



The Niagara Parks Commission  
Agency of the Government of  
Ontario since 1885

## REQUEST FOR PROPOSALS

FOR

***WEGO Transit and Fleet Operations Center Expansion***

<b>Request for Proposal No:</b>	<b>RFP-22-2024-AD</b>
<b>Issue Date:</b>	<b>December 16, 2024</b>
<b>Deadline for Questions:</b>	<b>January 7, 2025 at 12:00 p.m. ET</b>
<b>Proposal Submission Deadline:</b>	<b>January 23, 2025 at 2:00 p.m. ET</b>

## TABLE OF CONTENTS

Part 1 Introduction and Background .....	4
1.1 The Niagara Parks Commission.....	4
1.2 Background to Procurement.....	5
1.3 Agreement.....	5
1.4 Proof of Insurance .....	5
1.5 No Guarantee of Volume of Work or Exclusivity of Contract.....	6
1.6 RFP Timetable.....	6
1.7 Mandatory Proponents’ Site Visit.....	6
1.8 RFP Coordinator.....	6
Part 2 RFP Terms and Procedures.....	9
2.1 Definitions .....	9
2.2 Interpretation .....	11
2.3 Restricted Communications.....	12
2.4 Authorized Communications, Amendments, Waivers .....	12
2.5 Due Diligence, Inconsistencies, Errors, Etc. ....	12
2.6 Proponent Questions.....	13
2.7 Issued Addenda .....	13
2.8 Proposal Submission.....	14
2.9 Withdrawal of Proposal .....	14
2.10 Amendment of Proposal.....	15
2.11 Rectification Period .....	15
2.12 Proposal Irrevocable after Proposal Submission Deadline.....	15
2.13 Clarification of Proponent’s Proposal .....	15
2.14 Verification of Information .....	15
2.15 No Publicity or Promotion .....	16
2.16 Confidentiality and Privacy .....	16
2.17 Debriefing.....	17
2.18 Bid Dispute .....	17
2.19 Freedom of Information and Protection of Privacy Act .....	18
2.20 Accessibility .....	18
2.21 Competition Act.....	18
2.22 Trade Agreements .....	18
2.23 Rights of NPC – General.....	18

2.24	Rights of NPC – Ranking Proponent .....	20
2.25	Proponent’s Costs.....	21
2.26	Priority of Documents.....	21
2.27	Ontario / Canadian Law .....	21
Part 3 Proposal Format and Contents .....		22
3.1	Proposal Format .....	22
3.2	Proposal Contents .....	23
Part 4 Evaluation Process .....		25
4.1	General .....	25
4.2	Stage I – Review of Mandatory Requirements (Pass/Fail) .....	25
4.3	Stage II – Evaluation of Rated Elements .....	25
4.4	Stage III – Pricing .....	27
4.5	Tie Break Process.....	27
4.6	Stage IV – Reference Verification (Pass/Fail) .....	28
4.7	Finalization of Agreement with Ranking Proponent .....	28
Specifications Schedule.....		29
Form of Agreement Schedule .....		38
Mandatory Requirements Schedule.....		63
Rated Elements Schedule.....		65
Declaration and Certification Schedule .....		70
Pricing Schedule .....		74
Subcontractor Listing Schedule .....		78
Project Experience Response Schedule.....		79
Technical Specifications Schedule .....		82
List of Drawings Schedule .....		85

# REQUEST FOR PROPOSALS

## PART 1 INTRODUCTION AND BACKGROUND

### 1.1 The Niagara Parks Commission

The Niagara Parks Commission (“NPC”) is a Provincial Crown Agency and a corporation incorporated by an Act of the Provincial Legislature of Ontario on the 23rd of April 1887 and continued under the *Niagara Parks Act*, R.S.O. 1990, Chapter N.3.

Prior to the opening of the original Park, the NPC was guided by two general principles which were regarded by the Government of the day as indispensable conditions. The first was that there should be no permanent financial burden on the Province, but that the Parks should become self-supporting. The second was that the Park should, as far as possible, be free to the public. These indispensable conditions continue to guide our operations:

#### NPC’s Mandate

Preserving and promoting the natural and cultural heritage along the Niagara River corridor.

Niagara Parks is also committed to delivering commercially successful products in a way that ensures benefits for everyone (people who travel, the adjacent communities, and the respective natural, social, and cultural environments).

#### Vision

By 2028, Ontario’s Niagara Parks will be:

- An innovative example of sustainability as the environmental and cultural stewards of the Niagara River corridor
- A welcoming, accessible and inspiring place offering world-class natural, historical, and authentic experiences
- A source of national pride and identity
- One of the most spectacular Parks in the world

NPC is committed to achieving excellence. We all take pride in everything we do. We expect our Contractors to use best practices in all that they do through quality service, leadership and professionalism. This can be done by applying the best possible skills, knowledge and experience for our visitors. We encourage innovation, new ideas and continuous improvement. We promote an environment that attracts, motivates and recognizes high performance. We value change as opportunity. See NPC’s procurement webpage for our Suppliers’ Code of Conduct.

NPC is an operational enterprise of the Ontario Ministry of Tourism, Culture and Gaming, an agency that has the financial and operating authority to carry on a business with revenues.

NPC raises revenue primarily through the operation of attractions, gift shops, golf courses, restaurants and parking lots.

## 1.2 Background to Procurement

This Request for Proposals is issued by NPC for the provision of a qualified general contractor to supply all construction services required to construct an extension to the existing WEGO bus garage to facilitate the amalgamation of fleet services and WEGO bus operations located at 7810 Niagara Portage Road. The extension is comprised of an addition of two new double bays in the western direction and an extension in the south direction to the existing service bays.

This expansion will provide the necessary space to integrate both departments, enhancing operational efficiency and optimizing resource utilization.

More detailed requirements are set out in the Specifications Schedule.

## 1.3 Agreement

It is expected that the Ranking Proponent, if any, will be invited to sign a comprehensive agreement (the “**Agreement**”) setting out the terms and conditions that will apply to the purchase of Work.

The form of Agreement set out in the Form of Agreement Schedule (the “**Form of Agreement**”) is the form that NPC intends to use as the basis for the final agreement with the successful Proponent.

If a Proponent objects to any aspect of the Form of Agreement, it is strongly encouraged to raise issues or proposed changes to the Form of Agreement as part of the submission of questions process (per Section 2.6 (Proponent Questions)).

**NPC is under no obligation to negotiate the Form of Agreement or to entertain a Proponent’s changes to it.** After the Proposal Submission Deadline, NPC may consider requests for changes to the Form of Agreement that are in the nature of clarifications, or corrections of typographical or clerical or similar errors, however, NPC is under no obligation to enter into any Agreement that is not in form and content substantially similar to the Form of Agreement. **Any Proponent that requires changes that would, in the sole discretion of the NPC, cause an Agreement not to be in form and content substantially similar to the Form of Agreement, may be disqualified.**

It is intended that only a single Ranking Proponent will be selected to sign an Agreement (however, NPC reserves the right to select more than one Ranking Proponent to sign an Agreement).

See Section 4.7 (Finalization of Agreement with Ranking Proponent).

### 1.3.1 Agreement – Execution

It is expected that the Agreement will be signed on or around February 7, 2025, and no obligation on the part of NPC shall arise until such time as the Agreement is signed.

## 1.4 Proof of Insurance

Regardless of whether proof of insurance coverage is required or otherwise provided as part of a Proposal, NPC may – as a pre-condition to signing an Agreement – require a successful Proponent to provide proof of insurance coverage in the form of a valid certificate of insurance as required by the Agreement. Failure to provide that proof of coverage within the time period

specified by NPC may result in NPC rescinding that award notification and awarding the Agreement to the next-highest Proponent.

### 1.5 No Guarantee of Volume of Work or Exclusivity of Contract

NPC makes no guarantee of the value or volume of work to be assigned to the successful Proponent. Any Agreement executed with the successful Proponent will not be an exclusive contract. The NPC may contract with others for the same or similar Work to those described in this RFP or may obtain the same or similar Work internally.

### 1.6 RFP Timetable

The following is a summary of the key dates in the RFP process:

Event	Location	Date
RFP Issue Date	–	December 16, 2024
Mandatory Proponents’ Site Visit	7856 Portage Road Niagara Falls, Ontario, L2G 6R7	January 7, 2025 at 11:00 a.m. ET
Deadline for Questions (see Section 2.6.1 (Submission of Questions))	–	January 14, 2025 at 12:00 p.m. ET
Proposal Submission Deadline	–	January 23, 2025 at 2:00 p.m. ET
Invitation to Ranking Proponent to Sign Agreement	–	February 7, 2025
Anticipated Agreement Start Date	–	February 10, 2025

NPC may change any of the above dates and times, including the Proposal Submission Deadline, in its sole discretion and without liability, cost, or penalty. If a change is made to any of the above dates, NPC will post any such change on Bonfire.

In the event of any change in the Proposal Submission Deadline, the Proponents shall thereafter be subject to the extended Proposal Submission Deadline.

### 1.7 Mandatory Proponents’ Site Visit

It is mandatory that Proponent representatives visit the Place of Work. Arrangements have been made for the site visit to be held at Place of Work on the date specified in section 1.6 (RFP Timetable).

Start time: The site visit will begin promptly at the time specified in section 1.6 (RFP Timetable), at the designated meeting location.

Designated meeting location: The front main entrance of the existing WEGO building located at: 7810 Portage Road, a complex within 7805 Niagara Parkway, Niagara Falls, Ontario, L2G7M8, Canada (Google link: <https://maps.app.goo.gl/cL3LXRJjuQhotq6W8> )

Proponent representatives must sign in at the designated meeting location, specified above, prior to the start time for the site visit. Proponents are strongly encouraged to make any necessary arrangements to ensure that representatives arrive at the designated meeting location at least 30 minutes prior to the start time for the site visit. This additional time is recommended as:

- heavy vehicular traffic in the Niagara Falls area can lead to transit delays;
- the parking lot is large and a distance from the designated meeting location; and
- sign-in of Proponent representatives is required upon arrival and prior to scheduled start time of the site visit.

If parking in an area where access is controlled, Proponent representatives are to notify the parking attendant at the gate that they are attending a site visit at the time indicated in this section. Proponents representatives are not be charged for parking for the purposes of the site visit.

NPC representatives will conduct the sign in process. Upon arrival at the designated meeting location, Proponent representatives will present themselves to the RFP Coordinator and ask to be signed in by the RFP Coordinator. The RFP Coordinator may, in their sole discretion, accept late arrivals including Proponent representatives who arrived on time at the designated meeting location and are simply waiting to sign in. Once the RFP Coordinator calls the start of the site visit no late arrivals will be permitted to sign in.

Proponents who do not send a representative to the site visit will not be given an alternative appointment, but they will not be precluded from submitting a Proposal and will be disqualified from submitting a Proposal.

A site visit may involve a maximum of 2 representatives for each Proponent. If a Proponent wishes to involve more representatives, it may submit a request to the RFP Coordinator to permit additional representatives. A Proponent should not proceed to involve more than the above number of representatives in a site visit without receiving approval from the RFP Coordinator (which may be refused).

Prior to the visit, Proponents should review all provided material (e.g., drawings, studies) to gain a better understanding of the work site conditions.

Proponents will be given access to the areas of the site that are relevant to the performance of the work. NPC reserves the right to deny any individual's participation in the site visits in its sole discretion (including if NPC determines that a given individual arrived at the designated meeting location after the scheduled start time, or has no business or technical need to be present). NPC reserves the right to cancel and / or re-schedule any site visits.

Although Proponent representatives may record images and video of the site, the Proponent is only permitted to use those images and video for the purpose of responding to this RFP. Proponent representatives are not permitted to make any other use or disclosure of those images or video, such as publishing them online.

Any statements made by NPC representatives during the site visit are not binding on NPC. If the Proponent wishes to rely on any statements made by NPC representatives during the site visit, it should seek written clarification or confirmation by submitting a question before the Deadline for Questions.

If the Proponent believes that any aspect of the RFP documentation provided by or on behalf of NPC does not accord with conditions noted during the site visit, it should raise any questions or clarifications with NPC prior to the Deadline for Questions.

## 1.8 RFP Coordinator

All communications with NPC regarding any aspect of this RFP (up until any contract award notification) should be directed to the RFP Coordinator:

Name: Adam De Giuli

Title: Coordinator, Strategic Sourcing and Procurement

via Bonfire's Opportunity Vendor Discussions board (valid until the Proponents' Deadline for Questions)

[procurement@niagaraparks.com](mailto:procurement@niagaraparks.com) (use only after the Proponents' Deadline for Questions).

**PART 2**  
**RFP TERMS AND PROCEDURES**

**2.1 Definitions**

In this RFP, unless the context otherwise requires, the following terms have the meanings indicated below:

- (a) **“Acceptance Period”** for the purpose of Digital Bonding, Acceptance Period means the period the Proponent shall be open for acceptance of their Proposal from the Proposal Submission Deadline which is 120 days. In cases where the expiry date of the Acceptance Period falls on a Saturday, Sunday or public holiday, the time for acceptance shall be extended to the first following Business Day;
- (b) **“Agreement”** has the meaning ascribed in Section 1.3 (Agreement).
- (c) **“Alternate Price”** has the meaning ascribed to it in Section 3.2.6.
- (d) **“Applicable Laws”** means any common law requirement and all applicable and enforceable statutes, regulations, directives, policies, administrative interpretations, orders, by-laws, rules, guidelines, approvals, and other legal requirements of any government and/or regulatory authority in effect from time to time.
- (e) **“Business Day”** or **“Business Days”** means Monday to Friday between the hours of 9:00 a.m. to 5:00 p.m. ET, except when such a day is a public holiday, as defined in the *Employment Standards Act* (Ontario), or as otherwise agreed to by the parties in writing.
- (f) **“Canadian Business”** means a person or group of persons that provides or could provide goods or services and that has a place of business in Canada. For the purposes of this definition, (a) person means a natural person, or an entity constituted, established or organized under applicable laws; and (b) place of business means an establishment where a supplier conducts activities on a permanent basis that is clearly identified by name and accessible during normal business hours.
- (g) **“Cash Allowance”** has the meaning ascribed to it in Section 3.2.2.
- (h) **“Conflict of Interest”** means any situation or circumstance where, in relation to the performance of its obligations under the Agreement, the Proponent’s other commitments, relationships or financial interests (i) could or could be seen to exercise an improper influence over the objective, unbiased, and impartial exercise of its independent judgement; or (ii) could or could be seen to compromise, impair, or be incompatible with the effective performance of its obligations under the Agreement.
- (i) **“Contractor”** means the Proponent that is successful in this RFP and that enters into the Agreement with NPC.
- (j) **“Days”** means calendar days.
- (k) **“Eligible Proposal”** means a Proposal that meets or exceeds a prescribed requirement, allowing it to proceed to the next stage of the evaluation process.

- (l) **“Evaluation Matrix”** means the 10-point evaluation methodology set out at Section 4.3 (Stage II – Evaluation of Rated Elements).
- (m) **“Evaluation Team”** means the individuals who have been selected by NPC to evaluate the Proposals.
- (n) **“Form of Agreement”** has the meaning ascribed in Section 1.3 (Agreement).
- (o) **“Itemized Price”** has the meaning ascribed to it in Section 3.2.2.
- (p) **“MSDS”** means material safety data sheets which describes the properties and potential hazards of the material, how to use it safely, and what to do in an emergency.
- (q) **“NPC”** or **“Owner”** means The Niagara Parks Commission.
- (r) **“Personal Information”** means recorded information about an identifiable individual or that may identify an individual that is received or collected by NPC as part of this RFP.
- (s) **“Place of Work”** is defined in accordance with definitions of the Specifications Schedule.
- (t) **“Project”** is defined in accordance with definitions of the Specifications Schedule.
- (u) **“Proponent”** or **“Proponents”** means an entity that submits a Proposal in response to this RFP and, as the context may suggest, refers to a potential Proponent.
- (v) **“Proposal”** or **“Proposals”** means all of the documentation and information submitted by a Proponent in response to the RFP.
- (w) **“Proposal Submission Deadline”** means the corresponding date and time as set out in Section 1.6 (RFP Timetable) as may be amended from time to time in accordance with the terms of the RFP.
- (x) **“Ranking Proponent”** means the Proponent(s) that NPC has identified as the highest-ranked Proponent(s) in accordance with the evaluation process.
- (y) **“Rectification Period”** means the period commencing on the date that NPC issues a rectification notice to the Proponent pursuant to Section 2.11 (Rectification Period) and running for the number of Business Days provided in that notice, expiring at 5:00 p.m. ET on the last Business Day.
- (z) **“Request for Proposals”** or **“RFP”** means this Request for Proposals issued by NPC, and all addenda thereto.
- (aa) **“RFP Coordinator”** means the individual identified in Section 1.8 (RFP Coordinator) accessible:
  - (i) on or before the Proponents’ Deadline for Questions, via Bonfire’s Opportunity Vendor Discussions board; and

- (ii) after the Proponents' Deadline for Questions, via email at [procurement@niagaraparks.com](mailto:procurement@niagaraparks.com)
- (bb) "**Separate Price**" has the meaning ascribed to it in Section 3.2.4.
- (cc) "**Subcontractor**" is defined in accordance to definitions of the Form of Agreement Schedule.
- (dd) "**Stipulated Price Bid**" means the total fixed price or lump sum proposed by a Proponent and as described in the Pricing Schedule.
- (ee) "**Timetable**" means the timetable for this RFP, as described at Section 1.6 (RFP Timetable).
- (ff) "**Unfair Advantage**" means any conduct, direct or indirect, by a Proponent that may result in gaining an unfair advantage over other Proponents, including but not limited to (i) possessing, or having access to, information in the preparation of its Proposal that is confidential to NPC and which is not available to other Proponents, (ii) communicating with any person with a view to influencing, or being conferred preferred treatment in, the RFP process (including the offer or giving of a benefit of any kind, by or on behalf of a Proponent to anyone employed by, or otherwise connected with, NPC), or (iii) engaging in conduct that compromises or could be seen to compromise the integrity of the RFP process and result in any unfairness.
- (gg) "**Unit Price**" has the meaning ascribed to it in Section 3.2.5.
- (hh) "**Work**" means the goods/services that are the subject matter of this RFP, as described in the Specifications Schedule.

## 2.2 Interpretation

This RFP shall be interpreted according to the following provisions, unless the context requires a different meaning:

- (a) Unless the context otherwise requires, wherever used herein the plural includes the singular, the singular includes the plural, and each of the masculine and feminine includes the other gender.
- (b) Words in the RFP shall bear their natural meaning.
- (c) References containing terms such as "includes" and "including", whether or not used with the words "without limitation" or "but not limited to", shall not be deemed limited by the specific enumeration of items but shall, in all cases, be deemed to be without limitation and construed and interpreted to mean "includes without limitation" and "including without limitation".
- (d) In construing the RFP, general words introduced or followed by the word "other" or "including" or "in particular" shall not be given a restrictive meaning because they are followed or preceded (as the case may be) by particular examples intended to fall within the meaning of the general words.
- (e) Unless otherwise indicated, time periods will be strictly applied.
- (f) The following terminology applies in the RFP:

- (i) Whenever the terms “must” or “shall” are used in relation to NPC or the Proponents, such terms shall be construed and interpreted as synonymous and shall be construed to read “NPC shall” or the “Proponent shall”, as the case may be.
- (ii) The term “should” relates to a requirement which NPC would like the Proponent to address in its Proposal.
- (iii) The term “will” describes a procedure that is intended to be followed.

### **2.3 Restricted Communications**

Proponents that fail to comply with the requirement to direct all communications to the RFP Coordinator may be disqualified from the RFP process. Without limiting the generality of this provision, Proponents may not communicate with or attempt to communicate with the following (unless instructed to by the RFP Coordinator):

- (a) any commissioner, officer, employee or agent of NPC (other than the RFP Coordinator);
- (b) any member of the Evaluation Team;
- (c) any expert or advisor assisting the Evaluation Team; or
- (d) any elected official of any level of government, including any advisor to any elected official.

### **2.4 Authorized Communications, Amendments, Waivers**

Proponents are advised that from the date of issue of the RFP through any award notification:

- (a) only the RFP Coordinator is authorized by NPC to amend or waive the requirements of the RFP pursuant to the terms of this RFP; and
- (b) under no circumstances shall a Proponent rely upon any information or instruction from any commissioner, officer, employee, agent of NPC unless the information or instruction is provided in writing by the RFP Coordinator.

### **2.5 Due Diligence, Inconsistencies, Errors, Etc.**

Every Proponent is responsible for conducting its own investigations and due diligence necessary for the preparation of its Proposal. Every Proponent should carefully review the RFP to ensure that it has no reason to believe there are any inconsistencies, errors, omissions, or ambiguities in any part of the RFP.

If a Proponent has any reason to believe that there are any inconsistencies, errors, omissions, or ambiguities in any part of the RFP, the Proponent should raise this as soon as possible as part of the question and answer process pursuant to Section 2.6 (Proponent Questions), but in any event must notify the RFP Coordinator in writing prior to submitting a Proposal. The RFP Coordinator will then clarify the matter for the benefit of all Proponents.

## **2.6 Proponent Questions**

### **2.6.1 Submission of Questions**

NPC will use the following process regarding any Proponent question or other request for clarification of any aspect of the RFP:

- (a) Proponents must submit requests for clarification via Bonfire's Opportunity Vendor Discussion board, or as may otherwise be directed by the RFP Coordinator.
- (b) Where a question relates to a specific section of this RFP, reference should be made to the specific section number and page of the RFP.
- (c) Requests for clarification must be submitted prior to the Deadline for Questions.

### **2.6.2 Responses to Questions**

NPC will make reasonable efforts to provide Proponents with written responses to questions that are submitted in accordance with Section 2.6.1 (Submission of Questions), subject to the provisions of this Section.

Questions and answers will be distributed in numbered addenda to Proponents by posting such addenda on Bonfire. In answering a Proponent's question(s) in any addenda, NPC will set out the question(s), but without identifying the Proponent that submitted the question(s). Also, NPC may, in its sole discretion:

- (a) edit the question(s) for clarity;
- (b) exclude any question(s) that are either unclear or inappropriate; and
- (c) provide a single, consolidated answer to similar questions from various Proponents.

Where an answer results in any change to the RFP, such answer will be formally documented through the issue of a separate addendum reflecting that change.

Important Note: Proponents who intend to respond to this RFP are requested not to cancel the receipt of addenda or amendments option provided by Bonfire, since they must obtain important information and documents that are issued through Bonfire.

## **2.7 Issued Addenda**

NPC will only amend or supplement the RFP by issuing an addendum. Any amendment or supplement to the RFP made in any other manner will not apply to the RFP.

Before submitting a Proposal, a Proponent shall be responsible to verify that it has received all of the addenda that have been issued. All addenda that have any impact on a Proponent's Proposal will be posted on Bonfire at least 7 Days prior to the Proposal Submission Deadline, unless it is an addendum that extends the Proposal Submission Deadline or the addendum (in the sole discretion of NPC) addresses matters that are not likely to be material to whether a Proponent submits a Proposal or to a Proposal's contents.

## 2.8 Proposal Submission

To be considered in the RFP process, a Proponent's Proposal must be received by the Proposal Submission Deadline, and must be submitted as set out in this Section. Proposals submitted in any other manner will be disqualified.

- NPC uses a Bonfire portal for accepting and evaluating proposals digitally.
- Proposal is to be submitted in Microsoft Word or PDF format or a format identified by NPC. The content of web sites or other external documents referred to in the Proposal will not be considered.
- Upload your Proposal at: <https://niagaraparks.bonfirehub.ca/portal>
- For technical questions related to your submitting your Proposal via Bonfire, please contact Bonfire via phone 1-800-354-8010 extension 2, or via email at Support@GoBonfire.com. You can also visit their help forum at <https://bonfirehub.zendesk.com/hc>.

Important notes:

- Proposal will only be visible to NPC after the Proposal Submission Deadline.
- Uploading large documents may take significant time, depending on the size of the file(s) and your Internet connection speed.
- You will receive an email confirmation receipt with a unique confirmation number once you finalize your Proposal submission.
- Minimum system requirements: Internet Explorer 11, Microsoft Edge, Google Chrome, or Mozilla Firefox. JavaScript must be enabled. Browser cookies must be enabled.

Your Proposal must be uploaded, submitted, and finalized prior to the Proposal Submission Deadline. We strongly recommend that you give yourself sufficient time and at least 1 full day before Proposal Submission Deadline to begin the uploading process and to finalize your submission.

Proposals submitted in any other manner will be disqualified.

Proposals received after the Proposal Submission Deadline shall not be considered. Regardless of the method of delivery, each Proponent is responsible for the actual delivery of its Proposal by the Proposal Submission Deadline in accordance with this RFP.

## 2.9 Withdrawal of Proposal

A Proponent may withdraw its Proposal at any time prior to the Proposal Submission Deadline. To withdraw a Proposal prior to the Proposal Submission Deadline, use the "withdraw" functionality on Bonfire. NPC has no obligation to return withdrawn Proposals.

## **2.10 Amendment of Proposal**

A Proponent may amend its Proposal after submission, but only if the Proposal is amended and resubmitted before the Proposal Submission Deadline, pursuant to Section 2.8 (Proposal Submission).

## **2.11 Rectification Period**

If NPC determines that a Proposal fails to contain the elements listed in the Mandatory Requirements Schedule or has some other technical irregularity, NPC may issue a rectification notice to the applicable Proponent, identifying the irregularity and granting the Proponent an opportunity to rectify it.

If, prior to the expiry of the Rectification Period, the notified Proponent rectifies the irregularity (and delivers the rectified element(s) according to Section 2.8 (Proposal Submission) or as otherwise stated in the notice), NPC will consider the rectified element(s) during the evaluation process.

If the notified Proponent fails to do so, its Proposal may be disqualified.

## **2.12 Proposal Irrevocable after Proposal Submission Deadline**

Proposals shall remain irrevocable in the form submitted by the Proponent for a period of 120 days running from the moment that the Proposal Submission Deadline has lapsed.

## **2.13 Clarification of Proponent's Proposal**

NPC shall have the right at any time after the Proposal Submission Deadline to seek clarification from any Proponent in respect of that Proponent's Proposal, without contacting any other Proponent. NPC shall not be obliged to seek clarification of any aspect of any Proposal.

Any clarification sought shall not be an opportunity for the Proponent to either correct errors or to change the Proponent's Proposal in any substantive manner. Subject to the qualification in this provision, any written information received by NPC from a Proponent in response to a request for clarification from NPC may be considered to form an integral part of the Proponent's Proposal, in NPC's sole discretion.

## **2.14 Verification of Information**

NPC may:

- (a) verify any Proponent's statement or claim made in the Proponent's Proposal or made subsequently in any subsequent communication by whatever means NPC may deem appropriate, including contacting persons in addition to those offered as references;
- (b) reject any Proponent's statement, claim or Proposal, if such statement, claim or Proposal is patently unwarranted or is doubtful; or
- (c) access the Proponent's premises where any part of the work is to be carried out to confirm Proposal information, quality of processes, and to obtain assurances of viability, provided that, prior to providing such access, the Proponent and NPC shall agree on reasonable access terms, including pre-notification, extent of

access, security, confidentiality and the allocation and amount of any costs incurred in connection with such access.

## **2.15 No Publicity or Promotion**

No Proponent, including the Ranking Proponent, should make any public announcement or distribute any literature regarding this RFP or otherwise promote itself in connection with this RFP or any arrangement entered into under this RFP without the prior written approval of NPC.

If a Proponent, including the Ranking Proponent, makes a public statement either in the media or otherwise that is contrary to NPC's wishes noted above, then:

- (a) NPC may disqualify that Proponent; and
- (b) although NPC intends to treat all Proposals as confidential, NPC may disclose any information about a Proponent's Proposal to provide accurate information and/or to rectify any false impression which may have been created.

## **2.16 Confidentiality and Privacy**

### **2.16.1 Confidential Information of NPC**

At any time during this RFP process, NPC may request that all Proponents (or all Eligible Proponents, depending on the stage of the process) to sign a confidentiality agreement in connection with matters arising out of this RFP, and as a mandatory requirement to continue to participate in the RFP. Proponents that decline to sign such an agreement may be ineligible to continue to participate in the RFP.

### **2.16.2 Confidential Information of the Proponent**

Except as provided otherwise in this RFP, or as may be required by Applicable Laws, NPC will treat the Proponents' Proposals (including, but not limited to pricing and product information) and any information gathered in any related process as confidential, and will restrict access to such information to those of its employees or advisors who require access to the information for the purposes of this RFP and who are subject to binding confidentiality obligations.

NPC does not intend to treat as confidential any information that is or becomes generally available to the public other than as a result of disclosure by NPC.

### **2.16.3 Personal Information**

Personal Information shall be treated as follows:

- (a) **Submission of Information** – The Proponent should not submit as part of its Proposal any information related to the qualifications or experience of individuals who will be assigned to the project unless specifically requested. Should NPC request such information, NPC will treat this information in accordance with the provisions of this section and will maintain the information for a period of up to 7 years from the time of collection.
- (b) **Use** – Any Personal Information that is requested from each Proponent by NPC shall only be used (i) to select the qualified individuals to undertake the project; (ii) to confirm that the work performed is consistent with these qualifications; (iii) for

any audit of this procurement process; and (iv) in the case of the Contractor, for contract management purposes.

- (c) **Consent** – It is the responsibility of each Proponent to obtain the consent of such individuals prior to providing the information to NPC. If any Personal Information is disclosed to NPC by a Proponent, NPC will consider that the appropriate consents have been obtained for the disclosure to and use by NPC of the requested information for the purposes described herein.

## 2.17 Debriefing

Not later than 60 Days following the date of posting of a contract award notification in respect of the RFP, a Proponent may contact the RFP Coordinator to request a debriefing from NPC.

Any request that is not received within the foregoing timeframe will not be considered and the Proponent will be notified of same in writing.

## 2.18 Bid Dispute

Before initiating the bid dispute process, Proponents should raise their concerns with the RFP Coordinator, either as part of the question and answer period or debriefing. If the Proponents is not satisfied with the outcome, and wishes to initiate a formal bid dispute, the Proponents must follow the steps set out in section 9.15 (“Bid Dispute Process”) of NPC’s Procurement Policy CPM-01-03.

All bid disputes will receive a formal review and all Proponents who initiate a bid dispute in accordance with NPC’s procurement policy will be provided with a formal response.

A bid dispute must be submitted to NPC within 30 days of completion of the debriefing meeting. To submit a bid dispute, Proponents must:

- attach a detailed description of the bid dispute; and
- provide any additional relevant background information.

All documentation must be addressed to:

Attention: Senior Manager, Strategic Sourcing and Procurement  
The Niagara Parks Commission, 7400 Portage Road  
Niagara Falls, ON L2E 6T2

Once a bid dispute has been received, the Senior Manager, Strategic Sourcing and Procurement, will initiate a review of the matter. The Senior Manager, Strategic Sourcing and Procurement will complete that review as soon as reasonably possible, but generally within 30 days. The Senior Manager, Strategic Sourcing and Procurement, will then prepare a written decision regarding the matter and will send a copy of that decision to the Proponent that submitted the bid dispute. Filing a bid dispute does not affect a Proponent’s ability to participate in ongoing or future procurement opportunities with NPC.

NPC’s Procurement Policy CPM-01-03 is available on its website at: <https://www.niagaraparks.com/corporate/procurement-vendor/>.

## **2.19 Freedom of Information and Protection of Privacy Act**

The *Freedom of Information and Protection of Privacy Act* (Ontario), applies to records in the custody or control of NPC, and includes any information provided by Proponents in connection with this RFP. Such information may be subject to requests for access under that Act, and can only be withheld from disclosure in specific circumstances.

A Proponent should identify any information in its Proposal that, if disclosed to any other person, would harm that Proponent's competitive position. Generally, only specific portions of a Proposal should be identified.

## **2.20 Accessibility**

The NPC is committed to ensuring that accessible goods and services are purchased where accessibility would impact the successful use of the good or service by the public or staff or where a lack of accessibility would have direct impact on the success of an NPC project as required under The Accessibility for Ontarians with Disabilities Act (AODA), 2005 O. Reg. 191/11; Integrated Accessibility Standard.

## **2.21 Competition Act**

Under Canadian law, a Proponent's Proposal must be prepared without conspiracy, collusion, or fraud. For more information on this topic, visit the Competition Bureau website at <http://www.cb-bc.gc.ca/eic/site/cb-bc.nsf/eng/01240.html>, and in particular, part VI of the *Competition Act*, R.S.C. 1985, c. C-34.

## **2.22 Trade Agreements**

Proponents should note that this procurement process may be subject to:

- Chapter 9 of the Ontario-Quebec Trade and Cooperation Agreement;
- Chapter 5 of the Canadian Free Trade Agreement;
- Chapter 15 of the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP);
- World Trade Organization Government Procurement Agreement (WTO-GPA);
- Chapter 19 of the Canada-United Kingdom Trade Continuity Agreement (CUKTCA); and
- Chapter 19 of the Canada-European Union Comprehensive Economic and Trade Agreement and is subject to treaty requirements.

## **2.23 Rights of NPC – General**

In addition to any other express rights or any other rights which may be implied in the circumstances, NPC reserves the right to (in its sole discretion):

- (a) make public the names of any or all Proponents;
- (b) request written clarification or the submission of supplementary written information from any Proponent and to incorporate such clarification or supplementary written information into the Proponent's Proposal;

- (c) waive formalities and accept Proposals that substantially comply with the requirements of this RFP;
- (d) contact or not contact any or all references provided by the Proponent;
- (e) verify with any Proponent or with a third party any information, or check references other than those provided by Proponents, as set out in a Proposal, as described in Section 2.14 (Verification of Information);
- (f) disqualify any Proponent whose Proposal contains misrepresentations or any other inaccurate or misleading information, or any Proponent whose reasonable failure to cooperate with NPC impedes the evaluation process, or whose Proposal is determined to be non-compliant with the requirements of the RFP;
- (g) disqualify any Proponent that has a Conflict of Interest or Unfair Advantage, or where reasonable evidence of any Unfair Advantage or Conflict of Interest is brought to the attention of NPC, and NPC determines that no reasonable mitigation are possible, or that the Proponent has not taken sufficient steps to promptly address such matters to the satisfaction of NPC;
- (h) disqualify any Proponent that is bankrupt or insolvent, or where bankruptcy or insolvency are a reasonable prospect;
- (i) disqualify any Proponent that has engaged in significant or persistent deficiencies in performance of any substantive requirement or obligation under a prior contract or contracts;
- (j) disqualify any Proponent if the Proponent, or any officers, directors or other key personnel of the Proponent:
  - (i) are subject to final judgments in respect of serious crimes or other serious offences; or
  - (ii) have engaged in professional misconduct or acts or omissions that adversely reflect on the commercial integrity of the Proponent – including where there is any evidence that the Proponent or any of its employees or agents colluded with any other Proponent, its employees or agents in the preparation of its Proposal, or have made false declarations to NPC, or otherwise have been determined by NPC to be in contravention of NPC's Supplier's Code of Conduct (accessible on NPC's webpage);
- (k) disqualify any Proponent if the Proponent has failed to pay taxes;
- (l) make changes, including substantial changes, to this RFP provided that those changes are issued by way of addenda in the manner set out in this RFP;
- (m) accept or reject a Proposal if only one Proposal is submitted;
- (n) accept any Proposal in whole or in part;
- (o) reject a subcontractor proposed by a Proponent within a consortium;
- (p) reject a Proposal:

- (i) if the Proponent is involved in a dispute, claim or litigation against NPC;
  - (ii) if the Proponent has failed to satisfy an outstanding debt to the NPC;
  - (iii) if the Proponent has a history of illegitimate, frivolous, unreasonable or invalid claims;
  - (iv) if the Proponent provides incomplete, unrepresentative or unsatisfactory references; or
  - (v) if NPC determines that it would not be in the public interest to accept the Proposal;
- (q) select a Proponent other than the Proponent whose Proposal reflects the lowest cost to NPC; or
- (r) cancel this RFP process at any stage and issue a new RFP for the same or similar requirements, including where:
- (i) NPC determines that it would be in the best interest of NPC not to award an Agreement;
  - (ii) the Proposal prices exceed the funds available for the Work; or
  - (iii) the funding for the acquisition of the Work has been revoked, modified, or has not been approved;

and where NPC cancels this RFP, NPC may do so without providing reasons, and NPC may thereafter issue a new request for proposals, request for qualifications, engage in limited tendering, or take no further action in respect of the matters contemplated by this RFP.

By submitting a Proposal, the Proponent authorizes the collection by NPC of the information identified in this RFP which NPC may request from any third party.

## **2.24 Rights of NPC – Ranking Proponent**

If the Ranking Proponent fails or refuses to execute the Agreement within 10 Business Days from being notified that it is the Ranking Proponent, NPC may, in its sole discretion:

- (a) extend the period for concluding the Agreement (provided that if substantial progress towards executing the Agreement is not achieved within a reasonable period of time from such extension, NPC may, in its sole discretion, exercise either of the following rights under this Section);
- (b) exclude the Ranking Proponent's Proposal from further consideration and notify the next highest-ranked Proponent (who will then be deemed to be the Ranking Proponent) that it is the Ranking Proponent; or
- (c) exercise any other applicable right set out in this RFP, including but not limited to, cancelling the RFP and issuing a new RFP or other procurement process for the same or similar Work.

## **2.25 Proponent's Costs**

Each Proponent shall bear all costs and expenses incurred by that Proponent relating to any aspect of its participation in this RFP process, including all costs and expenses relating to the Proponent's participation in:

- (a) the preparation, presentation, and submission of its Proposal;
- (b) the Proponent's attendance at any meeting in relation to the RFP process, including any oral presentation and/or demonstration;
- (c) the conduct of any due diligence on its part, including any information gathering activity;
- (d) the preparation of the Proponent's own questions prior to the Proposal Submission Deadline; and
- (e) any discussion and/or negotiation, if any, in respect of the Agreement.

### **2.25.1 Limitation of Liability**

If NPC, the Government of Ontario or any Ministry of the Government of Ontario (the "**NPC Parties**") is found to be liable, in any way whatsoever, for any act or omission of any of them in respect of this RFP Process, the total liability of such persons to any Proponent (including any subcontractor within a consortium) or any other entity participating in this RFP process, and the aggregate amount of damages recoverable against any of the NPC Parties for any matter relating to or arising from any act or omission by any one or more of them, whether based upon an action or claim in contract, warranty, equity, negligence, intended conduct or otherwise, including any action or claim arising from the acts or omissions, negligent or otherwise, of any of the NPC Parties, shall be no greater than the Proponent's cost of preparing its Proposal or \$1,000, whichever is less.

## **2.26 Priority of Documents**

In the event of any inconsistencies between the provisions of the main part of the RFP and the Schedules, the RFP shall prevail over the Schedules during the RFP process.

## **2.27 Ontario / Canadian Law**

The RFP and the Proponent's Proposal will be interpreted according to the laws of Ontario and the federal laws of Canada applicable therein.

**PART 3  
PROPOSAL FORMAT AND CONTENTS**

**3.1 Proposal Format**

**3.1.1 Proposal Components**

The Proponent's Proposal should be comprised and formatted into two separate parts as follows:

- (a) technical Proposal containing the Proposal, excluding the Pricing Schedule; and
- (b) pricing Proposal containing the Pricing Schedule.

**3.1.2 Forms and Schedules**

Proposals should be submitted in accordance with the instructions set out in this RFP and by completing the Schedules referred to in Section 3.2 (Proposal Contents). Schedules should be completed without delineations, alterations, or erasures.

**3.1.3 Proposal Language and Formatting**

Proposals are to be submitted in English only, and any Proposal received by NPC that is not entirely in English may be disqualified.

In preparing its Proposal, the Proponent should adhere to the following:

- (a) limit its written Proposal to no more than 30 pages in length – with any supplementary information (such as company profile or promotional material) submitted in a separately identified appendix (which will not count towards this requested page limit);
- (b) all pages should be numbered;
- (c) avoid using symbols in electronic file names unless directed to use them (&, #, etc.);
- (d) each electronic document should not exceed 1000 MB in size; information may be split up into separate documents, if necessary;
- (e) avoid using scanned copies of documents, where possible (scanned copies tend to be of greater size than original electronic versions);
- (f) no embedded hyperlinks to online literature will be reviewed or evaluated;
- (g) completely address, on a point-by-point basis, each requirement identified in Section 3.2 (Proposal Contents); and
- (h) respond to the requirements in the applicable Schedule, or as may be directed in this RFP – the Schedules provided, as appropriate, should be used for completing the Proposal.

## **3.2 Proposal Contents**

Proposals must contain the elements listed in the Mandatory Requirements Schedule. A failure to do so will result in the Proposal being disqualified. Proponents should provide responses to the mandatory requirements in the corresponding schedule or as otherwise directed.

Proposals should address the elements listed in the Rated Elements Schedule by providing responses in the body of its Proposal under corresponding headings. Rated elements will be scored and failure by a Proponent to fully address any rated element will affect the Proponent's evaluation and final score under Part 4 (Evaluation Process). Only Proposals that reach or exceed the minimum score for any criterion or group of criteria will be eligible to proceed to the next stage of the evaluation process (as an Eligible Proposal).

Pricing information is to be provided per the Pricing Schedule, and submitted separately from the rest of the Proposal pursuant to Section 3.1.1 (Proposal Components).

### **3.2.1 Pricing Schedule**

All pricing should be quoted as outlined in the Pricing Schedule.

### **3.2.2 Cash Allowances**

All Cash Allowance items listed in the Pricing Schedule shall be subject to the requirements of the Form of Agreement Schedule. The total value of all Cash Allowance items shall be included in the Stipulated Price Bid.

Whether items on the Cash Allowance list are ultimately tendered by the Owner or the Contractor, the Contractor shall contract with the selected Contractors and / or Subcontractors, for execution of the parts of the Work identified under these Cash Allowances.

Such Contractors and Subcontractors shall have the same status as other Contractors and Subcontractors on the Work and the Contractor shall be responsible for such Contractors and Subcontractors, so nominated, as for the Contractor's other Contractors and Subcontractors on the Work.

### **3.2.3 Itemized Prices**

All Itemized Price items listed in the Pricing Schedule and as described in the Agreement shall have the appropriate price inserted adjacent to each item by the Proponent and be included in the Stipulated Price Bid.

Itemized prices shall include all labour, materials, products, equipment, services, and respective overhead, profit, taxes (excluding HST), disbursements and related charges required to provide these items and represent total amounts which will be deducted from Stipulated Price Bid if these items are not required to be included in the Agreement, with no change to Contract Time unless otherwise stated with the respective Itemized Price.

### **3.2.4 Separate Prices**

All Separate Price items listed in the Pricing Schedule and as described in the Agreement shall have the appropriate price inserted adjacent to each item by the Proponent and be excluded from the Stipulated Price Bid.

Separate Prices shall include all labour, materials, products, equipment, services, and respective overhead, profit, taxes (excluding HST), disbursements and related charges required to provide these items and represent the total amounts which will be added to the Stipulated Price Bid if

these items are required to be included in the Agreement, with no change to Contract Time unless otherwise stated with the respective Separate Price.

### **3.2.5 Unit Prices**

Unit Price items listed on the Pricing Schedule shall be used to ascertain the value of changes in the Work and to adjust the Stipulated Price Bid as and when required.

Unit Prices shall include all labour, materials, products, equipment, services, and respective overhead, profit, taxes (excluding HST), disbursements and related charges and represent the actual addition for extra Work or credit for deleted Work, to Stipulated Price Bid.

The Owner shall be under no obligation to accept the Unit Prices as submitted. Instead, the submitted Unit Prices shall be subject to review, negotiation and modification as mutually agreed-upon by the parties, prior to finalization of the Agreement.

### **3.2.6 Alternative Prices**

The Proponent may propose Alternate Price items on the Pricing Schedule. The Owner at its sole discretion may accept or reject any or all such offered Alternate Price items. Prior to its acceptance or rejection, any such proposed Alternate Price item might, at the Owner's discretion, be subject to detailed review by the Owner or its designated representative. Any such accepted Alternate Price item shall be incorporated into the Agreement and the Stipulated Price Bid adjusted as indicated in below:

Alternative Prices shall include all labour, materials, products, equipment, services and respective overhead, profit, taxes (excluding HST), disbursements and related charges required for substituting, deleting or changing materials and/or products and/or construction from that shown or specified and represent the total amounts which will be added to or deducted from the Stipulated Price Bid (as noted for each item). If the Owner agrees to include an Alternative Price item in the Agreement, there will be no change to the Contract Time unless otherwise stated with the respective Alternative Price submission and agreed-to by the Owner.

## PART 4 EVALUATION PROCESS

### 4.1 General

The evaluation of the Proposals will be conducted by the evaluation team (the “**Evaluation Team**”) in several stages, as described below. The evaluation of the Proposals will be conducted individually by each member of the Evaluation Team and averaged into a final score for each stage. NPC will determine the membership of the Evaluation Team, in its sole discretion, which may include external consultants and advisors. The stages and the points allocated to each stage of the evaluation process are as follows:

Stage	Description	Points	Minimum Score
I	Mandatory Requirements	(Pass/Fail)	Pass
II	Rated Elements	100	70
III	Pricing	40	N/A
IV	Reference Verification	(Pass/Fail)	Pass
	Total	140	N/A

### 4.2 Stage I – Review of Mandatory Requirements (Pass/Fail)

A Proposal must meet the requirements set out in the Mandatory Requirements Schedule.

Stage I will consist of a review to determine which Proposals comply with those requirements.

Subject to Section 2.11 (Rectification Period), if a Proposal fails to satisfy all of those requirements then it will be disqualified.

### 4.3 Stage II – Evaluation of Rated Elements

The Evaluation Team will score each Eligible Proposal according to the rated elements listed in the Rated Elements Schedule.

