at once. If verification of existing conditions is not done at the outset and any problems arise, the responsibility for same is entirely this Division's.
- .10 Disconnect and/or remove equipment piping, etc. as indicated.
- .11 Cap and conceal all redundant and obsolete connections.
- .12 Provide a list of equipment to be removed to the owner, for his acceptance of same. Remove all equipment from site which the owner does not retain.
- .13 Maintain equipment to be retained by owner on site where directed by consultant.
- .14 Demolition of all parts of the work must be completed within the confines of the work area and in such a way as the dust produced and risk to injury of will not adversely affect the building users.
- .15 Demolished areas of the existing building will remain in their current use in some cases. Demolition in these areas must be kept to the minimum required to complete the work.
- .16 Demolition shall take place within areas isolated from all other areas with appropriate hoarding, scaffolding, netting, fencing or other means of security between building users and the work.
- .17 Co-ordinate making safe electrical devices, capping plumbing and removal of fixtures prior to commencement of demolition.

- .18 All piping and equipment to be removed and/or abandoned shall be drained prior to capping and/or abandoning. Disposal of all liquids shall be to the approval of authority of having jurisdiction and/or provincial regulations.

3.2 EXISTING SYSTEM DRAINAGE

- .1 Drain all existing refrigeration systems including all related equipment as required to facilitate system renovations.
- .2 Store existing cooling and heating brine to be reused in new system.
- .3 Disposal of existing system shall be to the requirements of the local and/or provincial regulations.

END OF SECTION

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1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 ANSI/ASME B31.1, Power Piping.
- .3 ANSI/ASME Boiler and Pressure Vessel Code:
 - .1 Section 1: Power Boilers.
 - .2 Section V: Nondestructive Examination.
 - .3 Section IX: Welding and Brazing Qualifications.
- .4 CSA W47.2, Certification of Companies for Fusion Welding of Aluminum.
- .5 CSA W48, Filler Metals and Allied Metals for Arc Welding.
- .6 CSA B51, Boiler, Pressure Vessel and Pressure Piping Code.
- .7 CAN/CSA-W117.2, Safety in Welding, Cutting and Allied Processes.
- .8 CSA W178.1, Certification of Welding Inspection Organizations.
- .9 CSA W178.2, Certification of Welding Inspectors.
- .10 AWS B2.1, Specification for Welding Procedure and Performance Qualification.
- .11 AWS C1.1, Recommended Practices for Resistance Welding.
- .12 AWS W1, Welding Inspection.
- .13 ANSI/AWWA C206, Field Welding of Steel Water Pipe.

1.2 WELDERS QUALIFICATIONS

- .1 Welding qualifications to be in accordance with CSA B51.
- .2 Use qualified and licensed welders possessing certificate for each procedure to be performed from authority having jurisdiction.
- .3 Furnish welder's qualifications to Consultant.
- .4 Each welder to possess identification stamp issued by authority having jurisdiction.
- .5 Certification of companies for fusion welding of aluminum to be in accordance with CSA W47.2.

1.3 INSPECTORS QUALIFICATIONS

- .1 Inspectors to be qualified to CSA W178.2.

1.4 WELDING PROCEDURES

- .1 Registration of welding procedures in accordance with CSA B51.
- .2 Copy of welding procedures to be available for inspection at all times.
- .3 Safety in welding, cutting and allied processes to be in accordance with CAN/CSA-W117.2.

2 Products

2.1 ELECTRODES

- .1 Electrodes: in accordance with CSA W48 Series.

3 Execution

3.1 WORKMANSHIP

- .1 Welding to be in accordance with ANSI/ASME B31.1, ANSI/ASME Boiler and Pressure Vessel Code, Sections I and IX and ANSI/AWWA C206, using procedures conforming to AWS B3.0, AWS C1.1, and applicable requirements of provincial authority having jurisdiction.
- .2 Protect all adjacent areas.

3.2 INSTALLATION REQUIREMENTS

- .1 Identify each weld with welder's identification stamp.
- .2 Backing rings:
 - .1 Where used, fit to minimize gaps between ring and pipe bore.
 - .2 Do not install at orifice flanges.
- .3 Fittings:
 - .1 NPS 50 mm (2") and smaller: install welding type sockets.
 - .2 Branch connections: install welding tees or forged branch outlet fittings.

3.3 INSPECTION AND TESTS - GENERAL REQUIREMENTS

- .1 Review all weld quality requirements and defect limits of applicable codes and standards with Consultant before any work is started.
- .2 Formulate "Inspection and Test Plan" in co-operation with Consultant.
- .3 Do not conceal welds until they have been inspected, tested and approved by inspector.
- .4 Provide for inspector to visually inspect all welds during early stages of welding procedures in accordance with AWS W1. Repair or replace all defects as required by codes and as specified herein.

3.4 DEFECTS CAUSING REJECTION

- .1 As described in ANSI/ASME B31.1 and ANSI/ASME Boiler and Pressure Vessels Code.
- .2 In addition, hydronic water systems:
 - .1 Undercutting greater than 0.8 mm (1/32") adjacent to cover bead on outside of pipe.
 - .2 Undercutting greater than 0.8 mm (1/32") adjacent to root bead on inside of pipe.
 - .3 Undercutting greater than 0.8 mm (1/32") at combination of internal surface and external surface.
 - .4 Incomplete penetration and incomplete fusion greater than total length of 40 mm (1 1/2") in any 1500 mm (60") length of weld depth of such defects being greater than 0.8 mm (1/32").
 - .5 Repair all cracks and defects in excess of 0.8 mm (1/32") in depth.
 - .6 Repair defects whose depth cannot be determined accurately on the basis of visual examination or particle tests.

3.6 REPAIR OF WELDS WHICH FAILED TESTS

- .1 Re-inspect and re-test repaired or re-worked welds at Contractor's expense.

3.7 CLAIMS AGAINST OWNER FOR DELAYS

- .1 Claims against Owner for delays in completion of project will not be entertained for reasons of failures of welds to pass examinations.

3.8 OCCUPIED AREAS

- .1 Do not do any "Hot Work" in occupied areas.
- .2 Obtain "Hot Work" permits for working in existing building.

END OF SECTION

1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 American National Standards Institute/ American Society of Mechanical Engineers (ANSI/ASME)
 - .1 ANSI/ASME B31.1, Power Piping, (SI Edition).
- .3 American Society for Testing and Materials (ASTM)
 - .1 ASTM A 125, Specification for Steel Springs, Helical, Heat-Treated.
 - .2 ASTM A 307, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
 - .3 ASTM A 563, Specification for Carbon and Alloy Steel Nuts.
- .4 Manufacturer's Standardization Society of the Valves and Fittings Industry (MSS)
 - .1 MSS SP-58, Pipe Hangers and Supports - Materials, Design, Manufacture Selection, Application, and Installation.

1.2 DESIGN REQUIREMENTS

- .1 Construct pipe hanger and support to manufacturer's recommendations utilizing manufacturer's regular production components, parts and assemblies.
- .2 Base maximum load ratings on allowable stresses prescribed by ASME B31.1 or MSS SP-58.
- .3 Ensure that supports, guides, anchors do not transmit excessive quantities of heat to building structure.
- .4 Design hangers and supports to support systems under all conditions of operation, allow free expansion and contraction, prevent excessive stresses from being introduced into pipework or connected equipment.
- .5 Provide for vertical adjustments after erection and during commissioning. Amount of adjustment to be in accordance with MSS SP-58.

1.3 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with general requirements.
- .2 Submit shop drawings and product data for following items:
 - .1 All bases, hangers and supports.
 - .2 Connections to equipment and structure.
 - .3 Structural assemblies.

1.4 MAINTENANCE DATA

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

2 Products

2.1 GENERAL

- .1 Fabricate hangers, supports and sway braces in accordance with ANSI B31.1 and MSS-SP-58.
- .2 Use components for intended design purpose only. Do not use for rigging or erection purposes.

2.2 PIPE HANGERS

- .1 Finishes:
 - .1 Pipe hangers and supports: to ANSI & ULC requirements
 - .2 Ensure steel hangers in contact with copper piping are copper plated.
- .2 Upper attachment structural: Suspension from upper flange of I-Beam or joist.
 - .1 Cold piping NPS 50 mm (2") maximum: Ductile iron C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip.
 - .1 Rod: 10 mm (3/8") UL listed
 - .2 Cold piping NPS 65 mm (2 1/2") or greater, all hot piping: Malleable iron beam clamp, eye rod, jaws and extension with carbon steel retaining clip, tie rod, nuts and washers, UL listed & FM approved.
- .3 Upper attachment structural: Suspension from upper flange of I-Beam.
 - .1 Cold piping NPS 50 mm (2") maximum: Ductile iron top-of-beam C-clamp with hardened steel cup point setscrew, locknut and carbon steel retaining clip, UL listed.
 - .2 Cold piping NPS 65 mm (2 1/2") or greater, all hot piping: Malleable iron top-of-beam jaw-clamp with hooked rod, spring washer, plain washer and nuts.
- .4 Upper attachment to concrete.
 - .1 Ceiling: Carbon steel welded eye rod, clevis plate, clevis pin and cotters with weldless forged steel eye nut. Ensure eye 6 mm (1/4") minimum greater than rod diameter.
 - .2 Concrete inserts: wedge shaped body with knockout protector plate ULC listed.
 - Note: Rapidex and Siporex are not considered concrete. Should one of these systems be encountered, piping/ductwork and/or equipment shall be supported from adjacent walls or from supplemental steel provided by this contractor attached to the adjacent walls/structure.
- .3 Shop and field-fabricated assemblies.

- .1 Trapeze hanger assemblies: ASME B31.1.
- .2 Steel brackets: ASME B31.1.
- .4 Hanger rods: threaded rod material to MSS SP-58.
 - .1 Ensure that hanger rods are subject to tensile loading only.
 - .2 Provide linkages where lateral or axial movement of pipework is anticipated.
- .5 Pipe attachments: material to MSS SP-58.
 - .1 Attachments for steel piping: carbon steel.
 - .2 Attachments for copper piping: copper plated black steel.
 - .3 Use insulation shields for all piping.
 - .4 Oversize pipe hangers and supports to accommodate thermal insulation. Provide 1.5 mm (16 gauge) saddles.
- .6 Adjustable clevis: material to MSS SP-58 UL listed, clevis bolt with nipple spacer and vertical adjustment nuts above and below clevis.
 - .1 Ensure "U" has hole in bottom for rivetting to insulation shields.

2.3 RISER CLAMPS

- .1 Steel or cast iron pipe: black carbon steel to MSS-SP-58, type 42, UL listed.
- .2 Copper pipe: carbon steel copper plated to MSS-SP-58, type 42.
- .3 Bolts: to ASTM A 307.
- .4 Nuts: to ASTM A 563.

2.4 INSULATION PROTECTION SHIELDS

- .1 Insulated cold piping:
 - .1 64 kg/m² (13.12 lbs/ft²) density insulation plus insulation protection shield to: MSS SP-69, galvanized sheet carbon steel. Length designed for maximum 3 m (10') span.
- .2 Insulated hot piping:
 - .1 Curved plate 300 mm (12") long, with edges turned up, welded-in centre plate for pipe sizes NPS 300 mm (12") and over, carbon steel to comply with MSS SP-58.

2.5 EQUIPMENT SUPPORTS

- .1 Fabricate equipment supports not provided by equipment manufacturer from structural grade steel meeting requirements of miscellaneous metals, specified herein. Submit calculations with shop drawings.

2.6 EQUIPMENT ANCHOR BOLTS AND TEMPLATES

- .1 Provide templates to ensure accurate location of anchor bolts.

2.7 HOUSE-KEEPING PADS

- .1 For base-mounted equipment: Reinforced concrete, at least 100 mm (4") high, 150 mm (6") larger all around than equipment, and with chamfered edges as indicated.
- .2 Size of housekeeping pads shall be determined from approved shop drawings.
- .3 Concrete: 30 Mpa concrete with reinforced wire mesh.
- .4 Install all housekeeping pads not indicated on architectural drawings.

2.8 OTHER EQUIPMENT SUPPORTS

- .1 From structural grade steel meeting requirements of structural steel section specified herein.
- .2 Submit structural calculations with shop drawings.

2.9 MANUFACTURER

- .1 Acceptable materials:
 - Anvil
 - Myatt
 - Taylor

3 Execution

3.1 INSTALLATION

- .1 Install in accordance with:
 - .1 Manufacturer's instructions and recommendations.
- .2 Vibration Control Devices:
 - .1 Install on piping systems at pumps, boilers, chillers, cooling towers, elsewhere as indicated.
- .3 Clamps on riser piping:
 - .1 Support independent of connected horizontal pipework using riser clamps and riser clamp lugs welded to riser.
 - .2 Bolt-tightening torques to be to industry standards.
 - .3 Steel pipes: Install below coupling or shear lugs welded to pipe.
 - .4 Cast iron pipes: Install below joint.

- .4 Clevis plates:
 - .1 Attach to concrete with 4 minimum concrete inserts at each corner.
- .5 Provide supplementary structural steelwork where structural bearings do not exist or where concrete inserts are not in correct locations.

3.2 HANGER SPACING

- .1 Plumbing piping: most stringent requirements of Canadian Plumbing Code, Provincial Code, or authority having jurisdiction.
- .2 Fire protection: to applicable fire code.
- .3 Gas and fuel oil piping: up to NPS 15 mm (1/2"): every 1.8 m (6').
- .4 Copper piping: up to NPS 15 mm (1/2"): every 1.5 m (5').
- .5 Within 300 mm (12") of each elbow and:

Pipe Size: NPS	Maximum Spacing Steel	Maximum Spacing Copper
up to 32 mm (1 1/4")	2.1 m (7')	1.8 m (6')
40 mm (1 1/2")	2.7 m (9')	2.4 m (8')
50 mm (2")	3.0 m (10')	2.7 m (9')
65 mm (2 1/2")	3.6 m (12')	3.0 m (10')
80 mm (3")	3.6 m (12')	3.0 m (10')
90 mm (3 1/2")	3.9 m (13')	3.3 m (11')
100 mm (4")	4.2 m (14')	3.6 m (12')
125 mm (5")	4.8 m (16')	
150 mm (6")	5.1 m (17')	
200 mm (8")	5.7 m (19')	
250 mm (10")	6.6 m (22')	
300 mm (12")	6.9 m (23')	

- .6 Pipework greater than NPS 300 mm (12"): to MSS SP-69.

3.3 HANGER INSTALLATION

- .1 Install hanger so that rod is vertical under operating conditions.
- .2 Adjust hangers to equalize load.
- .3 Support from structural members. Where structural bearing does not exist or inserts are not in suitable locations, provide supplementary structural steel members.
- .4 Do "NOT" support piping, ductwork and equipment from roof deck, on bottom chord of floor and/or roof joist and/or from OWSJ bridging. Provide structural member between joist.

3.4 HORIZONTAL MOVEMENT

- .1 Angularity of rod hanger resulting from horizontal movement of pipework from cold to hot position not to exceed 4mm (5/32") from vertical.
- .2 Where horizontal pipe movement is less than 15 mm (1/2"), offset pipe hanger and support so that rod hanger is vertical in the hot position.

3.5 FINAL ADJUSTMENT

- .1 Adjust hangers and supports:
 - .1 Ensure that rod is vertical under operating conditions.
 - .2 Equalize loads.
- .2 Adjustable clevis:
 - .1 Tighten hanger load nut securely to ensure proper hanger performance.
 - .2 Tighten upper nut after adjustment.
- .3 C-clamps:
 - .1 Follow manufacturer's recommended written instructions and torque values when tightening C-clamps to bottom flange of beam.
- .4 Beam clamps:
 - .1 Hammer jaw firmly against underside of beam.

END OF SECTION

1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 Canadian General Standards Board (CGSB).
 - .1 CAN/CGSB-1.60, Interior Alkyd Gloss Enamel.
 - .2 CAN/CGSB-24.3, Identification of Piping Systems.
- .3 Canadian Standards Association (CSA).
 - .1 Natural Gas and Propane Installation Code CSA B149.1.
- .4 National Fire Protection Association
 - .1 NFPA 13, Installation of Sprinkler Systems.
 - .2 NFPA 14, Standpipe and Systems.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with General Requirements.
- .2 Product data to include paint colour chips, all other products specified in this section.

1.3 PRODUCT LITERATURE

- .1 Submit product literature in accordance with General Requirements.
- .2 Product literature to include nameplates, labels, tags, lists of proposed legends.

2 Products

2.1 MANUFACTURER'S EQUIPMENT NAMEPLATES

- .1 Metal or plastic lamicoid nameplate mechanically fastened to each piece of equipment by manufacturer.
- .2 Lettering and numbers to be raised or recessed.
- .3 Information to include, as appropriate:
 - .1 Equipment: Manufacturer's name, model, size, serial number, capacity.
 - .2 Motor: voltage, Hz, phase, power factor, duty, frame size.

2.2 SYSTEM NAMEPLATES

- .1 Colours:
 - .1 Hazardous: red letters, white background.
 - .2 Elsewhere: black letters, white background (except where required otherwise by applicable codes).
- .2 Construction:
 - .1 3 mm (1/8") thick laminated plastic, matte finish, with square corners, letters accurately aligned and machine engraved into core.
- .3 Sizes:
 - .1 Conform to following table:

Size	No. of Sizes mm (")	Height of Line mm (")	Letters mm (")
1	10 x 50 (3/8" x 2")	1 (3/64")	3 (1/8")
2	15 x 75 (1/2" x 3")	1 (3/64")	6 (1/4")
3	15 x 75 (1/2" x 3")	2 (5/64")	3 (1/8")
4	20 x 100 (3/4" x 4")	1 (3/64")	10 (3/8")
5	20 x 100 (3/4" x 4")	2 (6/64")	6 (1/4")
6	20 x 200 (3/4" x 8")	1 (3/64")	10 (3/8")
7	25 x 125 (1" x 5")	1 (3/64")	15 (1/2")
8	25 x 125 (1" x 5")	2 (5/64")	10 (3/8")
9	32 x 200 (1 1/4" x 8")	1 (3/64")	20 (3/4")
 - .2 Use maximum of 25 letters/numbers per line.
- .4 Locations:
 - .1 Terminal cabinets, control panels: Use size #5.
 - .2 Equipment in Mechanical Rooms: Use size #9.

2.3 EXISTING IDENTIFICATION SYSTEMS

- .1 Apply existing identification system to new work.
- .2 Where existing identification system does not cover for new work, use identification system specified this section.
- .3 Before starting work, obtain written approval of identification system from Consultant.
- .4 Upon completion of this project all references to room names and numbering shall be to the Owner's requirements which may or may 'NOT' be the numbering system used on the drawings. Each contractor shall verify the proper numbering scheme to be used prior to project completion.
- .5 All equipment shall be identified in sequence from the existing equipment and "NOT" duplicate numbering of equipment.

2.4 IDENTIFICATION OF PIPING SYSTEMS

- .1 Identify contents by background colour marking, pictogram (as necessary), legend; direction of flow by arrows. To CAN/CGSB 24.3 except where specified otherwise.
- .2 Legend:
 - .1 Block capitals to sizes and colours listed in CAN/CGSB-24.3.
- .3 Arrows showing direction of flow:
 - .1 Outside diameter of pipe or insulation less than 75 mm (3"): 100 mm (4") long x 50 mm (2") high.
 - .2 Outside diameter of pipe or insulation 75 mm (3") and greater: 150 mm (6") long x 50 mm (2") high.
 - .3 Use double-headed arrows where flow is reversible.
- .4 Extent of background colour marking:
 - .1 To full circumference of pipe or insulation.
 - .2 Length to accommodate pictogram, full length of legend and arrows.
- .5 Materials for background colour marking, legend, arrows:
 - .1 Pipes and tubing 20 mm (3/4") and smaller: Waterproof and heat-resistant pressure sensitive plastic marker tags.
 - .2 All other pipes: Pressure sensitive vinyl with protective overcoating, waterproof contact adhesive undercoating, suitable for ambient of 100% RH and continuous operating temperature of 150°C (300°F) and intermittent temperature of 200°C (395°F).
- .6 Colours and Legends:
 - .1 Where not listed, obtain direction from Consultant.
 - .2 Colours for legends, arrows: To following table:

Background colour:	Legend:	Arrows:
Yellow	White	Black
Green	White	Black
Red	White	Black
- .7 Background colour marking and legends for piping systems:

CONTENTS	BACKGROUND COLOUR MARKING	
	LEGEND	
Chilled brine supply	Green	CH BRINE SUPPLY
Chilled brine return	Green	CH BRINE RETURN
U/F brine supply	Green	U/F BRINE SUPPLY
U/F brine return	Green	U/F BRINE RETURN
Glycol heating water supply	Yellow	GLYCOL HEATING WATER SUPPLY
Glycol heating water return	Yellow	GLYCOL HEATING WATER RETURN

2.5 VALVES, CONTROLLERS

- .1 Brass tags with 15 mm (1/2") stamped identification data filled with black paint.

- .2 Include flow diagrams for each system, of approved size, showing charts and schedules with identification of each tagged item, valve type, service, function, normal position, location of tagged item.
- .3 Provide adhesive coloured tab (max. size 15 mm) indication on ceiling to locate valves/equipment above. Same applies to grid. Colour to be approved by consultant.

2.6 CONTROLS COMPONENTS IDENTIFICATION

- .1 Identify all systems, equipment, components, controls, sensors with system nameplates specified in this section.
- .2 Inscriptions to include function and (where appropriate) fail-safe position.
- .3 Provide equipment identification and/or indication on ceiling to locate devices/equipment above ceiling. Install identification on grid. Colours to be approved by contractor.

2.7 LANGUAGE

- .1 Identification to be in English.

3 Execution

3.1 TIMING

- .1 Provide identification only after all painting specified has been completed.

3.2 INSTALLATION

- .1 Perform work in accordance with CAN/CGSB-24.3 except as specified otherwise.
- .2 Provide ULC and/or CSA registration plates as required by respective agency.

3.3 NAMEPLATES

- .1 Locations:
 - .1 In conspicuous location to facilitate easy reading and identification from operating floor.
- .2 Standoffs:
 - .1 Provide for nameplates on hot and/or insulated surfaces.
- .3 Protection
 - .1 Do not paint, insulate or cover in any way.

3.4 LOCATION OF IDENTIFICATION ON PIPING SYSTEMS

- .1 On long straight runs in open areas in boiler rooms, equipment rooms, galleries, tunnels not more than 1.7 m (5'-8") intervals and more frequently if required to ensure that at least one is visible from any one viewpoint in operating areas and walking aisles.
- .2 Adjacent to each change in direction.
- .3 At least once in each small room through which piping or ductwork passes.
- .4 On both sides of visual obstruction or where run is difficult to follow.
- .5 On both sides of separations such as walls, floors, partitions.
- .6 Where system is installed in pipe chases, ceiling spaces, galleries, other confined spaces, at entry and exit points, and at each access opening.
- .7 At beginning and end points of each run and at each piece of equipment in run.
- .8 At point immediately upstream of major manually operated or automatically controlled valves, dampers, etc. Where this is not possible, place identification as close as possible, preferably on upstream side.
- .9 Identification to be easily and accurately readable from usual operating areas and from access points.
 - .1 Position of identification to be approximately at right angles to most convenient line of sight, considering operating positions, lighting conditions, risk of physical damage or injury and reduced visibility over time due to dust and dirt.