Unless otherwise provided in this RFP, each rated element will be generally evaluated in accordance with the following methodology. Where a given criterion is not scored out of 10 points, the Proponent will receive a score for that criterion that is based on its score out of 10 according to this Section, but pro-rated based on the maximum score attributable to that criterion.

Score	Description
10	<p>All the following are true:</p> <ul style="list-style-type: none"> <li>• information addresses all material points, AND</li> <li>• information has no shortcomings / deficiencies, and is credible, AND</li> <li>• information is fully consistent with the rest of the Proposal</li> </ul>
8-9	<p>As with 10, except information contains shortcomings / deficiencies that slightly weaken the credibility / persuasiveness / value of the Proposal.</p>
7	<p>As with 10, except one of the following is true:</p> <ul style="list-style-type: none"> <li>• information addresses most (but not all) material points, OR</li> <li>• information contains shortcomings / deficiencies that weaken the credibility / persuasiveness / value of the Proposal, OR</li> <li>• information is inconsistent with other (non-material) aspects of the Proposal in a manner that raises minor questions as to the credibility of the information.</li> </ul>
5-6	<p>As with 10, except two or more of the following are true:</p> <ul style="list-style-type: none"> <li>• information addresses most (but not all) material points, AND/OR</li> <li>• information contains shortcomings / deficiencies that weaken the credibility / persuasiveness / value of the Proposal, AND/OR</li> <li>• information is inconsistent with other aspects of the Proposal in a manner that raises minor questions as to the credibility of the information.</li> </ul>
3-4	<p>Any one or two of the following is true:</p> <ul style="list-style-type: none"> <li>• information fails to address most material points, AND/OR</li> <li>• information contains shortcomings / deficiencies that significantly weaken the credibility / persuasiveness / value of the Proposal, AND/OR</li> <li>• information is inconsistent with other aspects of the Proposal in a manner that raises serious questions as to the credibility of the Proposal</li> </ul>
1-2	<p>Any one or two of the following is true:</p> <ul style="list-style-type: none"> <li>• information fails to address any material points, AND/OR</li> <li>• information contains shortcomings / deficiencies that entirely undermine the credibility / persuasiveness / value of the Proposal, AND/OR</li> <li>• information is inconsistent with other aspects of the Proposal in a manner that raises serious questions as to the credibility of the Proposal</li> </ul>
0	<p>No relevant information</p>

#### 4.4 Stage III – Pricing

Only at the completion of all other rated criteria for all Eligible Proposals will the RFP Coordinator evaluate the Pricing Schedule of Eligible Proposals.

Pricing will be scored based on a relative pricing formula on the basis of the information provided in the Pricing Schedule.

Each Proponent will receive a percentage of the total possible points allocated to price by dividing the lowest bid price by the Proponent's price for the Work. For example, if the lowest price offered by one Proponent is \$120.00, that Proponent will receive 100% of the possible points ( $120/120 = 100\%$ ). A Proponent who bids \$150.00 will receive 80% of the possible points ( $120/150 = 80\%$ ) and a Proponent who bids \$240.00 will receive 50% of the possible points ( $120/240 = 50\%$ ).

$(\text{Lowest Price}/2^{\text{nd}} \text{ Lowest Price}) \times \text{Total available points} = \text{Score for proposal with } 2^{\text{nd}} \text{ lowest price}$

$(\text{Lowest Price}/3^{\text{rd}} \text{ Lowest Price}) \times \text{Total available points} = \text{Score for proposal with } 3^{\text{rd}} \text{ lowest price}$

A mathematical or transposition discrepancy or error in the Pricing Schedule may be corrected by NPC (in its sole discretion) by correcting the Proposal price as follows.

- If the discrepancy is in respect of extensions of unit prices, the unit price shall be taken as correct, and the extension shall be corrected accordingly.
- If a mathematical error is made in applying a fixed percentage to a stated amount (e.g., a 10% contingency fee on a pricing total), the recorded total will be corrected accordingly.
- If a mathematical error is made in adding line items to a total, the correct addition shall be taken as correct, and the recorded total will be corrected accordingly.
- If an error has been made in transferring an amount from one part of the Proposal to another, the amount shown before transfer shall be taken to be correct and the amount shown after the transfer and the Proposal price shall be corrected accordingly.
- If the discrepancy or error is such that more than one of the foregoing provisions applies, the corrections shall be applied sequentially, in descending order (provided that, if a mathematical error is made in adding line items to a total, the above will be applied first to correct individual line items, as appropriate).
- If the discrepancy or error is such that none of the foregoing provisions apply, the discrepancy or error shall be corrected by taking the lower of the inconsistent amounts as being correct, and the higher amount shall be corrected accordingly.

Any objection or refusal by a Proponent to NPC applying any of the foregoing shall result in either the disqualification of the Proponent, or the Proponent receiving the lowest possible score on the relevant criterion, in NPC's sole discretion.

#### 4.5 Tie Break Process

If two or more Proposals achieve a tie score on completion of the evaluation process (or any part of that process that limits the number of Proponents that can continue to the next stage), NPC shall break the tie by comparing the scores of the highest rated criterion evaluated in that stage

of the evaluation process. If a tie remains, then the second highest criterion will be used to compare scores, and so on, until the tie is resolved.

#### **4.6 Stage IV – Reference Verification (Pass/Fail)**

At this stage, the RFP Coordinator will verify as many references provided by the Ranking Proponent in the Project Experience Response Schedule as NPC may deem appropriate, and such references may be conducted in-person, as NPC may determine in its sole discretion. References will be assessed as to their satisfaction with the performance of the Proponent, on a pass/fail basis

#### **4.7 Finalization of Agreement with Ranking Proponent**

Subject to any reference verification, NPC may attempt to finalize the terms and conditions of the Agreement with the Ranking Proponent.

For certainty, NPC makes no commitment to the Ranking Proponent that the Agreement will be executed. The Ranking Proponent acknowledges that the commencement of any discussions does not obligate NPC to execute the Agreement.

NPC shall at all times be entitled to exercise its rights under Section 2.24 (Rights of NPC – Ranking Proponent).

NPC's approach to any negotiations is set out at Section 1.3 (Agreement).

## **Specifications Schedule**

All terms with initial capitalization that are not otherwise defined in this RFP or this Schedule shall have the meaning ascribed to them in the Form of Agreement.

### **1. Objectives and Background**

This Request for Proposals is issued by NPC for the provision of a qualified general contractor to supply all construction services required to construct an extension to the existing WEGO bus garage to enable the amalgamation of fleet services and WEGO bus operations located at 7810 Niagara Portage Road. The extension is comprised of an addition of two new double bays in the western direction and an extension in the south direction to the existing service bays.

The amalgamation of the fleet services department and the WEGO bus garage will enable more space to be made available at the maintenance center for future plans and repurposing of space. NPC seeks a qualified contractor to provide general contracting services for the Project.

The Ranking Proponent will provide a team of specialists (in-house and outsourced) who can provide all the required services necessary to complete the assignment within the specified timeframe.

Proponents shall base their Proposals upon the products and systems specified and the information provided in the Technical Specifications Schedule and/or in the

List of Drawings Schedule. Materials and equipment are specifically described in those specifications in order to establish standards to which Proponents shall adhere.

The Niagara Parks Commission shall, at its discretion, may reduce or increase the scope of work. There shall be NO COMPENSATION to the Contractor for any reduction in the contract value and scope

### **2. Requirements and Deliverables**

#### **2.1 Scheduling of the Work**

The Contractor may start the work as early as February 10, 2025 with a completion date no later than November 30, 2025. The Contractor shall submit a work schedule to NPC for review prior to the commencement of any work, subject to approvals and shall notify the project coordinator/manager in writing a minimum of 10 calendar days in advance of the date on which the Contractor intends to begin work. The Contractor's schedule must consider and minimize the impacts to the community and park guests.

NPC reserves the right to defer the start date to accommodate agency approvals, execution of documents, or site conditions.

It is the responsibility of the Contractor to arrange additional daylight shifts, as required, to complete the work within the specified time. There will be no additional payment made thereof.

#### **2.2 Examination of Site**

The Contractor declares that in submitting a Proposal for the work and in entering into the Contract, that it has satisfied itself and will assume the risk for the nature and location of the work; the nature of the ground conditions; the nature of subsurface materials and conditions; the

character, quality and quantity of the material to be encountered; the character of the equipment and facilities needed preliminary to and during the prosecution of the work; the general and local conditions and all other matters which can in any way affect the work under the Contract; and in so carrying out this examination the Contractor has assessed and will assume the risk for and has made its own estimate of the facilities and difficulties to be encountered; and has allowed for all conditions that could have a bearing on the cost of the work or the time allowed for its completion.

The Proponent declares that in submitting a Proposal for the work and entering into the Contract that it did not rely on any information from NPC or its agents relating to the site conditions. Adverse soil and/or natural conditions, or any adverse general or local condition encountered during the work, shall be immediately brought to the attention of the assigned Contract Administrator.

### 2.3 Estimated Quantity

Any quantities listed are estimates only and shall be used as a basis for calculation. These quantities are not guaranteed to be accurate and are furnished without any liability on the part of the NPC, whether increased or decreased.

### 2.4 Disposal of Excavated Material

All materials, as specified herein to be removed and disposed of, shall be removed by the Contractor and disposed of in a manner that is satisfactory to the NPC. The entire job site shall be left in an orderly and appropriate condition upon the completion of the work.

### 2.5 Dust Control

The Contractor will be solely responsible for controlling dust nuisance resulting from his operations. In the event that there is a conflict between this supplemental specification and the Standard Contract Specification, this supplemental special provision shall apply unless directed otherwise by the NPC Inspector or Project Coordinator/Administrator.

Where the work requires the sawing of asphalt or concrete, blades and grinders of the wet type shall be used together, with sufficient water, to prevent the incidence of dust, wherever dust would affect traffic or the residents of the area where the work is being carried out.

## 3. Existing Conditions

### 3.1 Access

Vehicular and pedestrian access to all businesses, homes and side streets must be maintained at all times. Co-ordination and co-operation from the Proponent will be required to ensure minimum disruption during all phases of the construction. In the case that there is a driveway closure, 24 hours' notice shall be given to the property owner.

### 3.2 Damages

The Contractor shall schedule their construction operations in such a manner that a storm drainage outlet will always be available. This is to ensure that the exposed sub-grade or granular base will not be subjected to flooding and ponding problems. The unit bid price, under the appropriate items, shall allow for this requirement and no extra payment shall be made for the excavation of soft wet areas caused by inadequate drainage.

### 3.3 Drainage

The Contractor shall schedule their construction operations in such a manner that a storm drainage outlet will always be available. This is to ensure that the exposed sub-grade or granular base will not be subjected to flooding and ponding problems. The unit bid price, under the appropriate items, shall allow for this requirement and no extra payment shall be made for the excavation of soft wet areas caused by inadequate drainage.

## 4. **Protection of Existing Utilities & Services**

The Contractor will protect, maintain, and support all existing exposed or concealed mechanical and electrical services in such manner as to allow them to function without interruptions, unless interruptions are due to alterations of attachments.

### General Protection

- a) The Contractor is to take all necessary measures, including those required by authorities that have jurisdiction, to protect the public and those employed on the work from bodily harm, and to protect NPC's and adjacent public and private property from damage.
- b) The Contractor must make full restitution for failure to take adequate protective measures.
- c) The Contractor must correct any damage to the work of this contract from whatever cause.
- d) The Contractor must comply with requirements of the Occupational Health and Safety Act and all associated regulations.
- e) The Contractor must take all necessary precautions to guard site, premises, materials, and the public at all times other than when work is in progress.
- f) Construction site to be fenced off accordingly to provide a safer environment for modifications to commence and without interrupting flow of traffic for NPC fleet services and WEGO bus routes.

## 5. **Contingency Allowance**

The Contractor is advised that all extra work required to complete this project must be authorized by the Project Coordinator/Manager prior to starting such extra work and all field force accounts shall be verified and signed by the Project Coordinator/Manager prior to the Contractor submitting his invoices for payment. Failure to follow this procedure may result in the rejection of invoices.

## 6. **Insurance Requirements**

Contractors are strongly advised to contact their respective insurance broker(s) and assess the impact the following insurance coverage requirements have on their proposals and pricing. Contractors are expected to cover all required insurance-related costs in their proposed pricing.

All risk property insurance, including fire insurance, to be provided by the Contractor and shall name the Owner as NPC.

General liability insurance shall be with limits of not less than \$5,000,000 per occurrence, and aggregate limit of not less than \$5,000,000 within any policy year with respect to completed operations, and a deductible not exceeding \$5,000. The insurance coverage shall not be less than the insurance provided by IBC Form 2100 (including an extension for a standard provincial and territorial form of non-owned automobile liability policy) and IBC Form 2320. To achieve the desired limit, umbrella or excess liability insurance may be used.

Automobile liability insurance in respect of vehicles that are required by law to be insured under a contract by a motor vehicle liability policy, shall have limit of not less than \$5,000,000 inclusive per occurrence for bodily injury, death and damage to property, covering all vehicles owned or leased by the Contractor. Where the policy has been issued pursuant or a government-operated automobile system, the Contractor shall provide NPC with confirmation of automobile insurance coverage for all automobiles registered in the name of the Contractor.

Proof of Insurances and the named insured showing NPC, and the Consultant as an additional named insured for the project shall be submitted to NPC upon execution of the Contract. Insurance certificate shall provide that the insuring company will give 30 days' notice to NPC of an intention to cancel.

## **7. Cash Allowances (If Applicable)**

- (a) The Contractor's Total Stipulated Price Bid, includes the cash allowances, if any, stated in the Pricing Schedule. The scope of the Services or costs included in such cash allowances shall be as described in this section.
- (b) The Total Stipulated Price Bid, and not the cash allowances, includes the Contractor's overhead and profit in connection with such cash allowances. The Contractor's overhead and profit shall not exceed 15%.
- (c) Where the actual cost of the Services under any cash allowance exceeds the amount of the allowance, any unexpended amounts from other cash allowances shall be reallocated, at the NPC's direction, to cover the shortfall, and, in that case, there shall be no additional amount added to the Total Stipulated Price Bid for overhead and profit. Only where the actual cost of the Services 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 only, as set out in the Agreement.
- (d) The net amount of any unexpended cash allowances, after providing for any reallocations as contemplated in paragraph c), shall be deducted from the Total Stipulated Price Bid by change order without any adjustment for the Contractor's overhead and profit on such amount.
- (e) NPC reserves the right to call, or to have the Contractor call, for competitive bids for portions of the Services, to be paid for from cash allowances.
- (f) The value of the Services performed under a cash allowance is eligible to be included in progress payments.
- (g) The Contractor and the NPC shall jointly prepare a schedule that shows when the items called for under cash allowances must be ordered to avoid delaying the progress of the Services.

## **8. Holdback for Unsatisfactory Performance**

The NPC shall not pay the final invoice to the successful bidder for the work, services, products or materials stated in these documents until the NPC is fully satisfied that all terms and conditions stated in these documents, and all work, service performed, products or materials delivered shall be deemed to have been completed, installed or delivered to the complete satisfaction of the Niagara Parks Commission. The Niagara Parks Commission reserves the right to apply a maintenance holdback to this contract of ten (10) percent for one (1) year after completion of the project.

**9. Layout**

The Contractor shall be responsible for the true and proper setting out of the work and for the correctness of the position, elevation and alignment of all parts of the work in accordance with accepted survey procedures and layout.

**10. Bonding**

At the time of executing the Agreement, the Contractor shall provide the following bonding from a Canadian surety company:

- (a) a performance bond in the amount of 100% of the contract amount, covering the performance of the Agreement, including the requirements thereunder with respect to the correction of deficiencies and the fulfillment of all warranties; and
- (b) a labour and material payment bond in the amount of 50% of the contract amount, covering payment for labour, products, or both.

**11. Phases, Milestones & Schedule**

The following milestone schedule indicates timelines for this project. The Contractor will have to meet the following high-level milestones as a requirement of this project. The Owner reserves the right to modify these timelines as the Owner deems necessary.

<b>Construction Phase</b>	<b>Date Range:</b>
Contractor Award	February 7, 2025
Substantial Performance	October 31, 2025
Total Performance	November 30, 2025

**12. Place of Work**

Work is to be completed at 7810 Portage Road, Niagara Falls, Ontario, a complex within 7805 Niagara River Parkway.

Location Link: <https://maps.app.goo.gl/JK9n4iHyVj3YMoZo8>



Figure 1 Location of the WEGO Bus Garage – 7810 Portage Road, Niagara Falls, ON

### 13. Applicable Acts / Regulations / Codes

The Contractor shall comply with all Federal, Provincial and Municipal Laws, statutes, regulations and bylaws, relevant to this Quotation including but not limited to:

- The Construction Lien Act, R.S.O 1990, c. C.30
- The Occupational Health & Safety Act, R.S.O. 1990, c.0.1, as amended
- Workplace Safety and Insurance Act, effective January 1, 1998, as amended
- The Municipal Freedom of Information and Protection of Privacy Act, R.S.O 1990,c.M.56, as amended.

### 14. Constraints

All work shall be completed Monday to Friday between 7:00am – 5:00pm, unless a request is made by the Contractor and approved by NPC. Laydown areas will need to be confirmed and approved with NPC.

### 15. Working Outside Normal Hours

The Contractor shall not work at night, except:

- (a) if the Contractor requests and receives the prior written approval from the NPC project coordinator to work at night; or
- (b) if the NPC project coordinator directs the Contractor to work at night; or
- (c) in the case of an emergency and then only with the written permission from the NPC project coordinator.

The term "night" shall be defined as any time between the hours of 5:00 p.m. and 7:00 a.m. for the purposes of the Contract. The Contractor shall not make any claim for extra compensation for work done at night. The Contractor shall, as far as is practicable, refrain from working on a day which is not a working day. If the Contractor is permitted to perform night work, it shall be conducted with adequate illumination and with due respect for the noise restrictions requested by local residents consistent with the faithful performance of the work. If the Contractor intends to work on a day which is not a working day the Contractor shall give the NPC project coordinator written notice of this intention at least four (4) working days before that day. The notice shall state the date and place of the work to be done. If the Contractor fails to notify the NPC project coordinator as set out in this section, this failure shall be deemed to be notice that no work requiring the presence of any representative of the Corporation is to be done on that day. The Contractor shall not make any claim for extra compensation for work done on a day which is not a working day. No weekend work will be permitted except in the case of emergency and then only with written permission of the NPC project coordinator and to such extent as they deems necessary.

**16. Pre-Construction Review Meeting**

Prior to the start of work, the Niagara Parks Commission and the successful contractor will coordinate and attend a review meeting. The Contractor will be required to submit the following:

1. A list of proposed recycling facilities and disposal sites, including written authorizations as required, to be utilized on this contract as/if required.
2. A listing of the Contractor's proposed supervisory personnel for this project, including contact information.

**17. Site Restoration/Damages (where applicable)**

Grassed areas are to be replanted with sod, or approved equivalent, by the Contractor, where applicable. The Contractor is responsible for the growth of the grass including watering the planted areas for a minimum of 30 days after placement.

The Contractor shall include costs for clean up and disposal of any surplus material debris or the like, not provided for by any other item in the contract, and restoration of all disturbed or damaged areas. This includes, but not limited to, concrete, topsoil and supply and placement of nursery sod on all disturbed areas resulting from the construction works.

Any reasonable damage, as determined by the Niagara Parks Commission, to grounds, lawns, driveways, sprinkler heads, valves, curb steps etc., shall be repaired immediately by the Contractor, at their expense.

**18. Deficient/Defective Work**

The Contractor shall, at any time when so required by the NPC project coordinator, during construction or during the period of warranty, make such openings, and to such extent through any part of the Work as the NPC project coordinator may direct, which they shall forthwith make good again to the satisfaction of the NPC project coordinator. Should the work so opened be found in the opinion of the NPC project coordinator, faulty in any respect, the whole of the expense, including the cost of inspection, shall be borne by the Contractor; but if the work so opened up be found in perfect condition, the said expense shall be borne by the Owner. All defective work or materials discovered by these or any other means must be forthwith wholly removed, and made good by the Contractor, to the satisfaction of the NPC project coordinator and the whole cost of such renewal, including the cost of materials, labour, and inspection shall be borne by the Contractor. Should the Contractor refuse to make such renewals as are ordered by the NPC project coordinator, then the NPC project coordinator will proceed with the work in any manner he may deem fit. The cost of such work shall be paid by the Contractor or deducted from any monies due, or if necessary, deducted from the Contractor or his Surety jointly or severally in any court of competent jurisdiction as a debt due to the Owner.

#### **19. Mobilization and Demobilization**

The Contractor shall include all costs of mobilizing onto the sites, demobilization, and final clean up upon completion of the work into their unit prices in the Pricing Schedule. The Contractor shall bear all costs associated with the provision of temporary facilities for construction.

#### **20. Material Inspection**

NPC reserves the right to commission a third party to perform material inspection services during construction. The frequency of the sample testing will be at the discretion of NPC. The Contractor shall allow for the samples to be taken by the third-party representative that may be on site on NPC's behalf. This cost will not be to the Contractor and as a result no costs associated with sample testing of the materials will be billed to NPC upon completion.

#### **21. Traffic Management**

Unless otherwise specified by NPC, the Contractor shall note that all roads will remain open to traffic during working operations apart from surface asphalt placement. All Traffic control signage shall be installed and maintained by the Contractor in accordance with the Ontario Traffic Manual (OTM), Book 7 (Temporary Conditions). The lump sum price bid for the Traffic Control and Signage in the pricing schedule shall include the cost of all labour, material, and equipment to provide all control measures as specified herein and for the preparation of all necessary Traffic Control plans.

#### **22. Co-ordination with Third Parties**

The Contractor is responsible for the co-ordination and scheduling of their work with the adjacent projects and utility companies and shall work around their respective schedules to the extent possible. No additional payment will be made for delays due to coordination and maintaining access for adjacent development, railway, and utility work within this contract.

#### **23. Site Safety and Security**

The Contractor shall be responsible for the safety and security of the work areas from the public. Erection of barriers, fencing, caution tape, notices, signing, etc., or other means of safety measures shall be undertaken where necessary for public safety.

#### **24. Site Cleanliness and Repairs**

The construction site must practise proper housekeeping. The WEGO bus garage is located on the same property as the Niagara Parks Maintenance center, human resources building and distribution center. As such, laydown areas shall be placed in a location that will provide minimal impact to traffic entering and leaving the site. Professional judgement shall be used to ensure signs and barriers are established at the jobsite to address any hazards and maintain safety as the overriding priority (i.e.: signs, barriers, pylons...etc.).

If any damage is caused to the site property, it is the responsibility of the proponent to identify the damage to the respective NPC employee overseeing the project and repair any such damages prior to claiming project completion / closeout.

**25. As-Constructed Drawings**

Upon construction completion of the garage extension, the proponent is to submit As-constructed drawings for record providing assurance that all work completed conforms with building codes and standards.

**26. Reference Documentation**

NPC provides reference documentation, attached to this RFP in the Reference Documentation Schedule, for informational purposes only to the Contractor. The Contractor shall be responsible for confirming current conditions.

Form of Agreement Schedule



**Agreement**

Between

THE NIAGARA PARKS COMMISSION

and

[\*\*INSERT LEGAL NAME OF CONTRACTOR\*\*]

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**for [\*\*insert title of the RFP\*\*]**

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**Effective Date: [\*\*insert start date for the Term\*\*]**

Agreement No.: RFP-22-2024-AD

## Agreement Index

### Article 1 - Interpretation and General Provisions

- 1.01 Defined Terms
- 1.02 No Indemnities from NPC
- 1.03 Entire Agreement
- 1.04 Severability
- 1.05 Interpretive Value of Contract Documents
- 1.06 Interpretive Value of Headings
- 1.07 Force Majeure
- 1.08 Notices by Prescribed Means
- 1.09 Governing Law
- 1.10 Currency
- 1.11 Counterparts
- 1.12 Execution and Transmission

### Article 2 – Nature of Relationship Between NPC and Contractor

- 2.01 Contractor's Power to Contract
- 2.02 Representatives May Bind Parties
- 2.03 Contractor Not a Partner, Agent or Employee
- 2.04 Responsibility of Contractor
- 2.05 Subcontracting or Assignment
- 2.06 Duty to Disclose Change of Control
- 2.07 Conflict of Interest
- 2.08 Contract Binding

### Article 3 – Performance by Contractor

- 3.01 Commencement of Performance
- 3.02 Performance Warranty
- 3.03 Use and Access Restrictions
- 3.04 Notification by Contractor to NPC
- 3.05 Condonation Not a Waiver
- 3.06 Changes by Written Amendment Only
- 3.07 Contractor to Comply with Reasonable Change Requests
- 3.08 Pricing for Requested Changes
- 3.09 Non-Exclusive Contract, Work Volumes
- 3.10 Performance by Specified Individuals Only
- 3.11 Security Clearance
- 3.12 Accessibility Requirements
- 3.13 NPC Rights and Remedies & Contractor Obligations Not Limited to Contract
- 3.14 Compliance with the Occupational Health and Safety Act

### Article 4 - Payment for Performance and Audit

- 4.01 Payment According to Contract Rates
- 4.02 Default Billing and Payment Process
- 4.03 Hold Back or Set Off
- 4.04 No Expenses or Additional Charges
- 4.05 Payment and Collection of Taxes and Duties
- 4.06 Withholding Tax

- 4.07 Interest on Late Payment
- 4.08 Document Retention and Audit

### Article 5 – Confidentiality, FIPPA, Security, and Publication of Data

- 5.01 Confidentiality and Promotion Restrictions
- 5.02 NPC Confidential Information
- 5.03 Restrictions on Copying
- 5.04 Injunctive and Other Relief
- 5.05 Notice and Protective Order
- 5.06 FIPPA Records and Compliance
- 5.07 Security
- 5.08 Publication of Data
- 5.09 Survival

### Article 6 - Intellectual Property

- 6.01 NPC Intellectual Property
- 6.02 Newly Created Intellectual Property
- 6.03 Contractor Intellectual Property
- 6.04 Presumption Governing Intellectual Property Ownership
- 6.05 Contractor's Grant of Licence
- 6.06 No Restrictive Material in Deliverables
- 6.07 Contractor Representation and Warranty Regarding Third-party Intellectual Property
- 6.08 Copyright Notice
- 6.09 No Use of NPC Insignia
- 6.10 NPC May Prescribe Further Compliance
- 6.11 Survival

### Article 7 - Indemnity and Insurance

- 7.01 Contractor Indemnity
- 7.02 Contractor's Insurance
- 7.03 Proof of Insurance
- 7.04 Proof of W.S.I.A. Coverage
- 7.05 Contractor Participation in Proceedings

### Article 8 - Termination, Expiry and Extension

- 8.01 Immediate Termination of Contract
- 8.02 Dispute Resolution by Rectification Notice
- 8.03 Termination on Notice
- 8.04 Termination for Non-Appropriation
- 8.05 Contractor's Obligations on Termination
- 8.06 Contractor's Payment Upon Termination
- 8.07 Termination in Addition to Other Rights
- 8.08 Expiry and Extension of Contract

## Schedule 1 (Description of Deliverables, Rates and Supplementary Provisions)

## Agreement

This Agreement (the "Agreement") for [\*\*insert title of the RFP \*\*] is effective as of [\*\*insert start date for the Term\*\*] ("**Effective Date**"),

Between:

### THE NIAGARA PARKS COMMISSION

(referred to as the "**NPC**")

And:

[\*\*INSERT LEGAL NAME OF CONTRACTOR\*\*]

(referred to as the "**Contractor**")

In consideration of their respective agreements set out below, the Parties (as defined below) covenant and agree as follows:

## ARTICLE 1 – INTERPRETATION AND GENERAL PROVISIONS

### 1.01 Defined Terms

When used in the Agreement, the following words or expressions have the following meanings:

"**AODA**" means *Accessibility for Ontarians with Disabilities Act, 2005*, S.O. 2005, c. 11, as amended;

"**Accessibility**" means a general term which is used to describe the degree of ease that something (e.g., device, service, and environment) can be used and enjoyed by persons with a disability. The term implies conscious planning or design, or both, effort to ensure it is barrier-free to persons with a disability, and by extension, usable and practical for the general population as well;

"**Authorities**" and "**Authority**" means any government authority, agency, body or department, whether federal, provincial or municipal, having or claiming jurisdiction over the Contract;

"**Business Day**" means any working day, Monday to Friday inclusive, but excluding statutory and other holidays, namely: New Year's Day; Family Day; Good Friday; Easter Monday; Victoria Day; Canada Day; Civic Holiday; Labour Day; Thanksgiving Day; Remembrance Day; Christmas Day; Boxing Day and any other day which NPC has elected to be closed for business;

"**Code of Conduct**" means the Contractors' Code of Conduct for The Niagara Parks Commission at <https://www.niagaraparks.com/files/Supplier's%20Code%20of%20Conduct.pdf>;

"**Conflict of Interest**" includes, but is not limited to, any situation or circumstance where:

- (a) in relation to the RFP process, a Proponent has an unfair advantage or engages in conduct, directly or indirectly, that may give it an unfair advantage, including, but not limited to (i) having or having access to information in the preparation of its Bid that is confidential to NPC and not available to other Proponents; (ii) communicating with any person with a view to influencing preferred treatment in the RFP process including the giving of a benefit of any kind, by or on behalf of a Proponent to anyone employed

by, or otherwise connected with, NPC; or (iii) engaging in conduct that compromises or could be seen to compromise the integrity of the open and competitive RFP process and render that process non-competitive and unfair; or

- (b) in relation to the performance of its contractual obligations in a contract with NPC, the Contractor's other commitments, relationships or financial interests (i) could or could be seen to exercise an improper influence over the objective, unbiased and impartial exercise of its independent judgement; or (ii) could or could be seen to compromise, impair or be incompatible with the effective performance of its contractual obligations;

**"Contract"** means the aggregate of: (a) the Agreement, including Schedule 1 (Description of Deliverables, Rates and Supplementary Provisions) and any other schedule attached at the time of execution; (b) the RFP, including any addenda and attachments; (c) the Proposal; and (d) any amendments executed in accordance with the terms of the Agreement;

**"Deliverable"** and **"Deliverables"** means everything developed for or provided to NPC in the course of performing under the Contract or agreed to be provided to NPC under the Contract by the Contractor or any of the Contractor's Personnel, as further defined, but not limited by Schedule 1, including, but not limited to, any goods or services or any and all Intellectual Property and any and all concepts, techniques, ideas, information, documentation and other materials, however recorded, developed or provided;

**"Employer"** means a person who employs one or more workers or contracts for the services of one or more workers and includes a contractor or subcontractor who performs work or supplies services and a contractor or subcontractor who undertakes with an owner, contractor or subcontractor to perform work or supply services;

**"Expiry Date"** means **November 30, 2025** or, if the original term is extended, the final date of the extended term;

**"FIPPA"** means the *Freedom of Information and Protection of Privacy Act*, R.S.O. 1990, c. F.31, as amended;

**"Fiscal Year"** means the period running from April 1 in one calendar year to, and including, March 31 in the next calendar year;

**"HRC"** means *Human Rights Code*, R.S.O. 1990, c. H.19, as amended;

**"HST"** means Ontario Harmonized Sales Tax;

**"Indemnified Parties"** means NPC's directors, officers, advisors, agents, appointees and employees, along with any and all permitted assignees of the Contract;

**"Industry Standards"** include, but are not limited to (a) the provision of any and all labour, supplies, equipment and other goods or services that are necessary and can reasonably be understood or inferred to be included within the scope of the Contract or customarily furnished by Persons providing Deliverables of the type provided hereunder in similar situations in Ontario and; (b) adherence to commonly accepted norms of ethical business practices, which shall include the Contractor establishing, and ensuring adherence to, precautions to prevent Contractor's Personnel from providing or offering gifts or hospitality of greater than nominal value to any person acting on behalf of or employed by NPC;

**"Intellectual Property"** means any intellectual, industrial or other proprietary right of any type in any form protected or protectable under the laws of Canada, any foreign country, or any

political subdivision of any country, including, without limitation, any intellectual, industrial or proprietary rights protected or protectable by legislation, by common law or at equity;

**“Losses”** means liabilities, costs, damages and/or expenses (including legal, expert and consulting fees);

**“NPC Address”** and **“NPC Representative”** means, unless NPC notifies the Contractor otherwise in writing:

The Niagara Parks Commission  
P.O. Box 150, 7400 Portage Road South  
Niagara Falls, Ontario L2E 6T2  
Canada

NPC Representative: **[\*\*insert name of individual’s name and title\*\*]**  
Telephone: **[\*\*insert name of individual’s telephone\*\*]**  
E-mail: **[\*\*insert name of individual’s e-mail\*\*]**

**“Newly Created Intellectual Property”** means any Intellectual Property created by the Contractor in the course of performance of its obligations under the Contract;

**“ODA”** means *Ontarians with Disabilities Act*, S.O. 2001, c 32, as amended;

**“OHSA”** means the *Occupational Health and Safety Act*, R.S.O. 1990, c. O.1, as amended;

**“NPC Confidential Information”** means all information of NPC that is of a confidential nature, including all confidential information in the custody or control of the NPC, regardless of whether it is identified as confidential or not, and whether recorded or not, and however fixed, stored, expressed or embodied, which comes into the knowledge, possession or control of the Contractor in connection with the Agreement. For greater certainty, NPC Confidential Information shall:

- (a) include: (i) all new information derived at any time from any such information whether created by NPC, the Contractor or any third-party; (ii) all information (including Personal Information) that NPC is obliged, or has the discretion, not to disclose under provincial or federal legislation or otherwise at law; but
- (b) not include information that: (i) is or becomes generally available to the public without fault or breach on the part of the Contractor of any duty of confidentiality owed by the Contractor to NPC or to any third-party; (ii) the Contractor can demonstrate to have been rightfully obtained by the Contractor, without any obligation of confidence, from a third-party who had the right to transfer or disclose it to the Contractor free of any obligation of confidence; (iii) the Contractor can demonstrate to have been rightfully known to or in the possession of the Contractor at the time of disclosure, free of any obligation of confidence when disclosed; or (iv) is independently developed by the Contractor; but the exclusions in this subparagraph shall in no way limit the meaning of Personal Information or the obligations attaching thereto under the Contract or at law;

**“Party”** means NPC or the Contractor, and **“Parties”** means both of them;

**“Person”** if the context allows, includes any individuals, firms, partnerships or corporations or any combination thereof;

**“Personal Information”** means recorded information about an identifiable individual or that may identify an individual;

**“Privacy Breach”** means any theft or loss of Personal Information or any collection, use or disclosure of Personal Information that is not permitted under this Agreement or not otherwise permitted by law;

**“Proceeding”** means any action, claim, demand, lawsuit, or other proceeding;

**“Procurement Card”** means the corporate charge card(s) used by NPC, as may be changed from time to time;

**“Procurement Card Protocols”** means the manner in which the Contractor is required to process any payments under the Contract that NPC elects to make by way of Procurement Card, which shall include the requirement to: (a) collect the authorized employee's name, the abbreviated Ministry name, the expiry date, and the employee's authorization; (b) contact the financial institution identified on the Procurement Card each time the Procurement Card is used for payment; (c) receive payment from the financial institution named on the Procurement Card once that institution authorizes payment; and (d) bear the cost of any and all charges relating to the use of the Procurement Card, including the financial institution's charges for payment through the Procurement Card;

**“Proposal”** means all the documentation submitted by the Contractor in response to the RFP;

**“Proponent”** means a legal entity that submits a Proposal in response to the RFP;

**“PSOA”** means the Public Service of Ontario Act, 2006, S.O. 2006, c. 35, Schedule A, as amended;

**“Rate”** and **“Rates”** means the applicable price, in Canadian funds, to be charged for the applicable Deliverables, as set out in Schedule 1, representing the full amount chargeable by the Contractor for the provision of the Deliverables, including, but not limited to: (a) all applicable duties and taxes, excluding Ontario Harmonized Sales Tax (HST); (b) all labour and material costs; (c) all travel and carriage costs; (d) all permit, licence and approval costs (e) all insurance costs; and (f) all other overhead including any fees or other charges required by law;

**“Record”** means any recorded information in the custody or control of NPC, including any Personal Information, in any form: (a) provided by NPC to the Contractor, or provided by the Contractor to NPC, for the purposes of the Contract; or (b) created by the Contractor in the performance of the Contract; and shall exclude any information specifically described in Schedule 1;

**“Requirements of Law”** means all applicable requirements, laws, statutes, codes, acts, ordinances, approvals, orders, decrees, injunctions, by-laws, rules, regulations, official plans, permits, licences, authorisations, directions, and agreements with all Authorities that now or at any time hereafter may be applicable to the Contract, the Contractor, NPC, or the Deliverables, or any part of them;

**“RFP”** means the Request for Proposals, as well as any addenda and attachments to it; dated **[\*\* insert RFP issue date \*\*]** for **WEGO Bus Garage Expansion Project**, reference number **RFP-22-2024-AD** issued by NPC for the Deliverables;

**“Security Incident”** means (i) accidental, unlawful or unauthorized disclosure of, access, destruction, loss, or alteration to NPC Confidential information (ii) compromising or accessing the Contractor’s systems that store and protect NPC Confidential Information; or, (iii) detected system weaknesses that may compromise the integrity of the information the Contractor obtained from NPC as a result of this Contract;

**“Subcontractors”** means in the case of each Party, any contractor of that Party or any of its subcontractors at any tier of subcontracting;

**“Term”** means the period of time from the Effective Date up to and including the earlier of: (i) the Expiry Date or (ii) the date of termination of the Contract in accordance with its terms;

**“Third-party Intellectual Property”** means any Intellectual Property owned by a party other than NPC or the Contractor;

**“Contractor Address”** and **“Contractor Representative”** means, unless the Contractor notifies NPC otherwise, in writing:

[\*\*insert name of Contractor\*\*]  
[\*\*insert address of Contractor\*\*]  
[\*\*City, Province Postal Code of Contractor \*\*]  
Country

Contractor Representative: [\*\*insert name of individual’s name\*\*]  
Telephone: [\*\*insert name of individual’s telephone\*\*]  
E-mail: [\*\*insert name of individual’s e-mail\*\*]

**“Contractor’s Intellectual Property”** means Intellectual Property owned by the Contractor prior to its performance under the Contract or created by the Contractor during the Term of the Contract, independently of the performance of its obligations under the Contract;

**“Contractor’s Personnel”** includes the directors, officers, employees, agents, partners, affiliates, volunteers, or Subcontractors of the Contractor;

**“WSIA”** means the *Workplace Safety and Insurance Act, 1997*, S.O. 1997, c. 16, Schedule A, as amended.

## **1.02 No Indemnities from NPC**

Notwithstanding anything else in the Contract, any express or implied reference in any document (including subcontracts) related to the Deliverables, to NPC providing an indemnity or any other form of indebtedness or contingent liability that would directly or indirectly increase the indebtedness or contingent liabilities of Ontario, whether at the time of execution of the Agreement or at any time during the Term, shall be void and of no legal effect.

## **1.03 Entire Agreement**

The Contract embodies the entire agreement between the Parties with regard to the provision of Deliverables and supersedes any prior understanding or agreement, collateral, oral or otherwise with respect to the provision of the Deliverables, existing between the Parties at the date of execution of the Agreement.

## **1.04 Severability**

If any term or condition of the Contract, or the application thereof to the Parties or to any Persons or circumstances, is to any extent invalid or unenforceable, the remainder of the Contract, and the application of such term or condition to the Parties, Persons or circumstances other than those to which it is held invalid or unenforceable, shall not be affected thereby.

#### **1.05 Interpretive Value of Contract Documents**

In the event of a conflict or inconsistency in any provisions in the Contract: (a) the main body of the Agreement shall govern over the Schedules to the Agreement; (b) the Agreement (including its Schedules) shall govern over the RFP and the Proposal; and (c) the RFP shall govern over the Proposal.

#### **1.06 Interpretive Value of Headings**

The headings in the Contract are for convenience of reference only and in no manner modify, interpret or construe the Contract.

#### **1.07 Force Majeure**

Neither Party shall (i) be liable for Losses, (ii) lose any rights hereunder, or (iii) be deemed to be in breach of the Contract for any delay or failure to perform its obligations under the Contract where such delay or failure is caused by an event beyond its reasonable control. The Parties agree that an event shall not be considered beyond one's reasonable control if a reasonable business person applying due diligence in the same or similar circumstances under the same or similar obligations as those contained in the Contract would have put in place contingency plans to either materially mitigate or negate the effects of such event.

Without limiting the generality of the foregoing, force majeure events shall include, but are not limited to, natural disasters, pandemics, acts of war, insurrection, and terrorism but shall not include shortages or delays relating to supplies or services.

If a Party seeks to excuse itself from its obligations under the Contract due to a force majeure event, that Party shall (i) immediately notify the other Party in writing of the delay or non-performance, the reason for such delay or non-performance and the anticipated period of delay or non-performance; and (ii) within five (5) Business Days of providing notice of such delay or non-performance, provide a written plan to the other Party setting out strategies to minimize the event's impact and reduce delay or non-performance. If the anticipated or actual delay or non-performance exceeds fifteen (15) Business Days, the other Party may immediately terminate the Contract by giving notice of termination and such termination shall be in addition to the other rights and remedies of the terminating Party under the Contract, at law or in equity.

#### **1.08 Notices by Prescribed Means**

Notices shall be in writing and shall be delivered by postage-prepaid envelope, personal delivery or email and shall be addressed to, respectively, NPC Address to the attention of NPC Representative and to the Contractor Address to the attention of the Contractor Representative. Notices shall be deemed to have been given: (a) in the case of postage-prepaid envelope, five (5) Business Days after such notice is mailed; or (b) in the case of personal delivery or email, one (1) Business Day after such notice is received by the other Party. In the event of a postal disruption, notices must be given by personal delivery or email. Unless the Parties expressly agree in writing to additional methods of notice, notices may only be provided by the methods contemplated in this section.

## **1.09 Governing Law**

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.

## **1.10 Currency**

All references to currency in the Agreement shall be to Canadian dollars.

## **1.11 Counterparts**

The Agreement may be executed in any number of counterparts, each of which shall be deemed an original and all of which together shall constitute one and the same instrument.

## **1.12 Execution and Transmission**

The Parties agree that the Agreement may be validly executed electronically, and that their respective electronic signature is the legal equivalent of a manual signature. The electronic signature of a Party may be evidenced by one of the following means and transmission of the Agreement may be as follows:

- (a) a manual signature of an authorized signing representative placed in the respective signature line of the Agreement and the Agreement scanned as a pdf and delivered by email to the other party;
- (b) a digital signature, including the name of the authorized signing representative typed in the respective signature line of the Agreement, an image of a manual signature, or any other digital signature of an authorized signing representative, placed in the respective signature line of the Agreement and the Agreement delivered by email to the other party; or
- (c) any other means with NPC's prior written consent.

## **ARTICLE 2 – NATURE OF RELATIONSHIP BETWEEN NPC AND CONTRACTOR**

### **2.01 Contractor's Power to Contract**

The Contractor represents and warrants that it has the full right and power to enter into the Contract and there is no agreement with any other Person that would in any way interfere with the rights of NPC under the Contract.

### **2.02 Representatives May Bind the Parties**

The Parties represent that their respective representatives have the authority to legally bind them to the extent permissible by the Requirements of Law.

### **2.03 Contractor Not a Partner, Agent or Employee**

The Contractor shall have no power or authority to bind NPC or to assume or create any obligation or responsibility, express or implied, on behalf of NPC. The Contractor shall not hold itself out as an agent, partner or employee of NPC. Nothing in the Contract shall have the effect of creating an employment, dependent contractor, partnership or agency relationship between NPC and the Contractor (or any of the Contractor's Personnel) or constitute an appointment under PSOA.

## **2.04 Responsibility of Contractor**

The Contractor agrees that it is liable for its acts and omissions and those of the Contractor's Personnel. This section is in addition to any and all of the Contractor's liabilities under the Contract and under the general application of law. The Contractor shall advise the Contractor's Personnel of their obligations under the Contract and shall ensure their compliance with the applicable terms of the Contract. This section shall survive the termination or expiry of the Contract.

## **2.05 Subcontracting or Assignment**

(a) The Contractor shall not subcontract or assign the whole or any part of the Contract or any monies due under it without the prior written consent of NPC. Such consent shall be in the sole discretion of NPC and subject to the terms and conditions that may be imposed by NPC. Without limiting the generality of the conditions which NPC may require prior to consenting to the Contractor's use of a Subcontractor, every contract entered into by the Contractor with a Subcontractor shall adopt all of the terms and conditions of the Contract as far as applicable to those parts of the Deliverables provided by the Subcontractor. Nothing contained in the Contract shall create a contractual relationship between the Contractor's Personnel and NPC.

(b) NPC may, upon sixty (60) calendar days prior written notice to the Contractor, assign all or any part of the Contract without the consent of the Contractor, to

- (i) any advisory, adjudicative, regulatory (including those with governing boards) operational services or operational enterprise agency of the Province of Ontario; or
- (ii) any other Person where such assignment is necessitated by outsourcing, privatizing, partnering, or is in conjunction with the transfer of all or part of NPC's business and operations relating to supply chain management or similar activity.

Upon notification of NPC, and for such reasonable period requested by NPC prior to the effective date of the assignment of the Contract, the Contractor shall cooperate with NPC and take such measures that are reasonably necessary to facilitate an orderly assignment of the Contract. The Contractor shall ensure that transition occurs in such a manner that assignment of the Contract will not prejudice or disrupt the operations of NPC or the assignee, and in particular, will not result in any disruption to provision of Deliverables.

## **2.06 Duty to Disclose Change of Control**

In the event that the Contractor undergoes a change in control, the Contractor shall immediately disclose such change in control to NPC and shall comply with any terms and conditions subsequently prescribed by NPC resulting from the disclosure.

## **2.07 Conflict of Interest**

The Contractor shall: (a) avoid any Conflict of Interest in the performance of its contractual obligations; (b) disclose to NPC without delay any actual or potential Conflict of Interest that arises during the performance of its contractual obligations; and (c) comply with any requirements prescribed by NPC to resolve any Conflict of Interest. In addition to all other contractual rights or rights available at law or in equity, NPC may immediately terminate the Contract upon giving notice to the Contractor where: (a) the Contractor fails to disclose an actual or potential Conflict of Interest; (b) the Contractor fails to comply with any requirements

prescribed by NPC to resolve a Conflict of Interest; or (c) the Contractor's Conflict of Interest cannot be resolved. This section shall survive any termination or expiry of the Contract.

## **2.08 Contract Binding**

The Contract shall enure to the benefit of and be binding upon the Parties and their successors, executors, administrators and their permitted assigns.

## **ARTICLE 3 – PERFORMANCE BY CONTRACTOR**

### **3.01 Commencement of Performance**

The Contractor shall commence performance upon receipt of written instructions from NPC.

### **3.02 Performance Warranty**

The Contractor represents and warrants that the Deliverables shall be provided:

- (a) fully and diligently in a professional and competent manner by Persons qualified and skilled in their occupations; and,
- (b) in accordance with the Contract, Industry Standards, and Requirements of Law.

If any of the Deliverables, in the opinion of NPC, are inadequately provided or require corrections, the Contractor shall forthwith make the necessary corrections at its own expense, as specified and required by NPC, following receipt of a rectification notice issued by NPC to the Contractor pursuant to Section 8.02 (Dispute Resolution by Rectification Notice).

### **3.03 Use and Access Restrictions**

The Contractor acknowledges that unless it obtains specific written preauthorization from NPC, any access to or use of NPC property, technology or information by the Contractor or the Contractor's Personnel, that is not necessary for the performance of its contractual obligations with NPC, is strictly prohibited. The Contractor further acknowledges that NPC may monitor the Contractor to ensure compliance with this section. This section is in addition to and shall not limit any other obligation or restriction placed upon the Contractor.

### **3.04 Notification by Contractor to NPC**

During the Term, the Contractor shall advise NPC promptly of: (a) any contradictions, discrepancies or errors found or noted in the Contract; (b) supplementary details, instructions or directions that do not correspond with those contained in the Contract; and (c) any omissions or other faults that become evident and should be corrected in order to provide the Deliverables in accordance with the Contract and Requirements of Law.

### **3.05 Condonation Not a Waiver**

Any failure by NPC to insist in one or more instances upon strict performance by the Contractor of any of the terms or conditions of the Contract, shall not be construed as a waiver by NPC of its right to require strict performance of any such terms or conditions, and the obligations of the Contractor with respect to such performance, shall continue in full force and effect.

### **3.06 Changes by Written Amendment Only**

Any changes to the Contract shall be by written amendment signed by the Parties. No changes shall be effective or shall be carried out in the absence of such an amendment.

### **3.07 Contractor to Comply with Reasonable Change Requests**

NPC may, in writing, request changes to the Contract, which may include altering, adding to, or deleting any of the Deliverables. The Contractor shall comply with all reasonable NPC change requests and the performance of such request shall be in accordance with the terms and conditions of the Contract. If the Contractor is unable to comply with a change request, it shall promptly notify NPC and provide reasons for such non-compliance. In any event, any such change request shall not be effective until a written amendment reflecting the change has been executed by the Parties.

### **3.08 Pricing for Requested Changes**

Where an NPC change request includes an increase in the scope of the previously contemplated Deliverables, NPC shall set out, in its change request, the proposed prices for the contemplated changes. Where the Rates in effect at the time of the change request:

- (a) include pricing for the particular type of goods or services contemplated in the change request, the Contractor shall not unreasonably refuse to provide those goods or services at prices consistent with those Rates; or
- (b) are silent to the applicable price for the particular goods or services contemplated in the change request, the price shall be negotiated between NPC and the Contractor within a reasonable period of time;

and in any event, such change request shall not become effective until a written amendment reflecting the change has been executed by the Parties.

### **3.09 Non-Exclusive Contract, Work Volumes**

The Contractor acknowledges that it is providing the Deliverables to NPC on a non-exclusive basis. NPC makes no representation regarding the volume or quantities of goods and services required under the Contract. NPC reserves the right to contract with other parties for the same or similar goods and services as those provided by the Contractor and reserves the right to obtain the same or similar goods and services internally.

### **3.10 Performance by Specified Individuals Only**

The Contractor agrees that, to the extent that specific individuals are named in the Contract as being responsible for the provision of the Deliverables, only those individuals shall provide the Deliverables under the Contract. The Contractor shall not substitute or replace any of the individuals named in the Contract without the prior written approval of NPC, which may not arbitrarily or unreasonably be withheld. Should the Contractor require the substitution or replacement of any of the individuals named in the Contract, it is understood and agreed that any proposed substitution or replacement must possess similar or greater qualifications than the individual named in the Contract. The Contractor shall not claim fees for any substitution or replacement individual greater than the Rates established under the Contract.

### **3.11 Security Clearance**

The Contractor shall, upon request from NPC, require those Persons providing services under the Contract to submit to security checks and the Contractor may be required to obtain

and pay for security clearance. Where such security checks are required NPC will provide information on how the Contractor can obtain them.

The Contractor shall provide to NPC, upon request, the names, addresses, dates of birth and consents of its Persons for whom security checks are required. The Contractor shall designate a chief security officer as the contact for this purpose. Any Person who is unable to obtain security clearance, or who refuses to consent to such security checks, shall not be permitted to perform services under the Contract.

Security clearance may be suspended or revoked if any Person fails to maintain security clearance or security standards required pursuant to the Contract. The Contractor shall notify NPC of any personnel changes, behaviours, or circumstances for which security clearance may require reconsideration.

Security clearance is not awarded in perpetuity. NPC may perform, or re-perform, security checks against any Person providing services under the Contract at any time, and will notify the Contractor of this requirement.

NPC may immediately terminate the Agreement if the Contractor fails to comply with the requirements of this section or if any security clearance results received by NPC are found, in the sole discretion of NPC, to be incompatible with the proper and impartial provision of the Deliverables in accordance with the terms and conditions of the Contract.

### **3.12 Accessibility Requirements**

The Contractor's delivery of the Deliverables shall comply with all applicable requirements, specifications and standards for Accessibility established in accordance with the HRC, the ODA, and the AODA, any regulations made thereto and any direction from NPC. The Contractor must meet the Government of Ontario's requirements on the Government of Ontario's schedule under the Integrated Accessibility Standards Regulation as directed by NPC.

### **3.13 NPC Rights and Remedies and Contractor Obligations Not Limited to Contract**

The express rights and remedies of NPC and obligations of the Contractor set out in the Contract are in addition to and shall not limit any other rights and remedies available to NPC or any other obligations of the Contractor at law or in equity.

### **3.14 Compliance with the Occupational Health and Safety Act**

The Contractor must comply, and ensure that any Subcontractor retained by the Contractor complies, with the OHSA and its regulations and any applicable NPC and site-specific health and safety requirements. The Contractor acknowledges that it is the Employer of its Subcontractors for the purposes of OHSA. The Contractor shall include in its agreements with its Subcontractors, the ability to terminate the Subcontractor for non-compliance with OHSA or its regulations, with the rules and policies of the Contractor or for failing to protect the safety of its workers.

NPC may stop the work where the Contractor fails to comply with OHSA or its regulations and an immediate danger to worker health and safety is observed. Failure or refusal by the Contractor to correct the observed violation, or willful or repeated non-compliance may, subject to Article 8 (Termination, Expiry and Extension), result in termination of the Contract.

## **ARTICLE 4 – PAYMENT FOR PERFORMANCE AND AUDIT**

### **4.01 Payment According to Contract Rates**

NPC shall, subject to the Contractor's compliance with the provisions of the Contract, pay the Contractor for the Deliverables provided at the Rates established under the Contract.

### **4.02 Default Billing and Payment Process**

Unless the Parties expressly set out an alternative billing and payment process in Schedule 1, the following process shall govern:

- (a) the Contractor shall provide NPC with a monthly billing statement no later than ten (10) Business Days after the end of each month and that billing statement shall include: (i) the reference number assigned to the Contract by NPC; (ii) a brief description of the Deliverables provided for the relevant month; and (iii) taxes, if payable by NPC, identified as separate items
- (b) NPC shall approve or reject the billing statement within fifteen (15) Business Days of receipt of the statement and in the event that NPC rejects the billing statement, it shall so advise the Contractor promptly in writing and the Contractor shall provide additional information as required by NPC to substantiate the billing statement;
- (c) each billing statement is subject to the approval of NPC before any payment is released and payment shall be made within thirty (30) Business Days of such approval;
- (d) it is acknowledged and agreed that either NPC may require that the Contractor include additional information in the billing statement, upon notice to the Contractor; and
- (e) NPC may, in its discretion, make payments under the Contract by way of the following methods:
  - (i) direct deposit and the Contractor shall accept and process any such payments; or,
  - (ii) Procurement Card and the Contractor shall accept and process any such payments.

and any paragraph set out above, that is not expressly replaced in Schedule 1 with an alternative provision, shall remain in full force and effect.

### **4.03 Hold Back or Set Off**

NPC may hold back payment or set off against payment if, in the opinion of NPC acting reasonably, the Contractor has failed to comply with any requirements of the Contract.

### **4.04 No Expenses or Additional Charges**

There shall be no other charges payable by NPC under the Contract to the Contractor other than the Rates established under the Contract.

### **4.05 Payment and Collection of Taxes and Duties**

The Contractor shall pay or charge and remit, as required, all applicable taxes, including excise taxes incurred by or on the Contractor's behalf with respect to the Contract.

#### **4.06 Withholding Tax**

NPC shall withhold any applicable withholding tax from amounts due and owing to the Contractor under the Agreement and shall remit it to the appropriate government in accordance with applicable tax laws. This section shall survive any termination or expiry of the Contract.

#### **4.07 No Interest on Late Payment**

NPC shall not be required to pay interest on any overdue amounts.

#### **4.08 Document Retention and Audit**

During and for seven (7) years after the Term, the Contractor shall maintain all necessary records to substantiate (a) all charges and payments under the Contract and (b) that the Deliverables were provided in accordance with the Contract and with Requirements of Law. During the Term, and for seven (7) years after the Term, the Contractor shall permit and assist NPC in conducting audits of the operations of the Contractor to verify (a) and (b) above. NPC shall provide the Contractor with at least ten (10) Business Days prior notice of its requirement for such audit. The Contractor's obligations under this section shall survive any termination or expiry of the Contract.

### **ARTICLE 5 – CONFIDENTIALITY, FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY ACT (FIPPA), AND PUBLICATION OF DATA**

#### **5.01 Confidentiality and Promotion Restrictions**

Any publicity or publications related to the Contract shall be at the sole discretion of NPC. NPC may, in its sole discretion, acknowledge the Deliverables provided by the Contractor in any such publicity or publication. The Contractor shall not make use of its association with NPC without the prior written consent of NPC. Without limiting the generality of this section, the Contractor shall not, among other things, at any time directly or indirectly communicate with the media in relation to the Contract, unless it has first obtained the express written authorization to do so by NPC.

#### **5.02 NPC Confidential Information**

During and following the Term, the Contractor shall: (a) keep all NPC Confidential Information confidential and secure, including in accordance with Section 5.07 (Security); (b) limit the disclosure of NPC Confidential Information to only those of the Contractor's Personnel who have a need to know it for the purpose of providing the Deliverables and who have been specifically authorized to have such disclosure; (c) not directly or indirectly disclose, destroy, exploit or use any NPC Confidential Information (except for the purpose of providing the Deliverables, or except if required by order of a court or tribunal), without first obtaining: (i) the written consent of NPC and (ii) in respect of any NPC Confidential Information about any third-party, the written consent of such third-party; (d) provide NPC Confidential Information to NPC on demand; and (e) at the request of NPC, return all NPC Confidential Information to NPC before the end of the Term, with no copy or portion kept by the Contractor.

#### **5.03 Restrictions on Copying**

The Contractor shall not copy any NPC Confidential Information, in whole or in part, unless copying is essential for the provision of the Deliverables. On each copy made by the Contractor, the Contractor must reproduce all notices which appear on the original.

#### **5.04 Injunctive and Other Relief**

The Contractor acknowledges that breach of any provisions of this Article may cause irreparable harm to NPC or to any third-party to whom NPC owes a duty of confidence, and that the injury to NPC or to any third-party may be difficult to calculate and inadequately compensable in damages. The Contractor agrees that NPC is entitled to obtain injunctive relief (without proving any damage sustained by it or by any third-party) or any other remedy against any actual or potential breach of the provisions of this Article.

#### **5.05 Notice and Protective Order**

If the Contractor or any of the Contractor's Personnel either becomes legally compelled, or receives requests for information, to disclose any NPC Confidential Information, the Contractor will provide NPC with prompt notice to that effect in order to allow NPC to seek one or more protective orders or other appropriate remedies to prevent or limit such disclosure, and it shall co-operate with NPC and its legal counsel to the fullest extent. If such protective orders or other remedies are not obtained, the Contractor will disclose only that portion of NPC Confidential Information which the Contractor is legally compelled to disclose, only to such Person or Persons to which the Contractor is legally compelled to disclose, and the Contractor shall provide notice to each such recipient (in co-operation with legal counsel for NPC) that such NPC Confidential Information is confidential and subject to non-disclosure on terms and conditions equal to those contained in the Agreement and, if possible, shall obtain each recipient's written agreement to receive and use such NPC Confidential Information subject to those terms and conditions.

#### **5.06 FIPPA Records and Compliance**

The Contractor and NPC acknowledge and agree that FIPPA applies to and governs all Records and may require the disclosure of such Records to third parties. Furthermore, the Contractor agrees:

- (a) to keep Records secure;
- (b) to provide Records to NPC within seven (7) calendar days of being directed to do so by NPC for any reason including an access request or privacy issue;
- (c) not to access any Personal Information unless NPC determines, in its sole discretion, that access is permitted under FIPPA and is necessary in order to provide the Deliverables;
- (d) not to directly or indirectly use, collect, disclose or destroy any Personal Information for any purposes that are not authorized by NPC;
- (e) to ensure the security and integrity of Personal Information and keep it in a physically secure and separate location safe from loss, alteration, destruction or intermingling with other records and databases and to implement, use and maintain the most appropriate products, tools, measures and procedures to do so;
- (f) to restrict access to Personal Information to those of the Contractor's Personnel who have a need to know it for the purpose of providing the Deliverables and who have

been specifically authorized by NPC Representative to have such access for the purpose of providing the Deliverables;

- (g) to implement other specific security measures that, in the reasonable opinion of NPC, would improve the adequacy and effectiveness of the Contractor's measures to ensure the security and integrity of Personal Information and Records generally; and
- (h) that any information, including confidential information supplied by the Contractor to NPC is subject to FIPPA and may be disclosed by NPC where it is obligated to do so under FIPPA, by an order of a court or tribunal or pursuant to a legal proceeding;

and the provisions of this section shall prevail over any inconsistent provisions in the Contract.

## **5.07 Security**

The Contractor shall implement, maintain and update the appropriate controls, policies and information systems to protect NPC Confidential Information and to detect and notify at the first reasonable opportunity any Security Incidents and Privacy Breaches. Furthermore, the Contractor agrees to:

- (a) immediately, and within 24 hours, notify NPC of any actual or suspected Security Incident or Privacy Breach under the NPC Confidential Information and FIPPA Records and Compliance sections above;
- (b) investigate the Security Incident or Privacy Breach;
- (c) take reasonable steps to mitigate the effects of such Security Incident or Privacy Breach;
- (d) minimize any damage resulting from the Security Incident or Privacy Breach and prevent a reoccurrence;
- (e) cooperate with NPC by providing any additional details about the Security Incident or Privacy Breach that NPC may require as information regarding the Security Incident or Privacy Breach is collected or otherwise reasonably becomes available; and
- (f) provide NPC with a written report setting out, at a minimum (i) a description of the nature and reasonably anticipated consequences of the Security Incident or Privacy Breach; (ii) the measures taken to mitigate any possible damage and adverse effects and prevent a recurrence; and, (iii) a description of the types of information that were the subject of the Security Incident or Privacy Breach.

## **5.08 Publication of Data**

It is NPC's intention, in accordance with the [Ontario's Digital and Data Directive, 2021](#) and as part of its commitment to open data, to publish and allow the public to use:

- (a) procurement contract data, including the name of the Contractor and total contract value; and,
- (b) data created or collected as an output of a contract,

except where NPC chooses not to publish the data, such as for privacy, confidentiality, security, legal or commercially sensitive reasons.

#### **5.09 Survival**

The provisions of this Article shall survive any termination or expiry of the Contract.

### **ARTICLE 6 – INTELLECTUAL PROPERTY**

#### **6.01 NPC Intellectual Property**

The Contractor agrees that all NPC Intellectual Property and every other right, title and interest in and to all concepts, techniques, ideas, information, and materials, however recorded, (including images and data) provided by NPC to the Contractor, shall remain the sole property of NPC at all times.

#### **6.02 Newly Created Intellectual Property**

NPC shall be the sole owner of any Newly Created Intellectual Property. The Contractor irrevocably assigns to and in favour of NPC and NPC accepts every right, title and interest in and to all Newly Created Intellectual Property in the Deliverables, immediately following the creation thereof, for all time and irrevocably waives in favour of NPC all rights of integrity and other moral rights to all Newly Created Intellectual Property in the Deliverables, immediately following the creation thereof, for all time.

#### **6.03 Contractor's Intellectual Property**

Subject to Section 6.04 (Presumption Governing Intellectual Property Ownership), NPC agrees that all Intellectual Property and every other right, title and interest in and to all concepts, techniques, ideas, information and materials, however recorded, (including images and data) provided by the Contractor to NPC that is not: (i) NPC Intellectual Property; (ii) Newly Created Intellectual Property or, (iii) Third-party Intellectual Property shall remain the sole property of the Contractor at all times.

#### **6.04 Presumption Governing Intellectual Property Ownership**

If the Contractor's Intellectual Property or Third-party Intellectual Property forms any part of the Deliverables, the Contractor shall notify NPC of such prior to the delivery of the particular Deliverable containing any such Contractor's Intellectual Property or Third-party Intellectual Property. In the absence of any such notice, the presumption governing the Contract shall be that NPC is the sole owner of any Intellectual Property in any form contained in any of the Deliverables.

#### **6.05 Contractor's Grant of Licence**

To the extent that the Deliverables contain, in whole in part, Contractor's Intellectual Property or Third-Party Intellectual Property, the Contractor grants to NPC, a perpetual, world-wide, non-exclusive, irrevocable, transferable, royalty free, fully paid up right and licence: (a) to use, modify, reproduce and distribute, in any form, those Deliverables; and (b) to authorize other Persons, including agents, contractors or sub-contractors, to do any of the former on behalf of NPC, the total consideration for which shall be payment of the Rates to the Contractor by NPC.

#### **6.06 No Restrictive Material in Deliverables**

The Contractor shall not incorporate into any Deliverables anything that would restrict the right of NPC to modify, further develop or otherwise use the Deliverables in any way that NPC deems necessary, or that would prevent NPC from entering into any contract with any contractor other than the Contractor for the modification, further development of or other use of the Deliverables.

**6.07 Contractor Representation and Warranty Regarding Third-party Intellectual Property**

The Contractor represents and warrants that the provision of the Deliverables shall not infringe or induce the infringement of any Third-party Intellectual Property rights. The Contractor further represents and warrants that it has obtained assurances with respect to any Contractor's Intellectual Property and Third-party Intellectual Property that any rights of integrity or any other moral rights associated therewith have been waived.

**6.08 Copyright Notice**

The Contractor shall place a copyright notice on all recorded Deliverables it provides to NPC under the Contract in the following form: "© The Niagara Parks Commission, [\*\*insert year of publication\*\*]"

**6.09 No Use of NPC Insignia**

The Contractor shall not use any insignia or logo of NPC except where required to provide the Deliverables, and only if it has received the prior written permission of NPC to do so.

**6.10 NPC May Prescribe Further Compliance**

NPC reserves the right to prescribe the specific manner in which the Contractor shall perform its obligations relating to this Article.

**6.11 Survival**

The obligations contained in this Article shall survive the termination or expiry of the Contract.

**ARTICLE 7 – INDEMNITY AND INSURANCE**

**7.01 Contractor Indemnity**

The Contractor shall indemnify and hold harmless the Indemnified Parties from and against any and all Losses and Proceedings, by whomever made, sustained, incurred, brought or prosecuted, arising out of, or in connection with, anything done or omitted to be done by the Contractor or any of the Contractor's Personnel, in the course of the performance of the Contractor's obligations under the Contract or otherwise in connection with the Contract. The obligations contained in this section shall survive the termination or expiry of the Agreement.

**7.02 Contractor's Insurance**

The Contractor agrees to put in effect and maintain insurance for the Term, at its own cost and expense, with insurers having a secure A.M. Best rating of A - or greater, or the equivalent, all the necessary and appropriate insurance that a prudent person in the business of the Contractor would maintain including, but not limited to, the following:

- (a) commercial general liability insurance on an occurrence basis for third party bodily injury, personal injury and property damage, to an inclusive limit of not less than **\$5**

**Million (\$5,000,000.00)** per occurrence and in products and completed operations aggregate. The policy is to include the following:

- (i) List **THE NIAGARA PARKS COMMISSION** as an additional insured with respect to liability arising in the course of performance of the Contractor's obligations under, or otherwise in connection with, the Contract;
  - (ii) contractual liability coverage;
  - (iii) cross-liability clause;
  - (iv) employers liability coverage (or compliance with the section below entitled "Proof of W.S.I.A. Coverage" is required);
  - (v) 30 day written notice of cancellation, termination or material change;
  - (vi) tenants legal liability coverage (if applicable and with applicable sub-limits); and,
  - (vii) non-owned automobile coverage with blanket contractual coverage for hired automobiles of not less than **\$2 million (\$2,000,000.00)** per occurrence and in the aggregate; and,
- (b) automobile Insurance: a) Automobile Insurance (OAP1) for **both owned and leased** vehicles with inclusive limits of not less than **\$2 million (\$2,000,000.00)** per occurrence and in the aggregate, and b) Proof of automobile insurance will not be required if the Contractor provides a signed letter stating that they do not own or lease vehicles.
- (c) Such other coverage as NPC from time to time may require, acting reasonably, to protect the NPC from all claims arising from the Deliverables and this Agreement.

The obligations contained in this section shall survive the termination or expiry of the Agreement.

### **7.03 Proof of Insurance**

Concurrently with execution and delivery of the Agreement by the Contractor, the Contractor shall provide NPC with certificates of insurance, or other proof as may be requested by NPC, that confirms the insurance coverage as provided for in Section 7.02, and renewal replacements on or before the expiry of any such insurance. Upon the request of NPC, a copy of each insurance policy shall be made available to it. The Contractor shall ensure that each of its Subcontractors obtains all the necessary and appropriate insurance that a prudent person in the business of the Subcontractor would maintain and that NPC named as additional insureds with respect to any liability arising in the course of performance of the Subcontractor's obligations under the subcontract for the provision of the Deliverables.

### **7.04 Proof of W.S.I.A. Coverage**

If the Contractor is subject to the WSIA, it shall submit a valid clearance certificate of WSIA coverage to NPC prior to the execution of the Agreement by NPC. In addition, the Contractor shall, from time to time at the request of NPC, provide additional WSIA clearance certificates. The Contractor covenants and agrees to pay when due, and to ensure that each of its Subcontractors pays when due, all amounts required to be paid by it/its Subcontractors, from time to time during the Term, under the WSIA, failing which NPC shall have the right, in addition to and not in substitution for any other right it may have pursuant to the Contract or otherwise at law or in equity, to pay to the Workplace Safety and Insurance Board any amount due pursuant to the WSIA and unpaid by the Contractor or its Subcontractors and to deduct

such amount from any amount due and owing from time to time to the Contractor pursuant to the Contract together with all costs incurred by NPC in connection therewith.

#### **7.05 Contractor Participation in Proceedings**

The Contractor shall, at its expense, to the extent requested by NPC, participate in or conduct the defence of any Proceeding against any Indemnified Parties and any negotiations for their settlement. NPC may elect to participate in or conduct the defence of any such Proceeding by notifying the Contractor in writing of such election without prejudice to any other rights or remedies of NPC under the Contract, Agreement, at law or in equity. Each Party participating in the defence shall do so by actively participating with the other's counsel. The Contractor shall not enter into any settlement unless it has obtained the prior written approval of NPC. If the Contractor is requested by NPC to participate in or conduct the defence of any such Proceeding, NPC agrees to co-operate with and assist the Contractor to the fullest extent possible in the Proceedings and any related settlement negotiations. If NPC conducts the defence of any such Proceedings, the Contractor agrees to co-operate with and assist NPC to the fullest extent possible in the Proceedings and any related settlement negotiations. This section shall survive any termination or expiry of the Contract.

### **ARTICLE 8 – TERMINATION, EXPIRY AND EXTENSION**

#### **8.01 Immediate Termination of Contract**

NPC may immediately terminate the Contract upon giving notice to the Contractor where:

- (a) the Contractor is adjudged bankrupt, makes a general assignment for the benefit of its creditors or a receiver is appointed on account of the Contractor's insolvency;
- (b) the Contractor breaches any provision in Article 5 (Confidentiality and FIPPA) of the Agreement;
- (c) the Contractor breaches the Conflict of Interest paragraph in Article 2 (Nature of Relationship Between NPC and Contractor) of the Agreement;
- (d) the Contractor, prior to or after executing the Agreement, makes a material misrepresentation or omission or provides materially inaccurate information to NPC;
- (e) the Contractor undergoes a change in control which adversely affects the Contractor's ability to satisfy some or all of its obligations under the Contract;
- (f) the Contractor subcontracts for the provision of part or all of the Deliverables or assigns the Contract without first obtaining the written approval of NPC;
- (g) the Contractor breaches any provision in Section 3.11 (Security Clearance) of the Agreement; or
- (h) the Contractor's acts or omissions constitute a substantial failure of performance;

and the above rights of termination are in addition to all other rights of termination available under the Contract, at law, in equity, or events of termination by operation of law.

#### **8.02 Dispute Resolution by Rectification Notice**

Subject to the above section, where the Contractor fails to comply with any of its obligations under the Contract, NPC may issue a rectification notice to the Contractor setting out the manner and timeframe for rectification. Within seven (7) Business Days of receipt of that notice, the Contractor shall either: (a) comply with that rectification notice; or (b) provide a rectification plan satisfactory to NPC. If the Contractor fails to either comply with that rectification notice or provide a satisfactory rectification plan, NPC may immediately terminate the Contract. Where the Contractor has been given a prior rectification notice, the same subsequent type of non-compliance by the Contractor shall allow NPC to immediately terminate the Contract.

### **8.03 Termination on Notice**

NPC reserves the right to terminate the Contract, without cause, upon thirty (30) calendar days prior notice to the Contractor.

### **8.04 Contractor's Obligations on Termination**

On termination of the Contract, the Contractor shall, in addition to its other obligations under the Contract and at law and in equity:

- (a) at the request of NPC, provide NPC with any completed or partially completed Deliverables;
- (b) provide NPC with a report detailing: (i) the current state of the provision of Deliverables by the Contractor at the date of termination; and (ii) any other information requested by NPC pertaining to the provision of the Deliverables and performance of the Contract;
- (c) execute such documentation as may be required by NPC to give effect to the termination of the Contract; and
- (d) comply with any other instructions provided by NPC, including, but not limited to, instructions for facilitating the transfer of its obligations to another Person.

This section shall survive any termination of the Contract.

### **8.05 Contractor's Payment Upon Termination**

On termination of the Contract, NPC shall only be responsible for the payment of the Deliverables provided under the Contract up to and including the effective date of any termination provided that those Deliverables have been accepted by NPC. Termination shall not relieve the Contractor of its warranties and other responsibilities relating to the Deliverables performed or money paid. In addition to its other rights of hold back or set off, NPC may hold back payment or set off against any payments owed if the Contractor fails to comply with its obligations on termination.

### **8.06 Termination in Addition to Other Rights**

The express rights of termination in the Agreement are in addition to and shall in no way limit any rights or remedies of NPC under the Contract, at law or in equity.

### **8.07 Expiry and Extension of Contract**

The Contract shall expire on the original Expiry Date.

**IN WITNESS WHEREOF** the Parties hereto have executed the Agreement effective as of the date first above written.

**THE NIAGARA PARKS COMMISSION**

\_\_\_\_\_  
Bob Gale,  
Chair

\_\_\_\_\_  
David Adames,  
Chief Executive Officer

Pursuant to delegated authority

**[\*\*INSERT LEGAL NAME OF CONTRACTOR\*\*]**

Signature: \_\_\_\_\_

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Date of Signature: \_\_\_\_\_

I have authority to bind the Contractor.

## Schedule 1: Description of Deliverables, Rates and Supplementary Provisions

### **A. Description of Deliverables**

A.1 Objectives

A.2 Background and History

A.3 Deliverables

A.3.1 Scope

A.3.2 Phases, Milestones & Schedule

A.3.3 Applicable Acts / Regulations / Codes

A.3.4 Client Support / Key Stakeholders

A.3.5 Work Location / Place of Delivery

A.3.6 Constraints

A.3.7 Contractor Resources

A.3.8 Performance, Monitoring and Reporting

A.3.9 Reference Documentation

A.3.10 Glossary

A.3.11

### **B. Rates and Reimbursements**

#### **B.1 Maximum Fee**

Notwithstanding anything else in the Contract, the total amount payable by NPC to the Contractor under the Contract shall not exceed a maximum amount of up to **[\*\*insert maximum contract amount and applicable taxes\*\*]** \$xxx.xx, plus applicable taxes (HST).

The total amount payable by NPC to the Contractor includes all disbursements (including travel, meal and accommodation expenses) and applicable taxes.

## **B.2 Rates**

The Rates for the Deliverables are set out below and shall remain fixed during the Term of the Contract (including the [Insert extension option term or terms.] extension option):

## **C. Billing Statements**

[Important: Insert this if NPC wants to have a billing scheme other than the one set out in the Agreement.]

[Consider whether you wish to set out an alternative billing and payment process to the process set out in the Agreement. For example, think about paying by milestone/deliverable rather than getting a monthly invoice setting out hourly or per diem rates – this helps to ensure that no matter how long the Contractor takes to do the work, NPC is only paying per milestone/deliverable so the risk of ‘overtime’ falls on the Contractor, not NPC.]

[On completion of customization to the procurement, delete all instructions and highlights [found within square brackets] from this document.]

## Mandatory Requirements Schedule

Mandatory Requirement	Evaluation
<p><b>1. <u>Declaration and Certification</u></b></p> <p>The Proposal includes the Declaration and Certification Schedule, completed by the Proponent in accordance with the instructions contained in that schedule.</p>	<p><i>Pass or Disqualification</i></p>
<p><b>2. <u>Written Proposal</u></b></p> <p>The Proposal includes a written submission that generally addresses the elements listed in the Rated Elements Schedule.</p>	<p><i>Pass or Disqualification</i></p>
<p><b>3. <u>Pricing Schedule</u></b></p> <p>The Proposal includes the Pricing Schedule, completed by the Proponent in accordance with the instructions contained in that schedule.</p>	<p><i>Pass or Disqualification</i></p>
<p><b>4. <u>Subcontractor Listing Schedule</u></b></p> <p>The Proposal includes a complete list of all subcontractors intended to be used for the work.</p>	<p><i>Pass or Disqualification</i></p>
<p><b>5. <u>Project Experience Response Schedule</u></b></p> <p>The Proposal includes the Project Experience Response Schedule, completed by the Proponent in accordance with the instructions contained in that schedule.</p>	<p><i>Pass or Disqualification</i></p>
<p><b>6. <u>Digital Bonding</u></b></p> <p>Proponents shall be required to submit, via its electronic bidding system (Bonfire), a copy of the digital bid bond and agreement to bond, meeting all the requirements in this section. The bid bond and agreement to bond must be uploaded in the bid submission file labelled “Bid Bond and Agreement to Bond” (or as otherwise directed by the platform).</p> <p>The <u>digital bid bond</u> must:</p> <ul style="list-style-type: none"> <li>a) be in the amount of 10% of the Pricing Proposal; and</li> <li>b) use CCDC 220, or the same content in other form used by a surety company authorized by law to do business in the Province of Ontario, and acceptable to NPC.</li> </ul> <p>The <u>digital agreement to bond</u> must be from a Canadian surety company, and must state that the surety is willing to supply:</p> <ul style="list-style-type: none"> <li>a) a performance bond in the amount of 100% of the Pricing Proposal, covering the performance of the Agreement, including the requirements thereunder with respect to the correction of deficiencies and the fulfillment of all warranties; and</li> <li>b) a labour and material payment bond in the amount of 50% of the Pricing Proposal, covering payment for labour, products, or both.</li> </ul> <p>The cost of these bonds shall be included in the Pricing Proposal.</p>	<p><i>Pass or Disqualification</i></p>

Mandatory Requirement	Evaluation
<p>All instruction details for accessing authentication should be included with the uploaded bid bond.</p> <p>The Proponent and the Proponent's surety should refer to the e-bonding information on Surety Association of Canada's website: <a href="http://www.surety-canada.com/en/ebonding/">http://www.surety-canada.com/en/ebonding/</a>. Information at this site includes:</p> <ul style="list-style-type: none"> <li>i. a list of third parties that provide online surety digital bond services such as Mobile Bonds or Xenex (Note: NPC does not endorse or promote any third party digital bond service provider); and</li> <li>ii. a set of required criteria, which digital bid bonds should meet.</li> </ul> <p>Proposals not accompanied by a digital bid bond and agreement to bond will be automatically disqualified.</p>	
<p><b>7. <u>Mandatory Proponents' Site Visit</u></b></p> <p>The Proponent has attended the Mandatory Proponents' Site Visit in accordance with Section 1.7 ("Mandatory Proponents' Site Visit").</p>	<p><i>Pass or Disqualification</i></p>
<p><b>8. <u>Canadian Business</u></b></p> <p>The Proponent must be a Canadian Business as attested by the Proponent in Declaration and Certification Schedule.</p>	<p><i>Pass or Disqualification</i></p>

**Rated Elements Schedule**

Rated Element	Available Points	Evaluation
<b>Part A Proponent's Experience and Qualifications</b> <i>(available points: 30)</i>		
<p><b><u>Proponent's Project Experience</u></b></p> <p>Using Project Experience Response Schedule, the Proponent should provide a detailed description of <u>3</u> completed projects where the Proponent acted as the general contractor for the project. The project examples should meet the following, with a maximum score of 10 points per project:</p> <ul style="list-style-type: none"> <li>• All projects completed within the last 5 years;</li> <li>• Project values should not be less than \$500,000.</li> <li>• The project examples should explain and demonstrate why the projects are relevant and comparable in terms of the Services requested in this RFP.</li> </ul> <p>Project description details are to be provided within the Project Experience Response Schedule as per the instructions therein.</p> <p>NPC will only evaluate the first 3 projects listed (if more than that number are submitted).</p> <p>All submitted projects may be subject to reference checks.</p>	30	Per Evaluation Matrix

Rated Element	Available Points	Evaluation
<b>Part B Project Team Experience</b> (available points: 25)		
<p><b><u>Assigned Project Team</u></b></p> <p>The Proponent should demonstrate that the team assigned to this project is capable of providing the required resources to meet or exceed the Service requirements described within this RFP. The Proponent should include details such as:</p> <p>The Proponent’s team of specialists (in-house or outsourced) who can provide all the required services necessary to complete the assignment within the specified timeframe. The Proponent’s team should include, but not be limited to the following professional services:</p> <ul style="list-style-type: none"> <li>• Carpentry</li> <li>• Plumbing</li> <li>• Mechanical and Electrical</li> <li>• Masonry</li> <li>• Concrete Flatworks</li> <li>• Concrete Foundations</li> <li>• Structural Steel</li> <li>• Sprinkler</li> <li>• Metal roofing and Siding</li> </ul> <p>Describe the experience and capability of the proposed team for this project, ensuring that the proposed team possesses the desired professional services demonstrating alignment with the scope of work described under this RFP.</p>	20	Per Evaluation Matrix
<p><b><u>Project Management and Site Supervisor</u></b></p> <p>The Proponent should provide resumes for the project manager and site supervisor to be assigned to this project.</p> <p>Higher points will be awarded for demonstration of key personnel experience with projects of similar scope, size and complexity.</p>	5	Per Evaluation Matrix

Rated Element	Available Points	Evaluation
<b>Part C Work Plan and Methodology</b> <i>(available points: 30)</i>		
<p>The Proponent should describe in writing its proposed methodology and strategy, that clearly demonstrates an understanding of the project, including:</p> <ul style="list-style-type: none"> <li>• The Proponent understands the risks associated with the high-staff area where the construction is taking place in and should explain in writing their plan to control the site with minimal or no impact to operations of staff activities. <b>(7 Points)</b></li> <li>• The Proponent clearly identifies and describes the understanding of all work requirements related to the Project’s Specification Schedule <b>(6 Points)</b></li> <li>• The Proponent has access to all appropriate tools, machinery, and apparatus to complete the project. <b>(1 Point)</b></li> <li>• The Proponent to deliver the assignment for achieving the following Substantial Performance date of October 31, 2025. <b>(1 Point)</b></li> </ul>	15	Per Evaluation Matrix
<p><b><u>Proposed Schedule</u></b></p> <p>The Proponent should provide a proposed schedule, preferably in Gantt chart format or excel format, that outlines a timeline in relation to the project milestones to deliver the assignment for achieving the Substantial Performance date of October 31, 2025.</p> <p><u>Higher points will be awarded for schedules depicting greater detail and project task breakdown.</u></p> <p>The Proponent should submit an example schedule from a previous completed project of similar scope and detail how it met the timelines of the project.</p>	10	Per Evaluation Matrix

Rated Element	Available Points	Evaluation
<p><b><u>Escalation Procedures</u></b></p> <p>Provide details of problem escalation procedures/process which the Proponent has in place to deal with performance issues, both internally and with respect to its subcontractors. Higher points will be awarded to Proponents that can provide immediate response time and resolution to maintain project schedule. Proponent to provide a communication plan/strategy to mitigate schedule delays and product supply.</p>	5	Per Evaluation Matrix
<p><b>Part D Health and Safety (available points: 10)</b></p>		
<p><b><u>Health and Safety Management Program</u></b></p> <p>It is expected that each Proponent must clearly demonstrate a well-established health and safety management program to ensure that workers and work sites are safe from injury.</p> <p>In the case that the Proponent has achieved CORTM Certification in Ontario, please submit the Certificate of Recognition along with a current Letter of Good Standing from the Infrastructure Health and Safety Association (IHSA).</p> <p>If Proponent's are not CORTM certified, they may submit the following elements of their established health and safety management program for review.</p> <ul style="list-style-type: none"> <li>• Health and safety program table of contents <b>(5 points)</b></li> <li>• Health and safety Policy statement (dated and signed) <b>(5 points)</b></li> </ul>	10	Per Evaluation Matrix

Rated Element	Available Points	Evaluation
<b><u>Part E Submission Quality (available points: 5)</u></b>		
<p>The Proponent's Proposal will be scored based on its overall presentation.</p> <p>Up to 3 points for writing the narrative portions of the Proposal in a clear, concise, and logical fashion and limiting Proposal content to information requested. Points will be awarded as follows:</p> <ul style="list-style-type: none"> <li>• 3 out of 3 points = Proposal content is clear and well written (e.g. grammar, syntax, spelling, etc.), with professional presentation. The Proposal responds logically to the requirements.</li> <li>• 2 out of 3 points = Proposal content is mostly clear and well written. The Proposal responds to the requirements and contains limited marketing material.</li> <li>• 1 out of 3 points = Proposal content is not clearly written. Content is included that does not clearly address the requirements.</li> <li>• 0 out of 3 points = The Proposal is not clear and is difficult to understand.</li> </ul> <p>Up to 1 point for ordering/structuring the Proposal to match the order and sequence of the rated criteria as stated in the RFP. Proposals will receive 1 point, subject to a deduction of 0.5 points for each requirement or criterion that is presented out of numeric sequence, to a maximum of 2 deductions.</p> <p>Up to 1 point for highlighted information in the Proposal that is specifically relevant to an evaluation factor or minimum qualifications and ensuring any cross-references within the Proposal for highlighted information are easily identified and clearly found. Points will be awarded as follows:</p> <ul style="list-style-type: none"> <li>• 1 out of 1 point = The Proposal contains highlighting, summary tables or cross-references to minimize duplication of content and facilitate review. References indicated in the Proposal are correct.</li> <li>• .5 out of 1 point = The Proposal contains highlighting, summary tables or cross-references. Cross-references indicated in the Proposal include some errors.</li> <li>• 0 points = The Proposal does not include any highlighting or cross-referencing, and it is difficult to locate information that addresses the requirements.</li> </ul>	5	As stated in this criterion (Part E Submission Quality)

## Declaration and Certification Schedule

Insert Name of Proponent: \_\_\_\_\_  
(Print company name)

**TO:** The Niagara Parks Commission  
**RE:** Proposal prepared and submitted in response to a Request for Proposals issued by The Niagara Parks Commission dated **December 16, 2024** (the “RFP”).

I am duly authorized by the undersigned company (the “Proponent”), including the persons, firms, corporations, and advisors joining in the submission of this Proposal, to execute this Declaration and Certification. Terms not defined herein are defined in the RFP.

I solemnly declare and certify as follows:

### 1. Proponent Information

(a) The full legal name of the Proponent is:

\_\_\_\_\_

(b) All other registered business names under which the Proponent carries on business are:

\_\_\_\_\_

(c) The jurisdiction in which the Proponent is organized and existing is:

\_\_\_\_\_

(d) The Business Number is a business identifier for the Canadian Revenue Agency (“CRA”). It is a nine (9) digit number. It can be found as the first nine digits of your Harmonized Sales Tax (HST) number.

Please enter the Proponent's Business Number:

\_\_\_\_\_

(e) The name, address, telephone, and e-mail address of the contact person for the Proponent:

Contact Name: \_\_\_\_\_

Address: \_\_\_\_\_

Telephone: \_\_\_\_\_

E-mail address: \_\_\_\_\_

### 2. Business Attestation

On behalf of the undersigned organization, we/I attest that the Proponent is a Canadian Business.

### 3. Addenda and Form of Agreement

The Proponent is deemed to have read and accepted all addenda to the RFP issued by the NPC to date, and the Form of Agreement. The Proponents understands that the onus remains on the Proponent to have made any necessary amendments to its Proposal based on the addenda and to consider the Form of Agreement in framing its Proposal.

### 4. Unfair Advantage and Conflict of Interest

The Proponent has reviewed the definitions of Unfair Advantage and Conflict of Interest set out in Section 2.1 (Definitions) of the RFP. If the boxes below are left blank, the Proponent shall be deemed to declare that (a) it has had no Unfair Advantage in preparing its Proposal and (b) there is no foreseeable actual or potential Conflict of Interest in performing the contractual obligations contemplated in the RFP.

If either or both of the statements below apply, check the appropriate box:

- The Proponent declares that there is an actual or potential Unfair Advantage relating to the preparation of its Proposal.
- The Proponent declares that there is an actual or potential Conflict of Interest in performing the contractual obligations contemplated in the RFP.

If the Proponent declares an actual or potential Unfair Advantage and/or an actual or potential Conflict of Interest (by marking either of the boxes above), relevant details are to be set out below.

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### 5. Disclosure of Information and Freedom of Information

The Proponent hereby consents to the disclosure, on a confidential basis, of this Proposal by NPC to NPC’s advisers retained for the purpose of evaluating or participating in the evaluation of this Proposal.

The *Freedom of Information and Protection of Privacy Act*, as amended, (“**FIPPA**”) applies to records provided to the NPC by a Proponent, and may require disclosure of such records to third parties.

The following chart is provided for Proponents to list all records supplied in confidence by the Proponent to the NPC pursuant to this procurement process (e.g. their Proposal or any accompanying documentation). It is intended to assist NPC in determining what aspects of the Proposal are non-confidential (i.e., contain publicly available information), and what aspects are confidential. Confidential aspects either contain:

- trade secrets, commercial, financial, scientific or technical information, that is supplied in confidence, the disclosure of which would involve harm (per section 17 of FIPPA); or
- personal information (per section 21 of FIPPA).

Record	Full Disclosure	Partial Disclosure	Identify portions of Record (e.g. pages or sections) that are supplied in confidence and
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			the exemption(s) or exclusion(s) under FIPPA being relied upon

Note: Listing the entire Proposal is not a useful means of distinguishing confidential from non-confidential information.

**6. NPC’s Supplier Code of Conduct**

The Proponent representative has read the Suppliers’ Code of Conduct for The Niagara Parks Commission at <https://www.niagaraparks.com/files/Supplier's%20Code%20of%20Conduct.pdf> and understands that NPC expects all of its Contractors to comply with it. Failure to comply with it may result in a Proponent being disqualified from an active procurement (including this RFP).

**7. NPC’s Contractor Safety Policy**

The Proponent representative has read the Contractor Safety Policy for The Niagara Parks Commission at <https://www.niagaraparks.com/media/2024/01/CPM-10-91-Contractor-Safety-Policy.pdf> and understands that NPC expects all of its Contractors to comply with it. Failure to comply with it may result in a Proponent being disqualified from an active procurement (including this RFP).