3.5 VALVES, CONTROLLERS

- .1 Valves and operating controllers, except at plumbing fixtures, radiation, or where in plain sight of equipment they serve: Secure tags with non-ferrous chains or closed "S" hooks.
- .2 Install one copy of flow diagrams, valve schedules mounted in frame behind non-glare glass where directed by Consultant. Provide one copy (reduced in size if required) in each operating and maintenance manual.
- .3 Number valves in each system consecutively. Where existing numbering system is installed start new numbering system at 100.

END OF SECTION

1 General

1.1 RELATED SECTIONS

- .1 Submittals.
- .2 Shop Drawings and Product Data.
- .3 Pipe hangers and Supports.

1.2 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 Canadian General Standards Board (CGSB)
 - .1 ASTM C553, Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
 - .2 CGSB 51-GP-52Ma, Vapour Barrier Jacket and Facing Material for Pipe, Duct and Equipment Thermal Insulation.
 - .3 CAN/CGSB-51.53, Poly (Vinyl Chloride) Jacketing Sheet, for Insulating Pipes, Vessels and Round Ducts.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S102, Method of Test for Surface Burning Characteristics of Building Materials and Assemblies.
- .4 American Society for Testing and Materials (ASTM)
 - .1 ASTM C 335, Test Method for Steady State Heat Transfer Properties of Pipe Insulation.
 - .2 ASTM C 921, Practice for Determining the Properties Jacketing Materials for Thermal Insulation.
 - .3 ASTM B 209M, Specification for Aluminum and Aluminum Alloy Sheet and Plate.
- .5 American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE).
 - .1 ASHRAE Standard 90.1.
- .6 Manufacturer's Trade Associations
 - .1 Thermal Insulation Association of Canada (TIAC): National Insulation Standards.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Submit for approval manufacturer's catalogue literature related to installation, fabrication for pipe, fittings, valves and jointing recommendations.

1.4 INSTALLATION INSTRUCTIONS

- .1 Submit manufacturer's installation instructions in accordance with general requirements.
- .2 Installation instructions to include procedures to be used, installation standards to be achieved.

1.5 QUALIFICATIONS

- .1 Installer to be specialist in performing work of this section, and have at least 3 years successful experience in this size and type of project, qualified to standards of TIAC.

1.6 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.
- .2 Protect from weather, construction traffic.
- .3 Protect against damage from any source.
- .4 Store at temperatures and conditions required by manufacturer.

1.7 DEFINITIONS

- .1 For purposes of this section:
 - .1 "CONCEALED" - insulated refrigeration services in suspended ceilings and non-accessible chases and furred-in spaces.
 - .2 "EXPOSED" - will mean "not concealed" as defined herein.

2 Products

2.1 FIRE AND SMOKE RATING

- .1 In accordance with CAN/ULC-S102:
 - .1 Maximum flame spread rating: 25.
 - .2 Maximum smoke developed rating: 50.

2.2 INSULATION

- .1 Mineral fibre as specified herein includes glass fibre, rock wool, slag wool.
- .2 Thermal conductivity ("k" factor) not to exceed specified values at 24°C (75°F) mean temperature when tested in accordance with ASTM C 335.
- .3 Type A-1: Rigid moulded mineral fibre with factory applied vapour retarder jacket.
 - .1 Mineral fibre: to ASTM C553.
 - .2 Jacket: to CGSB 51-GP-52 Ma.
 - .3 Maximum "k" factor: to ASTM C553.
- .4 Type A-3: Flexible unicellular tubular elastomer.
 - .1 Insulation to ASTM C553 with vapour retarder jacket.
 - .2 Jacket: to CGSB 51-GP-52 Ma.
 - .3 Maximum "k" factor: to ASTM C553.
 - .4 To be certified by manufacturer to be free of potential stress corrosion cracking corrodants.
- .5 Materials:
 - .1 All materials must be supplied by the same manufacturer.
 - .2 Acceptable Materials:
 - Fibreglass Canada
 - Knauf
 - Manson
 - Pittsburg Corning

2.3 INSULATION SECUREMENT

- .1 Tape: Self-adhesive, aluminum, reinforced, 50 mm (2") wide minimum.
- .2 Contact adhesive: Quick setting.
- .3 Canvas adhesive: Washable.

2.4 INDOOR VAPOUR RETARDER FINISH

- .1 Vinyl emulsion type acrylic, compatible with insulation.

2.5 JACKETS

- .1 Polyvinyl Chloride (PVC):
 - .1 One-piece moulded type [and sheet] to CAN/CGSB-51.53 with pre-formed shapes as required.
 - .2 Colours: white.
 - .3 Minimum service temperatures: -20°C (-4°F).
 - .4 Maximum service temperature: 65°C (150°F).
 - .5 Moisture vapour transmission: 0.02 perm.

- .6 Fastenings:
 - .1 Use solvent weld adhesive compatible with insulation to seal laps and joints.
 - .2 Tacks.
 - .3 Pressure sensitive vinyl tape of matching colour.

3 Execution

3.1 PRE-INSTALLATION REQUIREMENT

- .1 Pressure testing of piping systems and adjacent equipment to be complete, witnessed and certified.
- .2 Surfaces to be clean, dry, free from foreign material.

3.2 INSTALLATION

- .1 Install in accordance with TIAC National Standards.
- .2 Apply materials in accordance with manufacturers' instructions and this specification.
- .3 Maintain uninterrupted continuity and integrity of vapour retarder jacket and finishes.
 - .1 Hangers, supports to be outside vapour retarder jacket.
- .4 Supports, Hangers:
 - .1 Apply high compressive strength insulation, suitable for service, at oversized saddles and shoes where insulation saddles have not been provided.

3.3 REMOVABLE, PRE-FABRICATED, INSULATION AND ENCLOSURES

- .1 Application: At expansion joints, valves, primary flow measuring elements, flanges, and unions at equipment.
- .2 Design: To permit movement of expansion joint and to permit periodic removal and replacement without damage to adjacent insulation.
- .3 Insulation:
 - .1 Insulation, fastenings and finishes: same as system.
 - .2 Jacket: As per adjacent insulation.

3.4 INSTALLATION OF ELASTOMERIC INSULATION

- .1 Insulation to remain dry at all times. Overlaps to manufacturers instructions. Ensure tight joints.
- .2 Provide vapour retarder as recommended by manufacturer.

3.5 PIPING INSULATION SCHEDULES

- .1 Insulation types and thickness' to conform to following tables.
- .2 Includes valves, valve bonnets, strainers, flanges and fittings unless otherwise specified.
- .3 Install insulator and jackets to applicable TIAC codes.
- .4 Insulate ends of capped piping with type and thickness indicated for capped service.
- .5 Thickness of insulation to be as listed in following table.
 - .1 Do not insulate exposed runouts to plumbing fixtures, chrome plated piping, valves, fittings.
 - .2 All storm piping including all vertical and horizontal piping shall be insulated.

Application	Type	Pipe sizes through (NPS) and insulation thickness mm (")				
		to 25 (1")	32 (1¼") 40 (1½")	50 (2") 80 (3")	105 (4") 150 (6")	200 (8") & over
Brine Heating (including buried)	A-1	40 (1½")	50 (2")	50 (2")	50 (2")	50 (2")
Brine cooling (including buried)	A-1	25 (1")	25 (1")	25 (1")	25 (1")	25 (1")
Cooling Headers (under rink)	None					

- .6 Finishes: Conform to the following table:

<u>Application</u>	<u>Piping</u>	<u>Valves & Fittings</u>
Exposed indoors	PVC	PVC
Exposed in mech. rooms	PVC	PVC
Concealed indoors	N/A	PVC

- .7 Connection: To appropriate TIAC code.

END OF SECTION

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1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 American Society for Testing and Materials
 - .1 ASTM A53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless.
 - .2 ASTM A105/A105M, Specification for Carbon Steel Forgings for Piping Applications.

1.2 PRODUCT DATA

- .1 Submit product data in accordance with general requirements.
- .2 Indicate for each item as applicable:
 - .1 Manufacturer, model number, line contents, pressure and temperature rating.
 - .2 Movement handled; axial, lateral, angular and the amounts of each.
 - .3 Nominal size and dimensions including details of construction and assembly.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit maintenance data in accordance with general requirements.
- .2 Data to include:
 - .1 Servicing requirements, including any special requirements, stuffing box packing, lubrication and recommended procedures.

2 Products

2.1 FLEXIBLE CONNECTION

- .1 Application: to suit motion.
- .2 Minimum length in accordance with manufacturer's recommendations to suit offset.
- .3 Inner hose: stainless steel corrugated.
- .4 Braided wire mesh stainless steel outer jacket.
- .5 Diameter and type of end connection: as indicated.

- .6 Operating conditions:
 - .1 Working pressure: 1034 kPa (150 psi).
 - .2 Working temperature: 250°C (482°F).
 - .3 To match system requirements.

2.2 ANCHORS AND GUIDES

- .1 Anchors:
 - .1 Provide as indicated.
- .2 Alignment guides:
 - .1 Provide as indicated.
 - .2 To accommodate specified thickness of insulation.
 - .3 Vapour barriers, jackets to remain uninterrupted.

3 Execution

3.1 INSTALLATION

- .1 Install expansion joints with cold setting, as indicated as instructed by Consultant. Make record of cold settings.
- .2 Install expansion joints and flexible connections in accordance with manufacturer's instructions.
- .3 Install pipe anchors and guides as indicated. Anchors to withstand 150% of axial thrust.

3.2 APPLICATION

- .1 Provide flexible connections at all pumps inlet and outlet, and on all vibration isolated equipment.
- .2 Provide where requested by equipment manufacturers installation manuals.
- .3 Install in accordance with manufacturer's recommendations.

3.3 THERMAL EXPANSION

- .1 Provide in long runs of heating mains exceeding 100 ft. in length.

END OF SECTION

1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 PPI.PE4710 with an HDS of 1000 psi (6,895 kPa) for water at 73°F (23°C).
- .3 Canadian Standards Association (CSA) B137.1 as PE1404 with a HDS of 400 psi at 73°F (23°C)..
- .4 Canadian General Standards Board (CGSB) 41-GP-25M – “Pipe, Polyethylene for the transport of Liquids”.
- .5 CAN/CSA-C448, “Design and Installation of Earth Energy Systems.

2 Products

2.1 GENERAL

- .1 The low density polyethylene pipe is manufactured exclusively from material listed by the Plastic Pipe Institute as a PE1404 Virgin linear low density resin.
- .2 Application:
 - .1 UNDERFLOOR (RINK SUBFLOOR HEAT)
 - .2 RINK COLD FLOOR.

2.2 JOINTS

- .1 No joints allowed in rink piping.

2.3 PIPE SPECIFICATIONS

Nominal Size	Wall Thickness	Weight lb./100'	Nominal I.D.	Pres. Rating
1.25"	0.148"	28.1	1.38"	75 psi

- .2 Manufacturer:
 - .1 Trinus ‘Ice Rink Pipe’ or equal.

2.4 RINK PIPE SUPPORTS

- .1 Provide top loading steel, 'M' type pipe spacers with base plate at 600 mm centres. Spacers shall be fabricated from 4.8 mm diameter s.s. rod in 1829 mm long continuous sections and will space rink piping at 100 mm centres. Support sections to be overlapped. Piping shall be tied with #4 wire. Rink pipe supports shall be as manufactured by Cole Wire Products or Hunter Wire Products Ltd.

3 Execution

3.1 INSTALLATION

- .1 Install in accordance with Provincial Code and local authority having jurisdiction.
- .2 Installation of underground pipe:
 - .1 Install materials in accordance with Manufacturer's instructions.
 - .2 Stabilize unstable trench bottoms.
 - .3 Bed pipe with continuous support from firm base.
 - .1 Material and compaction to meet ASTM standard noted above.
 - .4 Piping shall be clean and installed according to manufacturer's recommendations.
- .3 Before piping is covered, conduct tests in presence of Consultant and correct leaks or defective work.
- .4 Pipe must be protected against excessive water hammer and water surge.
- .5 In order to avoid kinking use fittings to make short radius bends.
- .6 Radius bends should not exceed the following chart below:

PIPE SIZE	MIN.RADIUS OF BEND
¾"	19"
1"	23"
1¼"	30"
1½"	34"
2"	44"

- .7 Pipe must not be kinked, gouge or damaged during installation.
- .8 Use all stainless steel clamps when installing poly pipe.
- .9 Do not in any circumstance heat the pipe with a torch or any other type of flame in order to make insertion of fittings easier. Use a 5% soap solution.

3.2 TESTING

- .1 Each rink floor and header system shall be tested with minimum 414 kPa gauge hydrostatic test pressure and held for 48 hours without decrease in pressure prior to pouring of the concrete floor. Pressure to remain during complete pouring of the floor. It is the responsibility of this Section to be present at floor pouring to ensure against damage to piping and possible leaks. In case of leaks, the entire length of plastic pipe shall be replaced.

END OF SECTION

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1 General

1.1 RELATED SECTIONS

- .1 HVAC Water Treatment Section.

1.2 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 Canadian Standards Association (CSA).
 - .1 CSA W47.1, Certification of Companies for Fusion Welding of Steel.
- .3 American National Standards Institute (ANSI).
 - .1 ANSI/ASME B16.1, Gray Iron Pipe Flanges and Flanged Fittings, Class 25, 125, 250 and 800.
 - .2 ANSI/ASME B16.3, Malleable-Iron Threaded Fittings, Classes 150 and 300.
 - .3 ANSI/ASME B16.5, Pipe Flanges and Flanged Fittings: NPS½ through NPS24 Metric/Inch.
 - .4 ANSI/ASME B16.9, Factory-Made Wrought Steel Buttwelding Fittings.
 - .5 ANSI B18.2.1, Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series).
 - .6 ANSI/ASME B18.2.2, Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange, and Coupling Nuts (Inch Series).
 - .7 ANSI/AWWA C111/A21.11, Rubber Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
- .4 American Society for Testing and Materials (ASTM).
 - .1 ASTM A47/A47M, Specification for Ferritic Malleable Iron Castings.
 - .2 ASTM A53/A53M, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc Coated, Welded and Seamless.
 - .3 ASTM A536, Specification for Ductile Iron Castings.
 - .4 ASTM B61, Specification for Steam or Valve Bronze Castings.
 - .5 ASTM B62, Specification for Composition Bronze or Ounce Metal Castings.
 - .6 ASTM E202, Test Method for Analysis of Ethylene Glycols and Propylene Glycols.
- .5 Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS).
 - .1 MSS-SP-67, Butterfly Valves.
 - .2 MSS-SP-70, Cast Iron Gate Valves, Flanged and Threaded Ends.
 - .3 MSS-SP-71, Cast Iron Swing Check Valves, Flanged and Threaded Ends.
 - .4 MSS-SP-80, Bronze Gate, Globe, Angle and Check Valves.
 - .5 MSS-SP-85, Cast Iron Globe and Angle Valves, Flanged and Threaded Ends.

1.3 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with general requirements.
- .2 Indicate on manufacturers catalogue literature the following:
 - Piping
 - Valves
 - Accessories

1.4 CLOSEOUT SUBMITTALS

- .1 Provide maintenance data for incorporation into manual specified in general requirements.

2 Products

2.1 PIPE

- .1 Steel pipe: to ASTM A53/A53M, Grade B, as follows:
 - .1 NPS 200 mm (8") and smaller: Schedule 40.

2.2 PIPE JOINTS

- .1 NPS 50 mm (2") and under: screwed fittings with pulverized lead paste.
- .2 NPS 65 mm (2½") and over: welding fittings and flanges to CSA W47.1.
- .3 Flanges: plain or raised face, slip-on.
- .4 Flange gaskets: suitable for hydronic heating up to 110°C (220°F).
- .5 Pipe thread: taper.
- .6 Bolts and nuts: to ANSI B18.2.1 and ANSI/ASME B18.2.2.

2.3 FITTINGS

- .1 Screwed fittings: malleable iron, to ANSI/ASME B16.3, Class 150.
- .2 Pipe flanges and flanged fittings:
 - .1 Cast iron: to ANSI/ASME B16.1, Class 125.
 - .2 Steel: to ANSI/ASME B16.5.
- .3 Butt-welding fittings: steel, to ANSI/ASME B16.9.
- .4 Unions: malleable iron, to ASTM A47/A47M and ANSI/ASME B16.3.

2.4 VALVES MANUFACTURERS

- .1 All valves shall be of commercial grade and of same manufacturer.
- .2 Acceptable Manufacturers:
Newman Hattersley Canada Ltd.
Jenkins/Crane
Milwaukee
Toyo
Kitz
MA Stewart

2.5 VALVES

- .1 Connections:
 - .1 NPS 50 mm (2") and smaller: screwed ends.
 - .2 NPS 65 mm (2 1/2") and larger: flanged ends.
- .2 Butterfly valves: Application: Isolating each cell or section of multiple component equipment and where indicated.
 - .1 NPS 65 mm (2 1/2") and over: Flanged ends. Jenkins FIG 2232 ELJ.
- .3 Globe valves: Application: Throttling, flow control, emergency bypass:
 - .1 NPS 50 mm (2") and under:
 - .1 With PFTE disc, as specified. Jenkins 106BJ.
Bronze.
 - .2 NPS 65 mm (2 1/2") and over:
 - .1 With solid bronze disc, bronze trim, cast iron body. Jenkins 2342.
- .4 Drain valves: Gate, Class 125, non-rising stem, solid wedge disc, with chain and cap.
- .5 Swing check valves:
 - .1 NPS 50 mm (2") and under:
 - .1 Class 150, swing, with PFTE disc, as specified.
Bronze. Jenkins 4475TJ.
 - .2 NPS 65 mm (2 1/2") and over:
 - .1 Flanged or Grooved ends, Bronze trim, Cast Iron: Gate, Globe, Check. Jenkins 587J.
- .6 Ball valves:
 - .1 NPS 80 mm (3") and under:
 - .1 Body and cap: cast high tensile bronze to ASTM B62.
 - .2 Pressure rating: Class 125, 860 kPa (125 psi) steam, WP = 1.4 MPa (203 psi) WOG.
 - .3 Connections: Screwed ends to ANSI B1.20.1 and with hex. shoulders.
 - .4 Stem: stainless steel tamperproof ball drive.

- .5 Ball and seat: replaceable stainless steel solid ball and teflon seats.
- .6 Stem seal: TFE with external packing nut.
- .7 Operator: removable lever handle.
- .8 Extended handles on chilled water valves.
- .9 Full port.
- .10 Jenkins 201SJ.

2.6 AUTOMATIC AIR VENT

- .1 Industrial float vent: cast iron body and NPS 15 mm (1/2") connection and rated at 860 kpa (125 psi) working pressure.
- .2 Float: solid material suitable for 115°C (240°F) working temperature.
- .3 Plastic vents are not acceptable.
- .4 Acceptable materials:
Maid-O-Mist No. 67
Spirax Sarco

3 Execution

3.1 PIPING INSTALLATION

- .1 Installation shall be by a licensed pipe fitter.
- .2 Connect to equipment in accordance with manufacturer's instruction unless otherwise indicated.
- .3 Install concealed pipes close to building structure to keep furring space to minimum. Install to conserve headroom and space. Run exposed piping parallel to walls. Group piping wherever practical.
- .4 Slope piping in direction of drainage and for positive venting.
- .5 Use eccentric reducers at pipe size change installed to provide positive drainage or positive venting.
- .6 Provide clearance for installation of insulation and access for maintenance of equipment, valves and fittings.
- .7 Ream pipes, clean scale and dirt, inside and outside, before and after assembly.
- .8 Assemble piping using fittings manufactured to ANSI standards.
- .9 Saddle type branch fittings may be used on mains if branch line is no larger than half the size of main. Hole saw or drill and ream main to maintain full inside diameter of branch line prior to welding saddle.

3.2 VALVE INSTALLATION

- .1 Install rising stem valves in upright position with stem above horizontal.
- .2 Install butterfly valves on chilled water and condenser water lines only.
- .3 Install gate or ball valves at branch take-offs and to isolate each piece of equipment, and as indicated.
- .4 Install globe valves for balancing and in by-pass around control valves as indicated.
- .5 Provide silent check valves on discharge of pumps and in vertical pipes with downward flow and as indicated.
- .6 Provide swing check valves in horizontal lines as indicated.
- .7 Provide ball valves for glycol service.

3.3 AIR VENTS

- .1 Install at high points of systems.
- .2 Install ball valve on automatic air vent inlet.
- .3 Extend vent lines in Mechanical Room with screwdriver stop at 1.8 m AFF.

3.4 CIRCUIT BALANCING VALVES

- .1 Install flow measuring stations and flow balancing valves as indicated and as follows:
 - .1 On return side of all heating devices (convectors, panels, force flows, radiation, coils, etc).
 - .2 On return side of all water or glycol cooling coils.
 - .3 On return side of all reverse return piping loops and/or branch circuits.
- .2 Install to manufacturers requirements.
- .3 Valve size shall be one trade size smaller than piping.
- .4 Refer to Testing Adjusting and Balancing Section for applicable procedures.

3.5 FILLING OF SYSTEM

- .1 Co-ordinate filling of system with HVAC water treatment contractor.
- .2 Drain and vent all new and existing piping, etc. for a complete operable system.

Store all existing brine to be reused.

- .3 Refill brine cooling and heating system with existing brine solution.**

3.6 TESTING

- .1 Test system in accordance with Refrigeration General Requirements Section.
- .2 For glycol systems, retest with propylene glycol to ASTM E202, inhibited, for use in building system after cleaning. Repair any leaking joints, fittings or valves.

3.7 BRINE CHARGING

- .1 Retest for concentration to ASTM E202 after cleaning.**
- .2 Provide report to Consultant.**
- .3 Maintain brine level in storage tank until system is fully charged and has equalized throughout the entire system. Monitor system on bi-weekly basis until system is completely filled. Provide brine solution as required.**

3.8 FLUSHING AND CLEANING

- .1 Procedure:
 - .1 Flushing and cleaning shall only take place after successful piping pressure testing.
 - .2 Terminal device (reheat coils, heat pumps, perimeter radiation, etc.), air handling unit coils and their associated control and balancing valves shall be bypassed during the preliminary flushing and cleaning process.
 - .3 Instruments such as flow meters, flow metering valves and orifice plates shall only be installed after flushing and cleaning.
- .2 Timing:
 - .1 The overall construction schedule identifies piping flushing and cleaning with realistic time allotments.
 - .2 The refrigeration contractor is required to provide a detailed report outlining the processes and procedures for flushing and cleaning per piping system at least 4 to 6 weeks in advance of work.
 - .3 As a minimum, at least one piping flushing and cleaning procedure shall be witnessed, by the consultant and/or commissioning agent.
- .3 The refrigeration contractor shall to utilize a qualified water treatment specialist to supervise the flushing and cleaning process and provide the certified water analysis report certifying that the piping systems are clean.
- .4 Coordinate flushing and cleaning of refrigeration systems with HVAC water treatment contractor.
- .5 Flush and clean **new** piping system in presence of Consultant.