**8. Offer**

The Proponent has carefully examined the RFP and has a clear and comprehensive knowledge of the Work described in the RFP. By submitting the Proposal, the Proponent understands the provisions of the RFP, and offers to provide the Work in accordance therewith at the pricing set out in the Pricing Schedule.

It is the responsibility of the Proponent to seek clarification from the RFP Coordinator or its own advisors on any matter it considers to be unclear.

The Proponent understands that no delivery of Work will commence until NPC has entered into a contract with a successful Proponent.

**9. Proposal Irrevocable**

The Proponent agrees that its Proposal shall be irrevocable for **120** days following the Proposal Submission Deadline.

**10. Execution of Agreement**

The Proponent understands that in the event its Proposal is selected by the NPC, in whole or in part, the Proponent agrees to finalize and execute the agreement in the form set out in the RFP in accordance with the terms of the RFP.

\_\_\_\_\_  
Signature of Witness

\_\_\_\_\_  
Signature of Proponent representative

\_\_\_\_\_  
Name of Witness

\_\_\_\_\_  
Name and Title

---

Date:

I have authority to bind the Proponent

***In order for NPC to accept this form as compliant, this form must be submitted complete and signed by both the “Proponent representative” and the “Witness”.***

## Pricing Schedule

Insert Name of Proponent: \_\_\_\_\_  
(Print company name)

### General Instructions

Proponents must not amend the Pricing Schedule Form in any way other than by providing the requested information. No other fees or charges are payable for the services, other than those set out on this Form. Where no bid, state "0" or "nil". A price category that is left blank will be interpreted as a no bid. Your Proposal may be disqualified if a price category is left blank.

Rates quoted by the Proponent shall be all inclusive and shall include all other costs including labour and materials, equipment, management, office support, travel and carriage costs, insurance costs as required in the Specifications Schedule, Workplace Safety Insurance Board costs, and all other overhead including but not limited to any fees or other charges required by law.

Each Proponent must include this form completed according to the instructions contained in the form as well as those instructions set out below:

- (a) Pricing shall be provided in Canadian Funds, inclusive of all applicable duties and taxes and excluding Harmonized Sales Tax.

A Proposal that includes conditional, optional, contingent or variable Pricing that are not expressly requested in the Pricing Schedule, may be disqualified.

By submitting a Proposal, a Proponent is deemed to confirm that it has prepared its Proposal with reference to all of the provisions of the Form of Agreement and has factored all of the provisions of the Form of Agreement, including the insurance requirements, into its pricing assumptions and calculations and into the proposed costs indicated on the Pricing Schedule.

### Pricing Proposal

#### 1.1. Stipulated Price Bid

Proponent agrees to provide the Work according to the requirements of this Request for Proposal (RFP) to the Niagara Parks Commission (NPC).

The Proponent hereby offer to provide to the NPC, all services, labour and materials required to complete the assignment described in the RFP, **including the cost of all related disbursements as described in the RFP**, for the Stipulated Price Bid of;

\_\_\_\_\_ Dollars

*Insert Stipulated Price Bid in words. Words take precedence over numbers.*

\_\_\_\_\_ \$ Canadian

*Insert Stipulated Price Bid in numbers.*

Proponent understands that the Stipulated Price Bid stated in words will form the **Contract Price** to perform this Project as per the:

Form of Agreement Schedule.

Proponent acknowledges that the Stipulated Price Bid is the sum of the prices identified in this Pricing Schedule which includes the cost of all related disbursements. Other disbursement costs in addition to the Stipulated Price Bid will not be permitted.

Proponent acknowledges that the Stipulated Price Bid includes the cost to complete all work described herein including presentations and travel and that some deviation from the work as described is normal and expected, and has been factored into the Stipulated Price Bid.

**1.2. Cash Allowances (If Required):**

Proponent has **included** in the Stipulated Price Bid all Cash Allowances, as indicated in the table below and in compliance with section 3.2.2. (Cash Allowances):

Cash Allowance Description	Allowance Price
Supply and install of one <b>2-ton</b> and one <b>5-ton</b> overhead crane.	\$200,000.00
Inspections, testing and surveying.	\$25,000.00

**1.3. Itemized Prices (If Required):**

Proponent has **included** in the Stipulated Price Bid all Itemized Prices, as indicated in the table below and in compliance with section 3.2.3 (Itemized Prices):

Itemized Price Description	Itemized Price

**1.4. Separate Prices (If Required):**

Proponent has **excluded** from the Stipulated Price Bid all Separate Prices, as indicated in the table below and in compliance with section 3.2.4 (Separate Prices):

Separate Price Description	Separate Price
Contingency	10% of Stipulated Price Bid

**1.5. Unit Prices (If Required):**

Proponent has provided all Unit Prices, as indicated in the table below and in compliance with section 3.2.5 (Unit Prices):

Unit Price Description	Cost / sq. ft. Extra	Cost / sq. ft. Deleted

**1.6. Alternate Prices (If Required):**

Proponent proposes Alternate Price, as indicated in the table below and in compliance with as indicated in the table below and in compliance with section 3.2.6 (Alternative Prices):

Alternative Price Description	Alternate Price

**1.7. Bid Bond:**

Enclosed is our Bid Bond made payable to the NPC in the amount of 10% of Stipulated Price Bid

**1.8. Examination of Site and Request for Proposal Documents:**

Proponent has carefully examined the Place of the Work and all the Request for Proposal Documents and has a clear and comprehensive knowledge of the Work required under this Agreement and of all the working conditions.

**1.9. Availability to Commence the Work:**

Proponent is in a position to commence the Work immediately upon receipt of the NPC’s written direction, and to carry it through to a prompt and satisfactory conclusion and understand the Substantial Performance date is \_\_\_\_\_.

**1.10. Stipulated Price Bid Breakdown:**

All Proponents shall complete the table below. The 10% contingency shall be shown as separate item in Section B below. (i.e. not included in Section A – Item Cost Breakdown)

<b>ITEM COST BREAKDOWN:</b>	
General Requirements	\$ _____
Bonding	\$ _____
Demolition / Removal / Disposal	\$ _____
Site Preparation / Equipment Placement	\$ _____

<b>ITEM COST BREAKDOWN:</b>	
Structural Steel	\$ _____
Concrete Foundations and Flatwork	\$ _____
Roofing and Siding	\$ _____
Mechanical	\$ _____
Electrical	\$ _____
Sprinkler	\$ _____
Masonry	\$ _____
Other Costs: _____	\$ _____
Other Costs: _____	\$ _____
Other Costs: _____	\$ _____
Cash Allowance for one 2-ton and one 5-ton overhead crane	<b>\$200,000.00</b>
Cash Allowance for inspections, testing, and surveying	<b>\$25,000.00</b>
<b>TOTAL ITEM COST BREAKDOWN</b>	<b>\$ _____</b>
<b>B. 10% CONTINGENCY ALLOWANCE:</b> (A. TOTAL ITEM COST BREAKDOWN x 10%)	\$ _____
<b>TOTAL STIPULATED PRICE BID:</b> (A. TOTAL ITEM COST BREAKDOWN + B. CONTINGENCY) <b><u>excluding all applicable taxes</u></b>	\$ _____ Insert in Section 1.1

### Subcontractor Listing Schedule

Insert Name of Proponent: \_\_\_\_\_  
(Print company name)

A complete list of all Subcontractors intended to be used for the work shall be completed by the Proponent.

Trade	Company Name	Address:

## Project Experience Response Schedule

Insert Name of Proponent:

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(Print company name)

On separate copies of this schedule, for each project, provide the required project information as described in the Rated Elements Schedule for **Three (3) projects** completed within the last **Five (5) years**. Examples should have a project value of **no less than \$500,000.00**. NPC may only evaluate the first 3 projects listed (if more than that number are submitted by the Proponent) and meet the projects requirements in the Rated Elements Schedule. All submitted projects are subject to the Reference Verification section in Part 4.

<b>Project 1</b>	
Project Name:	
Project Value:	
Year of Project Completion:	
Client Information (name/phone/email):	
Projected Budget for Portion of Services Completed by Proponent:	
Actual Cost for Portion of Services Completed by Proponent (including any additional work beyond original scope):	
Detailed description of services provided. Please indicate if services were original scope and/or additional.	

<b>Project 2</b>	
Project Name:	
Project Value:	
Year of Project Completion:	
Client Information (name/phone/email):	
Projected Budget for Portion of Services Completed by Proponent:	
Actual Cost for Portion of Services Completed by Proponent (including any additional work beyond original scope):	
Detailed description of services provided. Please indicate if services were original scope and/or additional.	

<b>Project 3</b>	
Project Name:	
Project Value:	
Year of Project Completion:	
Client Information (name/phone/email):	
Projected Budget for Portion of Services Completed by Proponent:	
Actual Cost for Portion of Services Completed by Proponent (including any additional work beyond original scope):	
Detailed description of services provided. Please indicate if services were original scope and/or additional.	

## Technical Specifications Schedule

The following is the list of specifications sheets included for this project which have been attached to this RFP document:

WEGO Service Garage Addition  
 Client: Niagara Parks Commission  
 Project No.: 24-006

### TABLE OF CONTENTS

Page 1

#### DIVISIONS

#### Pages

#### Division 01 - GENERAL REQUIREMENTS

Section 01 00 05 - General Instructions .....	13
Section 01 00 10 - General Work .....	6
Section 01 11 00 - Summary of Work .....	1
Section 01 14 00 - Work Restrictions .....	2
Section 01 30 10 - Construction Schedule .....	2
Section 01 33 00 - Submittal Procedures .....	4
Section 01 35 30 - Health and Safety Requirements .....	3
Section 01 35 73 - Procedures for Deconstruction of Structures .....	5
Section 01 45 00 - Quality Control .....	3
Section 01 51 00 - Temporary Utilities .....	3
Section 01 52 00 - Construction Facilities .....	3
Section 01 54 50 - Safety Requirements .....	1
Section 01 56 00 - Temporary Barriers and Enclosures .....	3
Section 01 61 00 - Common Product Requirements .....	5
Section 01 74 11 - Cleaning .....	3
Section 01 74 19 - Construction/ Demolition Waste Management and Disposal .....	5
Section 01 77 00 - Closeout Procedures .....	2
Section 01 78 00 - Closeout Submittals .....	7
Section 01 79 00 - Demonstration and Training .....	2
Section 01 91 00 - Commissioning .....	3

#### Division 02 - EXISTING CONDITIONS

Section 02 41 14 - Asphalt Pavement Removal .....	2
---------------------------------------------------	---

#### Division 03 - CONCRETE

Section 03 15 13 - Concrete Accessories - Water stops .....	5
Section 03 30 00 - Cast In Place Concrete .....	14
Section 03 41 00 - Precast Concrete Planks .....	5

#### Division 04 - MASONRY

Section 04 03 07 - Masonry Repointing and Repair .....	5
Section 04 05 10 - Masonry Procedures .....	8
Section 04 05 12 - Mortar and Grout Masonry .....	3
Section 04 05 19 - Masonry Anchorage and Reinforcing .....	4
Section 04 05 23 - Masonry Accessories .....	2
Section 04 22 00 - Concrete Masonry .....	3

**Division 05 - METALS**

Section 05 10 00 - Structural Steel (VBSA).....8  
Section 05 30 10 – Steel Floor and Roof Deck (VBSA) .....5  
Section 05 50 00 - Metal Fabrications .....6

**Division 06 - WOOD AND PLASTICS**

Section 06 10 11 - Rough Carpentry.....4  
Section 06 20 00 - Finish Carpentry .....5  
Section 06 40 00 - Architectural Woodwork .....8  
Section 06 47 00 - Plastic Laminate .....4

**Division 07 - THERMAL AND MOISTURE PROTECTION**

Section 07 10 00 - Damp Proofing & Water Proofing .....6  
Section 07 11 13 – Below Grade Foundation Wall Bituminous Damp proofing .....5  
Section 07 21 13 - Board Insulation.....4  
Section 07 21 16 - Blanket Insulation .....3  
Section 07 27 00 - Firestopping and Smoke Seals .....3  
Section 07 27 31 - Adhesive Grade Air Barrier Membrane and Thru-Wall Flashing.....5  
Section 07 41 00 –Kingspan Specification (Architectural.....11  
Section 07 52 00 - Modified Bitumen Roofing.....13  
Section 07 62 00 - Sheet Metal Flashing and Trim .....4  
Section 07 62 10 – Metal Soffit and Fascia.....3  
Section 07 81 00 - Intumescent Fire Resistive Coating System .....2  
Section 07 82 00 - Interior Cementitious Spray-Applied Fireproofing .....18  
Section 07 92 10 - Joint Sealing .....5

**Division 08 - OPENINGS**

Section 08 11 14 - Metal Doors and Frames .....9  
Section 08 31 00 - Service Access Doors and Frames .....3  
Section 08 36 13 – Insulated Sectional Overhead Doors .....6  
Section 08 51 13 – Aluminum Fixed Windows .....9  
Section 08 71 00 - Finish Hardware .....8  
Section 08 80 50 - Glazing and Mirrors .....6  
Section 08 90 00 - Louvres and Vents.....3

**Division 09 - FINISHES**

Section 09 21 16 - Gypsum Board Assemblies.....8  
Section 09 22 16 - Non-Structural Metal Framing .....3  
Section 09 22 27 - Acoustical Suspension .....4  
Section 09 30 13 - Porcelain Tile .....5  
Section 09 51 13 - Acoustical Panel Ceilings .....3  
Section 06 65 13 – Resilient Base and Accessories .....3  
Section 09 65 13 – Resilient Stair Treads and Risers .....4  
Section 09 91 13 - Painting .....13  
Section 09 96 59 – High Build Glazed Coatings .....3

**Division 12 - FURNISHINGS**

Section 12 36 23– Plastic Laminate Countertops.....4

**Division 31 - EARTHWORK**

Section 31 23 00 – Earthworks (VBSA) .....7  
Section 31 23 10 - Excavation, Backfill, and Compaction.....7

**END OF SCHEDULE**

**1. DESCRIPTION OF WORK**

- .1 Work included under this Contract covers New Service Garage Addition located at 7805 Niagara River Parkway, Niagara Falls Ontario, L2G 7M8 for Niagara Parks Commission.
- .2 Work not included in Contract comprises those items indicated "N.I.C.", "by Owner", or "supplied by Owner".
- .3 The Work to the building shall be substantially completed by **Fall 2025**.
- .4 Measures must be put into place for maintenance of ongoing existing building operations (if applicable).

**2. GENERAL CONDITIONS**

- .1 Conform with Divisions Per Owner Instructions.
- .2 The Contractor MUST provide to the Owner, before commencing the Work, copies of Material Safety Data Sheets (MSDS) for all products covered under the Ontario Health and Safety Act and Regulations, and WHMIS regulations which are to be used on or in conjunction with the Work, together with information as to how and where they are to be used.
- .3 The Work for which these General Conditions are issued is governed by the Occupational Health and Safety Act and regulations for Construction Projects, Revised Statutes of Ontario, 1980 Chapter 321 as amended (Ontario reg. 213/91). The successful tenderer, upon award of a purchase order number for the work outlined, shall assume full responsibility under this legislation as the "Constructor" as defined therein.
- .4 The Contractor shall ensure that the staff for which they are responsible are adequately trained and kept up to date on relevant health and safety legislation as per the Occupational Health and Safety Act and Regulations for Construction Projects. This could include but is not limited to the following: Personal Protective Equipment, Fall Protection, Travel restraint, Fall Restricting and Arrest, Overhead Protection, Fire Safety, Confined Space Entry, Ladders, Scaffolding, Elevated Work Platforms, Cranes, Hoists, Rigging, Cables, Slings, Explosive Fastening Tools, Electrical Hazards, Lock Out & Tag Out, Roofing and Excavations.

**3. DOCUMENTS REQUIRED**

- .1 Maintain at job site, one copy each of the following:
  - .1 Contract drawings/plans
  - .2 Project Manual/Specifications
  - .3 Addenda
  - .4 Change Orders and Proposed Change Orders
  - .5 Other modifications to Contract
  - .6 Copy of approved work schedule
  - .7 Manufacturer's installation and application instructions
  - .8 All materials required for Posting by Authorities
  - .9 Shop Drawings and Submittals

- .10 Field Test Reports
- .11 As-Built drawings
- .12 Minutes of Site Meetings

#### **4. CONSTRUCTION SCHEDULE**

- .1 Contractor to provide within 14 days of award of contract a construction schedule to show weekly progress and is to include detailed co-ordination with the sub-contractors anticipated progress and a final date within the time period stated on tender form.
- .2 Provide a schedule of submissions of shop drawings.

#### **5. CONTRACTOR'S USE**

- .1 Repair grounds once work is complete, if damaged.
- .2 Do not unreasonable encumber site with materials or equipment.
- .3 Refer to site plan for further information.

#### **6. CODES AND STANDARDS**

- .1 Perform work in accordance with Ontario Building Code and any other Codes of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
- .2 Meet or exceed requirements of Contract documents, specified standards, codes and referenced documents.

#### **7. PROJECT MEETINGS**

- .1 Within 15 days of contract award, pre-construction meeting to be held.
- .2 Hold project meetings in the construction office at times approved by Consultant and Owner, **bi-weekly**, during construction attended by General Contractor, major sub-contractors, Consultant and Owner.
- .3 General Contractor to record all meeting minutes and distribute to all parties within 3 days.
- .4 Items to remain from previous meetings until removed by consent of the Owner, Consultant, and Contractor.

#### **8. EXISTING SERVICES**

- .1 Submit construction Schedule to and obtain approval from the **Owner** for any shut down or closure of active services **24 hrs**, in advance. Co-ordinate for ongoing use by Owner. Adhere to approved schedule.
- .2 Before commencing Work, establish location and extent of service lines in area of Work and notify Consultant of findings.

- .3 Refer to mechanical, electrical, and civil drawing for service locations. Where unknown services are encountered, immediately advise Consultant and Owner and confirm findings in writing.
- .4 Protect and record locations of maintained, re-routed and abandoned service lines.
- .5 Remove abandoned service lines within 2m of structure. Cap or otherwise seal lines at cut off points directed by Consultant.

## **9. ADDITIONAL DRAWINGS**

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

## **10. INSTALLATION**

- .1 Install all materials true and plumb in accordance with drawings. Avoid interference with other trades.

## **11. PRODUCTS**

- .1 Provide as specified except with prior approval of Owner and Consultant. Reject products not meeting the Specification. Store as shipped, providing adequate protection.

## **12. EXAMINATION AND ACCEPTANCE**

- .1 **Tender Documents are on display at the offices of the Niagara Construction Association and Hamilton Construction Association.**
- .2 In submitting bid, bidders affirmed that they did examine site for all conditions before submitting tender, and did examine the drawings of all disciplines (see Division C) and all tender documents thoroughly and accept them as clearly representing the Scope of Work.
- .3 Examine Work of others upon which your Work depends. Application of your Work constitutes acceptance of the other trade. Failure to report deficiencies prior to application will result in making good of rejected work at your expense.
- .4 Examine Work upon which your work depends. Report in writing defects in such work. Application of your work shall be deemed acceptance of work upon which your work depends.
- .5 Drawings are, in part, diagrammatic and are intended to convey scope of Work and indicate general and approximate location, arrangement and sizes of fixtures, equipment, ducts, piping, conduits and outlets and similar items. Obtain more accurate information about locations, arrangement and sizes from study and co-ordination of drawings, including shop drawings and manufacturer's literature and become familiar with conditions and spaces

affecting these matters before proceeding with Work.

- .6 Where job conditions require reasonable changes in indicated locations and arrangements, make such changes with approval of Consultant at no additional cost to Owner. Similarly, where existing conditions interfere with new installation and require relocation, such relocation is included in Work.
- .7 Install and arrange fixtures, equipment, ducts, piping and conduit to conserve as much headroom and space as possible, and avoid interference and obstruction of access. Observe good installation practice for safety, access, maintenance and follow manufacturer's recommendations. Make changes requested to comply with these requirements at no additional cost to Owner.
- .8 If requested by Consultant, and before installation, relocate equipment, services, doors, openings, furring and other work at no additional cost to Owner; providing such relocation involves only reasonable minor adjustments and reasonable advance notice is given in writing.

**13. DISCREPANCIES**

- .1 Report discrepancies found to the Consultant during tender period prior to the tender close.

**14. CLEANING**

- .1 Remove all material which may damage or be difficult to remove from your Work or adjacent surfaces. Clean your finished Work.
- .2 Maintain workplace in clean and orderly condition while working.

**15. MAINTENANCE MANUAL**

- .1 Provide all material regarding characteristics and maintenance of the work to the Contractor in duplicate for preparation of the Maintenance Manual under 01 00 10.

**16. SAFETY**

- .1 Comply with the Ontario Occupational Health and Safety Act, as amended by Bill 208 and all other applicable safety regulations, including Bill 168 – Workplace Harassment.

**17. SAMPLES**

- .1 Where samples are specified, provide two (2) to the Contractor for review by the Consultant, clearly labelled with Project Name and sample description.

**18. TEMPORARY SERVICES**

- .1 Provide office and storage space and sanitary facilities as defined in appropriate Section.

**19. CO-ORDINATE**

- .1 The Contractor will co-ordinate the work of all sub-contractors, including mechanical and electrical trades.
- .2 Co-ordinate work of each Section as required for satisfactory and expeditious completion of Work. Take field dimensions required. Take into account existing installations to assure best arrangements of components in available space. Consult before commencing Work in critical locations. Fabricate and erect work to suit field dimensions and field conditions.
- .3 Pay cost of extra work caused by others and make up time lost as result of failure to comply with these requirements at proper time.
- .4 Provide forms, templates, anchors, sleeves, inserts and accessories or other components required to be fixed to or inserted in Work. As applicable set them in place or instruct related Sections as to their location.

**20. CUTTING AND PATCHING**

- .1 **General Contractor is responsible to co-ordinate all cutting and patching required in relationship to work described under each Section including Mechanical and Electrical requirements.**
- .2 Use skilled mechanics in the appropriate trade and perform all cutting and patching in accordance with this specification.
- .3 This applies to cutting and patching in connection with the continued operation or reactivation of existing services.
- .4 All cutting and patching to be left in suitable condition for final finish.
- .5 Obtain Consultants' approval before cutting, boring, or sleeving load bearing members or partitions.
- .6 Removals and replacement of existing ceiling tiles will be the responsibility of Division 23 and 26 as it may affect their related work.

**21. SEQUENCING/ PHASING OF WORK AND AREA AVAILABILITY**

- .1 Erect hoarding and safety fencing as defined in applicable Section.
- .2 Control access to site after hours by gating off as defined in applicable Section.
- .3 Refer to 01 11 00 for detailed breakdown.

**22. RELICS & ANTIQUITIES**

- .1 Relics and antiquities and items of historical or scientific interest such as cornerstones and contents commemorative plaques, inscribed tablets, and similar objects found on site, shall remain property of Owner. Protect such articles and request directives from

Consultant.

**23. COLD WEATHER WORK**

- .1 Work will proceed under cold weather conditions contractor must "account and include" for the following:
  - .1 Provide all equipment, materials, and enclosures and all necessary power and fuel to offer complete winter protection and temporary heat.
  - .2 Masonry shall apply to CAN-A371-M84 Standards, noting that mortar must be maintained at a temperature of 5°C to 50°C until used.
  - .3 Reference standard for concrete and related work to CAN3-A23.1-M77, #4, ensure that all product for systems are not damaged by cold weather/ frost. Also reference Section 03 30 00, Cast In Place Concrete.
  - .4 Do not proceed with drywall work in unheated damp building.

**24. MATERIALS, PLANT AND EQUIPMENT**

- .1 Materials, plant and equipment specified shall form basis of Bid and Contract. Where more than 1 brand or manufacturer is named in Specifications or on Drawings, choice is Contractors' provided requirements of Drawings and Specifications are met.
- .2 Unless explicit statement is made in Bid/Contract Documents to say no substitutions will be permitted; then works "or approved alternate" are hereby deemed to apply to material, plant and equipment specified by brand or manufacturer, subject to following conditions:
  - a) Request for substitution is made after Contract award and in accordance with provisions for substitutions set out in the General Conditions of the Contract.
  - b) Proposed substitution satisfies all other indicated or specified requirements and conditions.
- .3 Materials, plant and equipment shall not be damaged or defective and shall be of quality compatible with Specifications for purpose intended. If requested provide evidence as to type, source and quality. Remove and replace defective products, at own expense, regardless of previous inspections, and be responsible for delays and expenses caused thereby.
- .4 Replace factory finished equipment, or parts thereof, whose paint finish is damaged and cannot be reasonably remedied by paint touch-up.

**25. MATERIAL STORAGE AND HANDLING**

- .1 Store packaged materials in original, undamaged containers with manufacturer's labels and seals intact. Handle and store materials in accordance with manufacturer's and suppliers' recommendations and in manner to prevent damage to materials during storage and

handling.

**26. CONCEALMENT OF WORK**

- .1 Conceal pipes, ducts, conduits, tubing, wiring and other items requiring concealment in floor, wall and ceiling construction of finished areas except where indicated or specified otherwise. If in doubt as to method of concealment, or intention of Contract Documents in this connection, request clarification from Architect before proceeding with work in question.
- .2 Lay out mechanical and electrical work in advance of concrete placement and furring installation to allow for its proper concealment.

**27. GENERAL WORKMANSHIP**

- .1 Do Work in accordance with industry practice for type of work unless Contract Documents stipulate more precise requirements.
- .2 Do Work in neat and careful manner to retain Work plumb, square and straight.
- .3 Ensure Work is properly related to form close joints and appropriately aligned junctions, edges and surfaces and is free of warp, twist, wind, wave, or other irregularities.
- .4 When required by Specifications or by manufacturer's recommendations, have manufacturer, supplier or accredited agent, inspect work, which incorporates their products.
- .5 Do not permit materials to come in contact with other materials whether in presence of moisture or otherwise if conditions will result in corrosion, stain or discoloration or deterioration of completed Work. Provide compatible, durable separators where such contact is unavoidable.

**28. FASTENERS**

- .1 Supply appropriate fasteners, anchors, accessories, and adhesives required for fabrication and erection of Work.
- .2 Unless specified otherwise use exposed metal fasteners and accessories of same texture, colour and finish as product being fastened.
- .3 Use metal fasteners of same material as metal component being fastened, or of metal which will not generate electrolytic action and cause damage to fastener or metal component under moist conditions. In general use non-corrosive or hot dip galvanized steel anchors occurring on or in exterior wall, slab or other exterior locations, unless higher standard is indicated or specified.
- .4 Fastening devices or adhesives shall be of appropriate type, used in sufficient quantity and in such manner to provide positive, permanent fastening, which will not shift, work loose or fail during occupancy of building due to vibration or other causes resulting from normal use of building. Install anchors at spacing to provide required load/stress carrying capacity. Do not use wood plugs.
- .5 Lay out fasteners neatly, evenly spaced and aligned. Keep exposed fasteners to minimum.

- .6 Supply adequate instructions and templates and, if necessary supervise installation, where fasteners or accessories for your Section are required to be built into work of other Sections.
- .7 Do not use fasteners which will cause spalling, cracking, or deformation or deterioration of material being fastened by or to.
- .8 Do not use powder actuated fastening devices, which are used in tension, without approval. Take stringent safety precautions when using powder actuated fasteners. Use only low velocity plunger-type devices.
- .9 Use adhesives specified, or if not specified, those recommended by manufacturer of materials involved, compatible with materials to be joined, and effective in forming permanent joint of adequate strength.
- .10 Use screws, nails, staples, and other similar, driven fasteners suitable to materials to be joined and to conditions under which they are installed and used. Ensure that in finished work, fasteners are sized to take durable hold under stress to be encountered without damage to finished work.
- .11 Do brazing or soldering to form durable connections of strength adequate to resist stresses to be encountered without deformation of elements joined. Prepare base metals and use methods and materials to ensure clean joint, and to prevent staining, corrosion, discolouration, deformation or other damage to finished Work.
- .12 Do welding to CSA W59-M89 (for steel) or CSA W59.2-M91 (for aluminum) for material and methods, unless specified otherwise. Have welding performed by industry certified operatives to CSA W47.1-83 or CSA W47.2-M87.

**29. ACCESSORIES**

- .1 Provide accessory items or materials required, such as brackets, cleats, connectors, sealants, lubricants, cleaners, protection, and similar items, whether specified or not, so that Work is complete and will perform as required.

**30. DESIGN AND SAFETY REQUIREMENTS FOR TEMPORARY WORK**

- .1 Be responsible for professional design, erection, maintenance and removal of temporary structural and other temporary facilities. Engage and pay for registered Professional Engineering personnel skilled in appropriate disciplines to perform these functions where required by law or by the Contract Documents; and in cases where such temporary facilities and their method of construction are of such nature that Professional Engineering skill is required to produce safe and satisfactory results.

**31. PROTECTION AND SAFETY**

- .1 Comply with requirements of Acts and Regulations with respect to health and safety including Occupational Health and Safety Act, as amended, and Workplace Hazardous Materials Information System (WHMIS) Regulation, including following:

- .1 Before commencement of Work, and throughout Contract, maintain on Site, and readily accessible to all those who may be exposed to hazardous materials, list of hazardous materials proposed for use on Site or Workplace together with current Materials Safety Data Sheet (MSDS).
- .2 Ensure hazardous materials used and/or supplied on Site are labelled in accordance with WHMIS requirements.
- .3 Know and be aware of the procedures for safe handling, storage and use of such hazardous materials including special precautions, safe clean-up and disposal procedures. Conform to Environmental Protection Act for disposal requirements.
- .4 Ensure that those who handle, and/or are exposed to, or are likely to handle or be exposed to, hazardous materials are fully instructed and trained in accordance with WHMIS requirements.
- .2 Protect excavation, trenches and building from damage from rainwater, ground water, backing up of drains or sewers and other water, frost and other weather conditions. Provide sheeting, piling, shoring, pumps, equipment, temporary drainage, protective covering and enclosures. Provide necessary pumps including spare pump for keeping project free of water throughout construction period.
- .3 Protect, relocate and maintain existing, active services wherever they are encountered. Wherever inactive services are encountered, cap them off and remove unwanted portion, with approval of authorities having jurisdiction or public utility concerned in manner approved by them.
- .4 Load no part of structure during construction with load greater than its calculated to bear safely when completed. Make every temporary support as strong as permanent support. Place no load on concrete structure until it has sufficient strength to safely carry such load.
- .5 Adequately protect floors and roofs from drainage. Take special measures when moving heavy loads or equipment on them.
- .6 Keep floors free of oils, grease or other materials likely to discolour them or affect bond applied surfaces including fumes generated by temporary heating devices. Take care not to spill or allow oil, grease, gasoline, diesel and fuel oil, chemicals and other substances to contaminate soil water on or adjacent to site. Should such contamination accidentally occur report it immediately and clean up to satisfaction of Consultant.
- .7 Protect work of other Sections from damage resulting from your work.
- .8 Damaged work shall be made good wherever possible by Section whose work is damaged but at expense of those causing damage.
- .9 Protect glass and other finishes against heat, slag and weld splatter using suitable protective shields or covers.
- .10 Prior to beginning of construction, familiarize yourself if applicable, with fire safety plan prepared by the Client in conjunction with local Fire Chief. Post fire safety plan throughout construction. Do not allow accumulation of waste that may constitute fire hazard.**

- .11 Conform to Construction Safety Association of Ontario's manual on Propane in construction. Watch work area for minimum of 30 minutes after hot work is completed. Provide site fire security when required by local building department and/ or municipal fire department. Ensure that water supply is adequate for fire fighting
- .12 Provide and maintain in working order, suitable Underwriters' labelled fire extinguishers and locate in suitable positions, to approval of authorities having jurisdiction.
- .13 Provide minimum of 3 safety helmets for Consultant and any other authorized visitors to Site if required.
- .14 Protect public and those employed on Work from injury. Equipment (mobile) when not in use shall have keys removed and locked up in secure location.

**32. SCAFFOLDING**

- .1 Erect scaffolding independent of walls. Use it in a manner as to interfere as little as possible with other Sections. When not in use, move it as necessary to permit installation of other work. Construct and maintain scaffolding in rigid, secure and safe manner. Remove it promptly when no longer required.

**33. TEMPORARY CLEANING**

- .1 Keep site, Livingston Avenue and building, including concealed spaces, free from accumulation of dirt, debris, garbage and excess material. Remove oily rags and waste from premises at close of each day, or more often if required. Wash down Livingston Avenue as required.

**34. MANUFACTURERS DIRECTIONS**

- .1 Except where specified otherwise, use each product in accordance with manufacturer's published or written instructions, specifications or recommendations regarding handling, storage, preparation, site conditions, ancillary products or accessories, methods of installation, protection and cleaning. Submit copy of such instructions, and indicate if and where there is discrepancy between them and requirements of specifications and obtain direction.

**35. SPARE PRODUCTS**

- .1 Where specified in other Sections, provide spare materials and products for future repair and replacement.
- .2 Ensure such materials are of same production run as those incorporated in Work.
- .3 Deliver quantities required, in separate labelled containers, and store where directed.
- .4 Labels shall state material description, colour, pattern and location of installation.

**36. ENVIRONMENTAL PRACTICES**

- .1 Take active role in implementing environmentally sound business practices and producing goods and services that lessen burden on environment in production, use and final disposition. Support implementation of reduction, reuse and recycling strategies and use of environmentally sound products. Reduce or eliminate excessive packaging and promote use of environmentally responsible packaging practices.
- a) Environmentally Sound Products: Product that is made, used and disposed of in a manner that significantly reduces harm it would otherwise cause environment. Product may be certified as environmentally sound because it is made in a way that improves energy efficiency, reduces hazardous by-products, uses recycled material, or because the product itself can be recycled or reuses, or in some way is environmentally benign.
  - b) Packaging requirements: Implement waste reduction by reducing or eliminating excessive packaging practices.
  - c) Use, where appropriate, combination of packaging materials such as reusable containers, blanket wrap or cushioning material provided that all reasonable requirements of materials handling, transportation and storage are observed.
  - d) Packaging materials such as Kraft paper and corrugated cartons shall be made from reclaimed products to facilitate recycling of secondary materials.
  - e) Packaging material shall be clearly labelled to display their recycled content and recyclability.
  - f) Ensure that packaging materials are removed from Site and disposed of in environmentally responsible manner.

**37. WASTE DISPOSAL**

- .1 Do not burn rubbish on Site. Obtain approval and use following off-site disposal alternatives, depending upon materials involved; burying, composting, Municipal collection or local dump or sanitary landfill site.

**38. SECURITY**

- .1 General Contractor at their cost, is to be responsible for and provide reasonable security measures to protect the site, building and contents until the date of Substantial Performance which may include but not limited to security personal, surveillance cameras, fencing, night lighting, etc.
- .2 General Contractor and Electrical Contractor to ensure existing building security and life safety systems remain in operation during construction (if applicable).

**39. LINES, LEVELS AND DIMENSIONS**

- .1 Have registered Ontario Land Surveyor establish 1 permanent bench mark on Site, referenced to established bench marks by survey control points. Provide and maintain

control lines and level required. Confirm and co-ordinate with the local municipal office, when setting out. Maintain record as-built survey of all new grades/ levels.

- .2 Lay out work in accordance with lines, levels and dimensions indicated and/or provided on bench marks established by survey.
- .3 Verify lines, levels, and dimensions. Report errors or inconsistencies in drawings and obtain direction before commencing work.
- .4 Except as provided by survey, provide lines, levels, and dimensions necessary to relate your work to work of other Sections.

**40. HOARDING/ FENCING/ PROTECTION/ SECURITY/ TEMPORARY ACCESS/ PARKING**

- .1 Provide and maintain all hoarding, safety fencing, shoring etc. necessary for the protection of workers, public and the work on other properties. Refer to contract documents for location of required hoarding and temporary site access routes.
- .2 Contractor shall be fully responsible for any cost associated to security as it is deemed necessary to site conditions.

**41. SPILL RESPONSE**

- .1 The contractor shall have written spill response procedures and material on site to respond to pollutants and containments into the natural environment in excess of levels permitted in regulations or cause or are likely to cause an adverse effect.

**42. CRIMINAL BACKGROUND CHECK**

- .1 "Under the Collection of Personal Information Regulation, made under the Education Act, the Owner reserves the right to require that a criminal background check (at no cost to the Owner) be conducted on, and/or an offence declaration obtained from, the Service Provider and/or his or her employees and sib-consultants/ sub-contractors who are deemed by the Owner to come into direct contact with pupils on a regular basis. As a condition to the Service Provider providing or continuing to provide services, the Owner may require the replacement of an individual (s) employed/ retained/ contracted by the Service Provider (at no cost to the Owner) if the individual:

- .1 Has prior convictions for offences under the Criminal Code (Canada) for which a pardon under section 4.1 of the Criminal Records Act (Canada) has not been issued or granted and which indicate that the individual could pose a threat to pupils, or
- .2 Has made false Offence Declaration, and/or
- .3 Declines to provide a verification of criminal record.

The Owner will ensure that personal information collected or conveyed to it under this regulation meets the requirements of the Municipal Freedom of information and Protection of Privacy Act."

**43. ASBESTOS AND ASBESTOS REPORT**

- .1 Should the Contractor find additional asbestos containing materials, notify the Consultant and the Owner will arrange for its removal.

**44. COMPLETION**

- .1 **The intent of the Owner is to have the building Work substantially complete by Fall 2025. Total completion for all Site Work is required by Fall 2025.**
- .2 Erect hoarding and safety fencing as necessary to protect the public. Maintain all required Fire Access Routes, hoard as required to provide safe travel and access.
- .3 Carry out work in such a way as to avoid interference with on-going operations of the existing building. This includes, but is not limited to, site access, services, public, building occupants, control of noise and dust etc.
- .4 Recognize that all existing facilities continue to operate through the course of new construction. Maintain all life safety equipment and measures in place. Refer to Drawing A1.3 for required enhanced measures.
- .5 Contractors' and their employees may not enter the existing building except by prior arrangement with the Owner and security personnel or front administrative office.

**END OF SECTION**

**1. CO-ORDINATE**

- .1 Conform to General Instructions.
- .2 Co-ordinate all Sections of the Work.
- .3 Co-ordinate with the Owner for timely inclusion of other trades, and the Work of Other Contractors.

**2. TEMPORARY UTILITIES**

- .1 Provide temporary power by arrangement with the local utility company as defined in Section 01 51 00 Temporary Utilities. If required.
- .2 Provide temporary water by arrangement with the Owner as defined in Section 01 51 00 Temporary Utilities.
- .3 Provide temporary heating and protection measures as defined in Section 01 51 00 Temporary Utilities.

**3. TEMPORARY FACILITIES**

- .1 Locate construction office trailer and trade support trailers, including storage as defined in Section 01 52 00 Construction Facilities.
- .2 Provide telephone and related support equipment within construction office trailer as defined in Section 01 52 00 Construction Facilities.
- .3 Provide temporary sanitary facilities as defined in Section 01 52 00 Construction Facilities.
- .4 Arrange and pay for all costs for temporary power (110V) is available with the owner. Do not interfere with ongoing operation of the existing Building functions.
- .5 Provide hoses and assume all costs of installation of temporary water meter onto fire hydrant, rental and installation and water costs. Do not interfere with the ongoing operation of the existing Building functions.
- .6 **Provide and pay for costs of all temporary heating** and protection measures for all sections and to industry standards. Do not use installed systems without owner approval. If approval is received, clean all systems and replace all filters prior to acceptance by Owner. Contractor to make own arrangements and pay for temporary natural gas for purposes of heating building once it is enclosed.

**4. TEMPORARY HEATING REQUIREMENT THROUGH WINTER CONSTRUCTION**

- .1 Provide any temporary heating required during construction period, including attendance, maintenance and fuel.
- .2 Construction heaters used inside building must be vented to outside or be non-flameless

type. Solid fuel salamanders not permitted.

- .3 Maintain temperatures of minimum 10 degrees Celsius in areas where construction is in progress.
- .4 Ventilate heated areas and keep building free of exhaust or combustion gases.
- .5 Permanent heating system of building, or portions thereof, may be used when available. Be responsible for damage hereto. Change filters. Contractor must make a formal request to do so in writing. An extended warranty of 1 year will be required.
- .6 **Allow for all costs associated with heating during winter months. No additional costs will be entertained.**

## **5. WINTER CONSTRUCTION REQUIREMENTS**

- .1 **When the Work proceeds under winter conditions**, the following apply:
  - .1 Provide all equipment, material and enclosures and all necessary power and fuel to offer complete "winter protection" and "temporary heat" as defined in Section 01 51 00 and section 01 52 00.
  - .2 Masonry and related work to CAN-A371-M94, noting that mortar must be maintained at a temperature of 5°C to 50°C until used.
  - .3 Concrete and related work to CAN3-A23.1-M77.
  - .4 Ensure that products or systems are not damaged by cold weather.
  - .5 Do not proceed with drywall work in unheated, damp building.

## **6. HOARDING, FENCING, PROTECTION, SECURITY, TEMPORARY ACCESS, PARKING**

- .1 Provide site access, roads, parking and security as defined in Section 01 52 00 for Construction Facilities.
- .2 Provide hoarding, fencing and related protection as defined in Section 01 56 00 for Temporary Barriers and Enclosures.

## **7. CLEAN-UP**

- .1 Maintain clean and orderly site.
- .2 Provide refuse receptacles and dumping service in a location approved by the Owner.
- .3 Perform final clean-up of all Sections before turning over to the Owner. Refer to Section 01 74 11 - Cleaning.

## **8. MAINTENANCE MANUALS**

- .1 Provide at the completion of the Work, 4 copies of a Maintenance Manual to the Owner. Include manufacturer's data and instructions for maintenance, adjustment, re-finishing, etc. of all materials and equipment. Include special warranty documentation and information; 3-ring binder format, indexed. **Supply all information to architect for incorporation into Final Record Drawings, for computer update of Tendered Documents, to be paid for by Contractor:**
- .2 **Consultant will withhold a sum of \$10,000.00 from final payment, noted on Certificate for Payment prorated over construction time period, until such time as manuals and as-builts have been submitted and approved and training, commissioning, and demonstration are completed.**
  - .1 The above amount is to be noted as a line item on progress draws.

## **9. SETTING OUT**

- .1 Confirm all dimensions with the Owner, and on site.
- .2 Provide dimensions, levels, etc. to all subcontractors and to the Owner as required.
- .3 **Employ the services of an Ontario Land Surveyor to set out the building and to establish benchmark levels and to verify all grading before final payment. Obtain and pay for Foundation Location Plan and final as built site plan drawing with all grades, etc., by Ontario Land Surveyor.**
  - .1 Provide control points to facilitate the accurate layout of the building on site, prepare stakeout diagrams for field layout.
  - .2 Establish bench marks on the perimeter of the construction area.
  - .3 Verify elevations of floor levels as construction proceeds.
  - .4 Verify accuracy of site dimensions on drawings.
  - .5 Provide as constructed survey to verify location of structure and elevations to update owner's existing database.
  - .6 Merge documented underground services information.

## **10. RECORD DRAWINGS**

- .1 **Maintain continuously a complete set of record prints**, clearly indicating all significant changes from the Contract Documents which will not be visible at the conclusion of Work.
- .2 Record information concurrently with construction progress. Do not conceal work until required information is recorded, and until Architect has reviewed As-built drawings.
- .3 Contract Drawings and shop drawings: legibly mark each item to record actual construction

including:

- .1 Measure depths of elements of foundation in relation to finish first floor datum.
  - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .4 Field changes of dimension and detail.
  - .5 Changes made by Change Orders.
  - .6 Details not on original Contract Drawings.
  - .7 References to related shop drawings and modifications.
- .4 Specifications: legibly mark each item to record actual construction, including:
- .1 Manufacturer, trade name, and catalogue number of each project actually installed, particularly optional items and substitute items.
  - .2 Changes made by Addenda and Change Orders.
- .5 Other Documents: maintain manufacturer's certification, inspection certifications, required by individual specifications sections.
- .6 **Supply Final as built marked up prints to Consultant for incorporation on Computer Drawings as Final record set for Owner.**

## 11. SUPERINTENDANTS

- .1 **Maintain competent superintendants on site full-time at all times that Work is being carried out, to the satisfaction of the Owner.**
- .2 The general contractor to provide one individual, suitably trained and experienced, specifically identified as the project superintendant, who will be on site at all times during construction, right through to the hand-over and completion of deficiencies. If the general contractor decides to change superintendants part-way through the project, it is to be with the agreement of the Consultant and Owner. Any replacement would have to meet the above requirements and be accepted by the Consultant and Owner.

## 12. SHOP DRAWINGS

- .1 Thoroughly examine submitted shop drawings and indicate the contractor's approval on them prior to submitting to the Consultants. Check all dimensions and conformance with Project Manual.
- .2 **Before commencing Work, prepare to the Consultant's satisfaction a schedule for submission of all required Shop Drawings. (See attached submittal checklist section 01 33 00).**
- .3 **Reproductions of Consultant's drawings will not be permitted.**
- .4 Provide specified shop drawings to Consultant for approval or in **PDF file format.**

- .5 Contractor must submit all shop drawings within **4 weeks** of award of contract.

**13. COST BREAKDOWN**

- .1 Before submitting first progress claim, submit breakdown of Contract Price in detail as directed by Consultant and aggregating Contract Price. After approval by consultant, cost breakdown will be used as basis for progress payment.
- .2 Include a detailed mechanical and electrical breakdown. A lump sum will not be permitted.

**14. MAKING GOOD**

- .1 Make good any existing surfaces disturbed by any cause during construction, to a condition at least equivalent to that in place before your work was commenced.

**15. CONSTRUCTION SCHEDULE (REFERENCE DECLARATION STATEMENT- TENDER FORM)**

- .1 **Provide within 14 working days after Contract award, a schedule showing progress stages and final completion of work, all to the satisfaction of the Consultant. Completion dates for construction is to be as defined in Supplementary Conditions.**

**16. EXISTING UTILITIES**

- .1 Arrange for location of all existing utilities prior to commencing any Work on site.
- .2 Verify with Owner.

**17. OTHER CONTRACTORS**

- .1 There may be 'Other Contractors' engaged under separate contracts completing Work. The Contractor will be provided with information on that Work By Others during construction. The Contractor must co-ordinate with the Other Contractors for the completion of the project.
- .2 This Contractor must examine the work of the Other Contractors upon which your work depends, advising the Consultant of any evident deficiency. Any trade applying their Work over that deficient work, shall be required to replace it at no expense to the Owner. Any trade that has a concern with the quality if any preceding work, should report their concerns immediately to the general contractor so that it can be replaces/ repaired as soon as possible so as to not delay the project schedule.

**18. INSPECTION AND TESTING**

- .1 Arrange for all required testing and pay costs from Cash Allowance, Section 01 21 00.
- .2 Testing requirements include concrete, compaction, mortar, welding of structural steel, asphalt pavement, roofing, and other items to be established by the Consultant.
- .3 The cost of retesting any work found to be substandard will be paid for by the trade responsible.
- .4 All test results to be forwarded electronically to applicable consultant team and Owner.

**19. GEOTECHNICAL CONSULTANT**

- .1 **Retain for Tender the services of a Geotechnical Consultant, to review excavation before placing of footings and test for compaction at Owner's approval.**
- .2 Pay for these services from Cash Allowance Section 01 21 00 at Owner's approval.

**END OF SECTION**

**Part 1            General**

**1.1                Related Sections**

- .1            Section 01 33 00 - Submittal Procedures.

**1.2                Work Covered By Contract Documents**

- .1            Work of this Contract comprises of WEGO Garage Addition, Niagara Falls, Ontario

**1.3                Scheduling of the Work**

- .1            The General Contractor shall perform their work in full cooperation with other trades, and co-ordinate the schedule and sequence of all work with other trade.
- .2            Refer to A1-200 series drawings for Phasing information as part of tender package (if applicable).
- .3            Refer to Section 01 00 05 General Instruction for Substantial Completion Date.

**1.4                Pre-ordered Products Pre-bid Work**

- .1            Refer to Division 23 and 26

**1.5                Pre-purchased Equipment**

- .1            Refer to Division 23 and 26

**1.6                Owner Furnished Items**

- .1            Not Used

**Part 2            Products**

**2.1                Not Used**

- .1            Not used.

**Part 3            Execution**

**3.1                Not Used**

- .1            Not used.

**END OF SECTION**

**Part 1            General**

**1.1                ACCESS AND EGRESS**

- .1        Design, construct and maintain temporary "access to" and "egress from" work areas, including stairs, runways, ramps or ladders and scaffolding, independent of finished surfaces and in accordance with relevant municipal, provincial and other regulations.

**1.2                USE OF SITE AND FACILITIES**

- .1        Execute work with least possible interference or disturbance to normal use of premises. Make arrangements with the Owner to facilitate work as stated.
- .2        Maintain existing services to building and provide for personnel and vehicle access.
- .3        Where security is reduced by work provide temporary means to maintain security.
- .4        The Owner will not assign sanitary facilities for use by Contractor's personnel. Contractor to provide own facilities.
- .5        Closures: protect work temporarily until permanent enclosures are completed.

**1.3                ALTERATIONS, ADDITIONS OR REPAIRS TO EXISTING BUILDING**

- .1        Execute work with least possible interference or disturbance to building operations occupants, public and normal use of premises. Arrange with Owner to facilitate execution of work.

**1.4                EXISTING SERVICES**

- .1        Notify Owner and utility companies of intended interruption of services and obtain required permission.
- .2        Where Work involves breaking into or connecting to existing services, provide Owner a minimum of 48 hours notice for necessary interruption to mechanical or electrical service throughout course of work. Keep duration of interruptions at a minimum. Carry out interruptions after normal working hours of occupants, preferably on weekends.
- .3        Provide for personnel, pedestrian and vehicular traffic.
- .4        Construct barriers in accordance with Section 01 56 00 - Temporary Barriers and Enclosures.

**1.5                SPECIAL REQUIREMENTS**

- .1        Ensure that Contractor personnel employed on site become familiar with and obey regulations including safety, fire, traffic and security regulations.
- .2        Keep within limits of work and avenues of ingress and egress.
- .3        Deliver materials outside of peak traffic hours during school unless otherwise approved by Owner.

**1.6 BUILDING SMOKING ENVIRONMENT**

- .1 Comply with smoking restrictions. Smoking is not allowed on property, even during summer holidays.

**1.7 FIRE PROTECTION**

- .1 General Contractor to provide and maintain temporary fire protection equipment during construction.
- .2 **A fire safety plan is to be posted on Site prepared in conjunction with the local Fire Department, attention to the current Fire Chief or Fire prevention officer.**
- .3 General Contractor and all sub-trades to regularly remove waste that may constitute a fire hazard.
- .4 An adequate water supply for fire fighting is to be maintained throughout construction.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**1. SECTION INCLUDES**

- .1 Schedule, form, content.
- .2 Scheduled revisions
- .3 Critical path scheduling

**2. RELATED SECTION**

- 1. General Work - Section 01 00 10
- 2. Submittal Schedule – Section 01 33 00

**3. SCHEDULES REQUIRED**

- .1 Submit the following schedules:
  - .1 Construction Progress Schedule
  - .2 Submittal Schedule for Shop Drawings and Product Data
  - .3 Product Delivery Schedule

**4. FORMAT**

- .1 Prepare schedule in the form of a horizontal bar chart.
- .2 Provide a separate bar for each trade or operation.
- .3 Provide horizontal time scale identifying the first work day of each week.
- .4 Format for listings: The Table of Contents of this specification.
- .5 Identification of listings: By Specification Subjects.

**5. SUBMISSION**

- .1 Submit initial schedules within **14 days** after award of Contract.
- .2 Submit one opaque reproduction, plus two copies to be retained by the Consultant.
- .3 Consultant will review schedule and return review copy within 5 days after receipt.
- .4 Resubmit finalized schedule within **7 days** after return of review copy.
- .5 Submit revised progress schedule with each application for payment.
- .6 Distribute copies of the revised schedule to:
  - .1 Job site office.
  - .2 Subcontractors.
  - .3 Other concerned parties.

- .7 Instruct recipients to report to the Contractor within 10 days, any problems anticipated by the timetable shown in the schedule.

## **6. CONSTRUCTION PROGRESS SCHEDULE**

- .1 Include the complete sequence of construction activities.
- .1 Refer to Section 01 00 05 General Instructions for Substantial Completion date.
- .2 Refer to A1-200 series drawings for project phasing if applicable.
- .2 Include the dates for the commencement and completion of each major elements of construction:
- a) Demolition
  - b) Foundations
  - c) Masonry
  - d) Mechanical Rough-In
  - e) Electrical Rough-In
  - f) Mechanical Finishes
  - g) Electrical Finishes
  - h) Millwork
  - i) Doors and Frames
  - j) Ceilings
  - k) Flooring
  - l) Painting
  - m) Structural Steel
  - n) Roofing
  - o) Windows
  - p) Asphalt
  - q) Site Work
  - r) Site Services
  - s) Demolition of Senior School
- .3 Show projected percentage of completion of each item as of the first day of the month.
- .4 Indicate progress of each activity to date of submission schedule.
- .5 Show changes occurring since previous submission of schedule:
- .1 Major changes in scope.
  - .2 Activities modified since previous submission.
  - .3 Revised projections of progress and completion.
  - .4 Other identifiable changes.
- .6 Provide a narrative report to define:
- .1 Problem areas, anticipated delays, and the impact on the schedule.
  - .2 Corrective action recommended and its effect
  - .3 The effect of changes on schedules of other prime contractors.

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1      Shop drawings and product data.
- .2      Samples.
- .3      Certificates and transcripts.

**1.2                RELATED SECTIONS**

- .1      Section 01 30 10 – Construction Schedule.
- .2      Section 01 45 00 - Quality Control.
- .3      Section 01 74 19 – Construction/Demolition Waste Management and Disposal
- .4      Section 01 78 00 - Closeout Submittals.
- .5      Section 01 79 00 - Demonstration and Training.
- .6      Section 23 05 54 - Mechanical Identification.

**1.3                REFERENCES**

- .1      Canadian Construction Documents Committee (CCDC)
  - .1      CCDC 2-**2008**, Stipulated Price Contract.

**1.4                ADMINISTRATIVE**

- .1      Submit to Consultant submittals listed for review. Submit with reasonable promptness and in orderly sequence so as to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2      Work affected by submittal shall not proceed until review is complete.
- .3      Present shop drawings, product data, samples and mock-ups in SI Metric units.
- .4      Where items or information is not produced in SI Metric units converted values are acceptable provided SI Metric units are shown in parenthesis.
- .5      Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and shall be considered rejected.
- .6      Notify Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.

- .7 Verify field measurements and affected adjacent Works are coordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Consultants review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
- .10 Keep one reviewed copy of each submission on site.

## **1.5 SHOP DRAWINGS AND PRODUCT DATA**

- .1 Refer to CCDC 2 GC 3.10.
- .2 The term "shop drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .3 Consultant's AutoCAD files will not be made available to contractors for use in creation of shop drawings.
- .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been coordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design drawings and specifications.
- .5 Allow **10** working days for Consultant's review of each submission.
- .6 Adjustments made on shop drawings by Engineer and Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.
- .7 Make changes in shop drawings as Consultant may require, consistent with Contract Documents. When resubmitting, notify Consultant in writing of any revisions other than those requested.
- .8 Accompany submissions with transmittal letter, in duplicate, containing:
  - .1 Date.
  - .2 Project title and number.
  - .3 Contractor's name and address.
  - .4 Identification and quantity of each shop drawing, product data and sample.
  - .5 Other pertinent data.
- .9 Submissions shall include:
  - .1 Date and revision dates.
  - .2 Project title and number.
  - .3 Name and address of:
    - .1 Subcontractor.
    - .2 Supplier.
    - .3 Manufacturer.

- .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
- .5 Details of appropriate portions of Work as applicable:
  - .1 Fabrication.
  - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
  - .3 Setting or erection details.
  - .4 Capacities.
  - .5 Performance characteristics.
  - .6 Standards.
  - .7 Operating weight.
  - .8 Wiring diagrams.
  - .9 Single line and schematic diagrams.
  - .10 Relationship to adjacent work.
- .10 After Consultant's review, distribute copies.
- .11 Submit digital shop drawings for each requirement requested in specification Sections and as consultant may reasonably request.
- .12 Submit digital product data sheets or brochures for requirements requested in specification Sections and as requested by Consultant where shop drawings will not be prepared due to standardized manufacture of product.
- .13 Delete information not applicable to project.
- .14 Supplement standard information to provide details applicable to project.
- .15 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, copies will be returned and fabrication and installation of Work may proceed. If shop drawings are rejected, noted copy will be returned and resubmission of corrected shop drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .16 Reproduction of Consultant's drawings will not be permitted. For a fee paid to consultant, CAD files may be made available to assist in preparation of shop drawings.

## **1.6 SAMPLES**

- .1 Submit for review samples in duplicate as requested in respective specification Sections. Label samples with origin and intended use.
- .2 Deliver samples prepaid to Consultant's business address.
- .3 Notify Consultant in writing, at time of submission of deviations in samples from requirements of Contract Documents.
- .4 Where colour, pattern or texture is criterion, submit full range of samples.
- .5 Adjustments made on samples by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

- .6 Make changes in samples which Consultant may require, consistent with Contract Documents.
- .7 Reviewed and accepted samples will become standard of workmanship and material against which installed Work will be verified.

**1.7 MOCK-UPS**

- .1 Erect mock-ups in accordance with 01 33 10 Submittal checklist and 01 45 00 - Quality Control.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1            Section 01 33 00 - Submittal procedures.

**1.2                REFERENCES**

- .1            Canada Labour Code (December 2010), Part 2, Canada Occupational Safety and Health Regulations.
- .2            Province of Ontario
  - 1.            Occupational Health and Safety Act and Regulations for Construction Projects, Ontario regulation 213/91; December 2016.

**1.3                SUBMITTALS**

- .1            Make submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2            Submit site-specific Health and Safety Plan: Within 7 days after date of Notice to Proceed and prior to commencement of Work. Health and Safety Plan must include:
  - .1            Results of site specific safety hazard assessment.
  - .2            Results of safety and health risk or hazard analysis for site tasks and operation found in work plan.
- .3            Submit copies of reports or directions issued by Federal, Provincial and Territorial health and safety inspectors.
- .4            Submit copies of incident and accident reports.
- .5            Submit Material Safety Data Sheets (MSDS) to Consultant.
- .6            Consultant may review Contractor's site-specific Health and Safety Plan and provide comments to Contractor. Revise plan as appropriate and resubmit plan to Consultant within 5 days after receipt of comments from Consultant.
- .7            Consultant's review of Contractor's final Health and Safety plan should not be construed as approval and does not reduce the Contractor's overall responsibility for construction Health and Safety.
- .8            Medical Surveillance: Where prescribed by legislation, regulation or safety program, submit certification of medical surveillance for site personnel prior to commencement of Work, and submit additional certifications for any new site personnel to Consultant.
- .9            On-site Contingency and Emergency Response Plan: Address standard operating procedures to be implemented during emergency situations.

**1.4                FILING OF NOTICE**

- .1            File Notice of Project with Provincial authorities prior to commencement of Work.

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**1.5 SAFETY ASSESSMENT**

- .1 Perform site specific safety hazard assessment related to project.

**1.6 MEETINGS**

- .1 Schedule and administer Health and Safety meeting with the Owners' representative prior to commencement of Work.

**1.7 HAZARDOUS MATERIAL AND ASBESTOS ABATEMENT**

- .1 All related Work will be by the Owner.

**1.8 SITE CONDITIONS**

- .1 Refer to site condition and assessment reports for any hazardous or contaminated materials or substances present at project site. List relevant hazardous or contaminated materials or substances required by the authority having jurisdiction which needs to be included in the contractor's Health and Safety Plan.
- .2 Develop written site-specific Health and Safety Plan based on hazard assessment prior to commencing any site Work and continue to implement, maintain, and enforce plan until final demobilization from site. Health and Safety Plan must address project specifications.
- .3 Consultant may respond in writing, where deficiencies or concerns are noted and may request re-submission with correction of deficiencies or concerns.

**1.9 RESPONSIBILITY**

- .1 Be responsible for health and safety of persons on site, safety of property on site and for protection of persons adjacent to site and environment to extent that they may be affected by conduct of Work.
- .2 Comply with and enforce compliance by employees with safety requirements of Contract Documents, applicable federal, provincial, territorial and local statutes, regulations, and ordinances, and with site-specific Health and Safety Plan.

**1.10 UNFORSEEN HAZARDS**

- .1 Should any unforeseen or peculiar safety-related factor, hazard, or condition become evident during performance of Work, and follow procedures in place for Employee's Right to Refuse Work in accordance with Acts and Regulations of Province having jurisdiction. Advise Consultant verbally and in writing.

**1.11 HEALTH AND SAFETY CO-ORDINATOR**

- .1 Employ and assign to Work, competent and authorized representative as Health and Safety Co-ordinator. Health and Safety Co-ordinator must:
  - .1 Have minimum 2 years' site-related working experience specific to activities associated with construction.
  - .2 Have a working knowledge of occupational safety and health regulations.
  - .3 Be responsible for completing Contractor's Health and Safety Training Sessions and ensuring that personnel not successfully completing required training are not permitted to enter site to perform Work.

- .4 Be responsible for implementing, enforcing daily and monitoring site-specific Contractor's Health and Safety Plan.
- .5 Be on site during execution of Work.

**1.12 POSTING OF DOCUMENTS**

- .1 Ensure applicable items, articles, notices and orders are posted in conspicuous location on site in accordance with Acts and Regulations of Province having jurisdiction.

**1.13 CORRECTION OF NON-COMPLIANCE**

- .1 Immediately address health and safety non-compliance issues identified by authority having jurisdiction.
- .2 Provide Consultant with written report of action taken to correct non-compliance of health and safety issues identified.
- .3 Consultant may stop Work if non-compliance of health and safety regulations is not corrected.

**1.14 BLASTING**

- .1 Blasting or other use of explosives is not permitted.

**1.15 POWDER ACTUATED DEVICES**

- .1 Use powder actuated devices only after receipt of written permission from Consultant.

**1.16 WORK STOPPAGE**

- .1 Give precedence to safety and health of public and site personnel and protection of environment over cost and schedule considerations for Work.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not used.

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1        Administrative, temporary and procedural requirements for the deconstruction of structures.

**1.2                RELATED SECTIONS**

- .1        Section 01 33 00 - Submittal Procedures.
- .2        Section 01 35 43 - Environmental Procedures.

**1.3                REFERENCES**

- .1        Federal Legislation
  - .1        Canadian Environmental Protection Act, 1999, c. 33 (CEPA).
  - .2        Canadian Environmental Assessment Act, 1992, c. 37 (CEAA).
  - .3        Transportation of Dangerous Goods Act 1992, c. 34 (TDGA).
  - .4        Motor Vehicle Safety Act 1993, c. 16 (MVSA).

**1.4                DEFINITIONS**

- .1        Alternate Disposal: Reuse and recycling of materials by designated facility, user or receiving organization which has valid Certificate of Approval to operate. Alternative to landfill disposal.
- .2        Deconstruction: Systematic dismantling of structure to salvage materials for reuse. What cannot be reused is considered subsequently for recycling. Ultimate objective is to recover potentially valuable resources while diverting from landfill what has traditionally been significant portion of waste stream.
- .3        Demolition: Rapid destruction of structure with or without prior removal of hazardous materials.
- .4        Disassembly: Physical detachment of materials from structure and may include: prying, pulling, cutting, unscrewing.
- .5        Hauler: Company (possessing appropriate and valid Certificate of Approval) contracted to transport waste, reusable or recyclable materials off site to designated facility, user or receiving organization.
- .6        Hazardous Materials: Dangerous substances, dangerous goods, hazardous commodities and hazardous products, may include but not limited to: poisons, corrosive agents, flammable substances, ammunition, explosives, radioactive substances, or other material that can endanger human health or well being or environment if handled improperly.
- .7        Processing: Tasks which are subsequent to disassembly and may include: moving materials, de-nailing, cleaning, separating and stacking.

- .8 Recyclable: Ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse by others.
- .9 Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .10 Recycling: Process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .11 Reuse: repeated use of product in same form but not necessarily for same purpose.  
Reuse includes:
  - .1 Salvaging reusable materials from remodelling Projects before the demolition stage, for resale, reuse on current project or for storage for use on future projects.
  - .2 Returning reusable items may include pallets and unused products to vendors.
- .12 Salvage: Removal of structural and non-structural structure materials from industrial, commercial and institutional structure deconstruction/disassembly projects for purpose of reuse or recycling.
- .13 Source Separation: Acts of keeping different types of waste materials separate beginning from first time they become waste.
- .14 Used Building Material Receipt: Receipt issued at end destination for materials designated for alternate disposal.
- .15 Waste Audit (WA): Detailed inventory of materials in building. Involves quantifying (by volume or weight) amounts of materials and wastes generated during deconstruction. Indicates quantities of reuse, recycling and landfill.
- .16 Weigh bill: Receipt received from recycling facility indicating weight and content of each load/bin of material.

## **1.5 SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 - Submittal Procedures.
- .2 WMC is responsible for fulfillment of reporting requirements.
- .3 Submit copies of certified weigh bills, bills of lading, used building material receipts from authorized disposal sites and reuse and recycling facilities for material removed from site to Consultant at specified project milestones or upon request.
- .4 Workers, haulers and subcontractors must possess current, applicable Certificates of Approval or permits to remove, handle and dispose of wastes categorized municipally as hazardous.
  - .1 Provide proof of compliance within 24 hours upon receipt of written request of Consultant.

- .5 Keep copies of submittals on file for minimum of 2 years after completion of project.

## **1.6 DECONSTRUCTION DRAWINGS**

- .1 Where required by authorities having jurisdiction, submit for approval drawings, diagrams and details showing sequence of deconstruction work, materials designated for salvage and support of structures and underpinning.
- .2 Submit drawings stamped and signed by qualified professional Engineer or Architect registered or licensed in Province of Ontario, Canada.

## **1.7 QUALITY ASSURANCE**

- .1 Qualifications: Provide adequate workforce training through meetings and demonstrations. Have someone on site with deconstruction experience throughout project for consultation and supervision purposes.
- .2 Regulatory Requirements: Ensure Work is performed in compliance with CEPA, CEAA, TDGA, MVSA, and applicable Provincial regulations.
- .3 Meetings: Hold project meetings every two weeks.
  - .1 Ensure key personnel, site supervisor, project manager, subcontractor representatives attend.
  - .2 Consultant will provide written notification of any change to regular meeting schedule established upon contract award to Contractor 24 hours prior to scheduled meeting.

## **1.8 SITE CONDITIONS**

- .1 Existing Conditions:
  - .1 Should materials resembling spray or trowel applied asbestos or other designated substance listed as hazardous be encountered in course of deconstruction, stop work, take preventative measures, and notify Consultant immediately. Do not proceed until written instructions have been received.
  - .2 Base structures to be deconstructed on their condition on date of contract award. Be responsible for provision of services required for deconstruction.
- .2 Storage:
  - .1 Store materials salvaged for reuse and recycling and designated for alternate disposal in locations as directed by Consultant.
  - .2 Maximum permitted duration of material storage on site determined in consultation with Consultant after project completion.

## **1.9 ENVIRONMENTAL PROTECTION**

- .1 Ensure Work is done in accordance with Section 01 35 43 - Environmental Procedures.
- .2 Ensure deconstruction work does not adversely affect adjacent watercourses, groundwater and wildlife, or contribute to excess air noise pollution.
- .3 Fires and burning of waste or materials is not permitted on site.

- .4 Do not bury waste or materials on site unless approved in writing by Consultant.
- .5 Do not dispose of waste or volatile materials into watercourses, storm or sanitary sewers.
  - .1 Ensure proper disposal procedures in accordance with CEPA, TDGA and applicable Provincial regulations.
- .6 Do not pump water containing suspended materials into watercourses, storm or sanitary sewers, or onto adjacent properties in accordance with authorities having jurisdiction.
- .7 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with authorities having jurisdiction.
- .8 Protect trees, plants and foliage on site and adjacent properties where indicated.
- .9 Prevent extraneous materials from contaminating air beyond deconstruction area, by providing temporary enclosures during Work.
- .10 Cover or wet down dry materials and waste to prevent blowing dust and debris. Control dust on temporary roads.
- .11 Employ reasonable means necessary and erect temporary fencing to protect salvaged materials from vandalism, theft, adverse weather, or inadvertent damage by heavy machinery.
- .12 Use natural lighting to do Work where possible.
  - .1 Shut off lighting except those required for security purposes at end of each day.
- .13 Organize site and workers in manner which promotes efficient flow of materials through disassembly, processing, stockpiling, and removal.

**1.10 SCHEDULING**

- .1 Employ necessary means to meet project time lines without compromising specified minimum rates of material diversion. In event of unforeseen delay notify Consultant in writing.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 SITE VERIFICATION OF CONDITIONS**

- .1 Investigate site and structures to determine dismantling, processing and storage logistics required prior to beginning of Work.
- .2 Develop strategy for deconstruction to facilitate optimum salvage of reusable and recyclable materials.

**3.2 PREPARATION**

- .1 Obtain necessary permits and approvals including Fire Marshall and demolition.
  - .1 Provide copies to Consultant prior to start of Work on site.
- .2 Post signs in visible locations and appropriate languages which indicates to workers, subcontractors, haulers, and public, stockpiling of each material, bin location and use e.g. ("CLEAN WOOD ONLY").

**3.3 REMOVAL FROM SITE**

- .1 Transport material designated for alternate disposal using approved haulers, facilities, and receiving organizations as directed by Consultant and in accordance with applicable regulations.
  - .1 Written authorization from Consultant is required to deviate from haulers, facilities, and receiving organizations.
- .2 Dispose of materials not designated for alternate disposal in accordance with applicable regulations.
  - .1 Disposal facilities must be those approved by authorize having jurisdiction.
  - .2 Written authorization from Consultant is required to deviate from disposal facilities.

**END OF SECTION**

**Part 1            General**

**1.1                Section Includes**

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

**1.2                Related Sections**

- .1        Section 01 21 00 - Allowances.
- .2        Section 01 33 00 - Submittal Procedures.
- .3        Section 01 33 10 - Submittal Checklist
- .4        Section 01 78 00 - Closeout Submittals.

**1.3                References**

- .1        Canadian Construction Documents Committee (CCDC)
  - .1        CCDC 2-2008, Stipulated Price Contract.

**1.4                Inspection**

- .1        Refer to CCDC 2, GC 2.3.

**1.5                Independent Inspection Agencies**

- .1        Independent Inspection/Testing Agencies will be engaged by Contractor for purpose of inspecting and/or testing portions of Work. Cost of services for testing or retesting will be borne by Contractor.
- .2        Allocated costs: to Section 01 21 00 - Allowances.
- .3        Provide equipment required for executing inspection and testing by appointed agencies.
- .4        Employment of inspection/testing agencies does not relax responsibility to perform Work in accordance with Contract Documents.
- .5        If defects are revealed during inspection and/or testing, appointed agency will request additional inspection and/or testing to ascertain full degree of defect. Correct defect and irregularities as advised by Consultant at no cost to Consultant.

**1.6 Access To Work**

- .1 Allow inspection/testing agencies access to Work, off site manufacturing and fabrication plants.
- .2 Co-operate to provide reasonable facilities for such access.

**1.7 Procedures**

- .1 Notify appropriate agency Consultant in advance of 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 Work.
- .3 Provide labour and facilities to obtain and handle samples and materials on site. Provide sufficient space to store and cure test samples.

**1.8 Rejected Work**

- .1 Refer to CCDC, GC 2.4.

**1.9 Reports**

- .1 Submit 4 copies of inspection and test reports to Consultant.
- .2 Provide copies to Subcontractor of work being inspected or tested and/or manufacturer or fabricator of material being inspected or tested.

**1.10 Tests And Mix Designs**

- .1 Furnish test results and mix designs as may be requested.
- .2 The cost of tests and mix designs beyond those called for in Contract Documents or beyond those required by law of Place of Work shall be appraised by Consultant and may be authorized as recoverable.

**1.11 Mock-ups**

- .1 Prepare mock-ups for Work specifically requested in specifications. Include for Work of all Sections required to provide mock-ups. See section 01 33 10
- .2 Construct in all locations acceptable to Consultant, as specified in specific Section.
- .3 Prepare mock-ups for Consultant's review with reasonable promptness and in an orderly sequence, so as not to cause any delay in Work.
- .4 Failure to prepare mock-ups in ample time is not considered sufficient reason for an extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .5 If requested, Consultant will assist in preparing a schedule fixing dates for preparation.
- .6 Remove mock-up at conclusion of Work or when acceptable to Consultant.

- .7 Mock-ups may remain as part of Work.
- .8 Specification section identifies whether mock-up may remain as part of Work or if it is to be removed and when.

**1.12 Mill Tests**

- .1 Submit mill test certificates as required of specification Sections.

**1.13 Equipment And Systems**

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

**Part 2 Products**

**2.1 Not Used**

- .1 Not Used.

**Part 3 Execution**

**3.1 Not Used**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1            Temporary utilities.

**1.2                RELATED SECTIONS**

- .1            General Work Section 01 00 10.
- .2            Temporary Facilities Section 01 52 00.

**1.3                INSTALLATION AND REMOVAL**

- .1            Provide temporary utilities controls in order to execute work expeditiously.
- .2            Remove from site all such work after use.

**1.4                DEWATERING**

- .1            Provide temporary drainage and pumping facilities to keep excavations and site free from standing water.

**1.5                WATER SUPPLY**

- .1            Water supply is available from the existing building and will be provided for construction usage at no cost.
- .2            Cost for Construction water will be paid for by the General Contractor.
- .3            Cost for connection to the existing system shall be paid for by the Contractor. The Contractor is to provide his own hoses for construction use.
- .4            Do not interfere with the ongoing operation of the existing building functions.
- .5            Permanent water supply system installed under this contract may be used for construction requirements with prior approval from the Consultant provided that guarantees are not affected. Make good any damage.

**1.6                FIRE PROTECTION**

- .1            Provide and maintain temporary fire protection equipment during performance of work required by insurance companies having jurisdiction and governing codes, regulations and bylaws.
- .2            Open and burning of rubbish are not permitted on site.

**1.7                POWER AND LIGHT**

- .1            Arrange and pay for connection to provide temporary power (110V) by arrangement with the local utility company.

- .2 Electrical power and lighting systems installed under this contact may be used for construction requirements with prior approval of Consultant provided that guarantees are not affected. Make good damage. Replace lamps, which have been used over a period of 3 months.

## **1.8 HEATING & VENTILATING**

- .1 Construction heaters used inside building must be vented to outside or be non-flameless type. Ventilate heated areas and keep building free of exhaust or combustion gases Solid fuel salamanders not permitted.
- .2 Pay for costs of temporary heat and ventilation used during construction, including costs of installation, fuel, operation, maintenance and removal of equipment. Use of direct-fired heaters discharging waste products into work areas will not be permitted.
- .3 Provide temporary heat and ventilation in enclosed areas as required to:
  - .1 Facilitate progress of work
  - .2 Protect work and products against dampness and cold.
  - .3 Prevent moisture condensation on surfaces
  - .4 Provide ambient temperatures and humidity levels for storage, installation and curing of materials.
  - .5 Provide adequate ventilation to meet health regulations for safe working environment.
- .4 Maintain minimum temperature of 10°C or higher where specified as soon as finishing work is commenced and maintain until acceptance of structure by Consultant.
- .5 Ventilating:
  - .1 Prevent hazardous accumulations of dust, fumes, mists, vapours, or gases, in areas occupied during construction.
  - .2 Provide local exhaust ventilation to prevent harmful accumulation of hazardous substances into atmosphere of occupied areas.
  - .3 Provide mechanical ventilation to accelerate drying out of building if necessary to maintain schedule.
  - .4 Ventilate storage spaces containing hazardous or volatile materials.
  - .5 Continue operation of ventilation and exhaust system for time after cessation of work process to assure removal of harmful elements.
- .6 Maintain strict supervision of operation of temporary heating and ventilating equipment to:
  - .1 Conform with applicable codes and standards
  - .2 Enforce safe practices
  - .3 Prevent abuse of services
  - .4 Prevent damage to finishes
  - .5 Vent direct-fired combustion units to outside.

- .7 Permanent heating system of building, or portions thereof, may be used when available. Be responsible for damage thereto. Do not use installed systems without owner approval. If approval is received, the Contractor is to make own arrangements and pay for all fuel costs for purposes of heating building once it is enclosed during construction. Activate air system after Consultant is satisfied that system will not be damaged by freezing. Protect ducting system by disposable filters 50% effective NDS inspected daily and replaced as necessary.
- .8 Upon completion of work or once the Owner is awarded partial or final occupancy for which permanent heating system is used, the Contractor must thoroughly clean and vacuum the system and replace all filters to the satisfaction of the Consultant.
- .9 Date of Substantial Performance and Warranties for heating system do not commence until entire system is in as near original condition as possible and is so certified by Consultant.
- .10 Refer to Section 01 74 11 Cleaning for replacement of filters at time of final acceptance of work.

## **1.9 CONSTRUCTION OFFICE SUPPORT EQUIPMENT**

- .1 Provide office support equipment according to Section 01 52 00 for Construction Facilities.

## **1.10 SANITARY FACILITIES**

- .1 Provide sanitary facilities according to Section 01 52 00 for Construction Facilities.

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1      Construction aids.
- .2      Office and sheds
- .3      Parking
- .4      Project identification

**1.2                RELATED SECTIONS**

- .1      Section 01 00 10 – General Work.
- .2      Section 01 51 00 - Temporary Utilities
- .3      Section 01 56 00 - Temporary Barriers and Enclosures

**1.3                REFERENCES**

- .1      Canadian Construction Documents Committee (CCDC)
  - .1      CCDC 2-2008, Stipulated Price Contract.
- .2      Canadian General Standards Board (CGSB)
  - .1      CGSB 1-GP-189-2000, Primer, Alkyd, Wood, Exterior.
  - .2      CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .3      Canadian Standards Association (CSA International)
  - .1      CAN3-A23.1-/A23.2-94, Concrete Materials and Methods for Concrete Construction/Method of Test for Concrete.
  - .2      CSA-0121-M1978, Douglas Fir Plywood.
  - .3      CAN/CSA-Z321-96, Signs and Symbols for the Occupational Environment.

**1.4                INSTALLATION AND REMOVAL**

- .1      Provide construction facilities in order to execute work expeditiously.
- .2      Remove from site all such work after use.

**1.5                SCAFFOLDING**

- .1      Provide, construct and maintain scaffolding, ramps, ladders, swing staging, platforms and temporary stairs etc. in a rigid, secure and safe manner.
- .2      Erect scaffolding independent of walls. Remove promptly when no longer required. Refer to Section 01 54 50 for safety requirements for scaffolding.

**1.6 HOISTING**

- .1 Provide, operate and maintain hoists cranes required for moving of workers, materials and equipment. Make financial arrangements with Subcontractors for use thereof.
- .2 Hoists cranes shall be operated by qualified operator.

**1.7 ELEVATORS**

- .1 Existing elevators may not be used for transporting construction personnel and materials unless approved by the Consultant.
- .2 If permitted use is approved the Contractor is to provide protective covering for finish surfaces of cars and entrances.

**1.8 SITE STORAGE / LOADING**

- .1 Refer to CCDC 2, GC 3.11.

**1.9 ACCESS / TRAFFIC**

- .1 Provide and maintain access to project site as indicated in construction documents.
- .2 Do not interfere with adjacent and local existing traffic patterns including such items as bus routes, drop-off/ pick-up lanes etc.
- .3 If authorized to use existing roads for access to project site, maintain such roads for duration of Contract and make good damage resulting from Contractor's use of roads.

**1.10 CONSTRUCTION PARKING**

- .1 Parking will be permitted on site as indicated in the contract documents.

**1.11 SECURITY**

- .1 As per Section 01 00 05 General Instructions.

**1.12 CONSTRUCTION OFFICE**

- .1 Provide a site office heated to 22 °C, lighted to 750 lx and ventilated. Office to be located on site as indicated on the construction documents. The office is to be of sufficient size to accommodate site meetings for a minimum of ten (10) persons. Furnish with a separate area aside from meeting area for a drawing lay down table.
- .2 Provide a clearly marked and fully stocked first-aid case in a readily available location.
- .3 Subcontractors may provide their own offices as necessary and located as directed.

**1.13 CONSTRUCTION OFFICE SUPPORT EQUIPMENT**

- .1 Provide and maintain a site telephone for the Consultants' use for the duration of construction. Pay telephones are not acceptable.
- .2 Provide and maintain communication equipment with the capabilities to copy, send and receive digital documents and/or if a facsimile machine is to be utilized, a separate dedicated telephone line is to be provided.

**1.14 EQUIPMENT, TOOL AND MATERIALS STORAGE**

- .1 Provide and maintain, in a clean and orderly condition, lockable weatherproof sheds for storage of tools, equipment and materials.
- .2 Locate materials not required to be stored in weatherproof sheds on site in a manner to cause the least interference with work activities.

**1.15 SANITARY FACILITIES**

- .1 Provide sanitary facilities for work force in accordance with governing regulations and ordinances.
- .2 Facilities to meet requirements of OHS Regulation 213/91 (Section 29)
- .3 Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.
- .4 Existing or new facilities are not to be used by the work force.

**1.16 CONSTRUCTION SIGNAGE**

- .1 Construction sign is as defined in Section 01 00 10 for General works.
- .2 Maintain signs and notices in good condition for duration of project and dispose of off site on completion of project or earlier as directed by the Consultant.

**1.17 REMOVAL OF TEMPORARY FACILITIES**

- .1 Remove temporary facilities from site when directed by Consultant.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                REFERENCES**

- .1            CSA S269.1-1975 - Falsework for Construction Purposes.
- .2            FC 301 June 1982 - Standard for Construction Operations.
- .3            CAN/CSA-S269.2-M87 - Access Scaffolding for Construction Purposes.

**1.2                CONSTRUCTION SAFETY MEASURES**

- .1            Observe construction safety measures of National Building Code 2005 Part 8, Provincial Government, Workers' / Workmen's Compensation Board and municipal authority provided that in any case of conflict or discrepancy more stringent requirements shall apply.

**1.3                OVERLOADING**

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

**1.4                FALSEWORK**

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

**1.5                SCAFFOLDING**

- .1            Design and construct scaffolding in accordance with CSA S269.2.

**Part 2            Products**

**2.1                Not Used**

- .1            Not Used.

**Part 3            Execution**

**3.1                Not Used**

- .1            Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1        Barriers
- .2        Environmental Controls
- .3        Traffic Controls.
- .4        Fire Routes

**1.2                RELATED SECTIONS**

- .1        Section 01 00 10 – General Works
- .2        Section 01 51 00 - Temporary Utilities
- .3        Section 01 52 00 - Construction Facilities

**1.3                REFERENCES**

- .1        Canadian General Standards Board (CGSB)
  - .1        CGSB GP -189-2000, Primer, Alkyd, Wood, Exterior.
  - .2        CGSB 1.59-97, Alkyd Exterior Gloss Enamel.
- .2        Canadian Standards Association (CSA International)
  - .1        CSA-O121-M1978, Douglas Fir Plywood.

**1.4                INSTALLATION AND REMOVAL**

- .1        Provide temporary controls in order to execute Work expeditiously.
- .2        Remove from site all such work after use.

**1.5                HOARDING**

- .1        Erect temporary site enclosures using 38 x 89 mm construction grade lumber framing at 600 mm centres and 1200 x 2400 x 13 mm exterior grade fir plywood to CSA O121 or alternatively – metal fence variety by Modu-Loc with emergency access gates as shown on site plan.
- .2        Apply plywood panels vertically as indicated.
- .3        Provide two lockable truck entrance gates and at least one pedestrian door as directed and conforming to applicable traffic restrictions on adjacent streets. Equip gates with locks and keys.
- .4        Erect and maintain pedestrian walkways including roof and side covers, complete with signs and electrical lighting as required by law.

- .5 Paint public side of site enclosure in selected colours with one coat primer to CGSB 1.189M and one coat exterior paint to CGSB 1.59. Maintain public side of enclosure in clean condition.
- .6 Provide barriers around trees and plants designated to remain. Protect from damage by equipment and construction procedures.

#### **1.6 GUARD RAILS AND BARRICADES**

- .1 Provide secure, rigid guard rails and barricades around deep excavations, open shafts, open stair wells, open edges of floors and roofs.
- .2 Provide as required by governing authorities.

#### **1.7 ENCLOSURE OF STRUCTURE**

- .1 Provide temporary weather tight enclosures and protection for exterior openings until permanently enclosed.
- .2 Erect enclosures to allow access for installation of materials and working inside enclosure.
- .3 Provide weather tight closures to unfinished door and window openings, tops of shafts and other openings in floors and roofs.
- .4 Design enclosures to withstand wind pressure and snow loading.

#### **1.8 DUST TIGHT SCREENS**

- .1 Provide and maintain dustproof and sound resistant barriers or partitions between the Work and existing occupied building, finished areas of the Work and the public.
- .2 Maintain and relocate protection until such work is complete.

#### **1.9 ACCESS TO SITE**

- .1 Provide and maintain access roads, sidewalk crossings, ramps and construction runways as defined in construction documents.

#### **1.10 PUBLIC TRAFFIC FLOW**

- .1 Provide and maintain competent signal flag operators, traffic signals, barricades and flares, lights, or lanterns as required to perform Work and protect the public.

#### **1.11 FIRE ROUTES**

- .1 Maintain access to property including overhead clearances for use by emergency response vehicles.

**1.12 PROTECTION FOR OFF-SITE AND PUBLIC PROPERTY**

- .1 Protect surrounding private and public property from damage during performance of Work.
- .2 Be responsible for damage incurred.

**1.13 PROTECTION OF BUILDING FINISHES**

- .1 Provide protection for finished and partially finished building finishes and equipment during performance of Work.
- .2 Provide necessary screens, covers, and hoardings.
- .3 Confirm with Consultant locations and installation schedule 3 days prior to installation.
- .4 Be responsible for damage incurred due to lack of or improper protection.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1        Product quality, availability, storage, handling, protection, and transportation.
- .2        Manufacturer's instructions.
- .3        Quality of Work, coordination and fastenings.
- .4        Existing facilities.

**1.2                REFERENCE STANDARDS**

- .1        Canadian Construction Documents Committee (CCDC)
  - .1        CCDC 2-2008, Stipulated Price Contract.
- .2        Conform to these reference standards, in whole or in part as specifically requested in specifications.
- .3        If there is question as to whether any product or system is in conformance with applicable standards, Consultant reserves right to have such products or systems tested to prove or disprove conformance.
- .4        Cost for such testing will be born by Owner in event of conformance with Contract Documents or by Contractor in event of non-conformance.
- .5        Conform to latest date of issue of referenced standards in effect on date of submission of Tenders, except where specific date or issue is specifically noted.

**1.3                QUALITY**

- .1        Refer to CCDC 2.
- .2        Products, materials, equipment and articles (referred to as products throughout specifications) incorporated in Work shall be new, not damaged or defective, and of best quality (compatible with specifications) for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .3        Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .4        Should any dispute arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.
- .5        Unless otherwise indicated in specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .6        Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

**1.4 AVAILABILITY**

- .1 Immediately upon signing Contract, review product delivery requirements and anticipate foreseeable supply delays for any items. If delays in supply of products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.
- .2 In event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

**1.5 STORAGE HANDLING AND PROTECTION**

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

**1.6 TRANSPORTATION**

- .1 Pay costs of transportation of products required in performance of Work.
- .2 Transportation cost of products supplied by Owner will be paid for by Owner. Unload, handle and store such products.

**1.7 MANUFACTURER'S INSTRUCTIONS**

- .1 Unless otherwise indicated in specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.

- .2 Notify Consultant in writing, of conflicts between specifications and manufacturer's instructions, so that Consultant may establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Consultant to require removal and re-installation at no increase in Contract Price or Contract Time.

**1.8 QUALITY OF WORK**

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Consultant if required Work is such as to make it impractical to produce required results.
- .2 Do not employ anyone unskilled in their required duties. Consultant reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Consultant, whose decision is final.

**1.9 CO-ORDINATION**

- .1 Ensure cooperation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

**1.10 CONCEALMENT**

- .1 In finished areas, conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation, inform Consultant if there is interference. Install as directed by Consultant.

**1.11 REMEDIAL WORK**

- .1 Refer to CCDC 2.
- .2 Perform remedial work required to repair or replace parts or portions of Work identified as defective or unacceptable. Coordinate adjacent affected Work as required.
- .3 Perform remedial work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

**1.12 LOCATION OF FIXTURES**

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Consultant of conflicting installation. Install as directed.

**1.13 FASTENINGS**

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.

- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior work, unless stainless steel or other material is specifically requested in affected specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

**1.14 FASTENINGS - EQUIPMENT**

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

**1.15 PROTECTION OF WORK PROGRESS**

- .1 Prevent overloading of any part of building. Do not cut, drill or sleeve any load bearing structural member, unless specifically indicated without written approval of Consultant.

**1.16 EXISTING UTILITIES**

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants and pedestrian and vehicular traffic.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3            Execution**

**3.1                NOT USED**

.1            Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1        Progressive cleaning.
- .2        Final cleaning.

**1.2                RELATED SECTION**

- .1        Section 01 74 19 – Construction/ Demolition Waste Management and Disposal.
- .2        Section 01 77 00 – Closeout Procedures.

**1.3                REFERENCE STANDARDS**

- .1        Canadian Construction Documents Committee (CCDC)
  - .1        CCDC 2-2008, Stipulated Price Contract.

**1.4                PROJECT CLEANLINESS**

- .1        Maintain Work in tidy condition, free from accumulation of waste products and debris, including that caused by Owner or other Contractors.
- .2        Allow for road area in front of site to be cleaned as required, particularly during more disruptive times such as excavation and foundation work.
- .3        Remove waste materials from site at regularly scheduled times. Do not burn waste materials on site.
- .4        Clear snow and ice from access to building, bank/pile snow in designated areas only.
- .5        Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .6        Provide on-site containers for collection of waste materials and debris.
- .7        Provide and use clearly marked separate bins for recycling. Refer to Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .8        Remove waste material and debris from site and deposit in waste container at end of each working day.
- .9        Dispose of waste materials and debris off site.
- .10      Clean interior areas prior to start of finish work, and maintain areas free of dust and other contaminants during finishing operations.
- .11      Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .12      Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.

- .13 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .14 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

## **1.5 FINAL CLEANING**

- .1 Refer to CCDC 2, GC 3.13.
- .2 When Work is Substantially Performed, remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .3 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .4 Prior to final review, remove surplus products, tools, construction machinery and equipment.
- .5 Remove waste products and debris including that caused by Owner or other Contractors.
- .6 Remove waste materials from site at regularly scheduled times. Do not burn waste materials on site.
- .7 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .8 The final cleaning, prior to Substantial Performance is to be done by a competent commercial cleaning company and is to include:
  - .1 Clean and polish glass, mirrors, hardware, wall tile, stainless steel, chrome, porcelain enamel, baked enamel, plastic laminate, washroom accessories and mechanical and electrical fixtures. Replace broken, scratched or disfigured glass.
  - .2 Remove stains, spots, marks and dirt from decorative work, electrical and mechanical fixtures, furniture fitments, walls, and floors.
  - .3 Clean lighting reflectors, lenses, and other lighting surfaces.
  - .4 Vacuum clean and dust building interiors, behind grilles, louvres and screens.
  - .5 Broom clean and wash exterior walks, steps and surfaces; rake clean other surfaces of grounds.
  - .6 Remove dirt and other disfiguration from exterior surfaces.
  - .7 Clean and sweep roofs, gutters, areaways, and sunken wells.
  - .8 Washing of all floors but not waxing
  - .9 In conjunction with Owner staff, wax, seal, shampoo or prepare floor finishes, as recommended by manufacturer
  - .10 Removal of visible labels left on materials, components and equipment.
  - .11 Cleaning of millwork and doors.
- .9 Inspect finishes, fitments and equipment and ensure specified workmanship and operation.
- .10 Sweep and wash clean paved areas.