- .6 Flush after pressure test for a minimum of 4 hrs.
- .7 Fill system with solution of water and non-foaming, phosphate-free detergent 3% solution by weight. Circulate for minimum of 8 hrs.
- .8 Thoroughly flush all new refrigeration systems and equipment with approved cleaning chemicals designed to remove deposition from construction such as pipe dope, oils, loose mill scale and other extraneous materials. Chemicals to inhibit corrosion of various system materials and be safe to handle and use.
- .9 During circulation of cleaning solution, periodically examine and clean filters and screens and monitor changes in pressure drop across equipment.
- .10 Refill system with clean water. Circulate for at least 2 hours. Clean out strainer screens/baskets regularly. Then drain.
- .11 Drainage to include drain valves, dirt pockets, strainers, every low point in system.
- .12 Drain and flush systems until alkalinity of rinse water is equal to make-up water. Refill with clean water treated to prevent scale and corrosion during system operation.
- .13 Re-install strainer screens/baskets only after obtaining Consultant's approval and approval from HVAC water treatment contractor.
- .14 Repeat system drain and flush as often as necessary to have a clean system.
- .15 Disposal of cleaning solutions to be approved by authority having jurisdiction.
- .16 Isolate new piping system from existing system as required for system cleaning.
- .17 **After piping system is cleaned, refill with existing brine solution.**
 - .1 **Underfloor system. (Heating and Cooling)**

3.9 EXISTING SYSTEM DRAINAGE

- .1 Drain existing system complete to facilitate system renovations.
- .2 Disposal of existing glycol and brine systems to the requirements of the local and/or provincial regulations.
- .3 Existing fluids to be stored and tested and be reused. Provide new additives/ glycol to restore proper composition of fluid. Contractor to have existing fluid tested and report provided to determine course for recharging.

END OF SECTION

1 General

1.1 REFERENCES

- .1 All codes, standards, etc. as referenced shall be the latest edition.
- .2 American Society of Mechanical Engineers (ASME).
- .3 ANSI/ASME Boiler and Pressure Vessel Code, Section VI.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with general requirements.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit operation and maintenance data for incorporation into manual specified in general requirements
- .2 Include following:
 - .1 Log sheets as recommended by manufacturer.
 - .2 Test reports.

2 Products

2.1 MANUFACTURER

- .1 Equipment, chemicals, service by one supplier.
- .2 Acceptable manufacturer:
To match existing supplier.

2.2 SHIPPING/ FEEDING CHEMICAL CONTAINERS

- .1 High density moulded polyethylene, with liquid level graduations, cover.
- .2 Agitators: as required by manufacturer.

2.4 CHEMICALS

- .1 Provide 1 year's supply.

2.5 TEST EQUIPMENT

- .1 Provide one set of test equipment for each system to verify performance.
- .2 Complete with carrying case, reagents for chemicals, all specialized or supplementary equipment.

2.6 CLEANING CHEMICALS

- .1 Provide as required to make system clean.
- .2 Cleaner chemical: compatible and of the same manufacturer of the water treatment supplier.

2.7 RECORD MANAGEMENT

- .1 Provide cards and card holder mounted on wall adjacent to each pot feeder.

3 Execution

3.1 INSTALLATION

- .1 Install water treatment systems in accordance with ASME Boiler Code Section VII, and requirements and standards of authorities having jurisdiction, except where specified otherwise.
- .2 Ensure adequate clearances to permit performance of servicing and maintenance of equipment.

3.2 CHEMICAL FEED PIPING

- .1 Install crosses at all changes in direction. Install plugs in all unused connections.

3.3 WATER TREATMENT SERVICES

- .1 After entire new and existing system is cleaned as specified elsewhere, provide monthly water treatment monitoring and consulting services for period of one year after system start-up. Provide written report to consultant after each visit. Service to include:
 - .1 Initial water analysis and treatment recommendations.
 - .2 System start-up assistance.
 - .3 On site system testing and recording of treated hydronic system.
 - .4 Operating staff training.
 - .5 Visit plant every 7 days during first month of operation and as required until system stabilizes, and advise consultant in writing on treatment system performance.
 - .6 Provide monthly visits with reports after system has stabilized to the satisfaction of the owner.
 - .7 Provide necessary monthly recording charts and log sheets for one year operation.
 - .8 Provide necessary laboratory and technical assistance.
 - .9 Instructions and advice to operating staff to be clear, concise and in writing.

3.4 START-UP

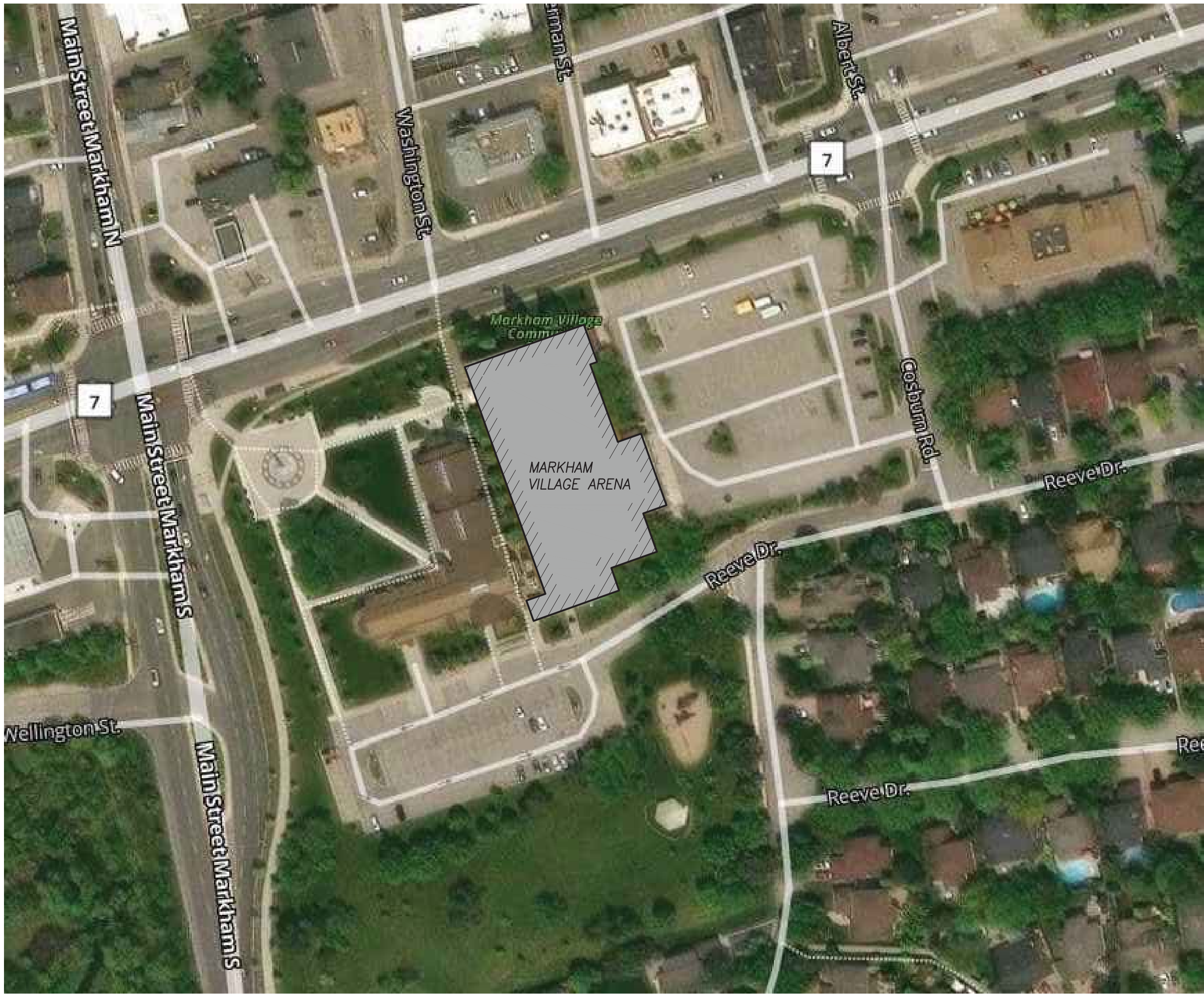
- .1 Start up water treatment systems in accordance with manufacturer's instructions.

3.5 SYSTEM COMMISSIONING AND TRAINING

- .1 Commissioning and training shall be provided by installing water treatment sub-contractor and water treatment supplier.
- .2 Timing:
 - .1 After start-up deficiencies rectified.
 - .2 After start-up and before TAB of connected systems.
- .3 Pre-commissioning Inspections:
 - .1 Verify:
 - .1 Presence of test equipment, reagents, chemicals, details of specific tests to be performed, operating instructions.
 - .2 Suitability of log book.
 - .3 Currency and accuracy of initial water analysis.
 - .4 Required quality of treated water.
- .4 Commissioning procedures - applicable to all Water Treatment Systems:
 - .1 Establish, adjust as necessary and record all automatic controls and chemical feed rates.
 - .2 Monitor performance continuously during commissioning of all connected systems and until acceptance of project.

- .3 Establish test intervals, regeneration intervals.
 - .4 Record on approved report forms all commissioning procedures, test procedures, dates, times, quantities of chemicals added, raw water analysis, treated water analysis, test results, instrument readings, adjustments made, results obtained.
 - .5 Establish, monitor and adjust automatic controls and chemical feed rates as necessary.
 - .6 Visit project at monthly intervals after commissioning is satisfactorily completed to verify that performance remains as set during commissioning (more often as required until system stabilizes at required level of performance).
 - .7 Advise Engineer in writing on all matters regarding installed water treatment systems.
- .5 Commissioning procedures - Closed Circuit Hydronic Systems:
- .1 Analyse water in system.
 - .2 Based upon an assumed rate of loss approved by Engineer, establish rate of chemical feed.
 - .3 Record types, quantities of chemicals applied.
 - .4 Provide written verification of glycol solution concentration.
- .6 Training:
- .1 Commission systems, perform tests in presence of, and using assistance of, assigned O&M personnel.
 - .2 Train O&M personnel in softener regeneration procedures.
- .7 Certificates:
- .1 Upon completion, furnish certificates confirming satisfactory installation and performance.
- .8 Commissioning Reports:
- .1 To include system schematics, test results, test certificates, raw and treated water analyses, design criteria, all other data required by Consultant.
- .9 Commissioning activities during Warranty Period:
- .1 Check out water treatment systems on regular basis and submit written report to Consultant.

END OF SECTION



MARKHAM VILLAGE ARENA

ICE PAD + DASHERBOARD REPLACEMENT

RFP No. 24023

DRAWING LIST	
DRAWING NO.	DRAWING NAME:
0.01	COVER PAGE
1.01	REMOVALS PLAN
1.02	GROUND FLOOR PLAN
1.03	FLOORING PLANS
1.04	PLAYER BENCH DETAILS
1.05	VIEWING PLATFORM PLAN & DETAILS
2.01	SECTIONS & DETAILS I
2.02	SECTIONS & DETAILS II

PROVISIONAL PRICES

#1 REMOVE & REPLACE EXISTING PLAYERS, PENALTY, AND TIME KEEPERS BOXES, BACK WALL, PLATFORMS, AND BENCHES, TIME KEEPERS BOX TO HAVE NEW ROOF

GENERAL NOTES

- CHECK ALL DIMENSIONS ON THESE DRAWINGS WITH ALL OTHER DRAWINGS, INCLUDING BUT NOT LIMITED TO DRAWINGS PREPARED ARCHITECTURAL, MECHANICAL OR ELECTRICAL CONSULTANTS. REPORT ANY INCONSISTENCIES TO THE ENGINEER PRIOR TO COMMENCING WITH THE WORK. DO NOT SCALE THE DRAWINGS.
- THE DESIGN LIVE LOADS ARE INDICATED ON THE DRAWINGS. CONSTRUCTION LOADS SHALL NOT EXCEED THE DESIGN LOADS.
- THE COMPLETED STRUCTURE IS SHOWN ON THE DRAWINGS. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY BRACING, SHORING AND ANY OTHER TEMPORARY OR PERMANENT MEASURES AS REQUIRED DURING CONSTRUCTION. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY SUPPORT OF EXISTING OR ADJACENT STRUCTURES AS REQUIRED. ALL BRACING AND SHORING IS THE RESPONSIBILITY OF THE CONTRACTOR.
- CONSTRUCTION FEATURES NOT FULLY SHOWN ARE COMPARABLE TO SIMILAR CONDITION DETAILS.
- REFER TO OTHER CONSULTANTS DRAWINGS FOR DETAILS OF OPENINGS, PITS, CHAMFERS, DEPRESSIONS NOT INDICATED ON THE STRUCTURAL DRAWINGS.
- ALL CONSTRUCTION SHALL BE IN CONFORMANCE WITH THE LATEST ONTARIO BUILDING CODE, LATEST APPLICABLE REGULATIONS AND GOOD CONSTRUCTION PRACTICES.
- THE STRUCTURAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER CONTRACT DRAWINGS AND SPECIFICATIONS.
- CLARIFY ANY QUERIES WITH THE ENGINEER REGARDING THE INTERPRETATION OF THE DRAWINGS, PRIOR TO THE COMMENCEMENT OF ANY WORK.

TIMBER FRAMING

- ALL DESIGN AND CONSTRUCTION SHALL BE CARRIED OUT IN CONFORMANCE WITH CSA STANDARD 086.
- SAWN LUMBER SHALL BE SPRUCE/PINE/FIR GRADE NUMBER 1 AND GRADE NUMBER 2 IN THE RATIO OF 67% (MINIMUM) AND 33% (MAXIMUM) RESPECTIVELY.
- ALL LUMBER TO BE PRESSURE TREATED.

STAIR RAILING NOTE:

- THE HANDRAILS MUST BE DESIGNED TO WITHSTAND LOADING AS SPECIFIED IN O.B.C. DIV. B. ARTICLE 3.4.6.4. & GUARD RAILS MUST BE DESIGNED TO WITHSTAND LOADING AS SPECIFIED IN ARTICLES 4.1.5.15. & 4.1.5.17. SHOP DRAWINGS ARE TO BE STAMPED BY A PROFESSIONAL ENGINEER

CONCRETE NOTES

- ALL STRUCTURAL CONCRETE ELEMENTS HAVE BEEN DESIGNED IN ACCORDANCE WITH CSA STANDARD CAN/CSA A23.3. ALL CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH CSA STANDARD CAN/CSA A23.1.
- MINIMUM CONCRETE STRENGTH AT 28 DAYS SHALL BE:
 - FOOTINGS 25 MPa TYPE N
 - FOUNDATION WALLS 25 MPa TYPE F1
 - SLAB ON GRADE 25 MPa TYPE N
 - ICE PAD 32 MPa
 - LEAN CONCRETE 10 MPaSLUMP SHALL BE 75mm± 25mm.
AGGREGATE SHALL BE 20mm MAXIMUM.
AIR ENTRAINMENT TO BE 6% ± 1% WHEN EXPOSED TO EXTERIOR.
CONTRACTOR TO SUBMIT CONCRETE MIX DESIGN FOR REVIEW.

RINK SLAB – MIX DESIGN

PROPORTION NORMAL DENSITY CONCRETE IN ACCORDANCE WITH CSA-A23.1, TO GIVE FOLLOWING PROPERTIES: FOR CONCRETE ICE PAD:

- MAXIMUM 25% SLAG CEMENT CONTENT
- MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS: 32 MPa.
- NOMINAL SIZE OF COARSE AGGREGATE: 15 mm.
- SLUMP AT TIME AND POINT OF DISCHARGE: 150 TO 170 mm.
- SLUMP AT TIME AND POINT OF PLACEMENT: 180 TO 200 mm.
- ADJUST APPLICATION OF SUPERPLASTICIZER TO ACCOUNT FOR LENGTH OF PUMPING.
- AIR CONTENT: 0 – 3% MAXIMUM.
- WATER/CEMENT RATIO 0.45.
- THE DEFORMED REINFORCING STEEL SHALL CONFORM TO CSA STANDARD G30.18M GRADE 300R FOR STIRRUPS AND TIES AND GRADE 400R FOR ALL OTHER REINFORCING. UNLESS OTHERWISE NOTED THE REINFORCING LAP LENGTH SHALL BE 'CLASS B' IN SPLICES. ALL REINFORCING HOOKS AND BENDS SHALL BE IN ACCORDANCE WITH A23.1.
- WELDED WIRE FABRIC SHALL BE IN ACCORDANCE WITH CSA G30.5. ALL MESH SHALL BE CHAISED PRIOR TO THE CONCRETE POUR. LIFTING OF THE MESH DURING THE CONCRETE POUR WILL NOT BE PERMITTED. ALL SPLICES SHALL BE A MINIMUM OF TWO CROSS WIRE SPACINGS PLUS 50mm.
- THE REINFORCING COVER FOR CONCRETE SHALL BE:
 - 75mm FOR CONCRETE AGAINST EARTH
 - 40mm FOR FORMED CONCRETE EXPOSED TO EARTH OR WEATHER WHERE THE REINFORCING BAR IS 15M OR SMALLER
 - 50mm FOR FORMED CONCRETE EXPOSED TO EARTH OR WEATHER WHERE THE REINFORCING BAR IS 20M OR LARGER
 - 25mm FOR INTERIOR CONCRETE. ALL CHAIRS, BOLSTERS, SPACERS AND BAR SUPPORTS SHALL BE IN ACCORDANCE WITH A23.1.
- FOOTINGS SHALL BEAR ON NATIVE UNDISTURBED SOIL WITH A MINIMUM BEARING RESISTANCE OF:
 - 150 kPa (SL)
 - 200 kPa (UL)THE CONTRACTOR SHALL VERIFY THE CAPACITY PRIOR TO PLACEMENT OF CONCRETE.
- THE LINE OF SLOPE BETWEEN ADJACENT FOOTINGS OR EXCAVATION OR STEP DOWN FOOTINGS SHALL NOT EXCEED A RISE OF 7 IN A RUN OF 10. STEP HEIGHT SHALL NOT EXCEED 600mm.
- KEEP EXCAVATIONS DRY BEFORE CONCRETE IS PLACED. REMOVE ALL LOOSE MATERIAL, SOFT SOIL OR WATER PRIOR TO PLACING CONCRETE. PROVIDE A 75mm MUD SLAB FOR ALL FOOTINGS BELOW THE WATER TABLE.
- PROTECT ALL FOOTINGS, WALLS AND SLABS AGAINST FROST ACTION DURING CONSTRUCTION. ALL EXTERIOR FOOTINGS SHALL FOUNDED BELOW THE FROST LINE, MINIMUM 1200mm BELOW GRADE.
- DO NOT BACKFILL AGAINST WALLS RETAINING EARTH UNTIL THE ELEMENTS PROVIDING LATERAL SUPPORT ARE COMPLETE. PLACE BACKFILL IN A MANNER WHERE THE ELEVATION DIFFERENCE ON EITHER SIDE OF THE WALL IS NO GREATER THAN 450mm. PROVIDE TEMPORARY SHORING AS REQUIRED.
- SLAB-ON-GRADE GRADE CONSTRUCTION SHALL BE CAPABLE OF SUPPORTING 25kN/m² WITHOUT RELATIVE SETTLEMENT.
- CONSTRUCT CONCRETE WALLS WITHOUT CONTROL JOINTS, UNLESS OTHERWISE NOTED. PROVIDE CHASES AND BEAMS POCKETS IN THE INTERIOR FACE OF THE WALL AS REQUIRED.
- PROVIDE DOWELS TO WALLS AND COLUMNS TO SUIT THE REINFORCING IN THE WALL OR COLUMN ABOVE.
- ALL ADHESIVE ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH THE HILTI HIT-HY200 (OR APPROVED EQUAL) PROCEDURES.

SUBMITTALS

- SUBMIT FOR REVIEW BY THE CONSULTANT, DETAILED SHOP DRAWINGS FOR ALL STRUCTURAL WORK INCLUDING, BUT NOT LIMITED TO: CONCRETE FORMWORK, REINFORCING STEEL, STRUCTURAL STEEL AND TEMPORARY SHORING.
- THE SCALE OF THE DRAWINGS SHALL BE SUCH THAT THE DETAILS OF THE STRUCTURAL WORK ARE CLEARLY SHOWN, AND IN NO CASE SMALLER THAN 1/4"=1'-0" (1:50).
- THE STRUCTURAL DRAWINGS SHALL NOT BE REPRODUCED, IN WHOLE OR IN PART, FOR USE AS SHOP DRAWINGS.
- EACH DRAWING SUBMITTED FOR CONCRETE FORMWORK, STRUCTURAL STEEL AND TEMPORARY SHORING SHALL BEAR THE SEAL AND SIGNATURE OF A QUALIFIED PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO.
- CONTRACTOR SHALL ALLOW FOR A 5 WORKING DAY TURN AROUND TIME FOR STRUCTURAL CONSULTANT TO REVIEW THE SHOP DRAWINGS.

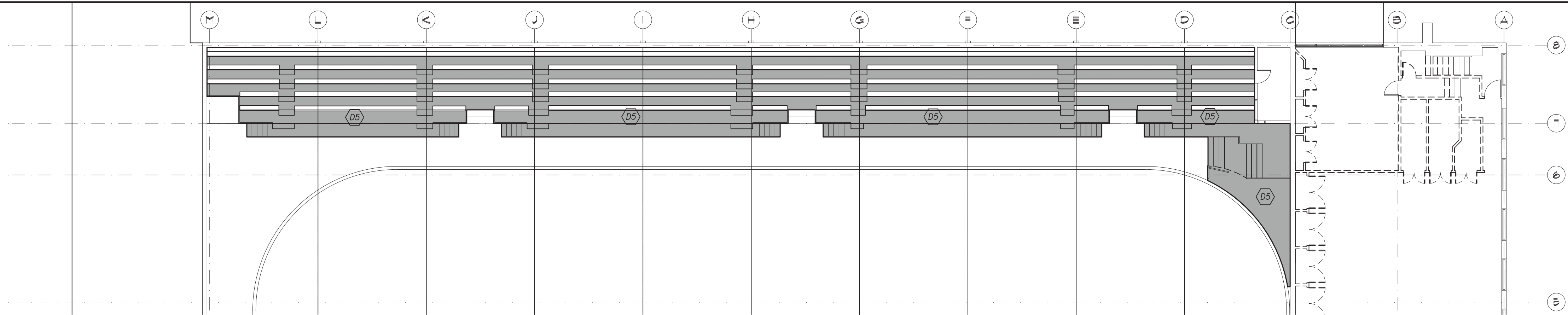
CALCULATIONS

- SUBMIT CALCULATIONS, BEARING THE SEAL AND SIGNATURE OF PROFESSIONAL ENGINEER LICENSED IN THE PROVINCE OF ONTARIO, FOR STRUCTURAL WORK, IF REQUESTED BY THE CONSULTANT.