- .11 Clean equipment and fixtures to a sanitary condition; clean or replace filters of mechanical equipment.
- .12 Clean roofs, downspouts, and drainage systems.
- .13 Remove snow and ice from access to building.
- .14 General Contractor to make diligent effort to keep existing rooms not part of the project, locked and dust free.
- .15 Existing furniture, school equipment, mechanical and electrical equipment to be kept free from dust and debris.
- .16 Maintain cleaning until Owner occupies project area.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1 General**

**1.1 SECTION INCLUDES**

- .1 Text, schedules and procedures for systematic Waste Management Program for construction, deconstruction, demolition, and renovation projects, including:
  - .1 Diversion of Materials.
  - .2 Waste Audit (WA) – Schedule A.
  - .3 Waste Reduction Workplan (WRW) – Schedule B.
  - .4 Demolition Waste Audit (DWA) – Schedule C.
  - .5 Cost/Revenue Analysis Workplan (CRAW) – Schedule D.
  - .6 Materials Source Separation Program (MSSP).
  - .7 Canadian Government Responsibility for Environment Resources – Schedule E.

**1.2 RELATED SECTIONS**

- .1 Section 01 35 30 – Health and Safety Requirements
- .2 Section 01 35 43 – Environmental Procedures.
- .3 Section 01 35 73 – Procedures for Deconstruction of Structures

**1.3 DEFINITIONS**

- .1 Cost/Revenue Analysis Work plan (CRAW): Based on information from Waste Reduction Work plan (WRW), and intended as financial tracking tool for determining economic status of waste management practices.
- .2 Demolition Waste Audit (DWA): Relates to actual waste created from project.
- .3 Materials Source Separation Program (MSSP): Consists of series of ongoing activities to separate reusable and recyclable waste material into material categories from other types of waste at point of generation.
- .4 Recyclable: Ability of product or material to be recovered at end of its life cycle and re-manufactured into new product for reuse by others.
- .5 Recycle: Process by which waste and recyclable materials are transformed or collected for purpose of being transferred into new products.
- .6 Recycling: Process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for purpose of using in altered form. Recycling does not include burning, incinerating, or thermally destroying waste.
- .7 Reuse: Repeated use of product in same form but not necessarily for same purpose. Reuse includes:
  - .1 Salvaging reusable materials from re-modelling projects, before demolition stage, for resale, reuse on current project or for storage for use on future projects.
  - .2 Returning reusable items including pallets or unused products to vendors.
- .8 Salvage: Removal of structural and non-structural materials from deconstruction/disassembly projects for purpose of reuse or recycling.

- .9 Separate Condition: Refers to waste sorted into individual types.
- .10 Source Separation: Acts of keeping different types of waste materials separate beginning from first time they became waste.
- .11 Waste Audit (WA): Detailed inventory of materials in building. Involves quantifying by volume/weight amounts of materials and wastes generated during construction, demolition, deconstruction or renovation project. Indicates quantities of reuse, recycling and landfill.
- .12 Waste Management Coordinator (WMC): Contractor representative responsible for supervising waste management activities as well as coordinating related, required submittal and reporting requirements.
- .13 Waste Reduction Workplan (WRW): Written report which addresses opportunities for reduction, reuse, or recycling of materials. WRW is based on information acquired from WA.

#### **1.4 DOCUMENTS**

- .1 Maintain at job site, one copy of following documents:
  - .1 Material Source Separation Plan, (MSSP).
  - .2 Waste Reduction Workplan, (WRW).
  - .3 Waste Audit, (WA).
  - .4 Schedules A, B, C, D and E completed for the project.

#### **1.5 SUBMITTALS**

- .1 Submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2 Prepare and submit the following prior to construction start-up:
  - .1 Submit 3 copies of completed Waste Audit (WA): Schedule A.
  - .2 Submit 3 copies of completed Waste reduction Workplan (WRW): Schedule B.
  - .3 Submit 3 copies of completed Demolition Waste Audit (DWA): Schedule C.
  - .4 Submit 3 completed copies of Cost/Revenue Analysis Workplan (CRAW): Schedule D.
  - .5 Submit 3 copies of Material Source Separation Program (MSSP) description.
- .3 Submit before final payment summary of waste materials salvaged for reuse, recycling or disposal by project using deconstruction/disassembly material audit form.
  - .1 Failure to submit could result in hold back of final payment.
  - .2 Provide receipts, scale tickets, waybills, and show quantities and types of materials reused, recycled, co-mingled and separated off-site or disposed of.
  - .3 For each material reused, sold or recycled from project, include amount [in tonnes] [quantities by number, type and size of items] and the destination.
  - .4 For each material land filled or incinerated from project, include amount [in tonnes] of material and identity of landfill, incinerator or transfer station.

## **1.6 QUALITY ASSURANCE - SITE VISIT**

- .1 Pre-bid site visit:
  - .1 Walk-through of project site prior to completion of bid submittal is mandatory.
  - .2 Date, time and location to be arranged by Consultant.
  - .3 Protection.
  - .4 Clear labelling of storage areas.
  - .5 Details on materials handling and removal procedures.
  - .6 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.

## **1.7 WASTE AUDIT (WA)**

- .1 Conduct WA prior to project start-up.
- .2 Prepare WA: Schedule A.
- .3 Record, on WA - Schedule A, extent to which materials or products used consist of recycled or reused materials or products.

## **1.8 WASTE REDUCTION WORKPLAN (WRW)**

- .1 Prepare WRW prior to project start-up.
- .2 WRW should include but not limited to:
  - .1 Destination of materials listed.
  - .2 Deconstruction/disassembly techniques and sequencing.
  - .3 Schedule for deconstruction/disassembly.
  - .4 Location.
  - .5 Security.
  - .6 Protection.
  - .7 Clear labelling of storage areas.
  - .8 Details on materials handling and removal procedures.
  - .9 Quantities for materials to be salvaged for reuse or recycled and materials sent to landfill.
- .3 Structure WRW to prioritize actions and follow 3R's hierarchy, with Reduction as first priority, followed by Reuse, then Recycle.
- .4 Describe management of waste.
- .5 Identify opportunities for reduction, reuse, and recycling of materials. Based on information acquired from WA.
- .6 Post WRW or summary where workers at site are able to review content.
- .7 Set realistic goals for waste reduction, recognize existing barriers and develop strategies to overcome these barriers.

- .8 Monitor and report on waste reduction by documenting total volume and cost of actual waste removed from project.

**1.9 DEMOLITION WASTE AUDIT (DWA)**

- .1 Prepare DWA prior to project start-up.
- .2 Provide inventory of quantities of materials to be salvaged for reuse, recycling, or disposal.

**1.10 COST/REVENUE ANALYSIS WORKPLAN (CRAW)**

- .1 Prepare CRAW: Schedule D.

**1.11 MATERIALS SOURCE SEPARATION PROGRAM (MSSP)**

- .1 Prepare MSSP and have ready for use prior to project start-up.
- .2 Implement MSSP for waste generated on project in compliance with approved methods and as reviewed by Consultant.
- .3 Provide on-site facilities for collection, handling, and storage of anticipated quantities of reusable and recyclable materials.
- .4 Provide containers to deposit reusable and recyclable materials.
- .5 Locate containers in locations, to facilitate deposit of materials without hindering daily operations.
- .6 Locate separated materials in area which minimize material damage.
- .7 Collect, handle, store on-site, and transport off-site, salvaged materials in separate condition.
  - .1 Transport to approved and authorized recycling facility or to users of material for recycling.
- .8 Collect, handle, store on-site, and transport off-site, salvaged materials in combined condition.
  - .1 Ship material to site operating under Certificate of Approval.
  - .2 Materials must be immediately separated into required categories for reuse or recycling.

**1.12 STORAGE, HANDLING AND PROTECTION**

- .1 Store, materials to be reused, recycled and salvaged in locations as directed by Consultant.
- .2 Unless specified otherwise, materials for removal do not become Contractor's property.
- .3 Protect, stockpile, store and catalogue salvaged items.

- .4 Separate non-salvageable materials from salvaged items. Transport and deliver non-salvageable items to licensed disposal facility.
- .5 Protect structural components not removed for demolition from movement or damage.
- .6 Support affected structures. If safety of building is endangered, cease operations and immediately notify Consultant.
- .7 Protect surface drainage, mechanical and electrical from damage and blockage.
- .8 Separate and store materials produced during dismantling of structures in designated areas.
- .9 Prevent contamination of materials to be salvaged and recycled and handle materials in accordance with requirements for acceptance by designated facilities.
  - .1 On-site source separation is recommended.
  - .2 Remove co-mingled materials to off-site processing facility for separation.
  - .3 Provide waybills for separated materials.

#### **1.13 DISPOSAL OF WASTES**

- .1 Do not bury rubbish or waste materials.
- .2 Do not dispose of waste, volatile materials, mineral spirits, oil, paint thinner into waterways, storm, or sanitary sewers.
- .3 Keep records of construction waste including:
  - .1 Number and size of bins.
  - .2 Waste type of each bin.
  - .3 Total tonnage generated.
  - .4 Tonnage reused or recycled.
  - .5 Reused or recycled waste destination.
- .4 Remove materials from deconstruction as deconstruction/disassembly Work progresses.
- .5 Prepare project summary to verify destination and quantities on a material-by-material basis as identified in pre-demolition material audit.

#### **1.14 USE OF SITE AND FACILITIES**

- .1 Execute work with least possible interference or disturbance to normal use of premises.
- .2 Provide temporary security measures approved by Consultant.

#### **1.15 SCHEDULING**

- .1 Coordinate Work with other activities at site to ensure timely and orderly progress of Work.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 APPLICATION**

- .1 Handle waste materials not reused, salvaged, or recycled in accordance with appropriate regulations and codes.

**3.2 CLEANING**

- .1 Remove tools and waste materials on completion of Work, and leave work area in clean and orderly condition.
- .2 Clean-up work area as work progresses.
- .3 Source separate materials to be reused / recycled into specified sort areas.

**3.3 DIVERSION OF MATERIALS**

- .1 From Schedules A to D, separate materials from general waste stream and stockpile in separate piles or containers, as reviewed by Consultant, and consistent with applicable fire regulations.
  - .1 Mark containers or stockpile areas.
  - .2 Provide instruction on disposal practices.
- .2 On-site sale of salvaged, recovered, reusable, recyclable, material is not permitted.

**3.4 CANADIAN GOVERNMENTAL DEPARTMENTS CHIEF RESPONSIBILITY FOR THE ENVIRONMENT**

- .1 Schedule E - Government Chief Responsibility for the Environment

Ontario	Ministry of Environment and Energy, 135 St. Clair Avenue West, Toronto, ON M4V 1P5	(416) 323-4321 (800) 565-4923	(416) 323-4682
	Environment Canada	(416) 734-4494	
	Toronto, ON		

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1            Administrative procedures preceding preliminary and final inspections of Work.

**1.2                RELATED SECTIONS**

- .1            Section 01 78 00 - Closeout Submittals.
- .2            Section 01 91 00 - Commissioning.

**1.3                REFERENCES**

- .1            Canadian Construction Documents Committee (CCDC)
  - .1            CCDC 2-2008, Stipulated Price Contract.

**1.4                INSPECTION AND DECLARATION**

- .1            Contractor's Inspection: General Contractor and all Subcontractors shall conduct an inspection of Work, identify deficiencies and defects, and repair as required to conform to Contract Documents.
  - .1            Notify Consultant in writing of satisfactory completion of Contractor's Inspection and that corrections have been made.
  - .2            Request Consultant's Inspection.
- .2            Consultant's Inspection: Consultant and Contractor will perform inspection of Work to identify obvious defects or deficiencies. Contractor shall correct Work accordingly.
- .3            Completion: submit written certificate that following have been performed:
  - .1            Work has been completed and inspected for compliance with Contract Documents.
  - .2            Defects have been corrected and deficiencies have been completed.
  - .3            Equipment and systems have been tested, adjusted and balanced and are fully operational.
  - .4            Certificates required by Boiler Inspection Branch Fire Commissioner Utility companies have been submitted.
  - .5            Operations of systems have been demonstrated to Owner's personnel.
  - .6            Work is complete and ready for Final Inspection.
- .4            Final Inspection: when items noted above are completed, request final inspection of Work by Owner, Consultant, and Contractor. If Work is deemed incomplete by Owner and Consultant, complete outstanding items and request reinspection.

**.5                SUBSTANTIAL PERFORMANCE**

- .1            Declaration of Substantial Performance: when Owner and Consultant consider deficiencies and defects have been corrected and it appears requirements of Contract have been substantially performed, make application for certificate of Substantial Performance. Refer to CCDC 2, General Conditions Article for specifics to application.

- .2 Consultant's certificates required prior to issuance of Certificate for Substantial Completion.
- .3 Full and complete information and demonstration training sessions for Owner staff to be provided by Mechanical and Electrical Contractors and their suppliers.
- .4 Owner shall have the right to enter and occupy the building for the purpose of placing fittings, equipment and the like prior to Substantial Completion. Such occupancy shall not be considered acceptance of contract work.
- .6 Commencement of Lien and Warranty Periods: date of Owner's acceptance of submitted declaration of Substantial Performance shall be date for commencement for warranty period and commencement of lien period unless required otherwise by lien statute of Place of Work.
- .7 Final Payment: When Owner and Consultant consider final deficiencies and defects have been corrected and it appears requirements of Contract have been totally performed, make application for final payment. Refer to CCDC 2. If Work is deemed incomplete by Owner and Consultant, complete outstanding items and request reinspection.
- .8 Payment of Holdback: After issuance of certificate of Substantial Performance of Work, submit an application for payment of holdback amount in accordance with CCDC 2.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1    As-built, samples, and specifications.
- .2    Equipment and systems.
- .3    Product data, materials and finishes, and related information.
- .4    Operation and maintenance data.
- .5    Spare parts, special tools and maintenance materials.
- .6    Warranties and bonds.
- .7    Final site survey.

**1.2                RELATED SECTIONS**

- .1    Section 01 00 10 – General Work.
- .2    Section 01 45 00 - Quality Control.
- .3    Section 01 77 00 - Closeout Procedures.
- .4    Section 01 79 00 - Demonstration and Training.
- .5    Section 01 91 00 - Commissioning.

**1.3                SUBMISSION**

- .1    Prepare instructions and data using personnel experienced in maintenance and operation of described products.
- .2    Provide consultant with **3 (three)** full copy of manuals for review.
- .3    Copy will be returned after final inspection, with Consultant's comments.
- .4    Revise content of documents as required prior to final submittal.
- .5    Two weeks prior to Substantial Performance of the Work, submit to the Consultant, four final copies of operating and maintenance manuals in English.
- .6    Ensure spare parts, maintenance materials and special tools provided are new, undamaged or defective, and of same quality and manufacture as products provided in Work.
- .7    If requested, furnish evidence as to type, source and quality of products provided.
- .8    Defective products will be rejected, regardless of previous inspections. Replace products at own expense.

- .9 Pay costs of transportation.

#### **1.4 FORMAT**

- .1 Organize data in the form of an instructional manual.
- .2 Binders: vinyl, hard covered, 4 'D' ring, loose leaf 219 x 279 mm with spine and face pockets.
- .3 When multiple binders are used, correlate data into related consistent groupings. Identify contents of each binder on spine.
- .4 Cover: Identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by systems, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: Manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.
- .9 Provide scaled Auto CAD files in dwg format on CD.

#### **1.5 CONTENTS - EACH VOLUME**

- .1 Table of Contents: provide title of project;
  - .1 Date of submission; names,
  - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties;
  - .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
  - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to clearly identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.
- .5 Typewritten Text: as required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions specified in Section 01 45 00 - Quality Control.
- .6 Training: Refer to Section 01 79 00 - Demonstration and Training.

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**1.6 AS-BUILTS AND SAMPLES**

- .1 In addition to requirements in General Conditions, maintain at the site for Consultant one record copy of:
  - .1 Contract Drawings.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change Orders and other modifications to the Contract.
  - .5 Reviewed shop drawings, product data, and samples.
  - .6 Field test records.
  - .7 Inspection certificates.
  - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction. Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual. Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition. Do not use record documents for construction purposes.
- .5 Keep record documents and samples available for inspection by Consultant.

**1.7 RECORDING ACTUAL SITE CONDITIONS**

- .1 Record information on set of black line opaque drawings, and in copy of Project Manual, provided by Consultant.
- .2 Provide felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress. Do not conceal Work until required information is recorded.
- .4 Contract Drawings and shop drawings: legibly mark each item to record actual construction, including:
  - .1 Measured depths of elements of foundation in relation to finish first floor datum.
  - .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  - .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
  - .4 Field changes of dimension and detail.
  - .5 Changes made by change orders.
  - .6 Details not on original Contract Drawings.
  - .7 References to related shop drawings and modifications.
- .5 Specifications: legibly mark each item to record actual construction, including:
  - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.

.2 Changes made by Addenda and change orders.

.6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual specifications sections.

## **1.8 FINAL SURVEY**

.1 Submit final site survey certificate in accordance with Section 01 00 10 – General Work, certifying that elevations and locations of completed Work are in conformance, or non-conformance with Contract Documents.

## **1.9 EQUIPMENT AND SYSTEMS**

.1 Each Item of Equipment and Each System: include description of unit or system, and component parts. Give function, normal operation characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.

.2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.

.3 Include installed colour coded wiring diagrams.

.4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

.5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

.6 Provide servicing and lubrication schedule, and list of lubricants required.

.7 Include manufacturer's printed operation and maintenance instructions.

.8 Include sequence of operation by controls manufacturer.

.9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

.10 Provide installed control diagrams by controls manufacturer.

.11 Provide Contractor's coordination drawings, with installed colour coded piping diagrams.

.12 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

.13 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

.14 Include test and balancing reports as specified in Section 01 45 00 - Quality Control and 01 91 00 - Commissioning.

.15 Additional requirements: As specified in individual specification sections.

**1.10 MATERIALS AND FINISHES**

- .1 Building Products, Applied Materials, and Finishes: include product data, with catalogue number, size, composition, and colour and texture designations. Provide information for re-ordering custom manufactured products.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and Weather-exposed Products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional Requirements: as specified in individual specifications sections.

**1.11 SPARE PARTS**

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

**1.12 MAINTENANCE MATERIALS**

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

**1.13 SPECIAL TOOLS**

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

**1.14 TRAINING SESSIONS**

- .1 Provide and record training sessions for all mechanical and electrical systems. The training video is to be shot with HD cameras and audio and turned over to the Owner on 2 flash drives.
- .2 All maintenance manuals and as built drawings are to be submitted to the Owner prior to any training sessions taking place.
- .3 Contractor to operate the building until training has been completed for all mechanical and electrical systems.

**1.15 STORAGE, HANDLING AND PROTECTION**

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

**1.16 WARRANTIES AND BONDS**

- .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
- .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
- .3 Obtain warranties and bonds, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of the applicable item of work.
- .4 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until the Date of Substantial Performance is determined.
- .5 Verify that documents are in proper form, contain full information, and are notarized.
- .6 Co-execute submittals when required.
- .7 Retain warranties and bonds until time specified for submittal.

**1.17 COMPLETE SUBMISSION**

- .1 All items noted above shall be submitted together as a complete package, not as individual packages.
- .2 Final payments will not be made until the Board receives the complete package.

**Part 2**            **Products**  
  
**2.1**            **NOT USED**  
                  .1        Not Used.

**Part 3**            **Execution**  
  
**3.1**            **NOT USED**  
                  .1        Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1            Procedures for demonstration and instruction of equipment and systems to Owner's personnel.

**1.2                RELATED SECTIONS**

- .1            Section 01 45 00 – Quality Control.
- .2            Section 01 78 00 - Closeout Submittals.
- .3            Section 01 91 00 - Commissioning.

**1.3                DESCRIPTION**

- .1            **Demonstrate scheduled operation and maintenance of equipment and systems to Owner's personnel two weeks prior to date of substantial performance.**
- .2            Owner will provide list of personnel to receive instructions, and will coordinate their attendance at agreed-upon times.

**1.4                QUALITY CONTROL**

- .1            When specified in individual Sections, require manufacturer to provide authorized representative to demonstrate operation of equipment and systems, instruct Owner's personnel, and provide written report that demonstration and instructions have been completed.

**1.5                SUBMITTALS**

- .1            Submit schedule of time and date for demonstration of each item of equipment and each system two weeks prior to designated dates, for Consultant's approval.
- .2            Submit reports within one week after completion of demonstration, that demonstration and instructions have been satisfactorily completed.
- .3            Give time and date of each demonstration, with list of persons present.

**1.6                CONDITIONS FOR DEMONSTRATIONS**

- .1            Equipment has been inspected and put into operation in accordance with Section 01 45 00 – Quality Control.
- .2            Testing, adjusting, and balancing has been performed in accordance with Section 01 91 00 - Commissioning and equipment and systems are fully operational.
- .3            **Provide one (1) copy of completed operation and maintenance manuals for use in demonstrations and instructions.**

**1.7 PREPARATION**

- .1 Verify that conditions for demonstration and instructions comply with requirements.
- .2 Verify that designated personnel are present.

**1.8 DEMONSTRATION AND INSTRUCTIONS**

- .1 Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, and maintenance of each item of equipment at agreed upon times, at the designated location.
- .2 Instruct personnel in all phases of operation and maintenance using operation and maintenance manuals as the basis of instruction.
- .3 Review contents of manual in detail to explain all aspects of operation and maintenance.
- .4 Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instructions.
- .5 Instructional period is to be in as many sessions as required to properly disseminate information of the Owner's technical staff.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1            SECTION INCLUDES**

- .1            Includes general requirements for commissioning facilities and facility systems.

**1.2            RELATED SECTIONS**

- .1            Section 01 21 00 - Allowances.
- .2            Section 01 45 00 - Quality Control.

**1.3            QUALITY ASSURANCE**

- .1            Provide testing organization services under provisions specified in Section 01 45 00 - Quality Control.
- .2            Testing organization: current member in good standing, certified to perform specified services.
- .3            Comply with applicable procedures and standards of the certification sponsoring association.
- .4            Perform services under direction of supervisor qualified under certification requirements of sponsoring association.

**1.4            REFERENCES**

- .1            Associated Air Balance Council (AABC): National Standards For Field Measurements and Instrumentation, Total Systems Balance, Air Distribution-Hydraulics Systems.

**1.5            SUBMITTALS**

- .1            Prior to start of Work, submit name of organization proposed to perform services. Designate who has managerial responsibilities for coordination of entire testing, adjusting and balancing.
- .2            Submit documentation to confirm organization compliance with quality assurance provision.
- .3            Submit 3 (three) preliminary specimen copies of each of report forms proposed for use.
- .4            Fifteen days prior to Substantial Performance, submit 3 (three) copies of final reports on applicable forms.
- .5            Submit reports of testing, adjusting, and balancing postponed due to seasonal, climatic, occupancy, or other reasons beyond Contractor's control, promptly after execution of those services.

**1.6            PROCEDURES - GENERAL**

- .1            Comply with procedural standards of certifying association under whose standard services will be performed.

- .2 Notify Consultant 3 (three) days prior to beginning of operations.
- .3 Accurately record data for each step.
- .4 Report to Consultant any deficiencies or defects noted during performance of services.
- .5 Controls contractor and equipment contractor to meet prior to start-up to ensure there are no controls–communication issues (ie. the metric versus imperial issue)
- .6 A pre-start up meeting be held between mechanical contractor, controls contractor, equipment contractor and engineer to walk through the process and ensure that any checks that can be performed ahead of time are indeed performed
- .7 Ensure start-up is scheduled and performed for both heating and cooling seasons.

## **1.7 FINAL REPORTS**

- .1 Organization having managerial responsibility shall make reports.
- .2 Ensure each form bears signature of recorder, and that of supervisor of reporting organization.
- .3 Identify each instrument used, and latest date of calibration of each.

## **1.8 CONTRACTOR RESPONSIBILITIES**

- .1 Prepare each system for testing and balancing.
- .2 Cooperate with testing organization and provide access to equipment and systems.
- .3 Provide personnel and operate systems at designated times, and under conditions required for proper testing, adjusting, and balancing.
- .4 Notify testing organization 7 (seven) days prior to time project will be ready for testing, adjusting, and balancing.

## **1.9 PREPARATION**

- .1 Provide instruments required for testing, adjusting, and balancing operations.
- .2 Make instruments available to Consultant to facilitate spot checks during testing.
- .3 Retain possession of instruments and remove at completion of services.
- .4 Verify systems installation is complete and in continuous operation.
- .5 Verify lighting is turned on when lighting is included in cooling load.
- .6 Verify equipment such as computers, laboratory and electronic equipment are in full operation.

**1.10 EXECUTION**

- .1 Test equipment, balance distribution systems, and adjust devices for HVAC systems.
- .2 Test hydronic systems, adjust and record liquid flow at each piece of equipment.

**Part 2 Products**

**2.1 NOT USED**

- .1 Not Used.

**Part 3 Execution**

**3.1 NOT USED**

- .1 Not Used.

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES**

- .1            Methods for removal of existing asphalt pavement.

**1.2                RELATED SECTIONS**

- .1            Section 02 41 16 Structure Demolition.

**1.3                WASTE MANAGEMENT AND DISPOSAL**

- .1            Divert unused asphalt materials from landfill to local facility.

**Part 2            Products**

**2.1                EQUIPMENT**

- .1            Use cold milling, planning or grinding equipment with automatic grade controls capable of operating from stringline, and capable of removing part of pavement surface to depths or grades indicated.

**Part 3            Execution**

**3.1                PREPARATION**

- .1            Prior to beginning removal operation, inspect and verify with Consultant areas, depths and lines of asphalt pavement to be removed.

**3.2                PROTECTION**

- .1            Protect existing pavement not designated for removal, light units and structures from damage. In event of damage, immediately replace or make repairs to approval of Consultant at no additional cost.

**3.3                REMOVAL**

- .1            Remove existing asphalt pavement to lines and grades as indicated.
- .2            Use equipment and methods of removal and hauling which do not damage or disturb underlying pavement.
- .3            Prevent contamination of removed asphalt pavement by topsoil, underlying gravel or other materials.
- .4            Provide for suppression of dust generated by removal process.

**3.4 STOCKPILING OF MATERIAL**

- .1 Dispose of removed asphalt pavement by stock-piling in locations designated by Owner.
- .2 Removed asphalt pavement which is to be recycled in hot mix asphalt concrete under this contract may be stockpiled at designated asphalt plant site.

**3.5 FINISH TOLERANCES**

- .1 Finished surfaces in areas where asphalt pavement has been removed to be within +/- 5 mm of grade specified but not uniformly high or low.

**3.6 SWEEPING**

- .1 Sweep remaining asphalt pavement surfaces clean of debris resulting from removal operations using rotary power brooms and hand brooms as required.

**END OF SECTION**

Select the following waterstop to provide a watertight seal of cold joints in concrete structures where there is a good potential for exposure to hydrocarbon liquids, including but not limited to containment structures, highway tunnels, concrete lined storm drainage and irrigation channels, pedestrian tunnels, below-grade parking garages and waste water treatment plants.

**Part 1 GENERAL**

**1.1 GENERAL REQUIREMENTS**

- .1 The General Conditions, the Supplementary Conditions, the Instructions to Bidders and Division 1 General Requirements shall be read in conjunction with and govern this section.
- .2 The Specification shall be read as a whole by all parties concerned. Each Section may contain more or less than the complete work of any trade. The Contractor is solely responsible to make clear to the Subcontractors the extent of their work.

**1.2 SUMMARY**

- .1 This Section includes requirements for supply and installation of swelling waterstop as specified herein, illustrated on project drawings, or as required to complete the work to comply with waterproofing warranty requirements.

**1.3 RELATED REQUIREMENTS**

- .1 Section 03 10 00 – Concrete Forming and Accessories
- .2 Section 03 21 00 – Reinforcing Steel
- .3 Section 03 30 00 - Cast-In-Place Concrete
- .4 Section 03 31 00 - Structural Concrete
- .5 Section 03 41 00 - Precast Structural Concrete
- .6 Section 07 11 00 - Dampproofing
- .7 Section 07 13 00 – Sheet Waterproofing
- .8 Section 07 14 00 – Fluid-Applied Waterproofing

**1.4 REFERENCES**

- .1 Specification American Society for Testing and Materials (ASTM):
  - .1 ASTM D4-86(2010), Standard Test Method for Bitumen Content
  - .2 ASTM D6-95(2011)e1, Standard Test Method for Loss on Heating of Oil and Asphaltic Compounds
  - .3 ASTM D36/D36M-14e1, Standard Test Method for Softening Point of Bitumen (Ring-and-Ball Apparatus)
  - .4 ASTM D41/D41M-11, Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
  - .5 ASTM D71-94(2015)e1, Standard Test Method for Relative Density of Slid Pitch and Asphalt (Displacement Method)
  - .6 ASTM D92-12b, Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester
  - .7 ASTM D113-07, Standard Test Method for Ductility of Bituminous Materials
  - .8 ASTM D217-10, Standard Test Method for Cone Penetration of Lubricating Grease
- .2 NSF International

- .1 NSF/ANSI 61, Drinking Water System Components – Health Effects.

## 1.5 ADMINISTRATIVE REQUIREMENTS

- .1 Coordination: Coordinate the Work of this Section with the installation of cast-in-place concrete; Sequence work so that installation of waterstop coincides with installation of concrete formwork, reinforcing steel and cast-in-place concrete preparation without causing delay to the Work.

## 1.6 SUBMITTALS

- .1 Provide requested information in accordance with Section [01 33 00 Submittals Procedures].
- .2 Action Submittals: Provide the following submittals before starting any work of this Section:
  - .3 Product Data: Submit manufacturer's data sheets covering installation, recommendations and limitations.
  - .4 Certifications: Submit copies of manufacturers' NSF Standard 61 certification.
    - .1 Submit Official NSF Listing for waterstop confirming that the products conforms to the requirements of NSF Standard 61 – Drinking Water System Components –Health Effects.

## 1.7 QUALITY ASSURANCE

- .1 Qualifications: Provide proof of qualifications when requested by [engineer] [architect] [consultant]:
  - .1 Perform Work in accordance with the manufacturer's written instructions of the waterstops indicated in this specification.
  - .2 Maintain one copy of manufacturer's written instructions on site.
  - .3 At the beginning of the Work and at all times during the execution of the Work, allow access to Work site by the manufacturers' representative.
  - .4 Components used in this section shall be sourced from one manufacturer, including waterstops, and primers.

## 1.8 DELIVERY, STORAGE AND HANDLING

- .1 Delivery:
  - .1 Deliver materials in factory sealed and labeled packaging. Sequence deliveries to avoid delays, while minimizing on-site storage.
  - .2 At the time of delivery, visually inspect all materials for damage. Note any damaged to materials on the receiving ticket and immediately report to the shipping company and the manufacturer.
  - .3 Remove damaged materials from the site immediately.
- .2 Storage:
  - .1 Store materials in accordance with manufacturer's written instructions, raised off the ground and cover with a weather proof flame resistant sheeting or tarpaulin.
  - .2 Store primers at temperatures of 5 deg C (41 deg F) and above to facilitate handling.
  - .3 Keep products away from open flame or excessive heat.
  - .4 Protect products from direct sunlight until ready for use.
- .3 Handling: Material shall be handled in accordance with sound material handling practices and in accordance with manufacturer's written instructions.

## 1.9 WARRANTY

- .1 Manufacturer's Material Warranty:

- .1 Warrant the work of this Section shall remain free from defects in materials in accordance with the Contract Requirements, and for a period of one (1) year from the date of substantial completion.

## **Part 2 PRODUCTS**

### **2.1 MATERIALS MANUFACTURER**

- .1 Materials and accessories specified herein are manufactured by:
  - .1 Henry Company, 15 Wallsend Drive, Scarborough, Ontario, Canada, M1E 3X6, Phone: (800) 387 9598, Website: [www.ca.henry.com](http://www.ca.henry.com)

### **2.2 MATERIALS**

- .1 Waterstop:
  - .1 Preformed, self-adhering waterstop designed swell in the presence of water, to provide a watertight seal in cold joints in concrete structures, and having the following physical properties:
    - .1 Appearance: Black strips (coiled)
    - .2 Colour: Black
    - .3 Certified to NSF/ANSI 61 for use in potable water systems.
    - .4 Elongation (Initial): 216%
    - .5 Flash Point (Open Cup): >287 deg C (>550 deg F)
    - .6 Specific Gravity @ 25 deg C (77 deg F): 1.20 – 1.35
    - .7 Size:
      - .1 Length: 5081mm (16.67') rolls
      - .2 Cross Section: 13mm x 32mm (1/2" x 1-1/4")
    - .8 Basis of Design Product: HF302 Hydro-Flex Waterstop manufactured by Henry Company.

## **Part 3 EXECUTION**

### **3.1 EXAMINATION**

- .1 Verification of Conditions:
  - .1 Examine substrates to receive work and surrounding adjacent surfaces for conditions affecting installation.
  - .2 Notify [engineer] [architect] [consultant] in writing of any discrepancies. Commencement of the work or any parts thereof shall mean acceptance of the prepared substrate.
- .2 Notify Contractor in writing of any conditions that are not acceptable.
- .3 Proceed with installation after verification and correction of surface conditions acceptable to manufacturer.

### **3.2 PREPARATION**

- .1 Using a wire brush or stiff bristle brush, ensure all surfaces are sound, clean and free of oil, grease, dirt, cement laitance, release agents or other contaminants which will impair or negatively affect the installation of the waterstop.

### 3.3 **INSTALLATION WATERSTOP**

#### .1 **Primer:**

- .1 Brush apply 50-75mm (2-3") wide strip of primer along center of joint surface and allow to dry thoroughly. Protect from rain or frost until fully dried.
- .2 Primer shall be dry to touch prior to installing waterstop.

#### .2 **Waterstop Installation - Cured Concrete Substrate:**

- .1 Once primer is dry to touch, prepare waterstop by removing release paper from one side of strip, and place onto primed surface, allowing for a minimum of 50mm (2") concrete coverage on all sides.
- .2 Position waterstop in center of the non-moving joint, or bottom of keyway if incorporated into the joint design.
- .3 Press firmly along the entire length of the strip, uncoil and slightly depress strip against the primed surface.
- .4 Tightly butt strip ends together at splices with a 25mm (1") overlap or side lap to form continuous waterstop.
- .5 Remove the remaining release film prior to second concrete pour.
- .6 Protect waterstop from exposure to rain or standing water.

#### .3 **Waterstop Installation - Fresh Concrete Substrate:**

- .1 Prepare waterstop by removing release paper from one side of strip, and carefully press strip into fresh concrete, leaving approximately 13mm (1/2") exposed above concrete surface.
- .2 Position waterstop in center of the non-moving joint.
- .3 Remove remaining release film once concrete has cured and continue with pour.

#### .4 **Waterstop Installation – Vertical Application:**

- .1 Prepare waterstop by removing release paper from one side of strip, leaving release film on the formwork side to prevent waterstop from adhering to formwork.
- .2 Nail waterstop to inside of concrete form using small finishing nails.
- .3 Chamfer strips 13mm (1/2") on each side of strip. Finishing nails pull through waterstop strips when form is removed.

#### .5 **Concrete Pour:**

- .1 Ensure waterstop is firmly attached to surface and in correct position prior to concrete pouring.
- .2 Ensure continuity of the waterstop throughout the scope of this section.
- .3 Protect waterstop from contact with vibrator during concrete pouring.

### 3.4 **CLEANING AND PROTECTION**

- .1 **Progress Cleaning:** Leave work area clean at the end of each work day.
- .2 **Waste Management:** Co-ordinate disposal of waste materials and packaging at appropriate facility. Certified installer shall be responsible for ensuring waste management efforts are practiced.

**END OF SECTION**

PART 1: GENERAL

1.1 GENERAL REQUIREMENTS

1. Conform to General Requirements, Division 1.

1.2 SCOPE OF WORK

1. Refer to the Contract Drawings and Documents for detailed requirements.
2. Supply all materials; provide all labour and equipment required by the drawings and specifications. The principal items include, but are not limited to:
  1. Reinforced concrete slabs, walls, beams, columns, footings and foundations
  2. Concrete cover slabs on composite metal deck and Comslab Deck
  3. Housekeeping pads for mechanical/electrical equipment
  4. Grouting of Column Bases
  5. Concrete Toppings
  6. Slabs-on-Grade
  7. Patching sleeves and pockets

1.3 RELATED WORK SPECIFIED ELSEWHERE

1. Excavating, Backfilling and Rough Grading – Section 31 20 00
2. Concrete Reinforcement – Section 03 20 00.
3. Composite Metal Deck – Section 05 31 10
4. Waterproofing – Division 7
5. Exterior concrete curbs, pavement (see Site Services drawing).
6. Building Insulation – Division 7

1.4 WORK INSTALLED UNDER THIS SECTION, SUPPLIED BY OTHER SECTIONS

1. Setting of anchors for mechanical and electrical trades – Division 15 and 16.
2. Grouting of Base/Bearing Plates and building in of iron and steel items – Section 05 10 00.
3. Setting of anchors and other hardware to be cast into the concrete including curtain wall anchors and – Division 5, 15 and 16.

1.5 REFERENCE STANDARDS

1. Unless otherwise stated, the applicable provisions of these reference standards are to be considered a part of this specification. Standards to be current issue.
2. Maintain copies of the following standards on the site at all times.
  1. Ontario Building Code.
  2. C.S.A. A23.1-14 Concrete Materials and Methods of Concrete Construction.
  3. C.S.A. A23.2-14 Test Methods and Standard Practices for Concrete.
  4. C.S.A. A23.3-14 Design of Concrete Structures.
  5. CSA G30.18-09(R2014) Carbon Steel Bars for Concrete Reinforcement.
  6. CSA A3000-18 Cementitious Materials Compendium.
  7. CSA S269.1-16 Falsework and Formwork
  8. ASTM A775/A775M-16 Standard Specification for Epoxy Coated Reinforcing Steel Bars.
  9. ASTM C309-11 Standard for Liquid Membrane Forming Compounds for Curing Concrete.
  10. A.C.I. Standard 302.1R-15, "Guide to Concrete Floor and Slab Construction".

11. A.C.I. Standard 301-16, "Specification for Structural Concrete".
12. Reinforcing Steel Institute of Canada (RSIC). "Reinforcing Steel Manual of Standard Practice"
13. Construction Safety Act or any other regulations of the Ontario Ministry of Labour relating to the work of this section.

#### 1.6 CO-ORDINATION & CO-OPERATION

1. Coordinate the work of this Section with the work of other sections and advise other trades when materials to be built into the forms will be required.
2. Cooperate with other sections to ensure an uninterrupted sequence of construction.
3. Ensure the electrical conduit and fixture receptacles are not embedded or recessed into the concrete suspended slabs or beams except as indicated below. No conduit is permitted in columns. Vertical conduit may be permitted in walls with prior approval from the Consultant. No horizontal conduit is permitted in walls. Conduit to run below slab-on-grade maintaining full slab thickness.
4. Install any items furnished by others, miscellaneous iron work, anchors, anchor bolts, pipe sleeves, precast hardware, etc., that are to be built into the concrete work.
5. Form all holes and openings shown or required to accommodate the work of other trades.
6. Make good all openings left in construction around pipes, openings for crane, anchorages, etc. for other trades in such a way as to maintain full fireproofing and soundproofing.

#### 1.7 SHOP DRAWINGS

1. Examine all drawings forming a part of this Contract and conform to the requirements of all such drawings.
2. Submit shop drawings for the proposed formwork, falsework, shoring and re-shoring for review by the Consultant. If such drawings are not satisfactory to the Consultant, make all required changes prior to the start of the work
3. Shoring and Falsework drawings are to show assumed values for all loads, types and grades of materials, dimensions, sizes and connection details. Where reshoring is required, provide sequence and details of shoring, reshoring, or leaving original shores in place as forms are stripped. Shop drawings for formwork, falsework and shoring are to be signed and sealed by a Professional Engineer, who will be responsible for the design and implementation of these structural systems, including field review.
4. Drawings for all exposed concrete such as stairwells, retaining walls, etc., are to show panel layouts, joint details, tie locations and types.
5. When patented methods of shoring are used, the manufacturer's recommendations as to load-carrying capacities and bracings may be followed, but only if supported by test reports.
6. Submit shop drawings in accordance with the General Requirements.
7. The Consultant's review of the shop drawings does not relieve this Contractor of his responsibility for ensuring that all forming systems are constructed properly and are maintained in position if necessary, to ensure the integrity of the structure during construction.

1.8 DESIGN CRITERIA – FORMWORK

1. Formwork, falsework and shoring is to be designed, erected, braced and maintained so that it will safely support:
  1. The liquid weight of the concrete.
  2. All applied construction loads, such as equipment, personnel, runways, and wind loads to which the system may be subjected.
  3. All supported loads including reshored slabs.
2. Follow the provisions of the Construction Safety Act as amended to-date and the recommendations of the current A.C.I. Standard 347.
3. Composite Metal deck will not be shored unless noted in steel deck shop drawings.
4. Tolerances within C.S.A. Standard CSA-A23.1 except that columns and wall alignment in vertical direction to be within 1 to 600, but total variation not to exceed 25 mm for total height of building. In addition, exterior face of spandrel girders to be 'true' both vertically and horizontally to  $\pm 5$ mm in any one bay. Stair risers and treads to be within the tolerances of the OBC.
5. Tolerances for equipment anchors, inserts, etc. to equipment supplier's requirements.

1.9 DESIGN CRITERIA – CONCRETE

1. Design all concrete mixes for the compressive strength and slump requirements as specified in "Proportioning" of this section. Allow for the appropriate coefficient of variation for each strength class for the batch plant supplying the concrete.
2. Submit detailed mix designs for each class of concrete for review by the Consultant as least two weeks prior to the commencement of concreting. Submit up to date statistical data for the batch plant confirming the coefficient of variation for each strength class.

1.10 SPECIAL CONDITIONS

1. The Contractor's attention is drawn to the fact that site access is restricted by the presence of, fire & vehicle routes, roadways and site works, which may affect the work of this Section including hoisting, delivery and the availability of laydown areas.

1.11 SAMPLES

1. Construct representative samples for each type of concrete element exposed to view for approval of the Consultant with respect to finish, tie patterns, rustication, etc.
2. Samples are to be large enough to provide proper representation of the final element with interior and exterior corners, soffits, rustication and any other special features.
3. At the discretion of the Consultant, samples may be a part of the actual building, located in a non-exposed area. Additional samples may be required until the desired finish is achieved, at no additional cost to the Owner.

1.12 UNIT PRICES

1. Provide unit prices listed in the Bid Form.
2. Include all labour, materials, overhead, profit and applicable taxes in the unit prices so that each unit price represents the total cost for the installation of the work.
3. Unit prices will be based upon the net difference of any particular change.

PART 2: PRODUCTS

2.1 MATERIALS

1. Cement

1. Type 10, normal in accordance with C.S.A. Standard A5.
2. Supplementary cementing materials in accordance with CSA Standards A23.5.
3. 20% maximum supplementary cement for suspended slabs and beams. The use of supplementary cement in slabs on grade to be coordinated with the finishers.

2. Aggregates

1. Fine and coarse aggregate materials and grading in accordance with C.S.A. Standard A23.1. Maximum size of coarse aggregate to suit spacing of reinforcing bars in accordance with C.S.A. Standard – A23.1.
2. Use pea gravel (6mm to 10MM) where concentration of reinforcement requires the use of smaller diameter aggregate and in toppings thickness is reduced below 50mm minimum thickness.

3. Admixtures

1. Use only those chemical admixtures and air entraining agents currently approved for use by the M.T.O. in accordance with OPSS Form 1303, Material Specifications for the Air Entraining Agents and Chemical Admixtures.
2. Chemical admixtures shall be type 1, Water Reducing Admixtures.
3. Admixtures to be compatible with the air entraining agent.

4. Superplasticizer – Normal setting, high range water reducing superplasticizing admixture in accordance with ASTM C-494 WRDA by Grace, Eucon-37 by Euclid Chemical or Sikament 300 CA by Sika Canada.

5. Asphalt Impregnated Fiberboard: 12mm thick fiberboard, uniformly saturated with a bituminous binder in accordance with current OPSS Form 1308, Type A.

6. Spray-Applied Curing and Sealing Compounds:

- .1 For interior floors curing and sealing compound to be Sealtight CS309 by W.R. Meadows, Masterkure CC200WB by Master Builder BASF, or Sika Florseal WB25. Curing and sealing compounds are to be non-yellowing. All curing compounds to be low VOC materials. Verify compatibility with flooring adhesives where applicable
- .2 For exterior sidewalks, and curbs curing compound to be Kurez Vox White Pigmented by Euclid Chemical, 1220 White by W.R. Meadows, unless specified otherwise. All curing compounds to be low VOC materials.

6. Lumber, Plywood: and other formwork materials to C.S.A. Standard A23.1, Article 11.3, except as noted.

1. Contact surfaces of forms for concrete which will be exposed to view in the completed structure to be new, minimum thickness 20mm, plywood form panels, overlaid with resin impregnated kraft paper.