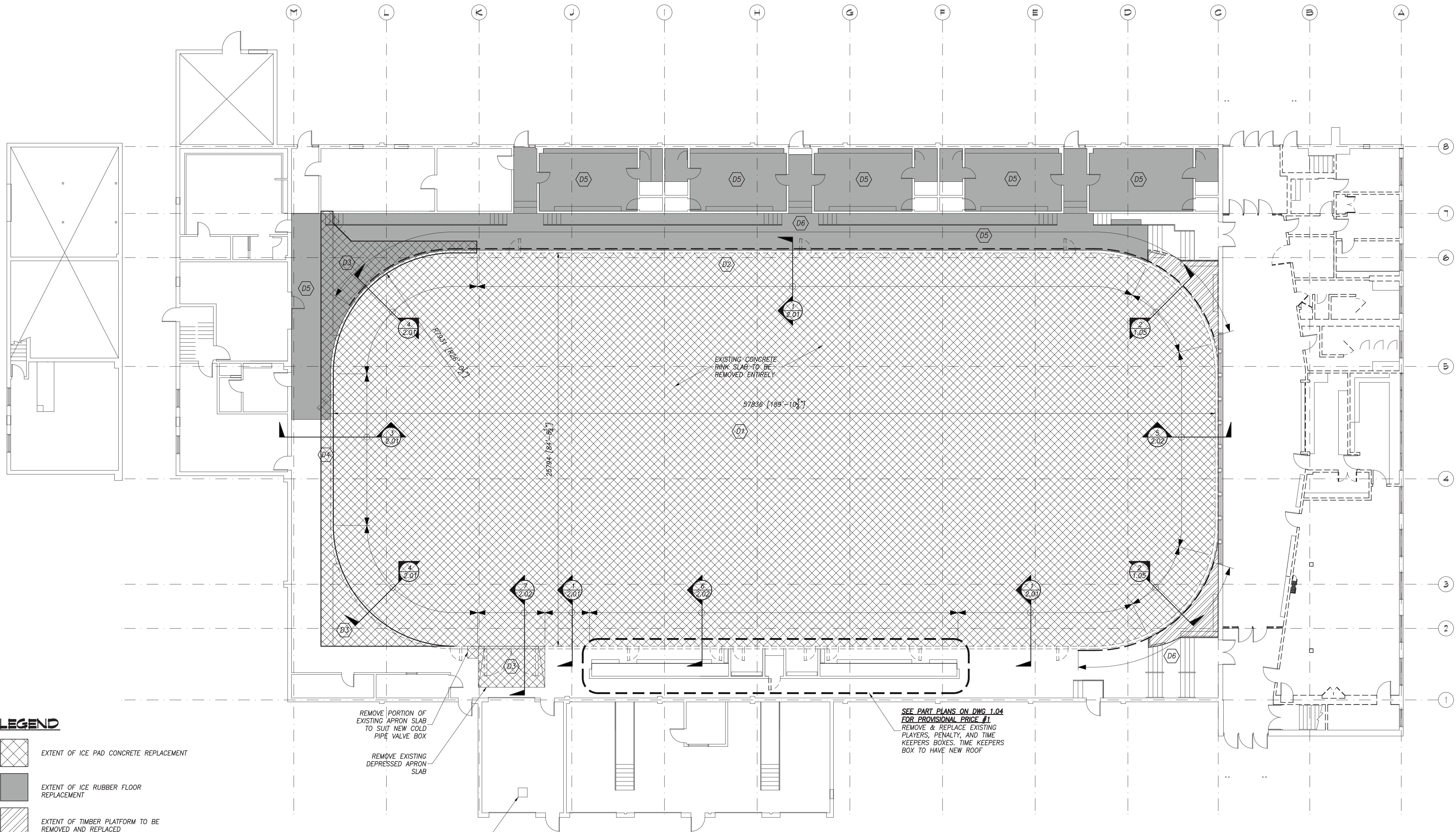
KEI ABBREVIATIONS

ARCH. – ARCHITECTURAL (DRAWINGS)
BLK. – BLOCK
BL. – BOTTOM LOWER LAYER
BM. – BEAM
BOT. – BOTTOM
BUL. – BOTTOM UPPER LAYER
CONC. – CONCRETE
CONT. – CONTINUOUS
c/c – CENTRE TO CENTRE
DWGS. – DRAWINGS
E.F. – EACH FACE
ELEV. – ELEVATION
E.S. – EACH SIDE
E.W. – EACH WAY
EX. – EXISTING
FDN. – FOUNDATION
FFE – FINISHED FLOOR ELEVATION
FLR. – FLOOR
FT. – FOOT
GALV. – GALVANIZED
HOR. – HORIZONTAL
H.O.F. – HORIZONTAL OUTSIDE FACE
H.I.F. – HORIZONTAL INSIDE FACE
H.E.F. – HORIZONTAL EACH FACE
I.F. – INSIDE FACE
LLH – LONG LEG HORIZONTAL
LLV – LONG LEG VERTICAL
LDH – LONG DIMENSION HORIZONTAL
LDV – LONG DIMENSION VERTICAL
MAX. – MAXIMUM
MECH. – MECHANICAL
MIN. – MINIMUM
NTS – NOT TO SCALE
Ø – DIAMETER
o.c. – ON CENTER
O.F. – OUTSIDE FACE
OWSJ – OPEN WEB STEEL JOIST
PL – PLATE
REINF. – REINFORCING
STD. – STANDARD
STL. – STEEL
T&B – TOP AND BOTTOM
T&G – TONGUE AND GROOVE
TLL – TOP LOWER LAYER
T.O.S. – TOP OF STEEL
TUL – TOP UPPER LAYER
TYP. – TYPICAL
U/S – UNDERSIDE
U.N.O. – UNLESS NOTED OTHERWISE
VERT. – VERTICAL
V.O.F. – VERTICAL OUTSIDE FACE
V.I.F. – VERTICAL INSIDE FACE
V.E.F. – VERTICAL EACH FACE
w/ – WITH
WT. – WEIGHT

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MARKHAM VILLAGE ARENA		
6041 YORK HWY 7		
MARKHAM ONTARIO		
TITLE PAGE AND GENERAL NOTES		
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PROJECT No. 24022	CHECKED BY H.A.P.H.	



BLEACHER FLOORING REMOVALS PLAN
SCALE: 1:150



LEGEND

- EXTENT OF ICE PAD CONCRETE REPLACEMENT
- EXTENT OF ICE RUBBER FLOOR REPLACEMENT
- EXTENT OF TIMBER PLATFORM TO BE REMOVED AND REPLACED

GROUND FLOOR REMOVALS PLAN
SCALE: 1:150

DEMOLITION NOTES

- D1 REMOVE EXISTING CONCRETE RINK SLAB AND UNDER FLOOR PIPING
- D2 REMOVE EXISTING BOARDS AND GLASS. REMOVE EXISTING STEEL POST @1200 O.C.
- D3 REMOVE EXISTING CONCRETE SLAB ON GRADE
- D4 REMOVE EXISTING TRENCH COVER & EDGE ANGLES.
- D5 REMOVE EXISTING RUBBER FLOORING. (APPROX. AREA HATCHED)
- D6 EXISTING NETTING TO BE ROLLED UP AND PROTECTED DURING CONSTRUCTION, REINSTATE UPON COMPLETION.

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CONST. NORTH

LICENCED PROFESSIONAL ENGINEER
H.A.P. HUITEMA
24-03-13
PROVINCE OF ONTARIO

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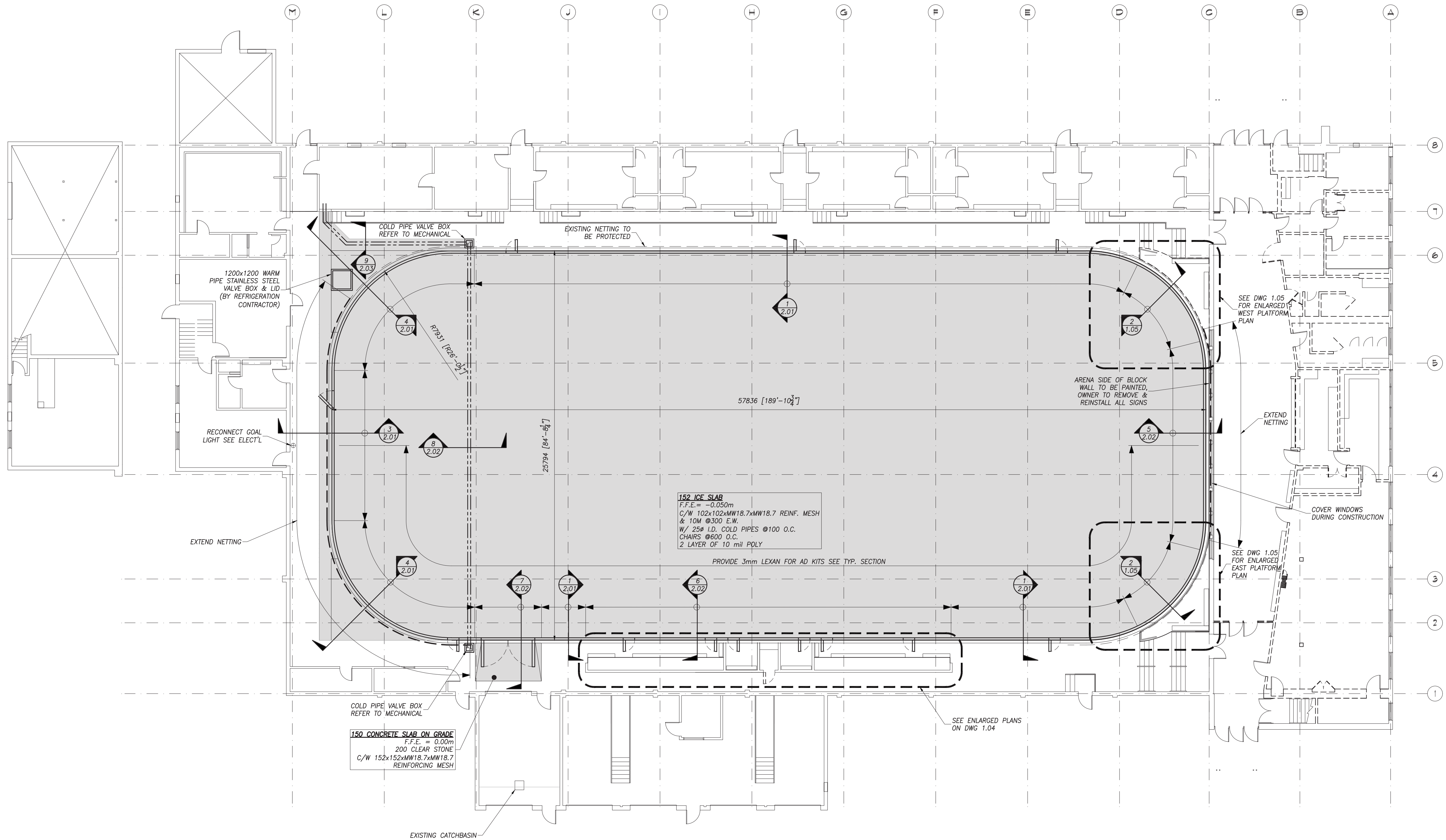
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REMOVALS PLANS

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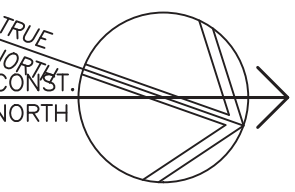


GROUND FLOOR PLAN
SCALE: 1:150


LEGEND

 EXTENT OF ICE PAD REPLACEMENT

NOTE:
CONTRACTOR TO COMPLETE A SURVEY OF THE SAND LAYER PRIOR TO INSTALLATION OF INSULATION. SURVEY GRID IS TO BE 3m x 3m MAXIMUM. TOLERANCE OR FLATNESS IS TO FOLLOW SPECIFICATIONS FOR THE FINISHED SLAB (3mm IN ANY 3m SECTION AND 6mm OVERALL. ADJUSTMENTS/CORRECTIONS ARE TO BE COMPLETED PRIOR TO PLACING INSULATION. RESURVEY AS REQUIRED FOLLOWING ANY ADJUSTMENTS




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24-05-15
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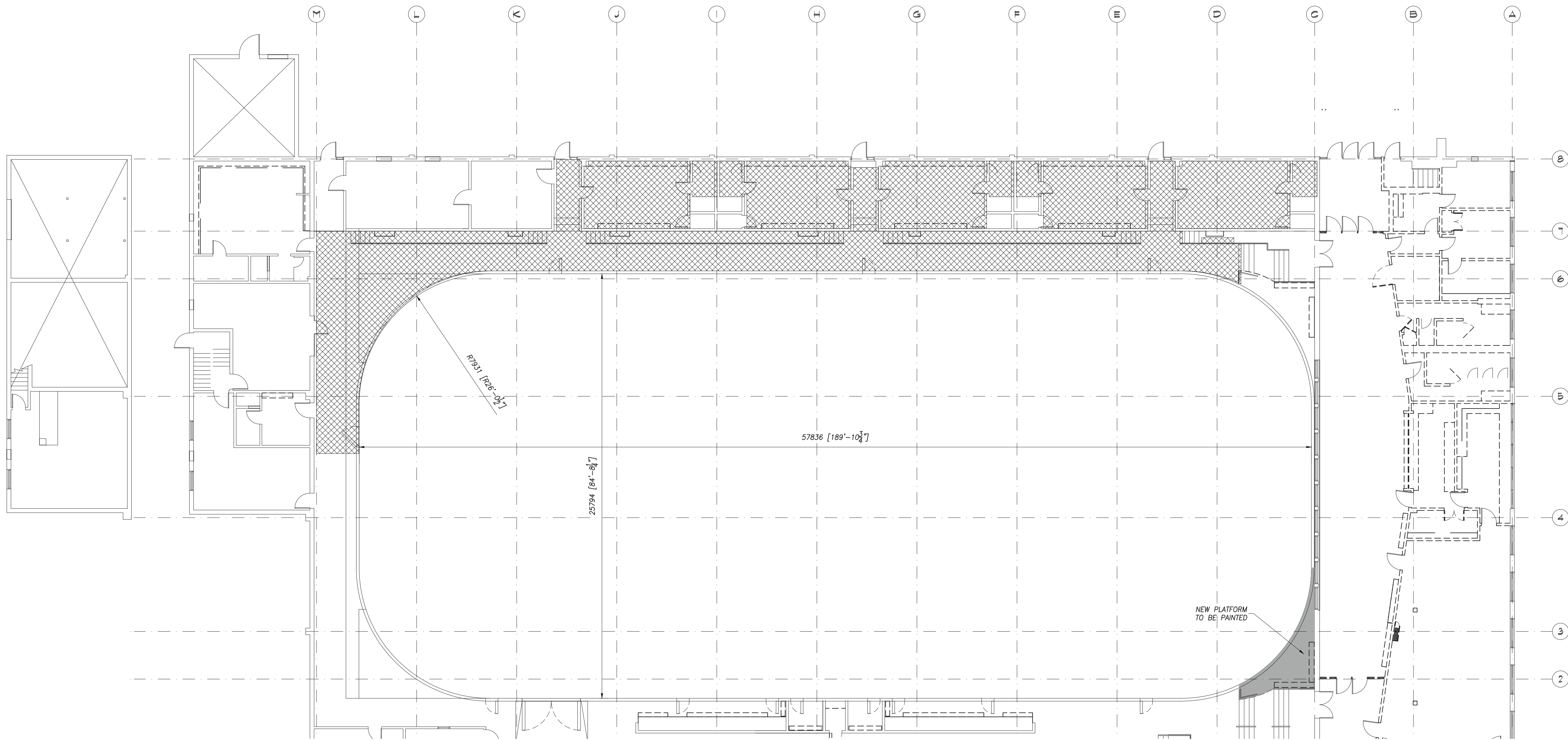
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GROUND FLOOR PLAN

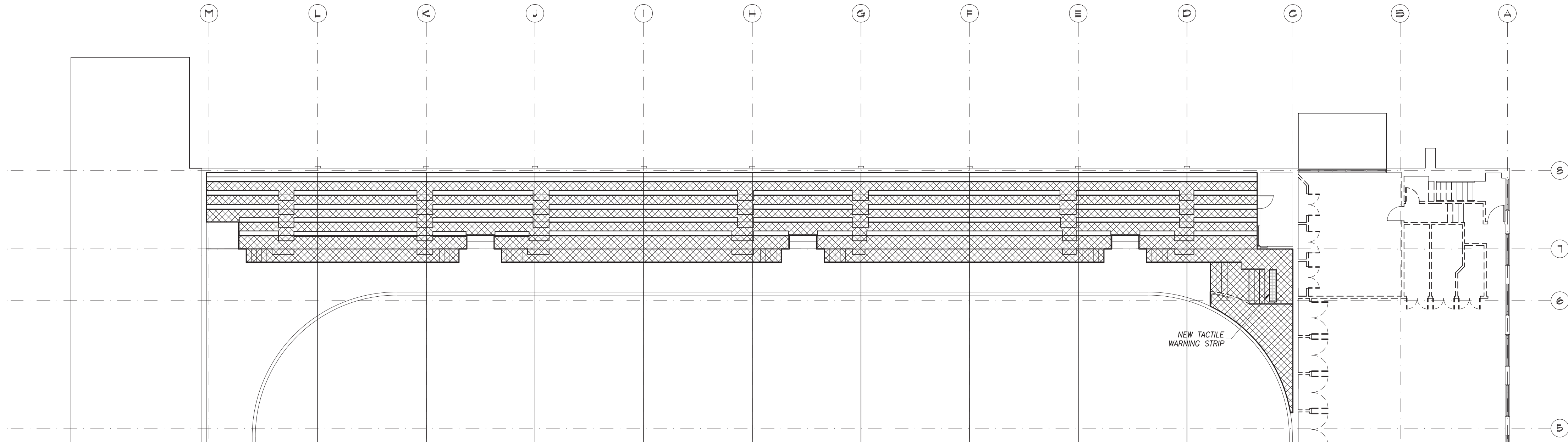
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LOWER FLOORING PLAN
SCALE: 1:150

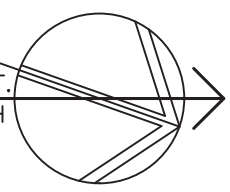
LEGEND

 EXTENT OF RUBBER FLOORING REPLACEMENT



UPPER FLOORING PLAN
SCALE: 1:150

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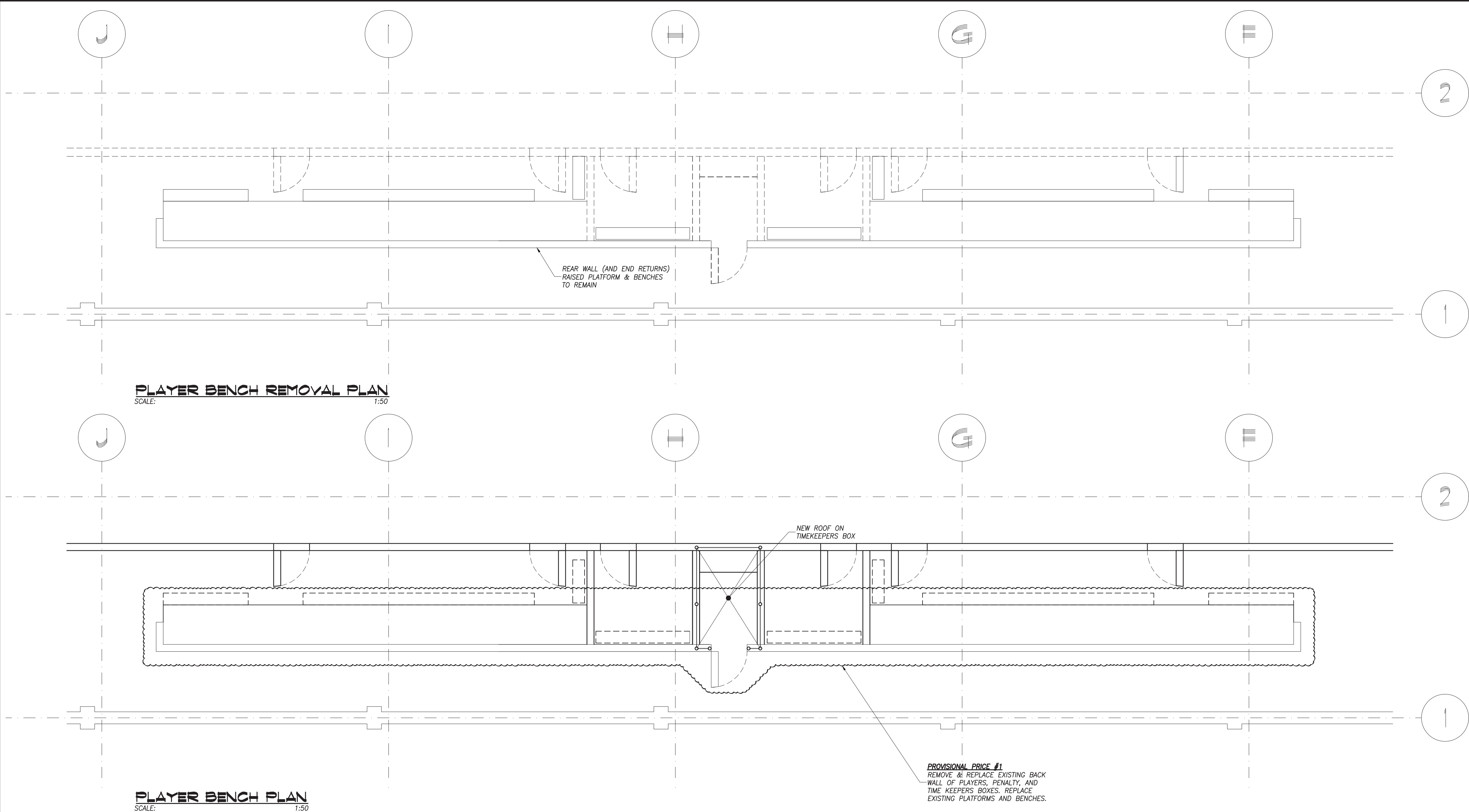
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FLOORING PLAN

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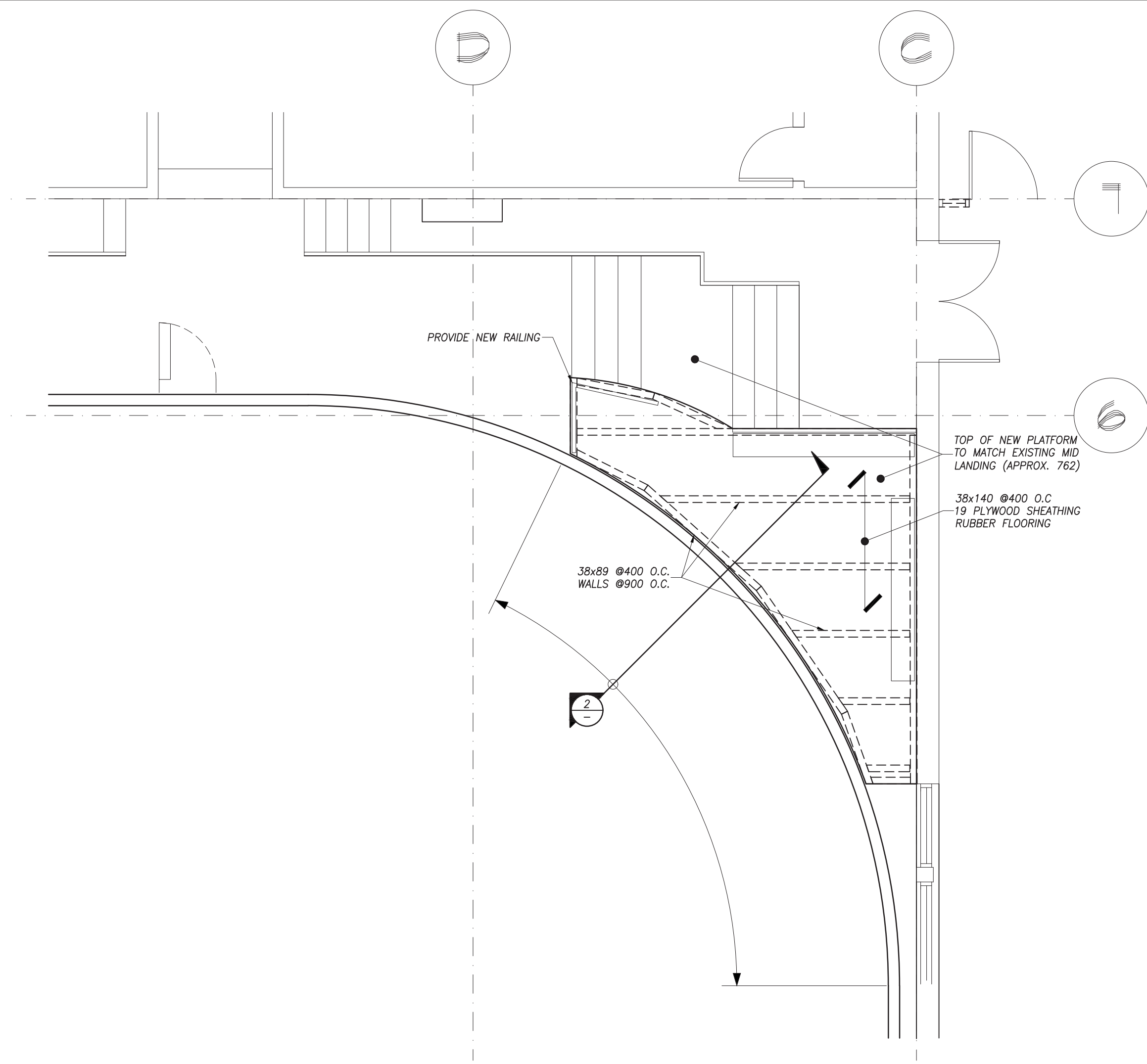
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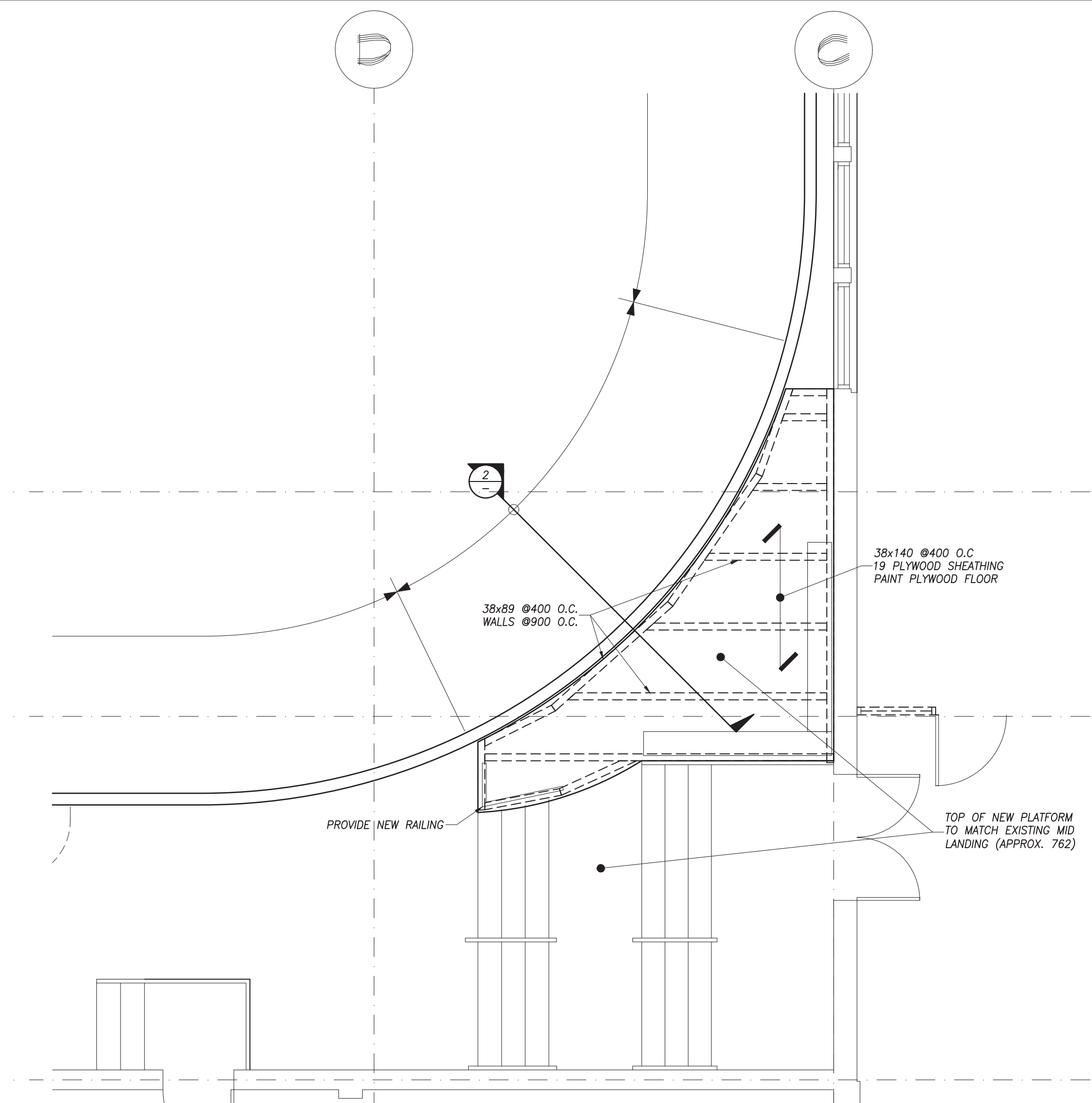
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PLAYERS BENCH
DETAILS

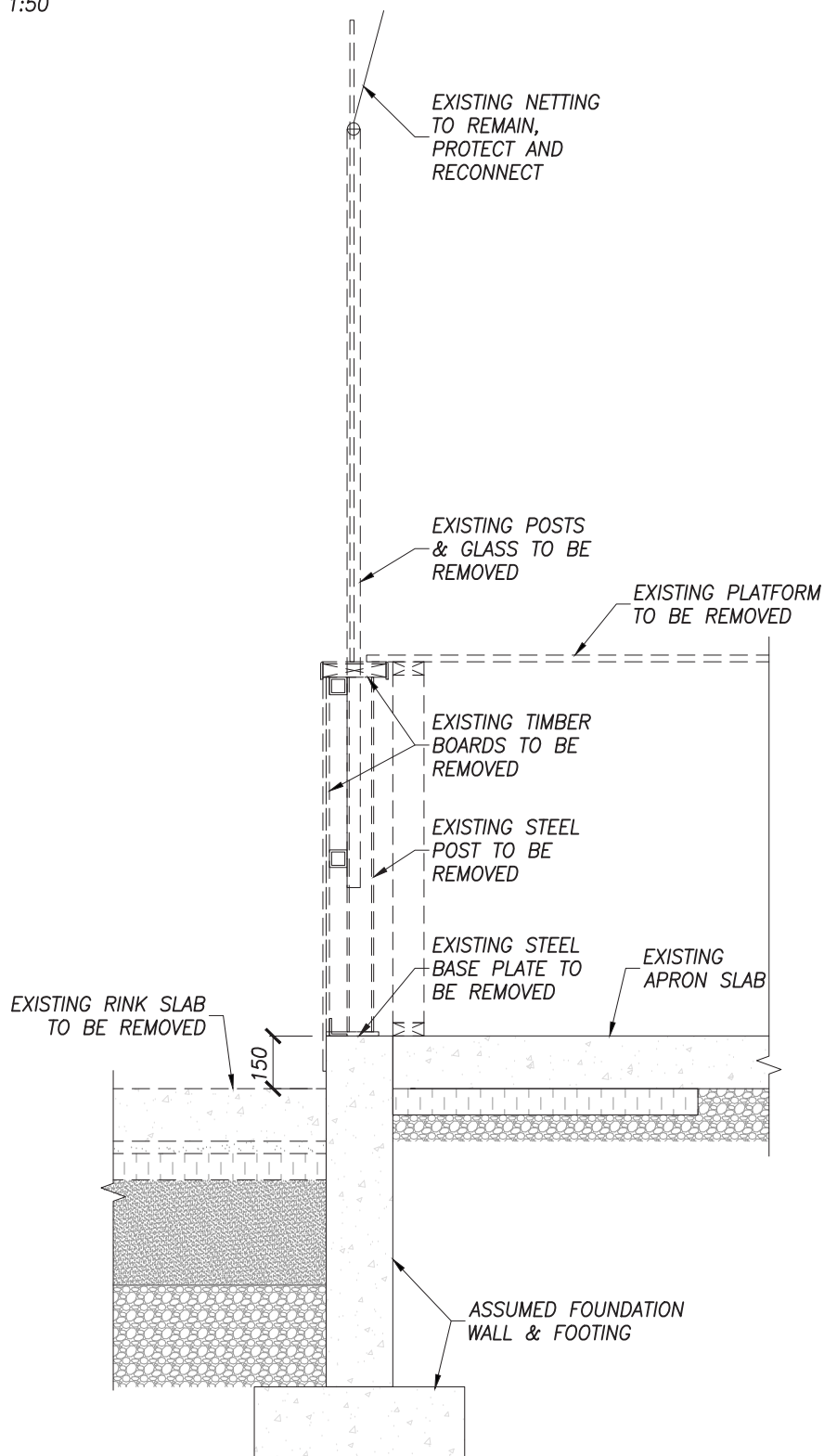
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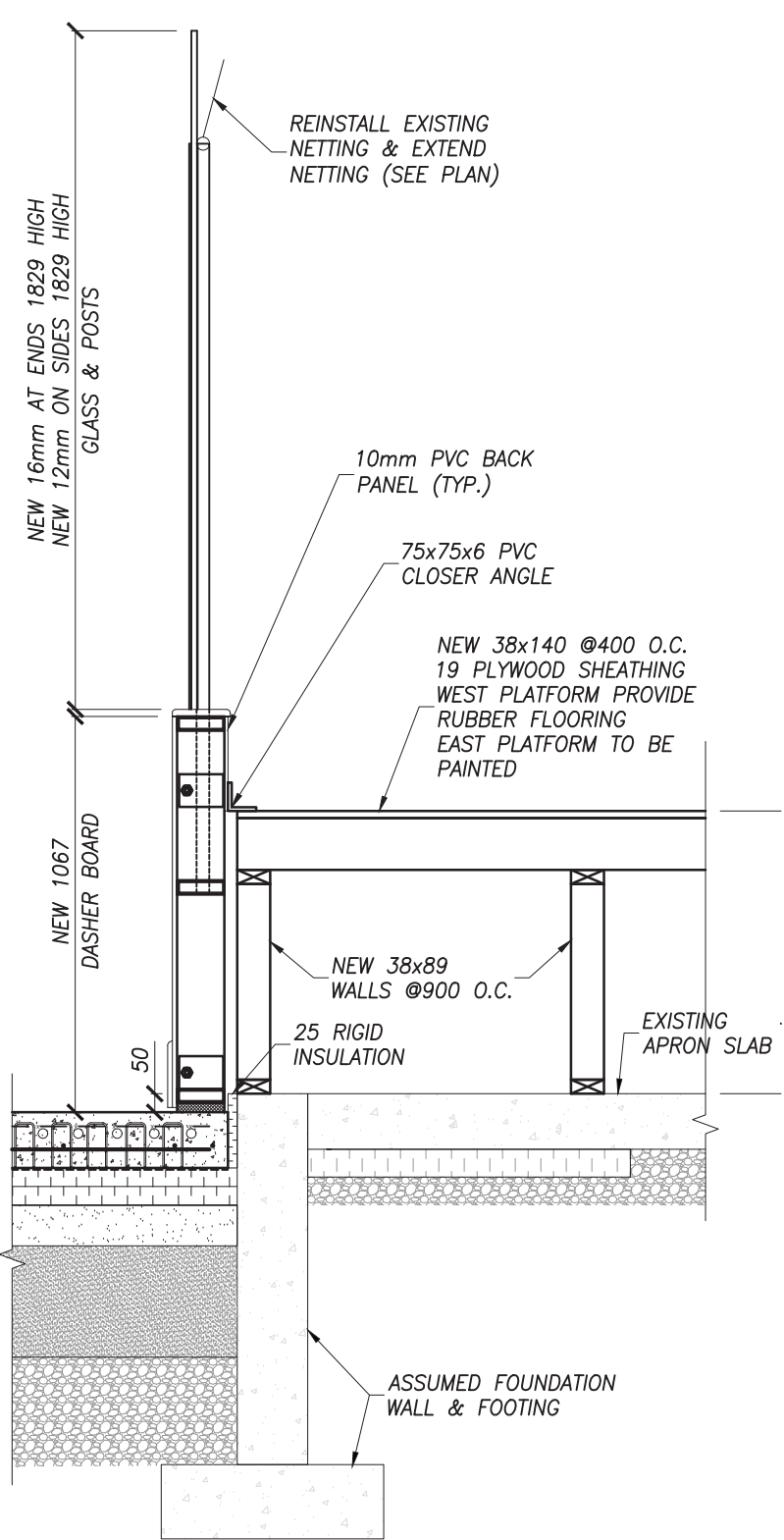
PLAN-WEST VIEWING PLATFORM
SCALE: 1:50