7. Form Oil: colorless, non-staining, mineral oil, free of kerosene.

8. Form Ties:

1. For general hidden wall areas, removable or snap-off metal ties that after removal of forms, no metal is within one inch of the finished surface.

2. On exposed sides of stairwell walls and retaining walls, metal ties with plastic cone formers to suit architectural details together with suitable plugs. For members exposed to weather, ties to be stainless. For interior architectural concrete, ties to be nickel plated.
3. Heavy duty ties for one-sided form construction.
9. Grout: (for steel base plates) V-3 by Meadows or Masterflow 713 by Master Builders – all pre-mixed.
10. Non-Metallic Dry Shake Hardener: (HC) to be gray 'MasterTop 100' by BASF factory, Diamag 7 by Sika, or Surfex Non-metallic by Euclid
11. Dovetail Anchor Slots: 24-gauge galvanized steel with Styrofoam filler.
12. Slab on Grade Sawcut Sealant: Meadows Rezi-Weld Flex or Sikaflex 1-9 (gray).
13. Vapour Barrier: Meadows Perminator Vapor Mat 10 mil polyethylene sheeting with 4"Perminator tape at all joints.
14. Circular Column or Light Standard Forms - Sonotube, seamless fibre forms with plastic liner to prevent transfer of spiral markings to concrete, as manufactured by Sonoco Products, Company Poli-Permaform with plastic liner as manufactured by Perma Tubes Ltd. or approved equal. Refer to Architectural and Electrical drawings and specifications if specially shaped forms are required for Light Standard bases.
15. Latex Bonding Agent - for bonding toppings to slabs or cast-in-place concrete items. – Latex R by Sika, Intralok by W.R. Meadows, or approved equal.

## 2.2 PROPORTIONING OF CONCRETE - GENERAL

1. Job-mixed concrete will not be allowed on this project.
2. Provide mixed-transit, ready-mixed concrete in accordance with C.S.A. Standard CSA-A23.1, obtained from a supplier approved by the Consultant for use on this project.
3. Mix all concrete with materials so graded and proportioned to produce a plastic mass of such consistency that it will flow slowly under its own weight and which can be readily worked into corners of forms and under and around reinforcing without forming voids or honeycombed surfaces.
4. Furnish to the Contractor, a 'delivery ticket' for each batch of concrete delivered to the site, which shall be kept on record for the inspection of the Consultant. Each ticket shall show the following:
  1. Date and truck number.
  2. Contractor's name.
  3. Job designation.
  4. Specified concrete strength, slump, air content and admixtures.
  5. Batch volume.
  6. Time of batching.
5. For concrete mixes requiring entrained air, do not pre-mix the air entraining agent with a chemical admixture solution. Where both an air entraining agent and chemical admixture are used, dispense the two materials separately.
6. Accelerating or retarding chemical admixtures shall only be used with the prior approval of the Consultant or at the Consultant's written request. Do not use calcium chloride or products containing calcium chloride.

7. Chemical admixtures and air entraining agents shall be supplied by the same manufacturer and be compatible. Use in strict accordance with the manufacturer's directions.
8. The compressive strength of all concrete is to be determined from test cylinders made in accordance with C.S.A. Standard CSA-A23.2
9. Minimum truck load 1½ cubic meters.

**2.3 PROPORTIONING OF CONCRETE - PROPERTIES**

1. Proportion the materials in accordance with the mix designs supplied under Article 1.9 of this Section to provide the following specified design strengths, slumps and air contents.

LOCATION	SPEC. 28 DAY COMPRESSIVE STRENGTH	SLUMP	Min. WATER CEMENT RATIO	AIR CONTENT	EXPOSURE CLASS
Mud slabs & lean fill	10 MPa	125 max.	As required	nil	-
Slabs-on-grade (interior)	30 MPa	100 max.	0.45	nil	-
Toppings and & slabs on composite & Comslab metal deck	30 MPa u/noted	75 ± 25 mm	0.50	nil	-
Exterior retaining walls	30 Mpa	100 max.	0.50	4 - 7%	-
Exterior stairs, exterior suspended slabs & columns	35 MPa	75 ± 25 mm	0.40	5 - 8%	C-1
Exterior foundation walls	30 MPa	100 max.	0.50	4 - 7%	-
Footings	25 MPa	100 max.	0.55	nil	-
Interior Structural Walls	30 Mpa	75±25 mm	0.45	nil	-
Exterior slabs, sidewalks, and curbs	32MPa	100 max.	0.45	5-8%	C-2

**2.4 QUALITY CONTROL**

1. All materials, batching and mixing procedures are subject to test or inspection by the Consultant or his designated representatives.
2. Provide samples of materials as may be required at no additional cost to the Owner.
3. Provide access to pits, batch plants, etc., as may be required by the Consultant or his designated representatives.
4. The cost of testing will be paid from the Testing & Inspection Allowance in accordance with Division 1.

### PART 3: EXECUTION

#### 3.1 EXAMINATION

1. Examine and obtain all necessary measurements of previously executed and existing work which may affect the work of this section prior to commencing operations.
2. Report any discovered discrepancies to the Consultant so that instructions can be given for the necessary remedial action.
3. Examine Mechanical and Electrical drawings for required housekeeping pads for supply and installation by this Section.

#### 3.2 ERECTION OF FORMS

1. Construct all forms to have sufficient strength, stability and rigidity to prevent bulging or deflection under the liquid weight of concrete and to support in addition, all construction loads to which they may be subjected including equipment, runways and wind forces.
2. Erect forms to the lines, dimensions and elevations shown on the drawings such that the completed work is within the tolerance limits for reinforced concrete buildings in accordance with Sub-Section 6.4 of CSA A23.1-14
3. Use new, minimum thickness 20mm, plywood form panels, overlaid with resin impregnated kraft paper for all concrete exposed to view in the completed structure. Maximum 4 re-uses in exposed areas.
4. Provide for all openings, offsets, risers, brackets, haunches, depressions and curbs as shown or required in the formwork.
5. For columns exposed to view in the completed structure, horizontal joints are to be above the ceiling. For exposed circular columns, forms must not leave spiral appearance.
6. For typical wall surfaces, arrange form ties such that after removal of the forms, no metal is within 25mm of the finished surface.
7. On the exposed sides of beams, stairwell walls, and retaining wall, install metal ties with plastic cone formers of the required depth and diameter to suit the architectural details. Provide vertical and horizontal feature strips to suit architectural details. Ensure that forms for these walls are tight to avoid bleeding at form joints or onto previously executed work. Seal, tape or caulk all form panel joints, including panel butt joints to prevent seepage of paste for Architectural Concrete.
8. For exposed surfaces of canopies, slabs, beams etc., provide vertical and horizontal feature strips to suit architectural details. Ensure that form joints are smooth, tight and accurately placed to provide a suitable finish.
9. Clean forms of all debris prior to concreting. Provide temporary openings at the base of walls, column forms and at other locations where necessary to facilitate cleaning and inspection. Place openings so that 'wash water' will have a clear run to the outside of the forms.
10. Provide 25mm x 25mm chamfers on all exposed corners of concrete, exposed to view in the finished structure.

11. Coat forms with a non-staining mineral oil prior to the placing of reinforcing steel in accordance with C.S.A. Standard CSA-A23.1. Where concrete surfaces are to receive a final coat of stain, paint, plaster, etc., omit the form oil and wet down the forms just prior to concreting.
12. Place continuous dovetail anchor slots as required to support the ends of abutting masonry walls and vertically at 600mm o.c. (maximum) on concrete surfaces which are faced with masonry, including walls, column faces, beam faces and slab edges.
13. Place anchors required for the support of mechanical or electrical equipment, precast hardware, curtain wall hardware and miscellaneous iron which is to be cast into the concrete as supplied by other Divisions.
14. Immediately prior to concreting, inspect all forms to ensure that they are properly placed, sufficiently rigid and tight, thoroughly clean, properly treated and free of snow, ice or other foreign materials. Do not use chemicals for snow/ice control.
15. Place cast-in inserts and bolts for support of angle and bent plate shelf 'angles'.
16. Formwork approved for concreting shall be properly protected until concrete is placed.
17. Do not form openings in concrete beams, slabs, columns or walls without prior approval of the Consultant unless they are shown on the structural drawings.
18. Set screeds with true and straight top edges to proper elevation. Provide camber for structural beams and slabs as detailed with smooth uniform curve.
19. Forms for the interior surfaces of stairwells are not to be plastic coated or other non-absorbent material.
20. Use steel forms for curbs cast-in-place or by the extrusion method.
21. Accurately set and secure in position, all inserts and other concrete inserts required for the work.
22. Install dovetail anchor slots.
23. Do not form openings in concrete beams, slabs, columns or walls without prior approval of the Consultant unless they are shown on the structural drawings
24. All footings to be formed. Earth forms are not permitted.
25. Take special care when lowering plastic lined circular forms over reinforcing steel to avoid scratching or otherwise damaging the plastic liner.

### 3.3 FORM REMOVAL

1. The proper time for the removal of forms is to be approved by the Consultant. Do not remove shoring until the supported member has reached sufficient strength to support safely both its own weight and the loads on it and in no case less than 75% of the specified strength.
2. Remove forms in accordance with C.S.A. Standard CSA-A23.1. Exercise care to ensure that exposed corners and edges are not chipped or damaged in the stripping operation.
3. Reshore suspended slabs and beams immediately after form removal. Do no strip in advance of reshoring by more than one bay.

4. The sequence and timing for stripping and reshoring of walls is to be based on actual field concrete strengths. Job-cured cylinders or other testing procedures such as Lok-Tests or maturity metering are to be performed by the testing company appointed by the Consultant, and the cost of such testing is to be paid by the Sub-Contractor.
5. Job-cured cylinders, when used as an indication of in place strength, are to be cured under conditions similar to the concrete construction which the specimen represents,
6. Remove forms in accordance with C.S.A. Standard A23.1.
7. Refer to CSA Standard S269.1 for the MINIMUM periods for which forms must be left in place.
8. The Concrete Sub-Contractor shall be responsible for the safety of the structure before, during, and after form removal.
9. Forms for architectural concrete shall not be stripped until at least 7 days after concrete is poured. Take particular care when stripping to ensure that damage does not occur at corners, reglets etc.
10. To help avoid colour variation in exposed concrete items, the length of time between pouring and stripping shall be approximately the same for each portion of the Work.

#### 3.4 CONCRETE PLACING

1. Do not start concrete placing until the Consultant has reviewed and approved all preparations including forms, joints and reinforcing steel.
2. Place vapour barrier below slabs at all slab-on-grade levels that have a moisture sensitive floor finish. Overlap vapour barrier 150mm at joints and tape with 100 mm Perminator tape. Extend to top of slab at all edges.
3. All conveying, depositing, compaction and vibration is to be done in accordance with the current C.S.A. Standard CSA-A23.1.
4. Maximum elapse of time between charging and placing is not to exceed 1½ hours. Reject concrete which exceeds this limit. In hot weather, this time period may have to be reduced as directed by the Consultant.
5. Place concrete carefully around all accessories, such as pipes, sleeves and conduits.
6. When concrete is to be placed in restricted locations, take special precautions to ensure close contact between the concrete and steel. Take care to exclude air-pockets and honeycombed areas. Use of a superplasticizer may be required for proper placement.
7. Where normal-size aggregate concrete can not be successfully placed in a congested area, use concrete with a smaller top aggregate size.
8. Use 'elephant trucks' for high lift concrete to prevent segregation.
9. When buggies are used for placing concrete in slabs on soil, they are to be supported on runways and not directly on the reinforcing steel and/or membrane.
10. Maintain a sufficient number of internal mechanical vibrators on site to properly compact the concrete within 15 minutes of placing, but not less than two vibrators for any pour.

11. Mechanical vibrators which are applied to the outside of the forms are not permitted, without prior approval of the Consultant.
12. Thoroughly compact all concrete during placing to ensure that the finished concrete is free of voids or other defects.
13. Ensure that reinforcement, hardware and inserts are not disturbed during concrete placement.
14. Strike off floor surfaces at the level shown on the drawings by means of previously set, continuous pipe screeding, set on adequate supports.
15. Notify the Consultant at least 24 hours in advance of any scheduled pour.
16. Grout all steel column bases with non-shrink grout by ramming in damp mixed grout tightly below bearing plate to completely fill space below plate without any voids.
17. Place concrete stair non-slip nosing strips into concrete stairs. Take special care to ensure strips are aligned equally from tread to tread and are installed straight vertically and horizontally.
18. Do not use fly ash in concrete that will be exposed to view nor in concrete that will be exposed to freeze-thaw cycles or de-icing chemicals.
19. Take precautions to ensure bleeding from subsequent concrete lifts do not bleed out and stain already finished work that is exposed in the finished structure. Provide control joints only at reveal locations and seal, tape, or caulk panel joints.
20. During mass concrete pours refer to and implement the requirements of thermal control plan. Take care not to damage or displace temperature sensors during the concrete pour.

### 3.5 CURING AND PROTECTION

1. Protection and curing of concrete in accordance with Sub-Section 7.7 of C.S.A. Standard CSA-A23.1.
2. Maintain all equipment and materials for the protection and curing of concrete on site, ready to use before concrete placing is started.
3. Cover walls, piers, columns, beams and slab edges with wet burlap or tightly wrap with properly lapped 4 mil polyethylene sheeting, immediately after stripping to continue the curing periods. (Surfaces which will not be exposed to view or which will not have other surface treatment may be sprayed with curing compound after stripping).
4. Completely cover floor slabs with 4 mil polyethylene sheeting, properly lapped at side and edge laps and weighted down immediately after finishing.
5. Cover sidewalks, curbs, gutters and exterior paved areas with wet burlap or polyethylene sheeting.

6. A sprayed-on membrane curing compound may be used for surfaces listed under paragraph 3, 4 and 5, in lieu of polyethylene sheeting for concrete poured between April 1<sup>st</sup> and October 14<sup>th</sup>, except as follows:
  1. Floor areas or wall surfaces which are to have topping or other specialty surface treatments are not to have spray-applied compounds employed but must be polyethylene cured. Coordinate with the flooring contractor to ensure compatibility with flooring adhesives.
7. Freshly finished floors are not to be used for seven (7) days after completion and only light use is permitted for an additional 7 days.

### 3.6 COLD WEATHER REQUIREMENTS

1. All concreting operations during cold weather in accordance with sub Section 7.1 of C.S.A. Standard CSA-A23.1. Carefully protect all corners and edges.
2. Exercise care to ensure that previously placed concrete and reinforcing steel are adequately heated to prevent freezing of new concrete placed directly against it.
3. Exercise care to avoid rapid temperature changes (thermal shock) when removing an area from temporary heating conditions.
4. Remove and replace all concrete damaged by frost or freezing at the direction of the Consultant at no cost to the Owner.
5. Accelerating chemical admixtures shall not be used without the written approval of the Consultant.
6. When pouring new concrete directly against existing protect heat loss by extending the protection for fresh concrete at least 600 over the existing.
7. Locate heating units to avoid heating concrete locally or drying it excessively. Avoid high temperature and drying heat in enclosures.

### 3.7 HOT WEATHER CONCRETING

1. All concreting operations during hot weather in accordance with Sub-Section 7.1 of C.S.A. Standard CSA-A23.1
2. Exercise care to prevent surface crazing of floor slabs due to combined high temperatures and drying winds.
3. The use of water reducing-retarding chemical admixture in the concrete mix may be required at the Consultant's discretion.

### 3.8 FINISHING OF HORIZONTAL SURFACES

1. Floors
  1. Refer to A.C.I. Standard 302 for recommended procedure for concrete floor and slab construction and finishing.
  2. Refer to CSA Standard CSA-A23.1. Maintain surface tolerances for all slabs in accordance with Table 21 of CSA A23.1 for Class B Floor. Finish all floors to achieve surface flatness as tested by the straightedge method to a maximum tolerance of  $\pm 5\text{mm}$  ( $3/16''$ ) in accordance with CSA Standard CSA-A23.1.

3. Concrete floors which are to receive carpet, resilient flooring, mosaic tile or be left exposed, shall be steel floated with a disc type power floating machine, having a 600mm disc, and weighing at least 130 kg. Continue the floating operation until sufficient moisture is brought to the surface to fill all voids. After floating when the floor has hardened sufficiently so that excess fines will not be brought to the surface, trowel with a steel trowel to a smooth level surface free of all pinholes, trowel and 'chatter' marks. See ACI Standard 301.
4. Provide sufficient lighting as necessary for finishing requirements.
5. Apply liquid surface evaporation reducers by sprayer to protect the concrete from pre-mature surface drying when required. Mix in accordance with the manufacturer's instructions and apply in a thin film following the bullfloating operation. Do not work liquid materials into the surface of the concrete.
6. In areas where shake applied surface hardeners are specified in Architectural finish schedule, apply shake applied hardener to achieve a medium duty floor.
7. Concrete floors which are to receive terrazzo finish, quarry tile or concrete toppings shall be screeded level, darbid and after attaining a partial set, brushed with a coarse wire broom to remove laitance and to score the surface to assure bond of the topping.
8. Provide slip resistant spun concrete or broom finish as indicated on Architect's drawings for all exterior concrete flat work.

### 3.9 TREATMENT AND REPAIRS FOR FORMED SURFACES

1. After removal of forms, the surfaces of concrete are to be given one or more of the finishes specified hereafter. Methods used are to be in accordance with Sub Section 7.9 of C.S.A. Standard CSA-A23.1.
2. When, in the opinion of the Consultant, satisfactory repairs cannot be made, then the defective work is to be cut out and replaced as directed by the Consultant.
3. Treatment of honeycombed areas is to be carried out as directed by the Consultant. Do not treat such areas prior to receiving instructions from the Consultant.
4. Patch tie holes and other defects (unless otherwise directed by the Consultant as noted in paragraph 2 and 3 above). Remove fins exceeding 5mm in height.

### 3.10 CONSTRUCTION JOINTS

1. Construction joints in walls and floors shall be placed in locations approved by the Consultant or shown on the drawings. All joints in exposed work to be carefully detailed and constructed.
2. Construction joints shall be keyed and dowelled to the adjoining pour as detailed on the drawings.
3. Before placing adjoining concrete at construction joints, clean the existing surface of dirt, laitance and loose aggregate.
4. Where additional resistance to horizontal shear is required, mortises or keys shall be formed in the concrete. The pouring sequence and the location of construction joints shall be as shown on the plans, noted herein, or as approved by the Consultant.

3.11 ISOLATION JOINTS

1. Provide asphalt-impregnated fibreboard as follows:

1. At locations shown and noted on the drawings.

3.12 CONTROL JOINTS

1. Provide control joints where shown and noted on the drawings in foundation and retaining walls and in floor slabs. Control joints in floor slabs shall be sawcut to the depth shown as soon after placing the concrete as the surface will allow without chipping but not later than 24 hours after placing. Clean sawcuts with compressed air. Fill sawcut joints exposed to view, with saw cut filler no earlier than 30 days after the pour. Joints should be cleaned free of debris with compressed air before filling.

3.13 GROUTING OF COLUMN BASE AND BEAM BEARING PLATES

1. Rough finish the top of walls or slabs which receive steel columns, or steel beams.
2. After the erection and alignment of columns and beams, fill the space beneath the plates with a non-shrink grout. Take care to ensure that air pocket or voids are eliminated.
3. Mix and place the grout in strict accordance with the manufacturer's directions.

3.14 FIELD QUALITY CONTROL

1. All materials and workmanship shall be subject to test and inspection by a testing and inspection company appointed by the Consultant.
2. Cost of testing and inspection will be paid from the Testing and Inspection Allowance in accordance with Division 1 except as noted hereafter.
3. Provide unhindered access to the project for purposes of inspection and testing. Provide storage space and the necessary protection for test specimens against damage or loss while on site.
4. Provide representative samples of the materials as requested by the testing and inspection company at no cost to the Owner.
5. All field test for concrete quality and all criteria relating to failure to meet test requirements in accordance with the Ontario Building Code and C.S.A. Standard CSA-A23.1, except as follows:
  1. Each test shall consist of three standard cylinders, accompanied by a slump test and measurement of air content (where applicable). Unless otherwise directed by the Consultant, one cylinder shall be tested at 7 days and the remaining two at 28 days.
  2. The inspection company shall take concrete tests for:
    - i) not less than one test for each class of concrete placed each day, and,
    - ii) not less than one test for each 100 cubic meters or portion thereof placed in any day.
6. The cost of any additional testing and/or the cost of replacement of any part of the structure resulting from failure of the concrete to meet the test requirements shall be borne by the Contractor.

7. Notify the testing company of the pouring schedule sufficiently in advance so that tests may be made.

3.15 CLEAN-UP

1. At the completion of the work of this Section, remove from the site any excess materials, debris and equipment.

**END OF SECTION 03 30 00**

**1 General**

**1.1 GENERAL REQUIREMENTS**

- .1 Conform to General Instructions, Division 1.

**1.2 SCOPE OF WORK**

.1 Work Included

Provide all plant, labour, equipment and materials to complete the precast-prestressed concrete work. The work includes, but is not limited to:

- manufacture and installation of precast concrete planks.
- core drilling of all openings in slabs identified by other trades.
- grouting of reinforcing in joints between precast units.
- caulking grooves at bottom side of slab ( at exposed precast locations only).
- Installation of dowels into precast slabs.
- Installation of weld plates or angles into slabs unless noted otherwise.
- Welding of rebar anchors or weld plates grouted into precast slabs to structural steel items.

.2 Related Work Specified Elsewhere

- .1 Cast-In-Place Concrete – Division 3
- .2 Masonry – Division 4
- .3 Structural Steel Division 5

**1.3 REFERENCED STANDARDS**

- .1 Unless otherwise stated, the applicable provisions of these reference standards are to be considered a part of this application. Standards to be current issue.
- .2 Ontario Building Code.
- .3 Do precast prestressed concrete work in accordance with C.S.A. Standard CAN3-A23.4-M and CAN3-A23.3
- .4 Do welding in accordance with C.S.A. W59-M for welding to steel structures and C.S.A. a251-M for welding reinforcement.
- .5 Construction Safety Act or any other regulations of the Ontario Ministry of Labour relating to the work of this section.

**1.4 COORDINATION & COOPERATION**

- .1 Coordinate the work of this Section with the work of other sections.
- .2 Cooperate with other sections to ensure an uninterrupted sequence of construction.
- .3 Form or core drill all holes and openings shown or required to accommodate the work of other trades.

**1.5 SHOP DRAWINGS**

- .1 Examine all drawings forming a part of this Contract and conform to the requirements of all such drawings. Confirm all dimensions.
- .2 Submit shop drawings for review by the Consultant. If such drawings are not satisfactory to the Consultant, make all required changes prior to the start of the work.
- .3 Shop drawings are to show the following information:
  - .1) Precast design loading
  - .2) Camber on all precast units
  - .3) Types and grades of materials
  - .4) Finish schedule for all precast units.
  - .5) Dimensions and joint location of all precast units
  - .6) Location of openings, and cast-in inserts
  - .7) Connection details, reinforcement details, and cast-in anchor details.
  - .8) Reinforcement location and sizes
  - .9) Methods of handling and erection
- .4 Shop drawings are to be signed and sealed by a Professional Engineer, who will be responsible for the design and implementation of these structural systems. The stamping engineer must be experienced in the design and implementation of precast plank framing systems and must be registered in the Province of Ontario.
- .5 Submit one digital PDF copy and two prints of each shop drawing with minimum scale of 1:50.
- .6 The Consultant's review of the shop drawings does not relieve this Sub-Contractor of his responsibility for ensuring that precast systems are constructed properly.

**1.6 DESIGN CRITERIA**

- .1 Design precast prestressed concrete units to CAN3-A23.3 and to carry handling stresses.
- .2 Design for loading shown on drawings as well as loads due to handling, earthquake, wind, and temperature.
- .3 Consider vibration characteristics in accordance with National Building Code.
- .4 Design Prestressed units to meet two hour fire resistance rating.
- .5 At all locations where load bearing wall bears directly on top of precast slabs, design bearing pads for the loading from the individual slab plus the accumulated wall loads above. Bearing pads are to resist loads without permanent deformation. The maximum accumulated loads at lowest level is as follows:

Building Level	Bearing Pad Load = Slab Reaction + $\frac{1}{2}$ wall above factored loading in kN/m
Max load underside each precast plank	Slab reaction +0.5x 200 kN/m

## 1.7 SOURCE QUALITY CONTROL

- .1 Provide Engineer with certified copies of quality control tests and inspection related to project as specified in CAN3-A23.4 and C.S.A. G279-M
- .2 Inspection of prestressed concrete tendons is required in accordance with C.S.A. G279-M
- .3 Upon request, provide Engineer with certified copy of mill test report of reinforcing steel supplied, showing physical and chemical analysis.

## 1.8 QUALIFICATIONS OF MANUFACTURER

- .1 Manufacturers of precast concrete elements to be certified by C.S.A. A251-M

## 2 Products

### 2.1 MATERIALS

- .1 Cement, aggregates, water, admixtures: to CAN3-A23.4-M, CAN3-A23.1-M, CAN3-A23.1S1, and CAN-A23.1S2
- .2 Prestressing steel: Uncoated 7 wire cable conforming to CAN/C.S.A.-S6-M and C.S.A G279-M
- .3 Weldable Reinforcing Steel - new deformed bars in accordance with CSA G30.12 with a guaranteed yield stress of 400 MPa.
- .4 Anchorage and couplings: To CAN3-A23.1-M, CAN3-A23.1S1, CAN3.1S2
- .5 Embedded steel: To CAN/C.S.A.-G40.21-M type M300W.
- .6 Welding materials: To C.S.A. W48.1-M
- .7 Bearing pads: 3mm thick masonite smooth one side in lightly loaded zones and engineered Korlath or neoprene bearing pads for highly loaded bearing conditions or at locations where masonite pads could become damaged due to wet or moist conditions. All bearing pads are to be a minimum of 75mm (3") wide unless wider pads are required for bearing..
- .8 Insulation: Expanded polystyrene to CAN/CGSB-51-20-M87
- .9 Chemical admixtures: To CAN3-A266.2-M78.
- .10 Gypsum Based Self Levelling Topping: Gyp-Crete 2000 by Maxxon Corporation or approved equal. Apply gypsum based floor levelling toppings in strict conformance with manufacturers' instructions.
- .11 Polymer Modified Repair Mortars : W.R. Meadows Meadow-crete GPS in conjunction with Meadow Patch-T1 or approved equals.

## **2.2 CONCRETE MIXES**

- .1 Use concrete mix designed to produce 41 MPa compressive cylinder strength at 28 days with maximum water /cement ratio to CAN3-A23.1-M77, Table 7 for Class D exposure, CAN3-A23.1S1, CAN3-A23.1S2
- .2 Air entrainment of concrete mix to CAN3-A266.5-M.
- .3 Admixtures to CAN3-A266.5-M.
- .4 Do not use calcium chloride or products containing calcium chloride.

## **2.3 GROUT MIX**

- .1 Cement grout - one part type 10 Portland cement 2-1/2 parts sand, sufficient water for placement and hydration.

## **2.4 MANUFACTURE**

- .1 Manufacture units in accordance with C.S.A. 251-M1982
- .2 Mark each precast unit to correspond to identification mark on shop drawings for location on part of unit that will not be exposed.
- .3 Provide hardware suitable for handling elements.
- .4 Provide 50mm (2") thick insulation plug at each cell of hollow core at exterior.

## **3 Execution**

### **3.1 EXAMINATION**

- .1 Examine and obtain all necessary measurements of previously executed and existing work which may affect the work of this section prior to commencing operations.
- .2 Report any discovered discrepancies to the Consultant so that instructions can be given for the necessary remedial action.

### **3.2 ERECTION**

- .1 Erect elements within allowable tolerances indicated or specified.
- .2 Non-cumulative erection tolerances in accordance with CAN3 -A23.4-M78, Section 10.
- .3 Install 3mm (1/8") masonite or korlath bearing pads, smooth side up on bearing ends, of concrete or masonry.
- .4 Set units in a tight, level position on true level bearing surface provided by others. Minimum bearing 100mm (4") on masonry and 75mm (3") on structural steel.

- .5 Fasten precast units in place as indicated on reviewed shop drawings.
- .6 Level differential elevation of horizontal joints with grout to slope not more than 1:12.
- .7 Clean field welds with wire brush and touch up with primer.
- .8 Field cut holes and openings up to 152mm (6") diameter for other trades. Openings larger than 152mm (6") to be located on shop drawings at time of approval and to be cut in field. Do not cut reinforcing without approval of precast slab manufacturer and Engineer.
- .9 Grout reinforcing bars in joints as shown on approved shop drawings.

### **3.3 TOPPING**

- .1 This contractor shall provide a suitable top finish to accept direct application of finished flooring/roofing as per room finish schedule.
- .2 At locations where 50mm (2") concrete topping is to be applied the top surface of the precast prestressed slabs is to be raked (roughened) for bonding of topping.
- .3 At locations other than at 2" topping areas the Precast Contractor is provide a skim coat finish to taper top of uneven top of slab elevations to provide a smooth transition between uneven planks.

### **3.4 EXPOSED CEILING**

- .1 Refer to Architectural reflected ceiling plans and caulk slab soffit longitudinal joints, at locations where precast slabs are to be left exposed using standard caulking.
- .2 The underside of precast shall be finished as per C.S.A. A23.4-M78 (24.2.2) Standard finish.

### **3.5 CLEAN-UP**

- .1 At the completion of the work of this Section, remove from the site any excess materials, debris and equipment.

**END OF SECTION 03 41 00**

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**Part 1            General**

**1.1                RELATED SECTIONS**

- .1    Section 04 05 10 – Masonry Procedures
- .2    Section 04 05 12 - Mortar and Masonry Grout
- .3    Section 04 05 19 - Masonry Anchorage and Reinforcing
- .4    Section 04 05 23 - Masonry Accessories
- .5    Section 04 22 00 – Concrete Masonry
- .6

**1.2                MEASUREMENT PROCEDURES**

- .1    Work of this section, except as specified otherwise, will be measured by the Contractor. It will be paid for under payment items:
  - .1    Inspecting and testing to identify unsound joints. This item will not be measured; payment will be according to one fixed lump sum price for work necessary to locate unsound joints.
  - .2    Pointing - on lump sum basis.
- .2    Repair work will be paid for on a unit price basis according to pre-established unit prices. Measurement will be based on lump sum.

**1.3                REFERENCES**

- .1    Canadian Standards Association (CSA)
  - .1    CSA A23.1- [94] , Construction Materials and Methods of Concrete Construction.
  - .2    CAN3-A371- [94] , Masonry Construction for Buildings.

**1.4                DEFINITIONS**

- .1    Raking: the removal of loose/deteriorated mortar until sound mortar is reached.
- .2    Repointing: filling and finishing of masonry joints from which mortar has been raked out and or missing.
- .3    Tooling: finishing of masonry joints using tool to provide final contour.
- .4    Repair: using adhesives to rebond sections of fractured masonry.
- .5    Consolidation: strengthening masonry units to prevent deterioration (spalling).
- .6    Descaling: the removal of loose portions of the masonry (usually spalled area) through impact with a brush hammer or similar device.

**1.5                SYSTEM DESCRIPTION**

- .1    Work of this Section includes but is not limited to:
  - .1    Visually inspecting for obvious signs of deteriorated masonry and testing/verification of masonry joints.
  - .2    Raking identified unsound joints.
  - .3    Preparation of masonry surface including joints surface cleaning, flushing of voids and open joints, and masonry wetting.

- .4 Repointing of identified masonry joints.
- .5 Removal of loose portions on stone surface.
- .6 Resetting of dislodged masonry units.
- .7 Ensuring cure of mortar.
- .8 Grouting by hand, small voids.
- .9 Consolidation of fractured masonry units or spalled units.
- .10 Replacement of deteriorated or missing units.

1.6 **SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit labelled samples of materials used on project for approval before work commences.

1.7 **QUALIFICATIONS**

- .1 Contractor-Mason:
  - .1 Use single Contractor-mason for all masonry work. Ensure Contractor-mason has 10 years minimum in masonry work especially historic stone masonry.
  - .2 Ensure mason has certificate of qualification with experience in stone masonry. Ensure that all masonry work is strictly undertaken by certified masons.
  - .3 Ensure Contractor-mason has good level of understanding of structural behaviour of masonry walls if masonry work involves replacing or repairing stones which are part of structural masonry work.
- .2 Cement grouting: grouting activities should be undertaken by experienced workers in manipulation and cement grouting methods.

1.8 **MOCK-UPS**

- .1 Construct mock-up in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Construct mock-up 600mm x 600mm m to demonstrate repair procedure for each type of masonry material specified.
- .3 Construct mock-up under supervision of Consultant to demonstrate a full understanding of specified procedures, techniques and formulations are achieved before work commences it required.
- .4 Construct mock-up where directed.
- .5 Allow 24 hours for inspection of mock-up by Consultant before proceeding with masonry repointing and repair work.
- .6 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may remain as part of finished work.

1.9 **DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Store cementitious materials and aggregates in accordance with CSA A23.1.
- .3 Store lime putty in plastic lined sealed drums.
- .4 Keep material dry. Protect from weather, freezing and contamination.
- .5 Ensure that manufacturer's labels and seals are intact upon delivery.

- .6 Remove rejected or contaminated material from site.

#### 1.10 **STORAGE AND PROTECTION**

- .1 Deliver, store, handle and protect materials of this section in accordance with Section 01 61 00 - Common Product Requirements.
- .2 At end of each working day, cover unprotected work with waterproof membranes. Membranes should extend to 0.5 m over surface area of work and be tightly installed to prevent finished work from drying out too rapidly.
- .3 Protect adjacent finished work against damage which may be caused by on-going work.

#### 1.11 **EXISTING CONDITIONS**

- .1 Report in writing, to Consultant areas of deteriorated masonry revealed during work. Obtain Consultant's approval and instructions of repair and replacement of masonry units before proceeding with repair work.

#### 1.12 **ENVIRONMENTAL REQUIREMENTS**

- .1 When temperature is 10°C or less:
  - .1 Store cements and sands for immediate use within heated enclosure. Allow these materials to reach minimum temperature of 10°C (that is equilibrium with air temperature in enclosure).
  - .2 Heat water to minimum of 20°C and maximum of 30°C:
    - .1 At time of use temperature of mortar to be minimum of 15°C and maximum of 30°C.
    - .2 Do not mix cement with water or with aggregate or with water-aggregate mixtures having higher temperature than 30°C.
- .2 Protection requirements are specified in Section 04 05 10 - Common Work Results for Masonry.
- .3 Obtain approval from Consultant for methods of enclosure and protection.

### **Part 2 Products**

#### 2.1 **MATERIALS**

- .1 Mortar materials: to Section 04 05 12 - Mortar and Masonry Grout
- .2 Mortar: to match existing adjacent mortar colour, texture and patterning.

### **Part 3 Execution**

#### 3.1 **GENERAL**

- .1 Perform work in accordance with CAN3-A371.
- .2 Use manual raking or tool to remove deteriorated mortar and ensure that no masonry units are chipped/altered/damaged by work to remove mortar.
- .3 Tool and compact using jointing tool to force mortar into joint.
- .4 Finish joints to match existing joints, except where specified otherwise.
- .5 Use suitable approved jointing tool to form compacted concave or V-shaped tooled joints.

### 3.2 REPOINTING

- .1 Procedure of testing: inspect joints visually for obvious signs of deteriorated masonry. Test joints not visually deteriorated as follows:
  - .1 Test for voids and weakness by using hammers or other approved means.
  - .2 Perform testing in co-operation with Consultant so that unsound joints can be marked and recorded.
- .2 Raking joints:
  - .1 Rake unsound joints free of deteriorated and loose mortar, dirt and other undesirable material.
  - .2 Clean joints to full depth of deteriorated mortar but in no case to less than 50 mm. Clean out voids and cavities encountered.
  - .3 Clean by compressed air, surfaces of joints without damaging texture of exposed joints.
  - .4 Flush open joints and voids; clean open joints and voids with low pressure water and if not free draining blow clean with compressed air.
  - .5 Leave no standing water.
- .3 Repointing:
  - .1 Dampen joints and completely fill with mortar. If surface of masonry units/ stone has worn rounded edges keep pointing back from surface to keep same width of joint. Avoid feather edges. Pack mortar solidly into voids and joints.
  - .2 Keep masonry damp while pointing is being performed.
  - .3 Do no pointing in freezing weather. **See Section 01 00 05 General Instructions** for protection required for work in this Section.
  - .4 Build-up pointing in layers not exceeding 12 mm in depth. Allow bottom layers to set before applying subsequent layers. Maintain joint width.
  - .5 Tool joints behind masonry face with identical tools used for weathered joints. Match weathered joint.
  - .6 Remove excess mortar from masonry face before it sets. Finish jointing neatly as specified.

### 3.3 DESCALING

- .1 Remove loose masonry portions by impact with bush hammer as directed by Consultant.

### 3.4 RESETTING

- .1 Fix dislodged masonry units in correct location with water soaked softwood wedges and firm mortar.
- .2 Insert and compress firm mortar to within 50 mm of pointing surface. Allow mortar to set 24 hours.
- .3 Pull out wood wedges when dried and shrunken.
- .4 Point to surface in two layers.

### 3.5 GROUTING

- .1 Clean out void with water until water runs clear.
- .2 Fill joints and cracks with mortar set back 50 mm from final mortar surface.
- .3 Pour epoxy grout through tube until void is full.
- .4 Point as rest of work.

**3.6 REPAIR**

- .1 Remove fractured unit without losing pieces or worsening damage or damaging adjacent units.
- .2 Drill holes in each section and fracture.
- .3 Insert non-ferrous dowels, seal in place temporarily with epoxy and apply cement grout to holes and joints between masonry units. Let set.
- .4 Reinstate repaired units into work and repoint with specified mortar as rest of work.

**3.7 CONSOLIDATION**

- .1 Remove decayed masonry as directed by Consultant.
- .2 Apply consolidant as directed by [Consultant.
- .3 Repoint as rest of job.

**3.8 CLEANING**

- .1 Clean surfaces of mortar droppings, stains and other blemishes resulting from work of this contract as work progresses.
- .2 Do further cleaning after mortar has set and cured.
- .3 Clean masonry with stiff natural bristle brushes and plain water only. Vinegar or chemicals are not to be used unless instructed in writing by Consultant.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1            Section 01 33 00 - Submittal Procedures
- .2            Section 01 74 19 - Construction/Demolition Waste Management and Disposal
- .3            Section 01 45 00 - Quality Control
- .4            Section 01 61 00 - Common Product Requirements
- .5            Section 03 30 00 - Cast-in-Place Concrete
- .6            Section 04 05 12 - Mortar and Masonry Grout
- .7            Section 04 05 19 - Masonry Anchorage and Reinforcing
- .8            Section 04 05 23 - Masonry Accessories
- .9            Section 04 21 13 - Brick Masonry
- .10          Section 04 22 00 - Concrete Unit Masonry
- .11          Section 04 73 13 - Calcium Silicate Manufactured Stone Masonry
- .12          Section 05 50 00 - Metal Fabrications
- .13          Section 07 21 19 - Foamed In Place Insulation
- .14          Section 07 21 31 – Adhesive Grade Air Barrier membrane and Thru-Wall Flashing
- .15          Section 07 92 10 - Joint Sealing

**1.2                REFERENCES**

- .1            Canadian Standards Association (CSA International).
  - .1            Unless otherwise stated, the applicable provisions of these reference standards are to be considered a part of this application. Standards to be current issue.
  - .2            CSA-A165 Series, Standards on Concrete Masonry Units
  - .3            CSA A179, Mortar and Grout for Unit Masonry.
  - .4            CSA-A371, Masonry Construction for Buildings.

**1.3                SUBMITTALS**

- .1            Product Data.
  - .1            Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2            Samples.
  - .1            Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

- 2 Submit samples.
  - .1 Two (2) of each type of masonry unit specified.
  - .2 One (1) of each type of masonry accessory specified.
  - .3 One (1) of each type of masonry reinforcement and tie proposed for use.
  - .4 As required for testing purposes.
- .3 Manufacturer's Instructions.
  - .1 Submit manufacturer's installation instructions.

#### **1.4 QUALITY ASSURANCE**

- .1 Test Reports.
  - .1 Submit laboratory test reports in accordance Section 01 45 00 – Quality Control.
  - .2 Certified test reports showing compliance with specified performance characteristics and physical properties.
  - .3 Submit laboratory test reports certifying compliance of masonry units and mortar ingredients with specification requirements.
  - .4 For clay units, in addition to requirements set out in reference to CSA and ASTM Standards, include date indicating initial rate of absorption for units proposed for use.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Mock-ups.
  - .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
  - .2 Construct mock-up panel of exterior masonry wall construction 1200 x 1800 mm showing masonry colours and textures, use of reinforcement, ties, through-wall flashing, weep holes, jointing, coursing, mortar and workmanship.
  - .3 Mock-up will be used:
    - .1 To judge workmanship, substrate preparation, operation of equipment and material application.
    - .2 For testing to determine compliance with performance requirements. Perform following tests.
      - .1 For clay units, in addition to requirements set out in referenced CSA and ASTM Standards include data indicating initial rate of absorption.
  - .4 Construct mock-up where directed.
  - .5 Allow seven (7) days for inspection of mock-up by Consultant before proceeding with work.
  - .6 When accepted by Consultant, mock-up will demonstrate minimum standard for this work. Mock-up may not remain as part of finished work.
- .4 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section 00 01 05 – General Instructions.

**1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver materials to job site in dry condition.
- .3 Storage and Protection.
  - .1 Keep materials dry until use except where wetting of bricks is specified.
  - .2 Store under waterproof cover on pallets or plank platforms held off ground by means of plank or timber skids.

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 for Construction/Demolition Waste Management and Disposal.

**1.7 ENVIRONMENTAL REQUIREMENTS**

- .1 Cold weather requirements.
  - .1 When air temperature is below 5° C the requirements for masonry construction shall be in accordance with CSA CAN3-A371-M94 Section 6.7.2.
  - .2 Maintain dry beds for masonry and use dry masonry units only. Do not wet masonry units in winter.
  - .3 Completed masonry or sections not being worked on shall be protected in accordance with CSA CAN3-A371-M04 Section 6.7.3.
- .2 Heating Requirements.
  - .1 Observe the following heating requirements for mortar:
    - .1 Air Temperature 5° C (41° F) to 0° C (32° F): Mortar aggregate or mixing water shall be heated to produce mortar temperatures between 5° C and 45° C (113° F).
    - .2 Air Temperature 0° C (32° F) to -4° C (25° F): Mortar aggregate and mixing water shall be heated to produce mortar temperatures between 5° C and 45° C. Mortar temperatures shall be maintained above freezing on the boards.
    - .3 Air Temperature -4° C (25° F) to -7° C (19° F): Mortar aggregate and mixing water shall be heated to produce mortar temperatures between 5° C and 45° C. Mortar temperatures shall be maintained above freezing on the boards. Salamanders or other sources of heat shall be used on both sides of walls under construction. Wind breaks shall be employed when excess of 25 Km/hour. wind is
    - .4 Air Temperature -7° C (19° F) and below: Mortar aggregate and mixing water shall be heated to produce mortar temperatures between 5° C and 45° C. Enclosure and auxiliary heat shall be provided to maintain air temperatures above 0° C. Temperature of units when laid shall not be less than -7° C.
  - .2 Protections to complete masonry and masonry not being worked:

.1 Air Temperature 5° C (41° F) to 0° C (32° F): Masonry shall be protected from rain or snow for 24 hours by covering with a weather resistive non-staining membrane.

.2 Air Temperature 0° C (40° F) to -4° C (25° F): Masonry shall be completely covered with weather resistive non-staining membrane for 24 hours.

.3 Air Temperature -4° C (25° F) to -7° C (19° F): Masonry shall be completely covered with insulating blanket or equally protected for 24 hours.

.4 Air Temperature -7° C (19° F) and below: Masonry temperature shall be maintained above 0° C for 24 hours by enclosure and supplementary heat, by electric heating blankets, infra-red heat lamps or other approved method.

.3 Hot weather requirements.

.1 Protect freshly laid masonry from drying too rapidly, by means of waterproof, non-staining coverings.

.2 Stiffened mortar due to the evaporation of water may be re-tempered within two (2) hours of original mixing provided the temperature is not over 25° C (77° F). If the temperature is over 25° C, it may only be re-tempered within one (1) hour of the original mixing.

## **1.8 PROTECTION**

.1 Construct and maintain temporary protection as requested to permit continuous progress of the work. Areas so protected shall be of sufficient size to permit progress of all work necessary to maintain an orderly and effective sequence of construction operation.

.2 Cover wall under construction exposed to the elements with weather resistant non-staining covers at the end of each day's work and keep covered until work is continued or completed and protected by flashings or other permanent construction. Ensure coverings extend over walls and down sides sufficiently to protect walls from wind driven rain.

.3 Protect face work from marking and other damage. Protect completed work from mortar droppings using non-staining covers.

.4 Provide temporary bracing of masonry work during and after erection until permanent lateral support is in place.

.5 Maintain ambient temperature between 5° C (41° F) and 50° C (122° F) and protect site from wind chill.

## **Part 2 Products**

### **2.1 MATERIALS**

.1 Masonry materials are specified in Related Sections 1.1.