PLAN-EAST VIEWING PLATFORM
SCALE: 1:50



EXISTING APRON SLAB SECTION @ PLATFORM
SCALE: 1:20



SECTION 2
SCALE: 1:20

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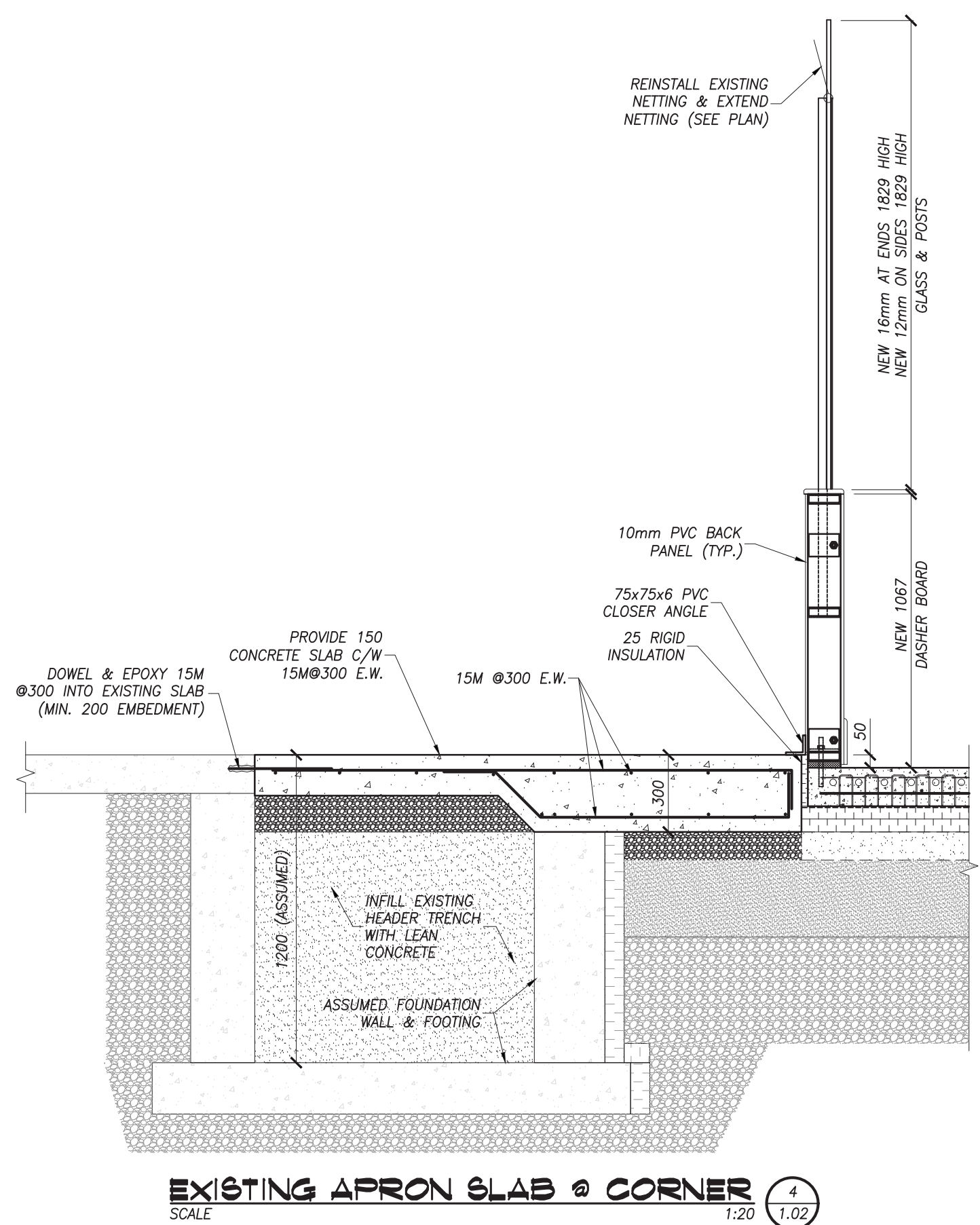
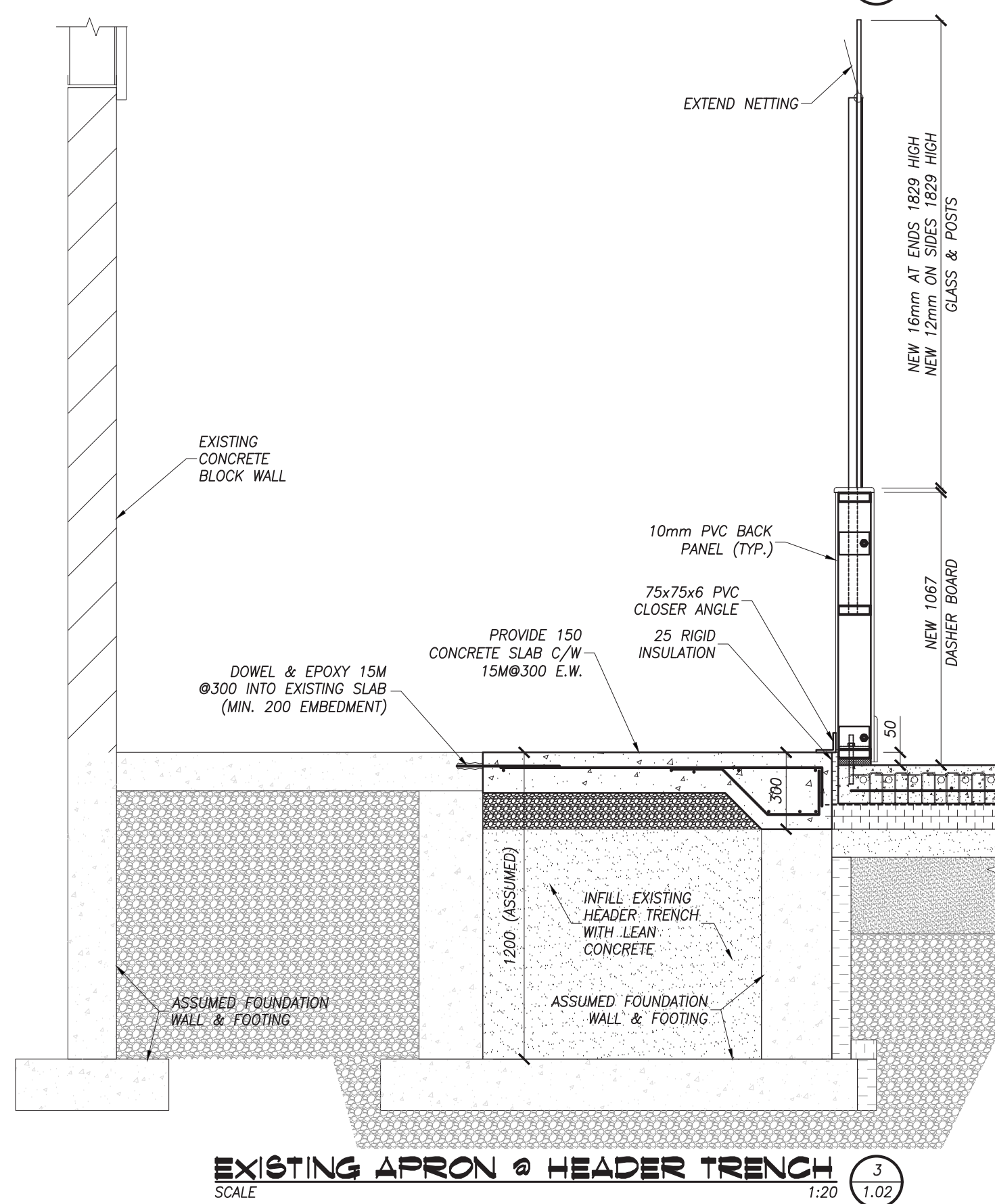
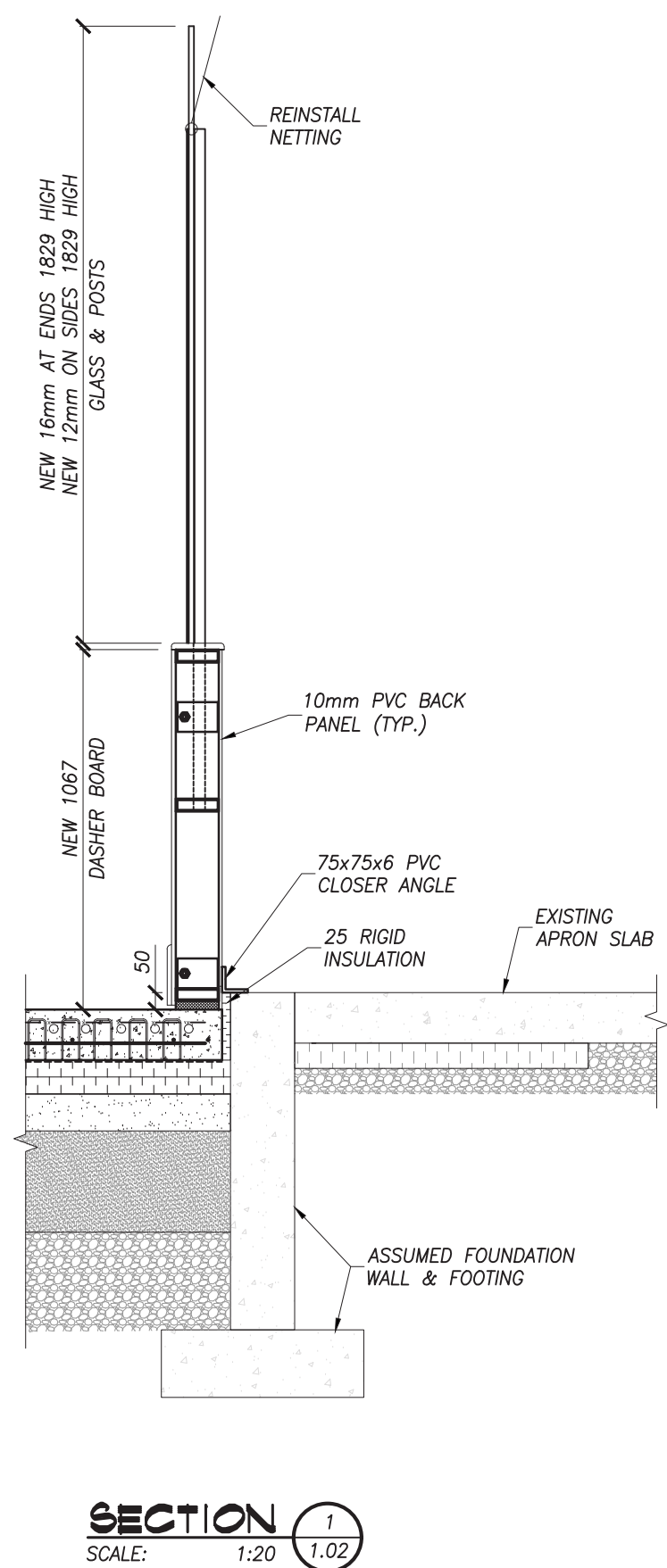
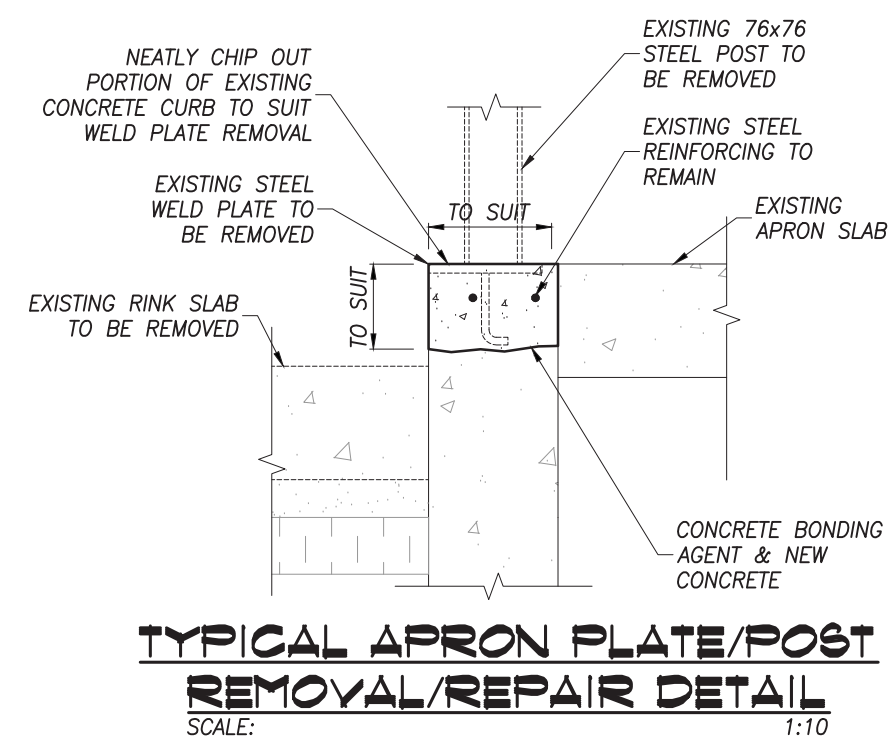
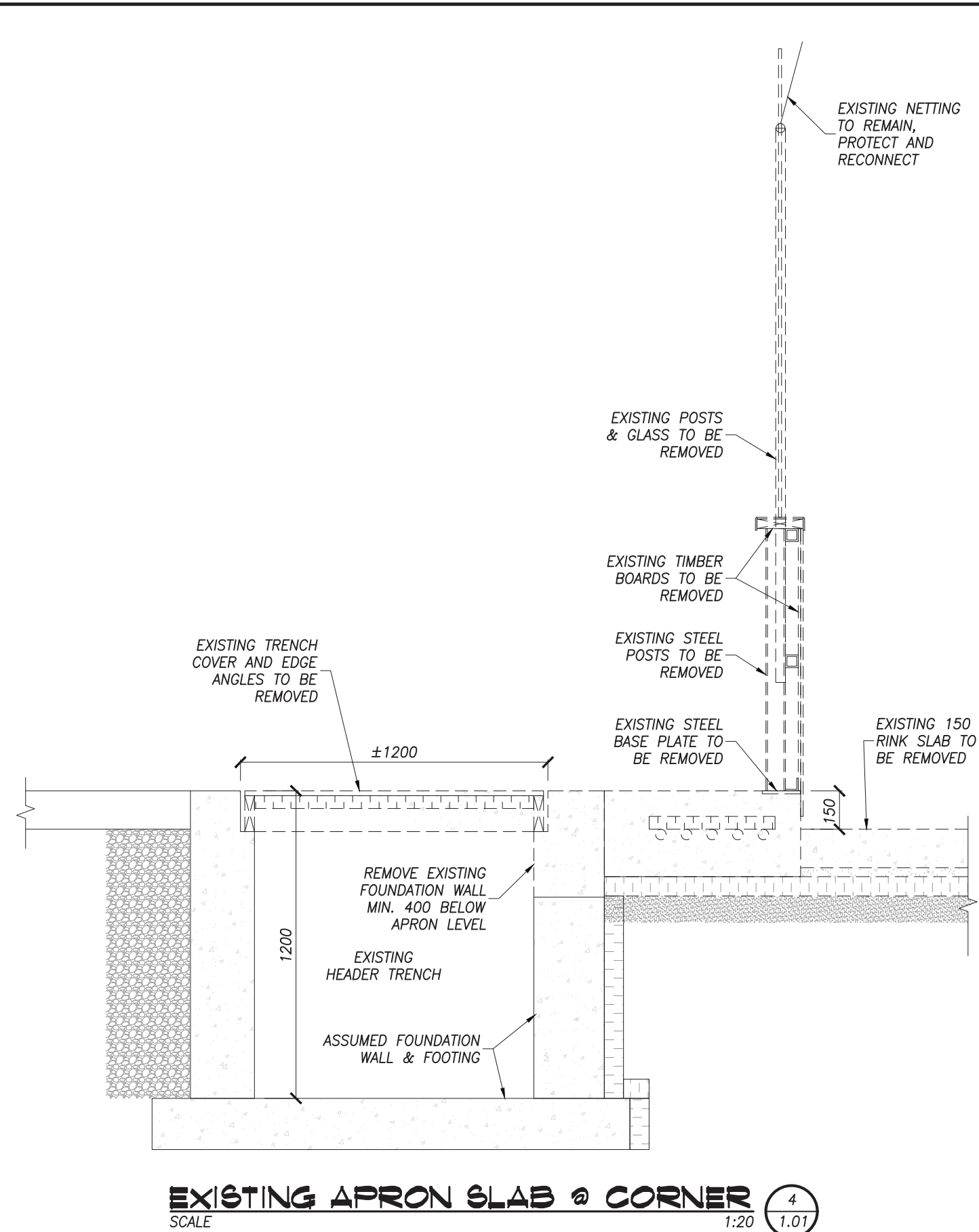
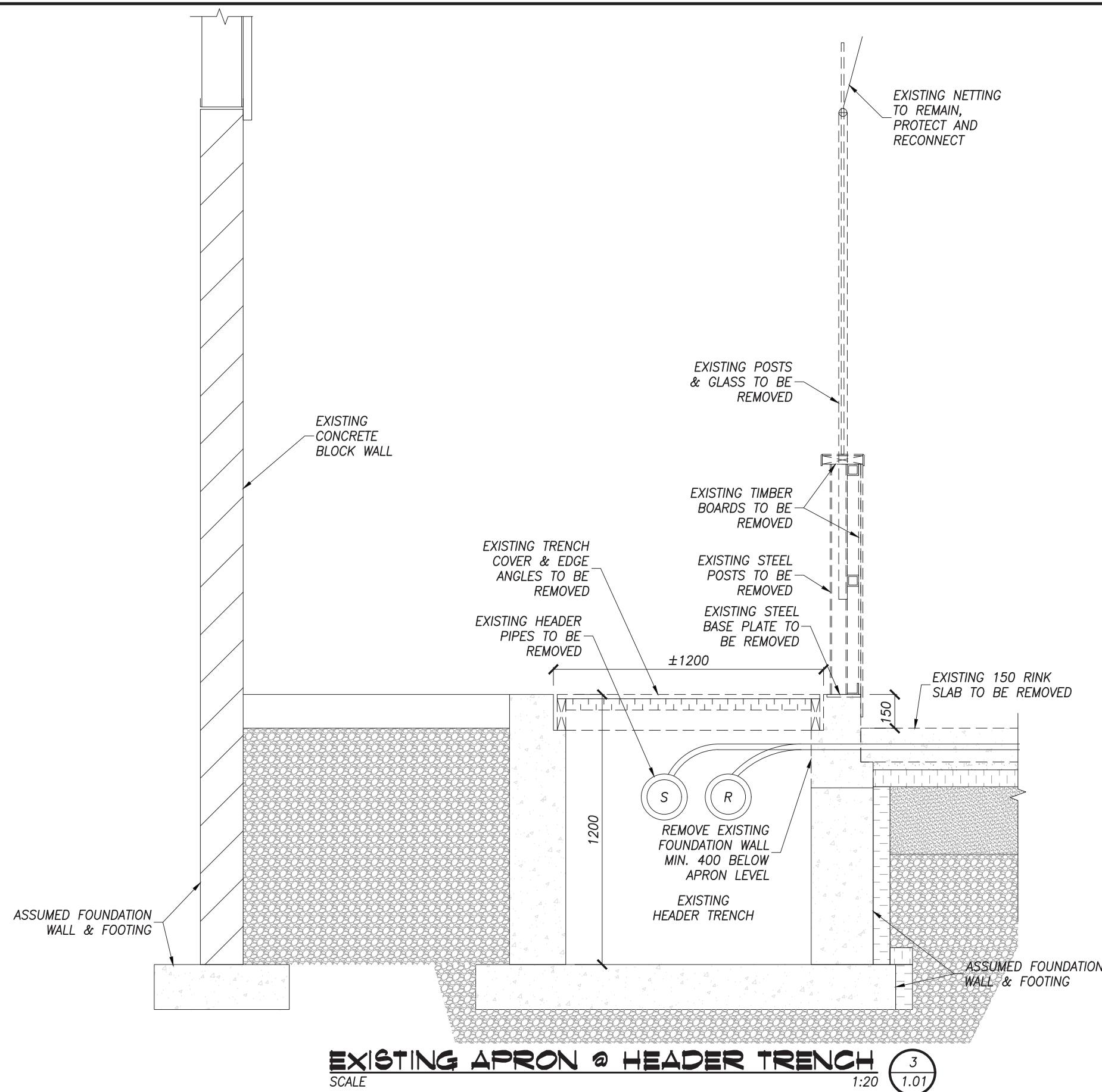
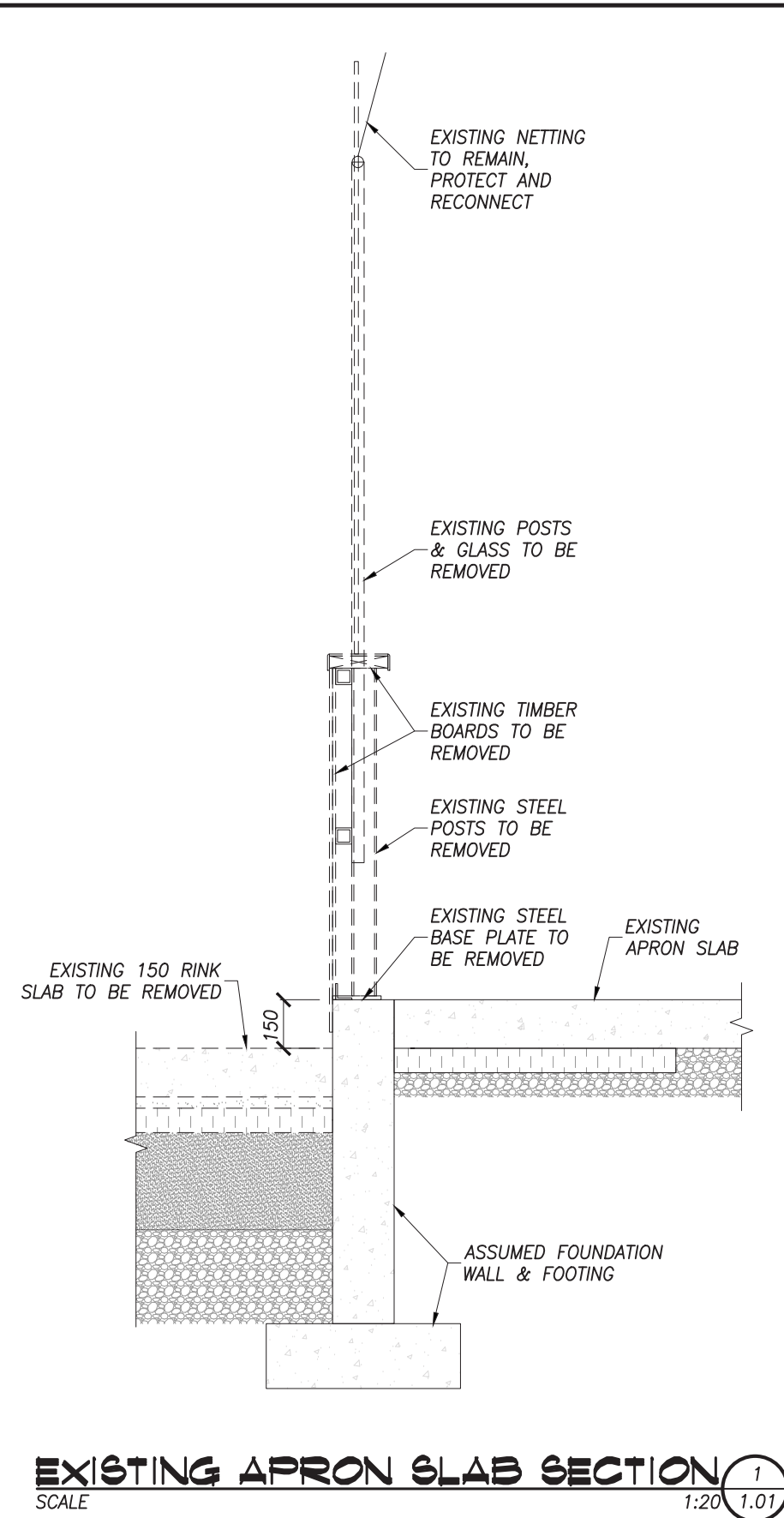
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VIEWING PLATFORM PLAN & DETAILS

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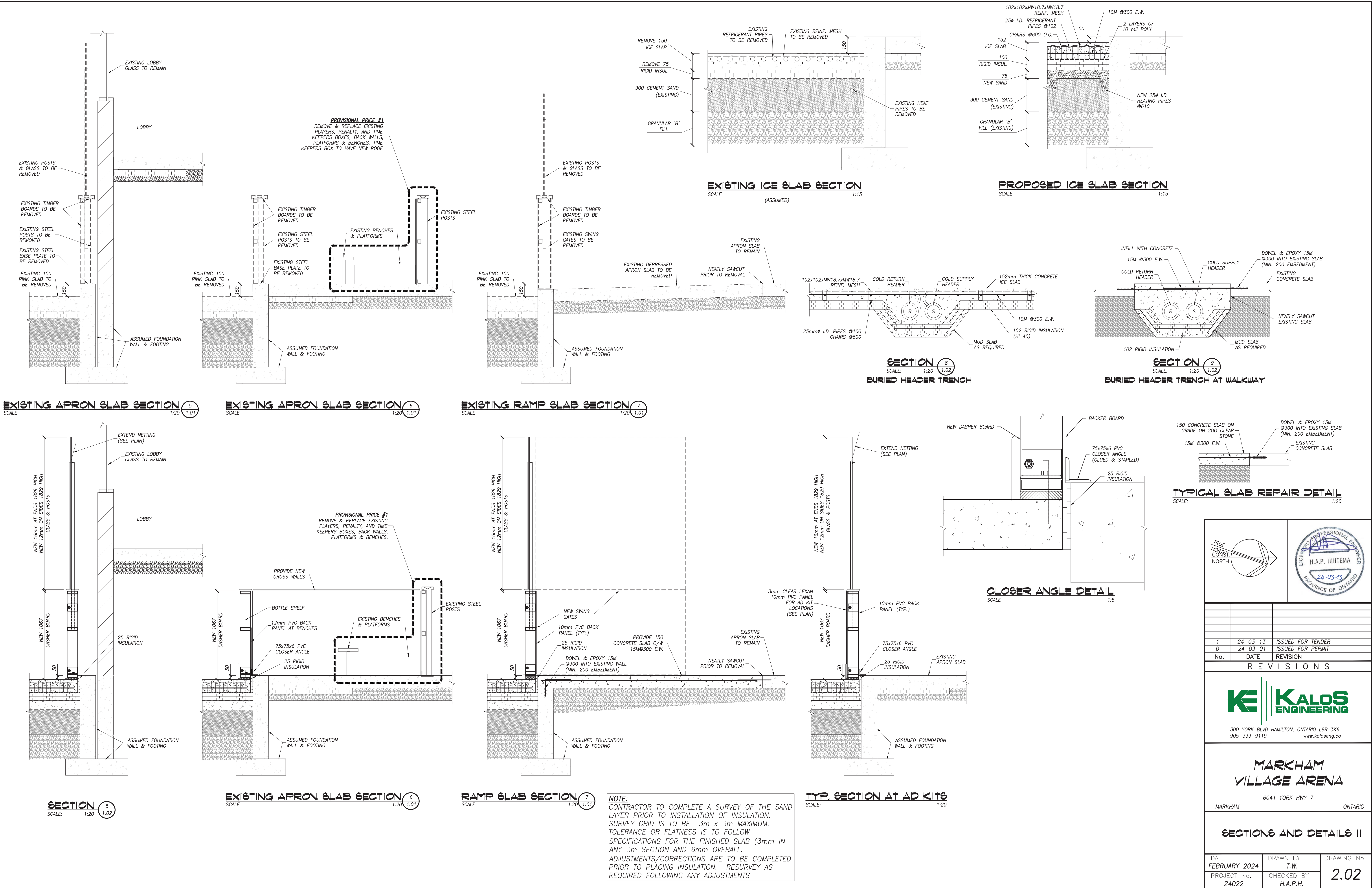
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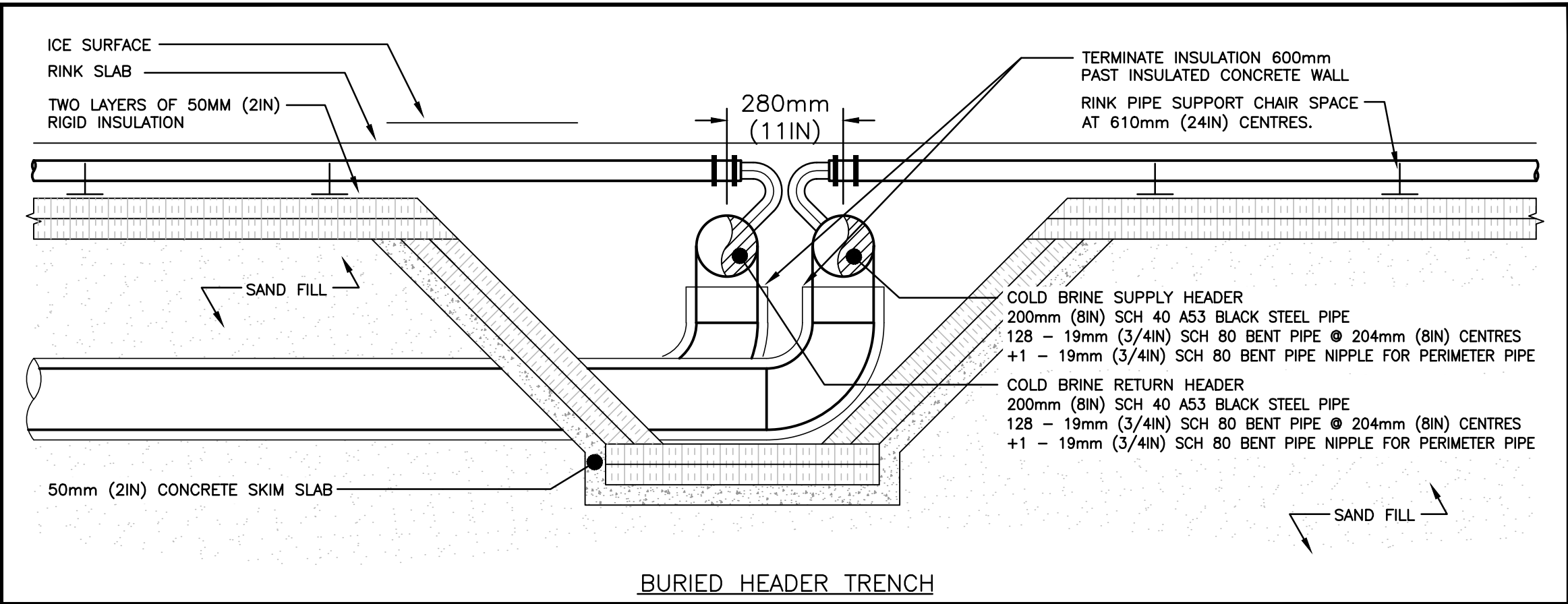
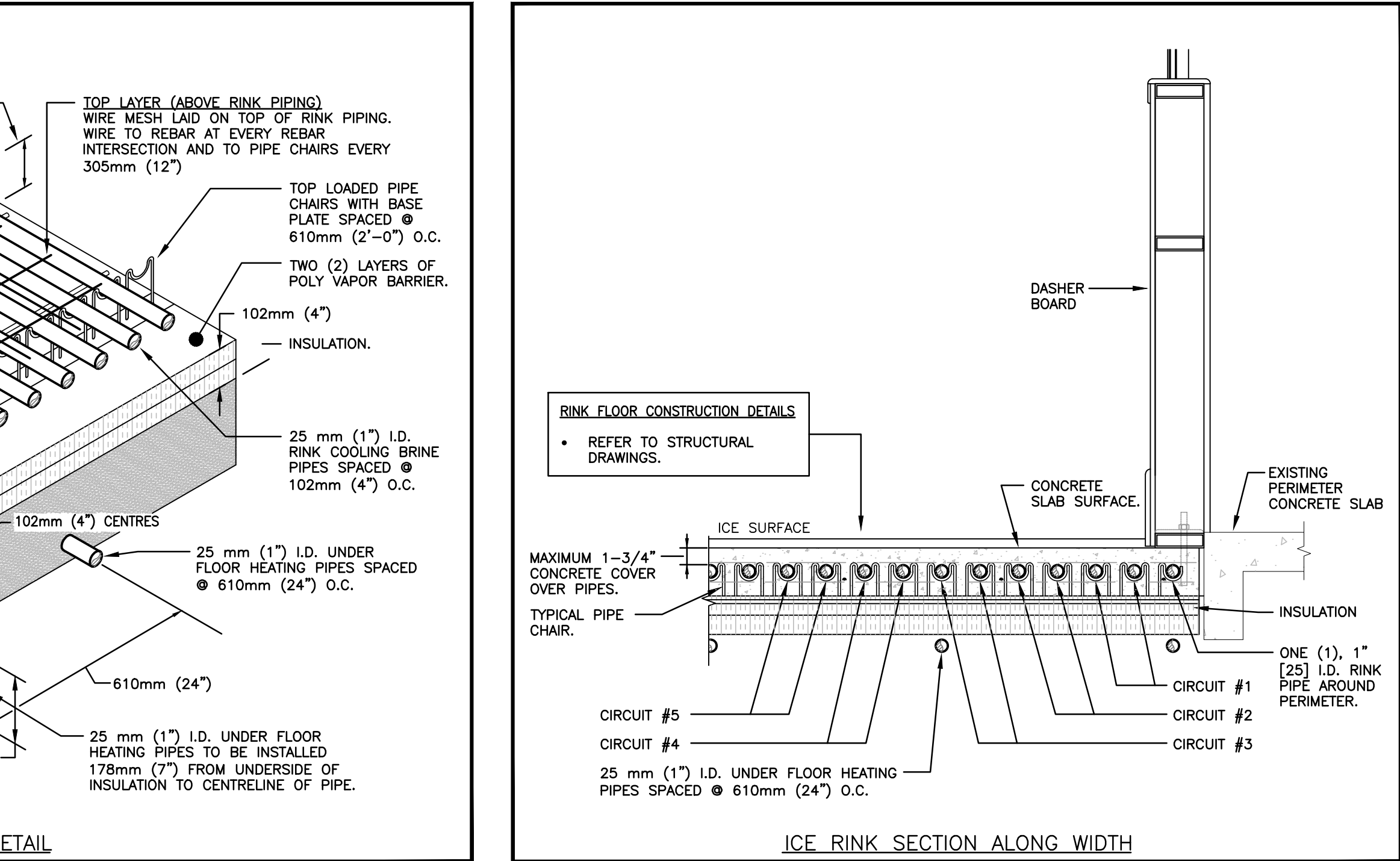
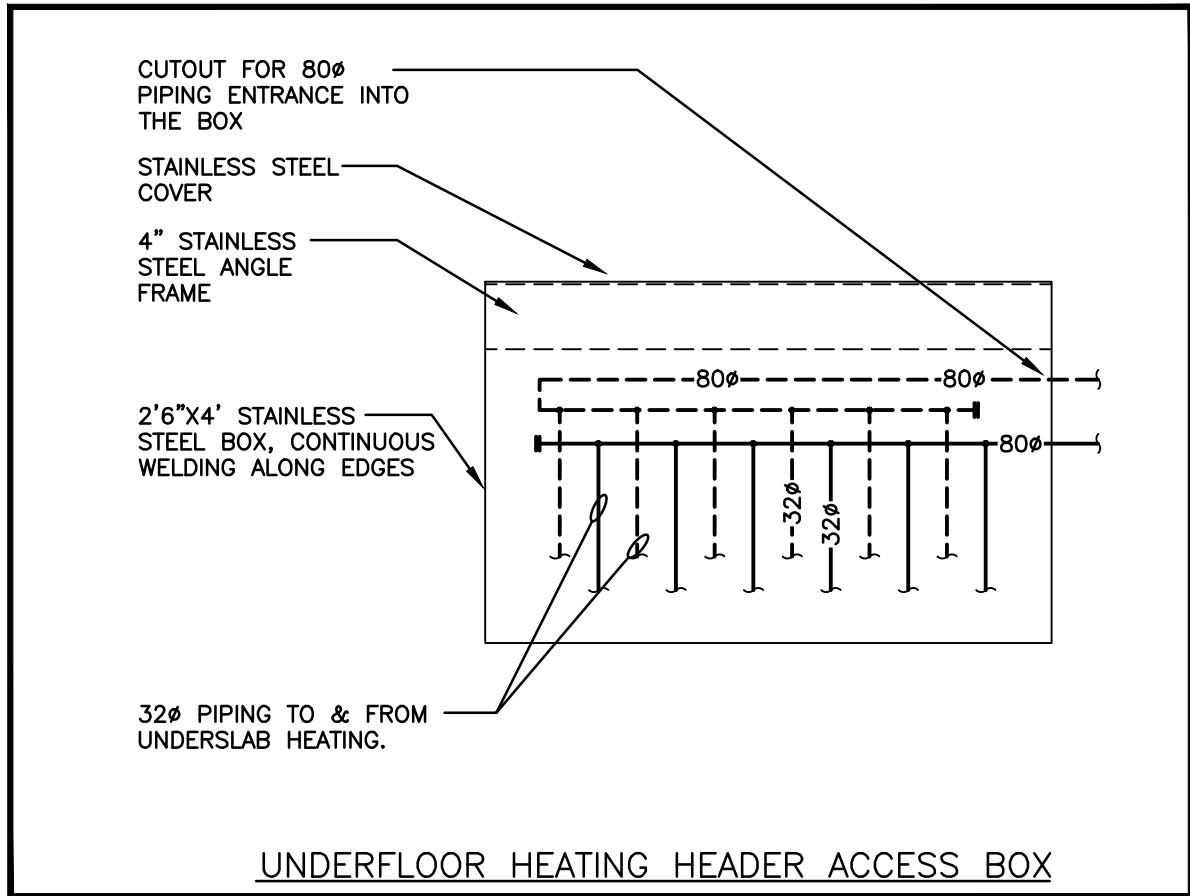
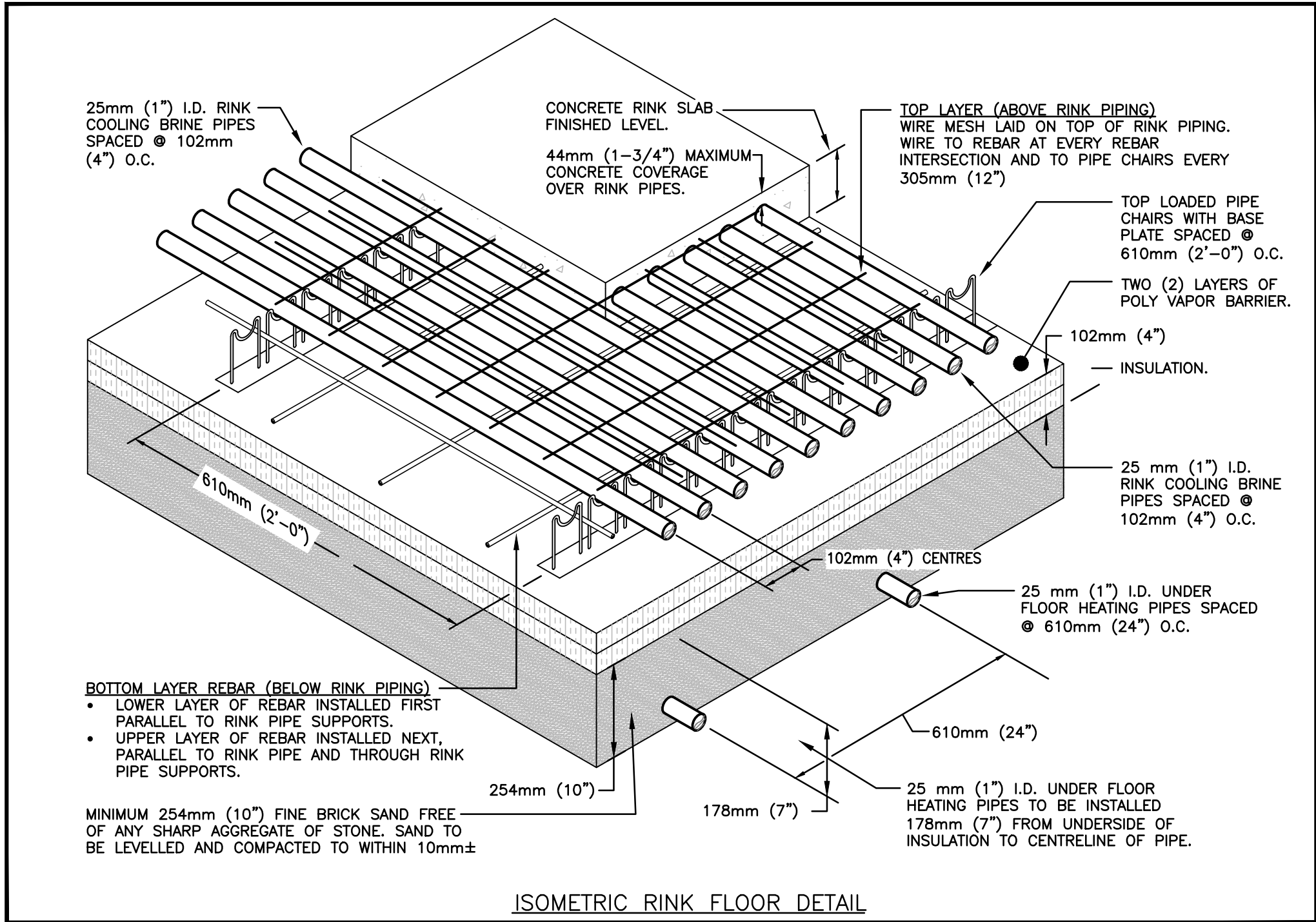
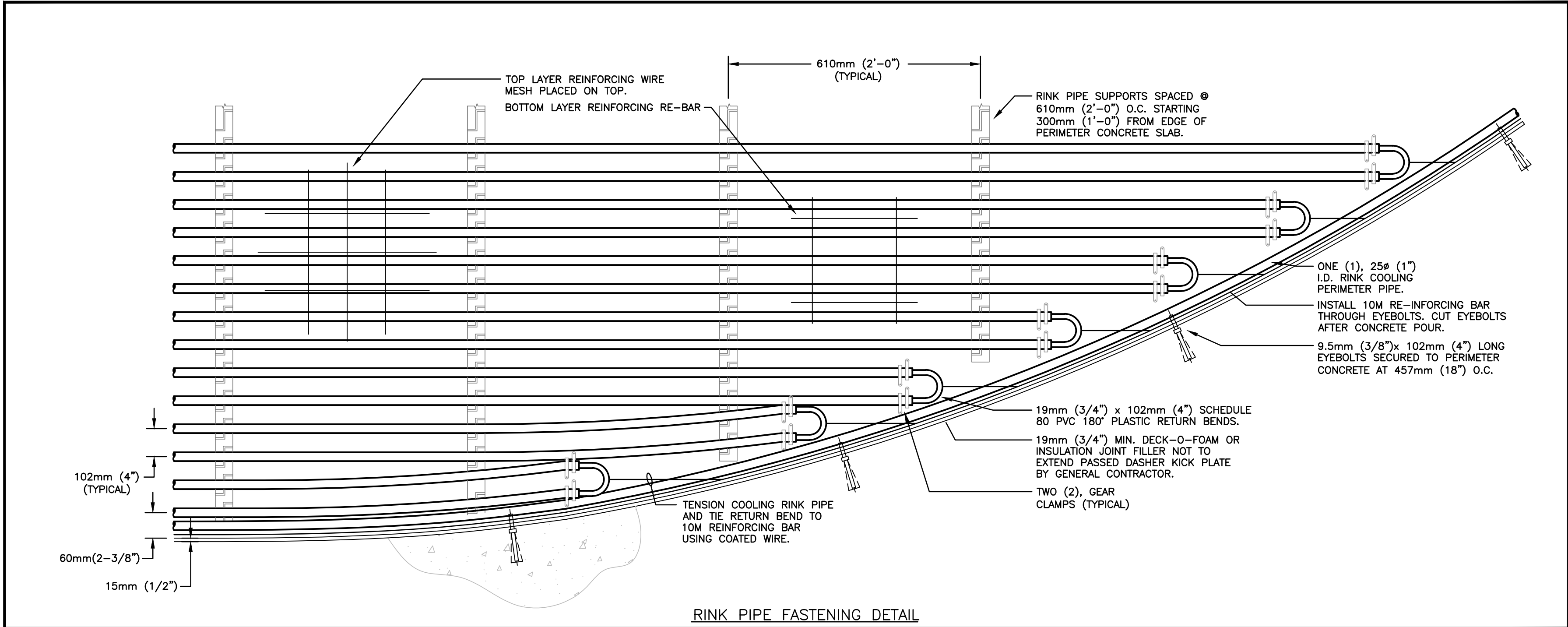
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SECTIONS AND DETAILS I

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GENERAL DEMOLITION NOTES

- EXISTING MECHANICAL ITEMS NOT SHOWN SHALL REMAIN UNLESS NOTED OTHERWISE.
- EXISTING MECHANICAL ITEMS SHOWN BUT NOT NOTED AS BEING REMOVED OR RENOVATED SHALL REMAIN AS PRESENTLY INSTALLED AND OPERATING.
- THIS CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING ON SITE ALL LOCATIONS AND SIZES OF ALL SERVICES & EQUIPMENT PRIOR TO THE COMMENCEMENT OF WORK.
- ALL OPENINGS THAT RESULT FROM THE REMOVAL OF EQUIPMENT OR SERVICES SHALL BE NEATLY PATCHED WITH SUITABLE NEW MATERIALS TO SUIT EXISTING CONSTRUCTION.
- REMOVAL OF EXISTING PIPING SYSTEMS INCLUDES REMOVAL OF ALL HANGERS, INSULATION, FITTINGS, ETC.
- MAINTAIN INTEGRITY OF EXISTING SYSTEMS THAT ARE TO REMAIN OR BE MODIFIED.
- INSTALL NEW SYSTEM OR SERVICES WHERE REQUIRED TO MAINTAIN SYSTEM OPERATION PRIOR TO DEMOLITION OF EXISTING SERVICES.

GENERAL NOTES

- THE SUCCESSFUL CONTRACTOR SHALL PROVIDE A FULLY ENGINEERED AND DESIGNED PIPING SYSTEM FOR THE NEW SLAB REFRIGERATION. THIS DESIGN SHALL BE SUBMITTED TO THE CONSULTANT FOR REVIEW (AS SHOP DRAWINGS). THE CONTRACTOR'S DESIGN SHALL BE SEALED BY A LICENSED PROFESSIONAL ENGINEER IN GOOD STANDING WITH THE PROFESSIONAL ENGINEERS ONTARIO (PEO).
- ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE PREPARED SPECIFICATION.
- UPON COMPLETION OF THE PROJECT THE CONTRACTORS SHALL PROVIDE THE FOLLOWING CERTIFICATES BEFORE CONFORMANCE LETTERS ARE ISSUED BY THE CONSULTANT:
 - TSSA CERTIFICATE OF AUTHORIZATION REFRIGERATION SYSTEMS

ELECTRICAL SPECIFICATION

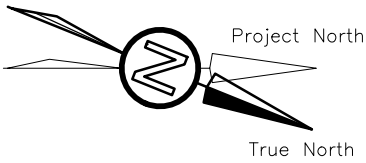
- PROVIDE LABOUR MATERIAL AND EQUIPMENT REQUIRED TO PROVIDE A COMPLETE INSTALLATION WITH QUALITY WORKMANSHIP ACCEPTABLE TO THE OWNER, ARCHITECT AND CONSULTANT.
- OBTAIN ALL PERMITS AND PAY ALL TAXES, FEES AND OTHER COSTS INCURRED WITH THIS WORK. FILE ALL PLANS, OBTAIN NECESSARY APPROVALS, CERTIFICATES AND INSPECTIONS. SUBMIT ALL FINAL CERTIFICATES TO THE CONSULTANT.
- COMPLY WITH RULES AND RECOMMENDATIONS OF THE BOARD OF UNDERWRITERS, ELECTRICAL SAFETY AUTHORITY, THE CANADIAN STANDARDS ASSOCIATION AND ALL REQUIREMENTS OF THE LOCAL UTILITY.
- VISIT THE SITE BEFORE SUBMITTING TENDERS TO EVALUATE ANY SITE CONDITIONS THAT MIGHT ARISE. INCLUDE ALL SITE CONDITIONS IN TENDER, EXTRAS WILL NOT BE ACCEPTED UNLESS BELIEVED TO BE REASONABLE BY THE OWNER AND CONSULTANT.
- CUTTING AND PATCHING SHALL BE BY THE CONTRACTOR REQUIRING TO INSTALL THE SERVICE.
- THE DRAWINGS ARE DIAGRAMMATIC. THE SERVICES SHALL BE INSTALLED TO CONSERVE HEADROOM AND INTERFERE AS LITTLE AS POSSIBLE WITH THE FREE USE OF THE SPACES THROUGH WHICH THEY PASS.
- PROVIDE ALL NECESSARY PROTECTION FOR FINISHED OR UNFINISHED WORK. ALL OPENINGS IN CONDUITS, DUCTS AND EQUIPMENT SHALL BE CAPPED TO ENSURE SERVICES ARE KEPT CLEAN WHEN NOT IN USE.
- MAINTAIN INSURANCE TO FULLY PROTECT THE CONTRACTOR, OWNER AND CONSULTANT FROM ANY AND ALL CLAIMS SUCH AS UNDER THE WORKMEN'S COMPENSATION ACT, ETC. POST PROJECT NOTIFICATION AT THE SITE IN ACCORDANCE WITH THE MINISTRY OF LABOUR REQUIREMENTS.
- WARRANTY ALL LABOUR, MATERIAL AND EQUIPMENT FOR A PERIOD OF ONE (1) YEAR AFTER FINAL ACCEPTANCE OF SYSTEM.
- COORDINATE WITH OTHER CONTRACTORS INSTALLING EQUIPMENT OR MATERIAL AND ARRANGE EQUIPMENT IN PROPER RELATION WITH APPARATUS OF ALL OTHER TRADES.
- ALL AREAS NOT AFFECTED BY RENOVATION OR DEMOLITION SHALL REMAIN AS PRESENTLY INSTALLED UNLESS OTHERWISE NOTED.
- THE CONTRACTOR IS TO DETERMINE GENERAL INSPECTION FEES WITH THE ELECTRICAL SAFETY AUTHORITY AND INCLUDE AS PART OF TENDER, SUBMIT FINAL ESA INSPECTION CERTIFICATE UPON COMPLETION.

LEGEND

Item	Description
----	ITEM TO BE REMOVED
+	CUT EXISTING & CONNECT NEW PIPING
→	FLOW DIRECTION
	POTABLE COLD WATER
	POTABLE HOT WATER
	POTABLE HOT WATER RECIRC.
—U/FHS—	UNDER FLOOR HEATING SUPPLY
—U/FHR—	UNDER FLOOR HEATING RETURN
—BCS—	BRINE COOLING SUPPLY
—BCR—	BRINE COOLING RETURN
FD	FLOOR DRAIN
—	TRAP PRIMER
+	TEE CONNECTION
c	PIPE DOWN
o	PIPE UP
↗	REDUCER/INCREASER
⌞	CHECK VALVE
⌞	REDUCED PRESSURE BACKFLOW PREVENTOR
— —	UNION
— —	STRAINER
↓	DRAIN (SCHEMATICS)
□ VB	VACUUM BREAKER
— —	SCREWED OR WELDED PIPE CAP
NO	NORMALLY OPEN
NC	NORMALLY CLOSED
⌞	BALL VALVE
⌞	BUTTERFLY VALVE
⌞	GATE VALVE
□ AV	AIR VENT
□ LWCO	LOW WATER CUT OFF
NC COM NO	3-WAY MIXING VALVE
←	VALVE ON RISER
⌞ BV	BALANCING VALVE
⌞	INLINE PUMP
TP	TEMPERATURE & PRESSURE RELIEF VALVE
⊙	PRESSURE GAUGE
⊙	TEMPERATURE GAUGE
⊙	THERMOMETER
□ FS	FLOW SWITCH
⌞ PRV	PRESSURE REDUCING VALVE
AFF	ABOVE FINISHED FLOOR
AFR	ABOVE FINISHED ROOF

DEI
Consulting Engineers
MECHANICAL | ELECTRICAL | AQUATIC

55 Northland Road, Waterloo, ON N2V 1Y8
Phone: 519-725-3555
Website: deiassociates.ca
Project Number: 24034



No.	DATE	REVISION
3	24/03/01	ISSUED FOR PERMIT & TENDER
2	24/02/23	ISSUED FOR REVIEW 02
1	24/02/13	ISSUED FOR REVIEW

REVISIONS

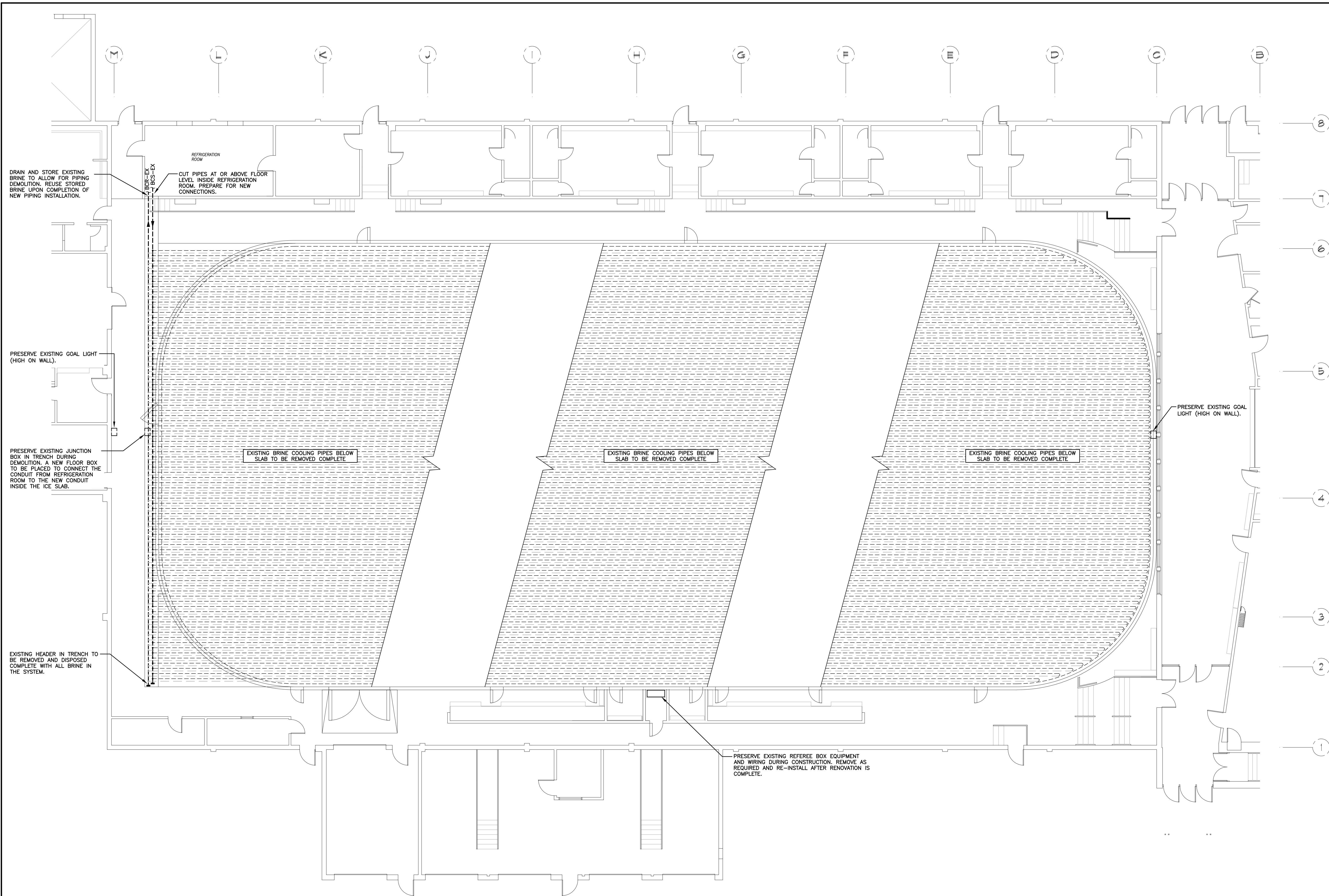
KALOS ENGINEERING
300 YORK BLVD HAMILTON, ONTARIO L8R 3K6
905-333-9119 www.kaloseng.ca

**MARKHAM VILLAGE
CC ICE PAD
REPLACEMENT**
6041 HWY 7

MARKHAM ONTARIO

LEGEND & DETAILS

DATE FEB 2024	DRAWN BY EH	DRAWING No. R1.01
PROJECT No. 24034	CHECKED BY MM	



EXISTING RINK COLD FLOOR PIPING PLAN-DEMOLITION
SCALE: 1:100

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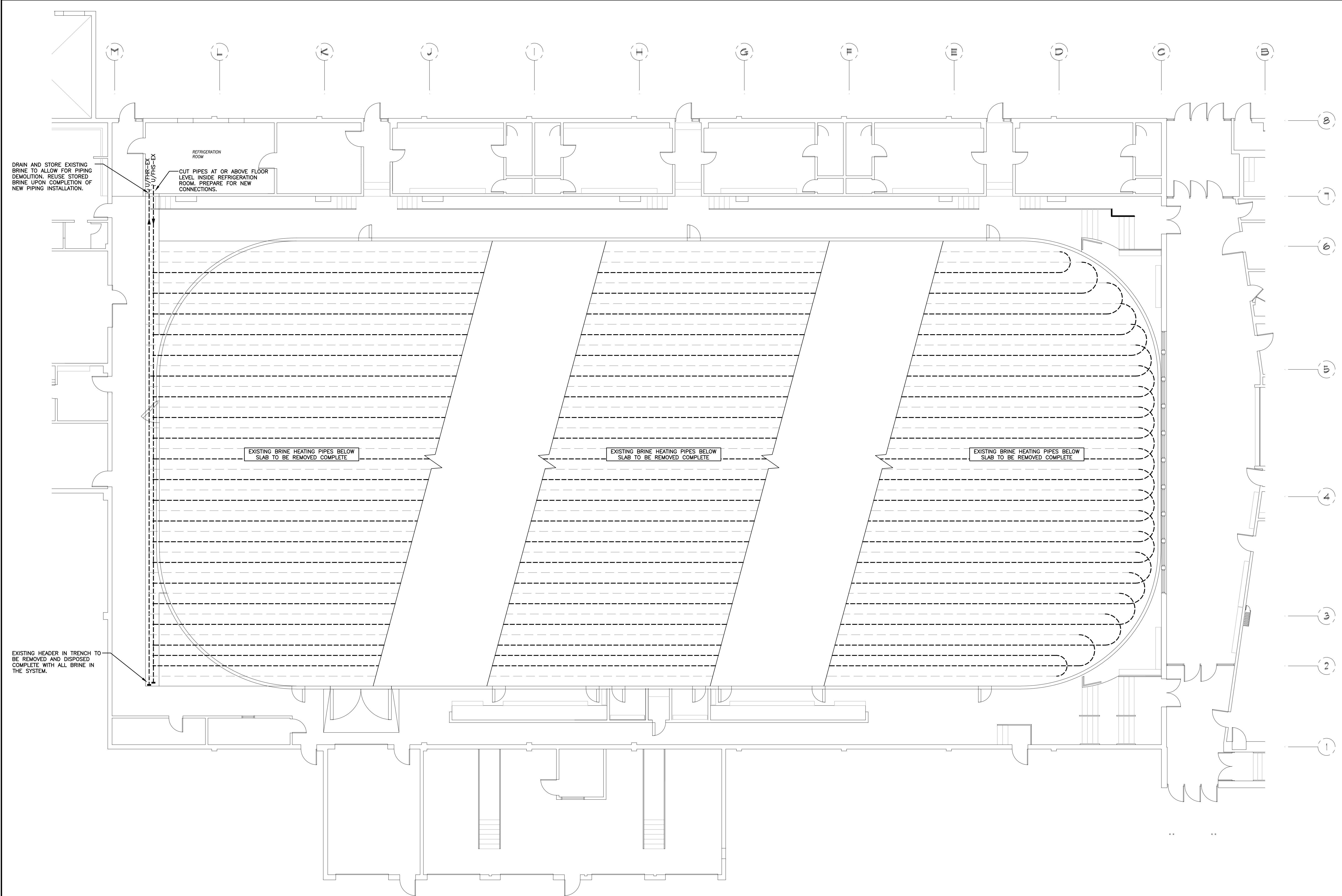
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**RINK COLD FLOOR
PLAN — DEMOLITION**

DATE FEB 2024	DRAWN BY EH	DRAWING No. R2.01
PROJECT No. 24034	CHECKED BY MM	



EXISTING RINK HEATING FLOOR PIPING PLAN—DEMOLITION
SCALE: 1:100

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Project Number: 24034

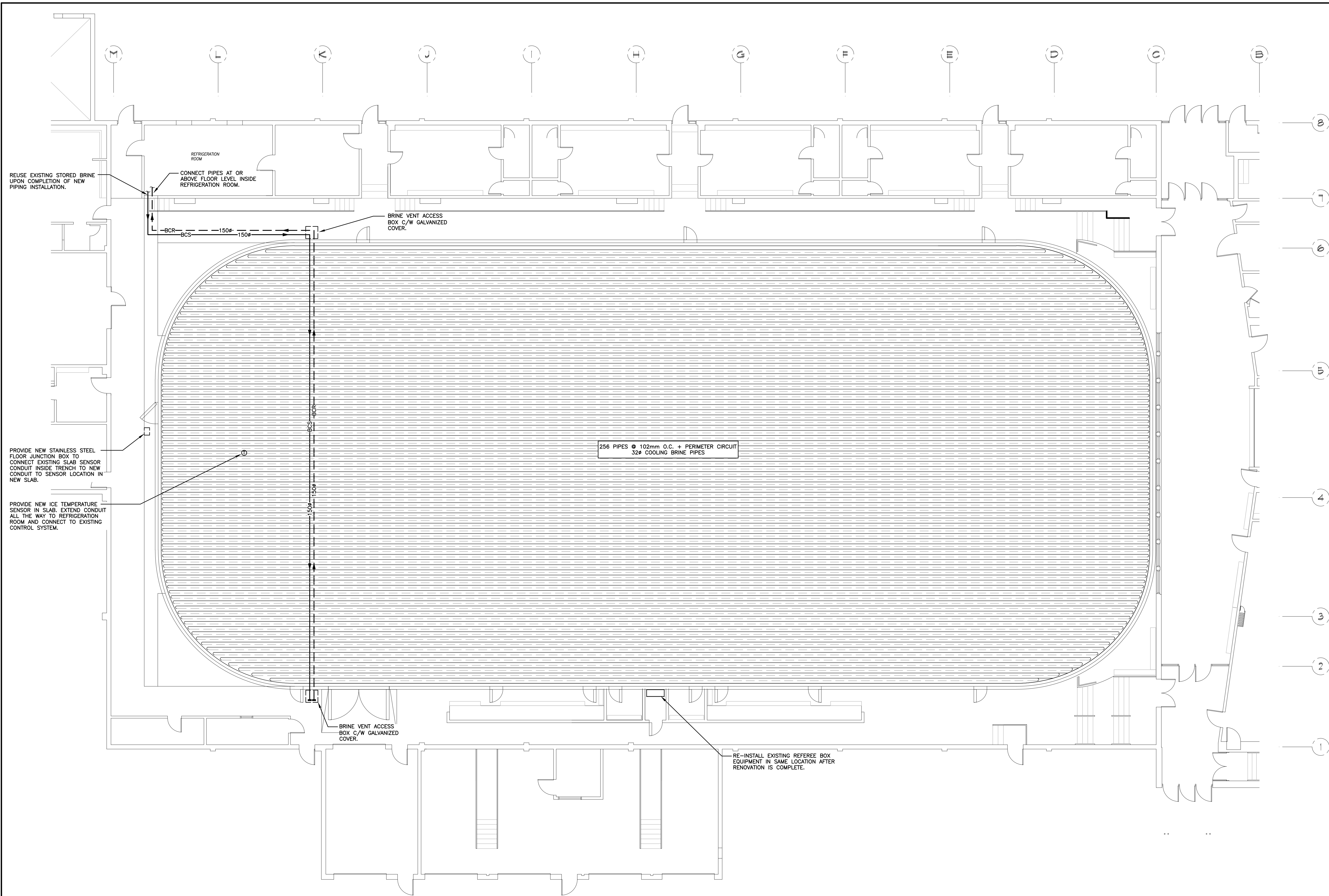
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**RINK HEATING FLOOR
PLAN — DEMOLITION**

DATE FEB 2024	DRAWN BY EH	DRAWING No. R2.02
PROJECT No. 24034	CHECKED BY MM	



RINK COLD FLOOR PIPING PLAN-RENOVATION
SCALE: 1:100

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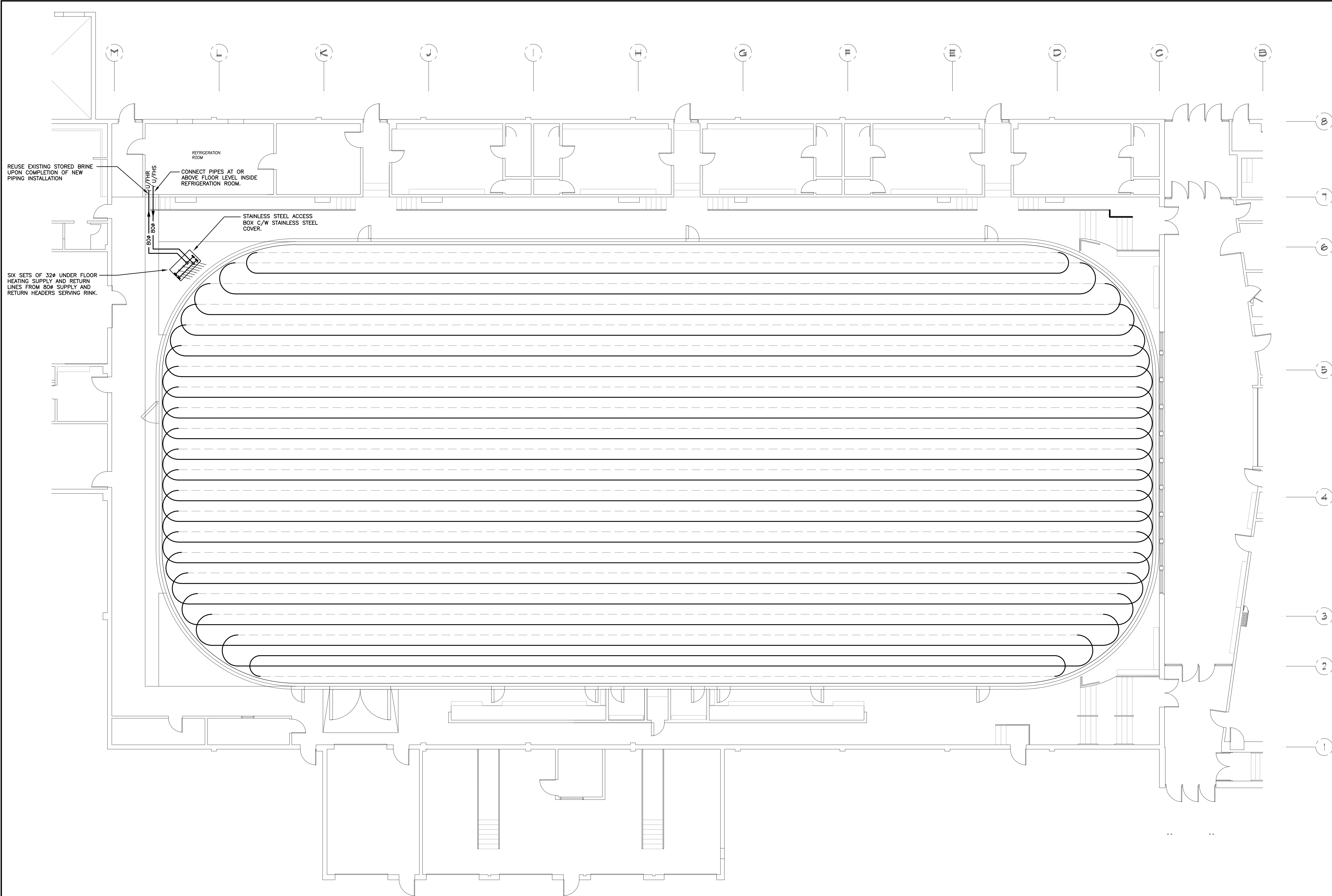
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REPLACEMENT**
6041 HWY 7
MARKHAM ONTARIO

**RINK COLD FLOOR
PLAN - RENOVATION**

DATE FEB 2024	DRAWN BY EH	DRAWING No. R3.01
PROJECT No. 24034	CHECKED BY MM	



RINK HEATING FLOOR PIPING PLAN-RENOVATION
SCALE: 1:100

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**RINK HEATING FLOOR
PLAN – RENOVATION**

DATE FEB 2024	DRAWN BY EH	DRAWING No. R3.02
PROJECT No. 24034	CHECKED BY MM	

BID FORM

091-T-24 - MARKHAM VILLAGE COMMUNITY CENTRE ICE PAD REPLACEMENT

Opening Date: March 27, 2024 3:00 PM
Closing Date: April 26, 2024 3:00 PM

Schedule of Prices

*Denotes a "MANDATORY" field

Do not enter \$0.00 dollars unless you are providing the line item at zero dollars.

If the line item and/or table is "**NON-MANDATORY**" and you are not bidding on it, leave the table and/or line item blank. Do not enter a \$0.00 dollar value.

Any HST amounts normally shown as "included" in goods or services are to be backed out and shown separately. HST will be calculated based on the **Bid Price (Excluding Taxes)** in the Summary Table below. Bidders are to show a separate line item for HST on their invoices and draw certificates

Credit Card Acceptance

☐ We will not be submitting for Credit Card Acceptance

Question	Response
Is credit card accepted as payment method?	<input type="radio"/> Yes <input type="radio"/> No

Payment Term Discount

If no discount, payment will be made in accordance with either Part III of the City's *General Terms and Conditions* or City's *Procurement Contract* - specific to the "Payment" clause identified therein.

In connection with any discount offered for early payment, time shall be computed from receipt of an approved invoice by the City Accounts.

Payable Department. NOTE: Invoices not mailed to the City Accounts Payable department, will have the discount extended accordingly.

Payment shall be considered to have been made on the date which appears on the payment cheque.

The City, in its sole discretion, will not take any discounts into consideration when determining the lowest priced Bid and the best value to the City.

☐ We will not be submitting for Payment Term Discount

Description	Discount (%)
Please provide your discount percentage (%) for Net 15 day payment	

091-T-24 Bid Form

Line Item	Description	Unit	Quantity	Unit Price *	Extended Price
1	Phase 1: to remove and replace the existing arena concrete pad and associated header piping system.	Lump Sum	1		
2	Phase 2: to remove and replace the existing arena boards and frames.	Lump Sum	1		
3	Phase 3: To remove and replace the existing rubber flooring surrounding the arena and in all associated arena change-rooms.	Lump Sum	1		
Subtotal:					

091-T-24 Provisional Items

Line Item	Description	Unit	Quantity	Unit Price *	Extended Price
1	Remove and replace completely the rear wall, posts, raised platform and bench for the players benches, penalty boxes and timekeeper box completed.	Lump Sum	1		
Subtotal:					

091-T-24 Cash Allowance

Line Item	Description	Unit	Quantity	Unit Price	Extended Price
1	For Inspection and Testing Services Specified for: Section 02200 : Earth Works	Lump Sum	1	\$6,000.0000	\$ 6,000.00
2	For Inspection and Testing Services Specified for: Section 03300 : Cast-in-Place Concrete	Lump Sum	1	\$6,000.0000	\$ 6,000.00
Subtotal:					\$ 12,000.00

Summary Table

Note: evaluation of the Bid prices will be based on the Bid Price (Excluding Taxes) set out in the summary table below.

Bid Form	Amount
091-T-24 Bid Form	
091-T-24 Provisional Items	
091-T-24 Cash Allowance	\$ 12,000.00
Subtotal Contract Amount:	

Reference List

List two (3) references of past projects of similar size and scope completed within the last 5 years.

Note: Reference checks may not be limited to those supplied by the Bidder. The City reserves the right not to award to the lowest priced Bidder whose reference checks do not provide proof of their performance and/or qualifications.

Line Item	Company Name *	Contact Person *	Email Address *	Phone number *	Contract Value *	Description of Work *	Completion Date *
1							
2							
3							

Unresolved Litigation

Question	Response *
Does the Bidder have any unresolved litigation with the City (including any affiliated entities or any principal thereof)?	<input type="radio"/> Yes <input type="radio"/> No

Sub-Contractors

Bidders are requested to list all Subcontractor(s) and type of Work proposed to be used for this project. Bidders are requested not to indicate "TBD" (To Be Determined) or "TBA" (To Be Announced) or similar wording and are requested not to indicate multiple choices of Subcontractor names for any Subcontractor category in their list of Subcontractors.

Bidders are requested to list only one (1) Subcontractor for each type of Work.

Bidder(s) will be required, upon request by the City, to produce a list of references for all or any proposed Subcontractors within three (3) business days.

Relevant Subcontractor List

☐ By clicking here I confirm that there are no Subcontractor(s) and the Bidder shall perform the project with their **"OWN FORCES"**.

Line Item	Company Name	Address	Contact Person Name	Contact Phone Number	Description of work	
1						*
2						
3						
4						
5						
6						
7						
8						

Documents

It is your responsibility to make sure the uploaded file(s) is/are not defective or corrupted and are able to be opened and viewed by the City. If the attached file(s) cannot be opened or viewed, your Bid Document may be rejected.

- Experience and Qualification of the Consulting Firm * (mandatory)
- Summary Resumes and Roles & Responsibilities of Project Lead Supervisor and Team * (mandatory)
- Project Understanding, Methodology, Approach and Management * (mandatory)
- Construction Schedule * (mandatory)

Addenda, Terms and Conditions

DECLARATION

The Bidder hereby acknowledges and agrees:

1. To provide all goods and services as more specifically set out in this Quotation, including but not limited to the scope of work, specifications, drawings, addenda (if issued by the City), the terms and conditions, etc. stated herein, which are expressly acknowledged and which shall form part of the Contract with the Successful Bidder.
2. This Bid is made without any connections, knowledge, comparison of figures or arrangements with any other company, firm or person making a Bid for the same Work and is in all respects fair and without collusion or fraud.
3. Bids shall be irrevocable and valid for acceptance by the City for a period of ninety (90) business days from the Closing Time. Bid Prices shall be guaranteed by the Successful Bidder until final completion of the Contract (including any renewal term).
4. The evaluation of the Bid prices will be based on the Bid Price (Excluding Taxes) set out in the Summary Table. Notwithstanding the foregoing, the City reserves the right, in its sole discretion, to award in whole or in part (including, without limitation, by part, item or group of items), or to award to more than one Bidder, in which case the evaluation of the Bid prices will be based on the Bid price for the applicable part, item or group of items.
5. The Bidder agrees to provide all necessary labour, material and equipment necessary to complete the Work or provide goods and services as applicable and as per the Work described in this Quotation for the quoted price on the Bid Form.
6. Declare that all information stated in response to this Quotation is in all respects fair and true.



I/We have the authority to bind the proponent/bidder to these declarations and acknowledgements and to submit the accompanying proposal/bid on behalf of the proponent/bidder.

The Bidder shall declare any potential conflict of interest that could arise from submitting a Bid.

Does the Bidder have a potential conflict of interest? ☒ **Yes** ☐ **No**

The Bidder acknowledges and agrees that the addendum/addenda below form part of the Bid document

Please check the box in the column "**I have reviewed this addendum**" below to acknowledge each of the addenda.

File Name	I have reviewed the below addendum and attachments (if applicable)	Pages
There have not been any addenda issued for this bid.		