- 
- Part 3 Execution**
- 3.1 WORKMANSHIP**
- .1 Build masonry plumb, level, and true to line, with vertical joints in alignment.
  - .2 Layout coursing and bond to achieve correct coursing heights, and continuity of bond above and below openings, with minimum of cutting.
- 3.2 TOLERANCES**
- .1 Exposed block wall: plumb within 1:600.
  - .2 Walls to receive thin-set ceramic tile: plumb within 1:600.
  - .3 Deviation in joint thickness: +/- 2mm (0.08").
- 3.3 EXPOSED MASONRY**
- .1 Remove chipped, cracked and otherwise damaged units in exposed masonry and replace with undamaged units.
  - .2 Exposed block masonry to be reviewed prior to application of first coat of paint (filler).
- 3.4 JOINTING**
- .1 Allow joints to set just enough to remove excess water before tooling joints.
    - .1 Mortar joints shall conform to CAN3-A371 standard, Clause 5.2.5.
    - .2 Tool horizontal and vertical joints with round jointer to provide smooth, compressed, uniformly concave joints for all exposed masonry.
    - .3 Strike flush all joints concealed in walls and joints in walls to receive gypsum board, plaster, tile, insulation, stucco or other applied material except paint or thin finish coating. similar
    - .4 If specifically noted, raked joints shall be uniform to 6mm (0.25") depth and compressed with square tool to provide smooth, compressed raked joints of depth. uniform
- 3.5 JOINING WORK**
- .1 Where necessary to temporarily stop horizontal runs on masonry, and in building corners:
    - .1 Step-back masonry diagonally to lowest course previously layed.
    - .2 At existing masonry, "tooth" new masonry into existing masonry using masonry units to match size of existing units. Any discrepancy between onsite conditions and the drawings the contractor is to notify the architect prior to commencing work.
    - .3 Fill in adjacent courses before heights of stepped masonry reach 1200mm (48").

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### **3.6 CUTTING**

- .1 Cut out neatly for electrical switches, outlet boxes, and other recessed or built-in objects.
- .2 Make cuts straight, clean, and free from uneven edges.

### **3.7 BUILDING-IN**

- .1 Build in items required to be built into masonry.
- .2 Prevent displacement of built-in items during construction. Check plumb, location and alignment frequently, as work progresses.
- .3 Brace door jambs to maintain plumb. Fill spaces between jambs and masonry with mortar.

### **3.8 WETTING OF MASONRY**

- .1 Except during winter, wet clay bricks having an initial rate of absorption exceeding 1g/minute/1000 mm<sup>2</sup> (0.025 oz./sq./inch/min.): wet to uniform degree of saturation, 3 to 24 hours before laying, and do not lay until surface is dry.
- .2 Wet tops of brick walls qualifying for wetting, when recommencing work on such walls.

### **3.9 SUPPORT OF LOADS**

- .1 Use concrete to Section 03 30 00 - Cast-in-Place Concrete, where concrete fill is used in lieu of solid units.
- .2 Install galvanized metal lath below voids to be filled with concrete; keep lath 25mm (1") back from face of units.

### **3.10 PROVISIONS FOR MOVEMENT**

- .1 Leave 10mm (0.375") space below shelf angles.
- .2 Leave 20mm (0.75") space between top of non-load bearing walls and partitions and structural elements. Do not use wedges.
- .3 Fill deflection space with mineral wool compressed to 50% of original thickness to completely seal space.
- .4 Coordinate laying of masonry with installation of lateral support specified in Division 4 and as provided in Division 5.

### **3.11 LOOSE STEEL LINTELS**

- .1 Install loose steel lintels centred over opening width, unless shown otherwise.

### **3.12 CONTROL JOINTS**

- .1 Provide continuous control joints to Typical Control Joint Details on Drawings where indicated.
  - .1 at intersections of interior block walls and exterior block walls.
  - .2 at locations between walls on foundations and walls on thickened slabs.

- .3 over window and door jambs.
- .4 not all control joints are shown on drawings. Provide control joints where new walls are bearing between existing to new structure and/or foundation. Provide control joints between existing and new walls.

- .2 Back reinforcement to be non-continuous at control joints.
- .3 Rake joints full height 10mm x 20mm and caulk to Section 07 92 10.

### 3.13 TESTING

- .1 Inspection and testing will be carried out by a Testing Laboratory approved by the Consultant.
- .2 Cost of testing will be paid for from Section 01 21 00 – Cash Allowances.

### 3.14 HEIGHT OF INTERIOR WALLS

- .1 Extend tops of walls and partitions to deck, slab, or structural members as applicable, unless indicated otherwise on the drawings.
- .2 Incorporate both lateral support and deflection space at termination of walls as required by Division 4.
- .3 Seal all voids in walls including tops to provide fire/smoke barriers, as per governing codes.

### 3.15 PENETRATION OF MASONRY

- .1 Fill voids of masonry within 19mm (0.75") of structural members, pipes, ducts and conduit that penetrates masonry walls and partitions unless otherwise indicated.
- .2 Keep masonry units similarly clear of such penetrations.
- .3 Finish mortar smooth to face of masonry.
- .4 Pack remainder of annular void surrounding penetrating items with fire separation packing to within 12.7mm (0.5") of face of masonry. Install appropriately rated sealant to maintain required fire separations

### 3.16 ADJUSTMENT AND CLEANING

- .1 Patch damaged masonry walls that have been rejected.
- .2 Point all holes in mortar joints except weep holes.
- .3 Point all voids in concrete unit masonry faces.
- .4 Cut out defective mortar joints to a minimum depth of 13mm (0.5") and report.
- .5 Wash down and brush masonry to remove mortar or stains. Use only detergents or proprietary masonry cleaners as recommended by brick manufacturers.

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

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1            Section 04 05 10 – Masonry Procedures
- .2            Section 04 21 13 – Brick Unit Masonry
- .3            Section 04 22 00 – Concrete Masonry Units

**1.2                REFERENCES**

- .1            CSA A179-94 Mortar and Grout for Unit Masonry.

**1.3                SHOP DRAWINGS**

- .1            Submit shop drawings in accordance with Section 01 33 00 – Submittal Procedures

**Part 2            Products**

**2.1                MATERIALS**

- .1            Mortar and grout: CSA A179.
- .2            Use aggregate passing 1.18 mm sieve where 6 mm thick joints are indicated.
- .3            Colour: ground coloured natural aggregates or metallic oxide pigments.
- .4            Dirt resistant additives: aluminum tristearate, calcium stearate or ammonium stearate.

**2.2                MATERIAL SOURCE**

- .1            Use same brands of materials and source of aggregate for entire project.
  - .1            Mortar for exterior masonry above grade:
    - .1            Loadbearing: Type S and M based on proportion specifications.
    - .2            Non-loadbearing walls shown on structural drawings to be reinforced with vertically reinforced cores or horizontal bond beams: Type S based on proportion specifications.
    - .3            Non-loadbearing not shown on Structural Drawings: Type N based on Proportion specifications.
    - .4            Parapet walls, chimneys, unprotected walls: Type S based on proportion specifications.
  - .2            Mortar for foundation walls, manholes, sewers, pavements, walks, patios and other exterior masonry at or below grade: Type M based on Proportion specifications.

- .3 Mortar for interior masonry:
  - .1 Loadbearing: Type S and M based on Proportion specifications.
  - .2 Non-loadbearing walls shown on structural drawings to be reinforced with vertically reinforced cores or horizontal bond beams: Type S based on proportion specifications.
  - .3 Non-loadbearing: Type N based on Proportion specifications.
- .4 Following applies regardless of mortar types and uses specified above:
  - .1 Mortar for calcium silicate brick and concrete brick: Type O based on Proportion specifications.
  - .2 Mortar for stonework: Type N based on Property specifications.
  - .3 Mortar for grouted reinforced masonry: Type S M based on Proportion specifications.
  - .4 Mortar for pointing: Type S based on Proportion specifications.
  - .5 Mortar for glass block: 1 part portland cement, 1 part hydrated lime, 4 parts aggregate by volume.
  - .6 Mortar for gypsum units: 1 part gypsum, 3 parts aggregate by weight.

### **2.3 WHITE MORTAR**

- .1 White mortar: use white silica sand, white portland cement, and lime white silica sand and white masonry cement to produce applicable mortar type.

### **2.4 COLOURED MORTAR**

- .1 Coloured mortar: use colouring admixture not exceeding 10% of cement content by mass, or integrally coloured masonry cement, to produce coloured mortar to match approved sample. Allow for two colours.
- .2 Use coloured mortar for brick masonry.

### **2.5 NON-STAINING MORTAR**

- .1 For non-staining mortar use non-staining masonry cement for cementitious portion of specified mortar type.

### **2.6 GROUT**

- .1 Grout: to CSA A179 Table 3.
- .2 Concrete grout for reinforced masonry shall consist of one part Portland cement and three parts sand with water to provide a minimum compressive strength of 15 Mpa at 28 days. Maximum aggregate size to be 10 mm. Slump for the grout to be 200 to 250 mm.
- .3 If special permission to complete high lift grouting is obtained. Grout for high lifts is consist of fine grout. Use of a superplasticizer will be required in congested areas to ensure cores are grouted full without voids.
- .4 Grout: Solid all pockets in concrete. Block walls where noted on the drawings and where structural components installed.

### **2.7 PARGING**

- .1 Parging mortar: Type 5 to CSA A179

**Part 3 Execution**

**3.1 MIXING**

- .1 Do masonry mortar and grout work in accordance with CSA A179 except where specified otherwise.
- .2 Mix grout to semi-fluid consistency.
- .3 Incorporate colour and admixtures into mixes in accordance with manufacturer's instructions.
- .4 Use clean mixer for coloured mortar.
- .5 Prehydrate pointing mortar by mixing ingredients dry, then mix again adding just enough water to produce damp unworkable mix that will retain its form when pressed into ball. Allow to stand for not less than 1 hour nor more than 2 hours then remix with sufficient water to produce mortar of proper consistency for pointing.
- .6 Do not use salt or any additives that will adversely effect reinforcing by increasing susceptibility to corrosion.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 33 00 - Submittal Procedures
- .2        Section 01 74 19 - Construction/Demolition Waste Management And Disposal
- .3        Section 04 05 10 – Masonry Procedures
- .4        Section 04 05 23 – Masonry Accessories
- .5        Section 04 21 13 – Brick masonry
- .6        Section 04 22 00 – Concrete Masonry
- .7        Section 04 73 13 – Calcium Silicate Manufactured Stone Masonry
- .8        Section 05 50 00 – Metal Fabrications
- .9        Section 07 21 19 – Foamed In Place Insulation
- .10      Section 07 21 31 – Adhesive Grade Air Barrier membrane and Thru-Wall Flashing

**1.2                REFERENCES**

- .1        Canadian Standards Association (CSA International).
  - .1        Unless otherwise stated, the applicable provisions of these reference standards are to be considered a part of this application. Standards to be current issue.
  - .2        Ontario Building Code
  - .3        CAN/CSA-A23.1-09/A23.2-09 Concrete Materials and Methods of Concrete Construction/Methods of Test for Concrete
  - .4        CSA-A370-04 (R2009), Connectors for Masonry
  - .5        CSA-A371-04 (R2009), Masonry Construction for Buildings
  - .6        CSA G30.14-M1983 (R1998), Deformed Steel Wire for Concrete Reinforcement
  - .7        CAN/CSA G30.18-09, Carbon-Steel Bars for Concrete Reinforcement.
  - .8        CSA G30.18-M92 (R2002) Billet-Steel Bars for Concrete Reinforcement
  - .9        CSA-S304.1-04 (R2009), Masonry Design for Buildings
  - .10      CSA W186-M1990 (R2007), Welding of Reinforcing Bars in Reinforced Concrete Construction.
  - .11      CSA A179-04 (R2009), Mortar and Grout for Unit Masonry
  - .12      ASTM A775/A775M-00a Standard Specification for Epoxy Coated Reinforcing Steel Bars
  - .13      Reinforcing Steel Institute of Canada (RSIC). “Reinforcing Steel Manual of Standard Practice”
  - .14      Construction Safety Act or any other regulations of the Ontario Ministry of Labour relating to the work of this section.

### **1.3 SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Submit two (2) copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for epoxy coatings and galvanized protective coatings and touch-up products.
- .2 Shop Drawings:
  - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Shop drawings consist of bar bending details, lists and placing drawings.
  - .3 On placing drawings, indicate sizes, spacing, location and quantities of reinforcement and connectors.
- .3 Manufacturer's Instructions:
  - .1 Submit manufacturer's installation instructions.

### **1.4 QUALITY ASSURANCE**

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements. Comply with Section 01 61 00 – Common Product Requirements.

### **1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Refer to Structural Drawings for reinforcement details for interior and exterior block walls including all tie details for brick veneer and manufactured stone masonry. Follow those requirements in detail, which shall take precedence over reinforcing conditions and materials described in this Section. This section shall supply and install all block cell vertical and horizontal reinforcing steel and grout fill in accordance with Sections 04 05 12 for Mortar and Grout Masonry.
- .2 **Interior and exterior concrete block walls single wythe:** Horizontal reinforcement shall be ladder or truss type as specified on Structural Details.

- .3 **Interior and exterior cavity walls:** At walls with concrete block backup, provide block ties as specified for brick veneer, or manufactured stone as specified on the Structural Details.

## **2.2 FABRICATION**

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

## **2.3 SOURCE QUALITY CONTROL**

- .1 Provide Consultant with certified copy of mill test report of reinforcement steel and connectors, showing physical and chemical analysis, minimum 5 weeks prior to commencing reinforcement work.
- .2 Inform Consultant of proposed source of material to be supplied.

## **Part 3 Execution**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

### **3.2 GENERAL**

- .1 Supply and install masonry connectors and reinforcement in accordance with CSA-A370, CSA-A371, CAN/CSA-A23.1 and CSA-S304.1 unless indicated otherwise.
- .2 Prior to placing concrete, mortar, grout, obtain Consultant's approval of placement of reinforcement and connectors.
- .3 Supply and install additional reinforcement to masonry as indicated.

### **3.3 BONDING AND TYING**

- .1 Bond walls of two or more wythes using metal connectors in accordance with CSA-S304, CSA-A371 and as indicated.
- .2 Tie masonry veneer to backing in accordance with NBC, CSA-S304.1, CSA-A371 and as indicated.

**3.4 REINFORCED LINTELS AND BOND BEAMS**

- .1 Reinforce masonry lintels and bond beams as indicated.
- .2 Place and grout reinforcement in accordance with CSA-S304.1, CSA-A371, and CSA-A179.

**3.5 GROUTING**

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

**3.6 ANCHORS**

- .1 Supply and install metal anchors as indicated.

**3.7 LATERAL SUPPORT AND ANCHORAGE**

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

**3.8 MOVEMENT JOINTS**

- .1 Reinforcement will not be continuous across movement joints unless otherwise indicated.
- .2 Terminate reinforcement 25 mm short of each side of control joints unless noted otherwise.

**3.9 FIELD BENDING**

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

**3.10 FIELD TOUCH-UP**

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

**3.11 CLEANING**

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

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 33 00 – Submittal Procedures
- .2        Section 01 74 19 - Construction/Demolition Waste Management and Disposal
- .3        Section 04 05 10 –Masonry Procedures
- .4        Section 04 21 13 – Brick Masonry
- .5        Section 04 22 01 – Concrete Masonry
- .6        Section 04 73 13 – Calcium Silicate Manufactured Stone Masonry
- .7        Section 07 21 19 –Foamed In Place Insulation
- .8        Section 07 55 50 – Modified Bitumen Flashing
- .9        Section 07 21 31 – Adhesive Grade Air Barrier membrane and Thru-Wall Flashing

**1.2                REFERENCES**

- .1        ASTM D2240-86 Test method for Rubber Property - Durometer Hardness.
- .2        CAN3-A371-94 Masonry construction for Buildings.
- .3        CAN4-S102-79 and CSA A101M 1982 Cavity Wall Insulations for Buildings.

**Part 2            Products**

**2.1                MATERIALS**

- .1        Control joint filler: purpose-made elastomer 35 Shore A durometer hardness to ASTM D2240 of size and shape to fit 12mm gap., Tremco; Dynamic Caulking. Color to match brick and concrete unit masonry.
- .2        Nailing inserts: 0.6 mm thick purpose-made galvanized steel inserts for setting in mortar joints.
- .3        Masonry flashing: Modified Bitumen Flashing Membrane reinforced with non-woven Fiberglas matt as per Blueskin® by Bakor or approved alternate.
- .4        Brick Vents/ Weepholes: Purpose made PVC: Williams-Goodco PVC brick vent for cavity walls for C.S.R. brick. Designed to drain cavities to exterior and to vent cavity. As supplied by Williams Products at Phone: 800-521-9594 or 248-643-6400 Or Email: [Wilpro@williamsproducts.net](mailto:Wilpro@williamsproducts.net) Colour to be light gray.

- .5 Mortar Net: By Dur-O-Wall – DA 1008 Mortar Net.

**Part 3 Execution**

**3.1 CONTROL JOINTS**

- .1 Install continuous control joint fillers in control joints at locations indicated.

**3.2 WEEP HOLE BRICK VENTS**

- .1 Provide weep hole brick vents in vertical joints immediately over thru-wall flashings, in exterior wythes of cavity wall and masonry veneer wall construction, at maximum 600 mm (24") O.C. Mortar or debris must not plug holes.

**3.3 BRICK VENT HOLES**

- .1 Provide brick vent holes in vertical joints at top of walls and/or immediately below flashings, in exterior wythes of cavity wall and masonry veneer wall construction, at a maximum of 600 mm (24") O.C. horizontally and every ten (10) courses vertically. Mortar or debris must not plug holes.

**3.4 NAILING INSERTS**

- .1 Install nailing inserts in mortar joints at 400 mm oc each way, for attachment of wall strapping.

**3.4 MASONRY FLASHING**

- .1 Install flashings in masonry in accordance with CAN3 A371.  
.2 Masonry flashings are as specified in Section 07 27 31 for Adhesive Grade Air barrier  
and Thru-Wall Flashings.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 03 30 00 – Cast-In Place Concrete
- .2        Section 03 41 00 – Plant-Precast Structural Concrete
- .3        Section 04 05 10 – Masonry Procedures
- .4        Section 04 05 12 – Mortar and Grout Masonry
- .5        Section 04 05 23 – Masonry Accessories
- .6        Section 04 05 19 – Masonry Anchorage and Reinforcing
- .7        Section 04 21 13 – Brick Masonry
- .8        Section 04 73 13 – Calcium Silicate Manufactured Stone Masonry
- .9        Section 05 41 00 - Light Gauge Structural Framing
- .10      Section 07 21 19 – Foamed In Place Insulation
- .11      Section 07 27 31 – Adhesive Grade Air Barrier Membranes and Thru-Wall Flashing

**1.2                REFERENCES**

- .1        CAN3-A165 Series - M85 CSA Standards on Concrete Masonry Units.

**1.3                SUBMITTALS**

- .1        Samples: submit duplicate samples of concrete block, glass block, masonry accessories and mortar, prior to commencing work in accordance with Section 04 05 10.

**1.4                DELIVERY**

- .1        Palletized with individual faces of block protected.

**1.5                STORAGE AND HANDLING**

- .1        Store on level ground, do not double stack pallets. Avoid access movement before installation.
- .2        Maintain glass block materials at ambient air temperature to minimum 4°C prior to, during and 48 hours after completion of installation.

**1.6                CO-ORDINATION**

- .1        Notify all other Trades when chases, openings, sleeves, etc. are required and are to be located in the work, and when other materials are to be set or anchored in the work of this Trade.

- .2 Make satisfactory arrangements with other Trades as to the time when various sections of the work are to be built.

## **1.7 QUALITY ASSURANCE**

- .1 Masonry surfaces, to which Air/ Vapour barrier is to be applied, shall be constructed flat and level; unevenness between masonry units shall not exceed 3 mm. All excess mortar must be removed, and all voids exceeding 3 mm in depth must be filled. All joints must be struck flush.

## **1.4 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

## **Part 2 Products**

### **2.1 PRECAST SILLS**

- .1 Precast sills as noted on building elevations and details shall be reinforced, smooth faces, complete with slope and drip edge as shown and drawings.
  - .1 Building Sills: 130mm wide x 150mm high sloping.
  - .2 Confirm locations on Building Elevations, including garden walls

### **2.2 MATERIALS**

- .1 **Standard concrete block** autoclaved or bubble cured cellular concrete block units: to CAN3-A165 Series-M85.
  - .1 Classification:
    - .1 H/15/C/M for exposed-to-view and painted surfaces.
    - .2 H/15/A/M for unexposed-to-view locations.
  - .2 Size: metric modular. Sizes as shown on drawings
  - .3 Special shapes: provide square and bull-nosed units for exposed corners/ sills. Provide purpose-made shapes for lintels and bond beams. Provide additional special shapes as indicated.
  - .4 Acceptable material: Day and Campbell, Niagara Block
- .2 **Architectural Block units** to CAN3-A165 Series - M85, scored units, colour by architect.
  - .1 Classification of body of unit: H/15/C/M to CAN3-A265.1.
  - .2 Size: metric modular, scored block
  - .3 Special shapes: provide special shapes indicated. Provide purpose made shapes for lintels and bond beams.

**Part 3 Execution**

**3.1 LAYING CONCRETE BLOCK UNITS**

- .1 Bond: running, unless noted otherwise or matching an adjacent wall..
- .2 Coursing height: 200 mm for one block and one joint.
- .3 Jointing: flush where exposed or where paint or other finish coating is specified.
- .4 Blocks installed to tapered pilasters shall be set such that each succeeding course follows the angle of taper called up on drawings.
- .5 Install bull-nosed blocks at **all** external corners/ or edges left exposed, including window sills.
- .6 Cut blocks to fit around and to face of structural steel columns located inside walls.

**END OF SECTION**

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with the General Conditions, Supplementary Conditions, the requirements of Division 1 and any supplements and/or addenda.

1.2 SCOPE OF WORK

- .1 Refer to the Contract Drawings for detailed requirements.
- .2 Supply all materials; provide all labour and equipment to fabricate and erect the structural steel as shown or required by the drawings or specifications. The principal items include but are not limited to:
  - .1 Structural steel columns, girders, beams, girts, angles, and shelf angles.
  - .2 Bracing, plates, stiffeners, strap anchors
  - .3 Galvanized bent plates, lintels
  - .4 Openings through steel beam
- 1. Supply for installation by other Sections:
  - .1 Anchor bolts and embedded steel plates – for installation under Section 03 30 00, "Cast-In-Place Concrete" and Division 4, "Unit Masonry".
  - .2 Loose lintels – for installation under Division 4, "Unit Masonry".
  - .3 Loose structural shapes cast into concrete work for installation under Section 03 30 00, "Cast-In-Place Concrete"
- 2. Related Work Specified Elsewhere:
  - .1 Steel Floor & Roof Deck – Section 05 30 10
  - .3 Sprayed Fireproofing – Division 7

1.3 APPLICABLE STANDARDS

- .1 All standards in accordance with latest issue.
- .2 CSA Standard S16.1-14 "Limit States Design of Steel Structures".
- .3 CSA Standard W59-18, "Welded Steel Construction" (Metal Arc Welding).
- .4 CSA Standard W55.3-08 (R2018), "Certification of Companies for Resistance Welding of Steel and Aluminum".
- .5 CSA Standard W47.1-09 (R2014), "Certification of Companies for Resistance Welding of Steel".
- .6 C.S.A. Standard G164 18, "Hot Dip Galvanizing of Irregularly Shaped Articles".
- .7 CSA Standard S136-16, "North American Specification for the Design of Cold Formed Steel Structural Members".
- .8 Ontario Building Code.
- .9 ULC, UL, and/or Warnock Hersey Fire Resistance Ratings.
- .10 CISC/CPMA 2-75 Quick Drying Primer for use on Structural Steel.

1.4 SHOP DRAWINGS

- .1 Examine all drawings forming a part of this contract and conform to the requirements of all such drawings.
- .2 The Consultant reserves the right to relocate members prior to and during the review of erection diagrams for clearing ducts, piping, walls, etc., and to finalize the location of mechanical equipment, pipe run, etc., at no additional cost to the Owner. Any cost involved in revisions to erection diagrams or shop drawings because of these changes shall be borne by this Contractor, at not additional cost to the Owner.
- .3 Any fabrication executed before review of shop drawings shall be at the Contractor's risk. Fabrication shall be assumed to begin when material is cut to length whether this is by the fabricator or at the mill to the fabricator's orders.
- .4 The Consultant's review of shop drawings will not relieve this Contractor from his responsibility for ensuring that his work is complete, accurate and in accordance with the drawings and specifications.
- .5 The use of reproducible copies of the Engineer's drawings for erection diagrams will not be allowed.
- .6 Include with the drawing submission a certificate, signed and sealed by the registered professional engineer responsible for the detailed structural steel connections, stating that the connections have been designed, detailed, and fabricated in accordance with the applicable standards for the loads shown or required. Drawings will not be accepted by the consultant for review without this certification.
- .7 The Consultant's review of shop drawings will not relieve the Contractor from his responsibility for ensuring that his work is complete, accurate and in accordance with the drawings and specifications.
- .8 No levelling plates will be allowed on this project unless the steel fabricator hires a 3rd party inspection firm to confirm that the requirements of clauses 25.4.1.3, 28.5, and 29.3.9 of CSA standard S16-14 have been met for all column bases where levelling plates have been used. Following inspection, the inspection firm must submit a letter signed and sealed by a professional engineer confirming that they have inspected all column bases employing levelling plates and that these bases meet the requirements of above noted clauses. The 3rd party inspection firm is to have a minimum 5 years' experience inspecting steel structures and shall be certified as CWB certified inspection company.
- .9 Within four weeks of awarding the contract the structural steel fabricator must submit for approval, a drawing showing the top of bearing plate elevations and horizontal dimensions to all bearing plates.

1.5 DESIGN CRITERIA

.1 Certificates

- .1 Provide a certificate signed and sealed by the registered professional engineer responsible for the detailed structural steel connections, stating that the connections have been designed, detailed, and fabricated in accordance with the applicable standards for the loads shown or required.
- .2 Certificates must bear the original seal and signature of the engineer(s) and be dated. Photocopies are not acceptable.

- .2 All loads, forces, and reactions, shown on the drawings or noted in the specifications are service loads (unfactored), unless noted otherwise.
- .3 Typical connection details are shown on the drawings for guidance only. Design and submit for approval suitable bolted or welded connections. In general, bolted connections should be designed as "bearing" connections with threads included in the shear plane. Unless otherwise indicated on drawings, design all connections to apply direct shear with zero moment to the supporting member.
- .4 The shear capacity of all beam and girder connections shall be not less than the shear capacity of the section acting as a simple beam loaded uniformly to its moment capacity over the same span nor less than that shown on the drawings, whichever is greater.
- .5 Refer to mechanical drawings for number of, approximate location, and weight of suspended mechanical units and piping runs. Final location will be determined during the shop drawing stage.
- .6 Note that the roof systems are sloped for drainage, which requires attention to detailing and fabrication.
- .7 Typical bearing stiffeners for beams continuous over columns are shown on the drawings. Design suitable stiffeners at other locations of concentrated loads, particularly at columns bearing on transfer beams, and as required to suit the connection design.
- .8 Working points for vertical braced frames and trusses are column/beam centreline intersection and column/base plate centerline intersection, unless noted otherwise.
- .9 In general, design all connections for beams as double-header angles or structural tees. Double header angles to be not less than 50% of the depth of the supported beam.
- .10 Refer to Architectural Drawings and specifications for specified ULC fireproofing design requirements.

#### 1.6 CO-ORDINATION

- .1 Co-ordinate the work of this Section with the General Contractor's scheduling in accordance with the General Conditions.
- .2 Co-ordinate the work of this Section with the work of all affected Divisions to provide proper clearances and assembly of the work, including mechanical loads, piping loads, and loose lintel requirements.
- .3 Co-ordinate the work of this Section with the work of Section 05 30 10, "Steel Floor & Roof Deck" to provide a continuous erection procedure.
- .4 Prior to commencement of fabrication of joists, obtain 'sign-off' from the Mechanical Trades and the General Contractor that all suspended mechanical equipment, piping runs and required openings have been identified, dimensioned and located.

#### 1.7 SUBSTITUTIONS

- .1 Substitution of available beam and column sections for those shown on the drawings may be permitted provided that the substituted members have equivalent or greater capacity and stiffness than those shown.
- .2 Proposed substitutions are subject to prior approval of the Consultant and must not interfere with Architectural clearances (or appearance in exposed work).

1.8 QUALITY ASSURANCE

- .1 Fabrication and erection of all components to be by companies holding current C.W.B. certification as Division 1 or Division 2. All welding by welders holding current certification for the required welding position.

1.9 UNIT PRICES

- .1 Provide in the Tender Form all requested unit prices.
- .2 Include all labour, materials, and applicable taxes in the unit prices representing the total cost for the completion of the work.
- .3 Unit prices will only apply to those additions or deletions requested by the Consultant. They will not apply to substitutions proposed by this Contractor under Article 1.7 of this Section.

1.10 SPECIAL CONDITIONS

- .1 Structural steel members exposed to view within or outside the building require special attention to welds, fit up, connections and finish.

PART 2 - PRODUCTS

2.1 MATERIALS

- .1 Rolled Steel Sections, Shapes and Rods:
  - .1 All wide flange, light beams, standard beams, channels, columns in accordance with CSA Standard G.40.21M-350W.
  - .2 All angles, plates – in accordance with G4.021M-300W.
- .2 Hollow Structural Sections: G40.21M - 350W, Class H.
- .3 High Strength Bolts & Washers: in accordance with ASTM Standard A325 or A490.
- .4 Shop Primer: In accordance with CISC/CPMA Standard, 1-73a for primed only and Standard 2-75 for steel to be subsequently finished painted. No lead-based paints allowed.
- .5 Shop Primer for Exposed Exterior Steel: Devoe Catha-Coat 302 Inorganic Zinc primer @ 2.0 – 4.0 mils dft per coat. Co-ordinate with Division 9 for compatibility with finish coats.
- .6 Field Touch Up Primer- Devoe Cathacoat 302V Low VOC
- .7 Anchor Bolts: in accordance with CSA Standard G40.21M- 300W.
- .8 Galvanizing: zinc coating by hot dip process after fabrication, shot blasting and pickling to provide a uniform coating of not less than 2.0 ounces per sq. ft.
- .9 Field Touch Up for Galvanized Members: Two coats of Galvafruid by W.R. Meadows.

2.2 FABRICATION

- .1 Fabrication of all structural steel in accordance with CSA Standard -S16.1.

- .2 Carefully make and fit all details and connections to ensure that the finished work presents a neat and workman like appearance. Unless noted otherwise on drawings all structural steel components exposed to view in the finished structure are to conform to minimum AESS category 3 in accordance with CISC guideline for Architecturally Exposed Structural Steel.
- .3 All shop and field connections are to be welded or high-strength bolted.
- .4 Splicing will not be allowed without the approval of the Consultant at the shop drawing review stage. Splicing will then only be allowed if the length of the fabricated member required is longer than that normally produced at the mill.
- .5 All members shall be true to length so that assembly may be done without fillers.
- .6 Provide holes for bolted connections, for connecting the work of other trades where such holes can be determined prior to fabrication and only at the request of the Engineer or the trade concerned. Such holes shall only be provided where they will not impair the satisfactory performance of the structure.
- .7 Provide welded strap or reinforcing bar anchors for beams and columns for anchorage of/to concrete or masonry as shown on the typical details.
- .8 Provide holes for blocking where blocking is required to receive 16 diameter bolts spaced at 600 o.c., and staggered where possible.
- .9 Provide holes in webs or welded bar assemblies for masonry anchors as per typical details.
- .10 Painting Preparation: Thoroughly clean all steel by effective means of all loose mill scale, oil, rust or any other deleterious material, which could affect the bond or performance of the paint (or primer). Refer also to Painting, Division 9. All 'exposed' structural steel and all steel to be fireproofed with intumescent paint requires shot blasting-see following.
- .11 Apply one coat of standard shop primer on dry surfaces for all members except as follows:
  1. Do not paint steel to be fireproofed or in direct contact with concrete where field welded connections are to be made or in other areas where paint will impair structural connections including incased elements.
  2. For shelf angles and lintel assemblies shown to be galvanized.
  3. 'Exposed structural members are to have all welds ground smooth, fully closed, and weld spatter ground off. Shot blast to SSPC SP10 just prior to finishing with protective paint coatings.
  4. For interior 'exposed' apply shop primer compatible with finish coats.
  5. For exterior steel, unless shown to be galvanized, apply 2 coats of Devoe Catha-Coat 302 inorganic Zinc primer @ 2.0 – 4.0 mils dft per coat.
  6. All steel to be fire protected by intumescent paint to be shot blasted to SSPC SP6, Commercial Shot Blast just prior to shipping to site.
- .12 Supply suitable loose lintels as shown on the schedule for all openings in masonry walls for installation under Division 4.

- .13 Supply suitable galvanized shelf angles and lintel assemblies as shown on the drawings for all exterior walls.
- .14 Supply suitable anchor bolts for base plates and bearing plates; and anchor plates for connection to concrete for installation under Section 03 30 00.
- .15 Fabricate beam openings as detailed.
- .16 Take care to minimize distortion due to welding and galvanizing procedures. Straighten members as required to maintain the fabrication tolerances of CSA S16.1.
- .17 Galvanizing to CSA Standard G164, including preparation. Blast clean to SSPC SP10 after fabrication, prior to galvanizing. Provide seal welds in addition to structural welds as required by good practice.
- .18 Provide welded 'seal' plates (minimum 5mm) as required to close all HSS sections. If this is not possible in all locations, provide drain holes.
- .19 Fabricate steel HSS columns that are to be filled with concrete fill for fire rating such that column can be filled and vibrated on site without segregation of the concrete mix.
- .20 Should the Structural Steel Contractor choose to employ leveling plates the Structural Steel trade will be responsible for providing a minimum of four (4) anchor bolts for each base plate. Fabricator to provide leveling nuts above and the leveling plate to hold it firmly in place during grouting operations.

## 2.3 QUALITY CONTROL

- .1 All materials and fabrication shall be subject to test by a testing and inspection company appointed by the Consultant.
- .2 Provide access to the work in the shop for the personnel of the inspection company.
- .3 Provide such samples of materials and mill test reports as may be required by the inspection company at no cost to the Owner.
- .4 The cost of testing will be paid for from the Testing Allowance in accordance with the General Conditions.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- .1 Examine and obtain all necessary measurements of previously executed and existing work, which may affect the work of this Section.
- .2 Make a line and level survey of the load bearing masonry and anchor bolts. Report any discovered discrepancies to the Contractor so that instructions can be given for the necessary remedial action.

### 3.2 ERECTION

- .1 Accurately set all steel to the lines and elevations shown on the drawings. Temporarily connect all members with sufficient bolts to ensure the safety of the structure until permanent connections are made.

- .2 Assemble all members without twists or open joints. Take care that all parts are well pinned-up and drawn together before bolting or welding is started.
- .3 Assume full responsibility for the correct plumbing and alignment and for setting of all members.
- .4 If members do not fit properly in the field, repairs must be made by methods to the satisfaction of the Consultant. In no case shall cutting be done with a torch except where specific approval as to size and location of same is granted by the Consultant. Unfair holes shall be enlarged with a twist drill and larger bolts used.
- .5 Set column base plates and beam bearing plates on steel shims. Grouting under these plates will be by Section 03 30 00, "Cast-In-Place Concrete".
- .6 Erect the steel frame true and plumb. Place temporary bracing where necessary to take care of all loads to which the incomplete building may be subjected such as wind, equipment, or construction procedures. Leave temporary bracing in place as long as necessary for the safety of the structure.
- .7 Erection tolerances in accordance with CSA-S16.1. Take care in the erection of 'exposed' members.
- .8 Erection of structural steel, o.w.s.j. and bridging in accordance with CSA-S16.1.
- .9 Handle galvanized and 'exposed' members with appropriate slings and protection to avoid damage to finish.
- .10 All field welding in accordance with CSA – S16.1, by welders holding current certification for the required position by CWB.
- .11 Set column base plates and beam bearing plates on steel shims or other suitable supports. Grouting under these plates will be by Division 3, "Cast-in-Place Concrete". If the Structural Steel Contractor chooses to use leveling plates they will be responsible for leveling all leveling plates to be grouted by Division 3. Leveling plates are to be installed with nuts above and below leveling plate secured firmly to ensure the plate does not move. The Structural Steel Contractor will re-inspect all leveling plates for elevation and levelness after grouting by Division 3 and just prior to erection of steel columns. Refer to item 1.4.9 of this specification for inspection of gaps between base of column and top of leveling plate.
- .12 Install restraining clip angles to provide lateral support at the top of all new masonry walls. Carefully co-ordinate with the Contractor and the Masonry Sub-contractor.

### 3.3 FIELD PAINTING

- .1 Field paint, using the shop primer, all scars, blemishes, bolts and welds not previously shop painted or those areas damaged by erection procedures.
- .2 For members, which are hot-dipped galvanized, touch up all scars, scratches, etc., with two coats of zinc rich paint after cleaning to bare metal.
- .3 For columns, base plates, and anchor bolts placed below grade, apply 6mm thick layer of trowel grade asphalt mastic to within 12mm below the exposed level.

### 3.4 FIELD QUALITY CONTROL

- .1 Provide access to the work at the site for the personnel of the inspection company.

- .2 Testing shall be carried out at the option of the Consultant and will be paid for from the Testing Allowance in accordance with Division 1, except that any retesting required due to defective work shall be borne by this Contractor.
- 3.5 CLEAN-UP
- .1 At the completion of the work of this Section, remove any excess materials, debris, and equipment from the site.

**END OF SECTION 05 10 00**

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Comply with the General Conditions, Supplementary Conditions, the requirements of Division 1 and any supplements and /or addenda.

1.2 SCOPE OF WORK

- .1 Supply and install all steel deck, closures, flashing plates and accessories.

1.3 RELATED WORK SPECIFIED ELSEWHERE

- .1 Structural Steel - Section 05 10 00.  
.2 Roofing, Flashing and Sheet Metal - Division 7.

1.4 APPLICABLE STANDARDS

- .1 All standards to be latest issue with amendments.  
.2 C.S.A. Standard S136-16, `` North American specification for the design of cold-formed steel structural members``.  
.3 C.S.A. Standard W47.1-19, ``Certification of Companies for Fusion Welding of Steel``.  
.4 Ontario Building Code.  
.5 Manufacturing Standards, Canadian Sheet Steel Building Institute.

1.5 SHOP DRAWINGS

- .1 Examine all drawings forming a part of this Contract and conform to the requirements of all such drawings.  
.2 Prepare shop drawings to supplement the Consultants' drawings. Report any discrepancies in the Contract Drawings to the Consultant. Make allowances for clearance and provide details of framing around openings where these are not detailed on the drawings.  
.3 Shop drawings shall show the position, extent, type and arrangement of the units, their relationship to other materials, depths, thicknesses, connections and accessories.  
.4 The Consultant's review of shop drawings will not relieve the Contractor from his responsibility for ensuring that his work is complete, accurate and in accordance with the drawings and specifications.  
.5 Examine the Mechanical and Electrical Drawings to establish the number, size and location of all openings through the deck.  
.6 Submit shop drawings in accordance with the General Conditions.  
.7 Shop drawings are to be signed and sealed by a licensed professional engineer responsible for the detailed design of deck

1.6 COORDINATION

- .1 Coordinate the work of this Section with the scheduling in accordance with the General Conditions.  
.2 Coordinate the work of this Section with the work of Section 05 10 00, Structural Steel to

ensure a continuous erection, procedure.

- .3 Supply and erect steel deck at such a rate and in proper sequence so that the schedule is maintained.

#### 1.7 DESIGN CRITERIA

- .1 The drawings show the minimum thicknesses and depths of the deck sections.
- .2 This Contractor's engineer to review the roof and floor deck systems proposed to ensure that they can support the live load plus dead load shown on the drawings for each area in accordance with the requirements of CSA Standard S136. Loading requirements, including snow drift patterns, are shown on the drawings. Increase the deck thickness above the minimum thicknesses shown, if required to support the loads.
- .3 Deflection of the roof deck shall not exceed 1/360th of the span under a live load of 1.92kPa (40 psf). Do not use drift loads to calculate deflections.
- .4 Deflection of composite floor deck not to exceed 1/360th of the span under a live load of 4.80 kPa (100 psf).
- .5 Design and detail units to run over three or more supports except where the structural steel layout does not permit. Composite deck will **not** be shored
- .6 Deck systems act as a structural diaphragm. Deck must ``close`` with perimeter boundary members to ensure integrity of diaphragms. Detail flashing plates at change of deck directions as required for diaphragm. Provide L40 x 40 x 3 closure angle welded to deck and boundary members where deck ends at high flute.
- .7 Design suitable reinforcing or framing details around openings (where these are not specifically detailed on the drawings) to suit the opening size and loading condition.

#### 1.8 STORAGE & HANDLING

- .1 Exercise care in storing, handling, and placing the steel deck units to prevent damage likely to impair the adequacy or appearance of the material in the finished structure.
- .2 Replace or correct damaged material to the approval of the Consultant.

#### 1.9 QUALITY ASSURANCE

- .1 All welding to be carried out by experienced deck welders holding current C.W.B. certification for deck welding and currently employed by a Division 1 or 2 company.

### PART 2 - PRODUCTS

#### 2.1 MATERIALS

- .1 Steel Sheets: For the fabrication of deck sections, metal closures, straps and flashings in accordance with A.S.T.M. Standard A653 SS Grade 33.
- .2 Zinc Coating:
  - .1 For Interior of building, deck to be painted provide Class ZF75 coating.
  - .2 For Exterior Canopies, and steel deck over high humidity areas, provide Class Z275 coating applied before forming by a hot dipping process for metal deck
- .3 Metal Roof Deck: 38 deep with flutes centred at 152 o/c in accordance with C.S.S.B.I. Standards - minimum core thickness 0.76 mm (22 ga). RD 938 by VicWest, P-3606 by

Canam Steel Works, RD36 by Agway Metals Inc., or equal. Note that nested side laps suitable for screwed side lap connections between adjacent sheets.

- .4 Composite Floor Deck:
  - .1 38mm deep with flutes centred at 152 o/c in accordance with C.S.S.B.I. Standards - minimum core thickness 0.76 (22 ga). HB 938 by VicWest, P-3606 Composite by Canam Steel Works, CD36 by Agway Metals, or equal.
- .5 Finishing channels: 1.52 mm (0.060") (minimum) thickness. #
- .6 Flashing Sheets, Deck Flute Closures & Edge Screeds: 1.22 mm (0.048") (minimum) thickness.
- .7 Deck Edge Supports: Steel angle L40x40x3 for 38 deep deck and L75x51x5 for 75 deep deck.
- .8 Screws for Screwed Side Laps: Hilti S-SLC 01 M HWH Zinc plated fasteners for lap joints for 22 and 20 gauge steel deck and S-SLC 02 M HWH Zinc plated fasteners for lap joints for 18 and 16 gauge steel deck.
- .9 Concrete Screed Closure Channels: 1.22mm (18 gauge) closure channels complete 1.22mm (18gauge) straps spaced at 750mm on-centre Refer to typical details.
- .10 Touch-up Paint: Meadows Galvafruid Zinc Rich Paint for previously galvanized members.

## 2.2 FABRICATION

- .1 Form all deck units to have interlocking male and female side laps. Embossed or rolled mechanical indentations for mechanical bonding for composite deck.
- .2 Provide sheet steel cover plates as noted on the drawings and to cover gaps where deck units abut or change direction.
- .3 Provide steel angle 40 x 40 x 3 deck supports for 38deep deck and 75x51x5 angles for 75 deep deck. Install angles to close between high flute of deck units and spandrel members, and deck edge supports (as required) to maintain the integrity of the diaphragms.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- .1 Examine and obtain all necessary measurements of previously executed work, which may affect the work of this section.
- .2 Report any discovered discrepancies to the Consultant so that instructions can given for any remedial action.

### 3.2 ERECTION

- .1 Erection of steel deck shall be performed by the erection forces of the manufacturer. Sub-letting of the erection of these materials will not be allowed without the prior written consent of the Consultant.
- .2 Place and align units in their final position on the supporting steel structure prior to

- making permanent connections.
- .3 Provide any temporary connection of the deck to the supporting structural steel to prevent displacement of the deck due to construction operations, wind forces, etc., which may result in a hazardous condition.
  - .4 Provide permanent connection of the new 38 deep steel roof deck to the supporting steel structure with 20 mm diameter puddle welds and screw sheets together at side laps as noted below. Note that lesser spacing may be required as determined by the deck design engineer to satisfy diaphragm loading requirements.
    - .1 End welds, every flute for each sheet.
    - .2 Perimeter welds, 300 mm (12") on centre.
    - .3 Intermediate supports, every flute for each sheet.
    - .4 Screw side laps together at 600 o.c.
  - .5 Provide permanent connection of the new 75 deep composite metal floor deck to the supporting steel structure with 20 mm diameter puddle welds and screw sheets together at side laps as noted below. Note that lesser spacing may be required as determined by the deck design engineer to satisfy diaphragm loading requirements.
    - .1 End welds, every flute for each sheet.
    - .2 Perimeter welds, 300 mm (12") on centre.
    - .3 Intermediate supports, every other flute for each sheet.
    - .4 Screw side laps together at 600 o.c. I
  - .6 Provide permanent connection of the new 38 deep composite floor deck to the supporting steel structure with 20 mm diameter puddle welds and button punch sheets together at side laps as noted below. Note that lesser spacing may be required as determined by the deck design engineer to satisfy diaphragm loading requirements.
    - .1 End welds, every flute for each sheet.
    - .2 Perimeter welds, 300 mm (12") on centre.
    - .3 Intermediate supports, every other flute for each sheet.
    - .4 Screw side laps together at 600 o.c.
  - .7 Ensure that welds penetrate through deck and flashing sheets where double thickness occurs.
  - .8 Exercise care to avoid burning through joist chords. Damaged joist chords will be repaired under the direction of the Engineer at no additional cost to the Owner.
  - .9 Cut and reinforce, where necessary, all holes through the deck where secondary structural framing is not specifically shown around the openings as designed under Sub-Section 1.7.7 of this Section. Exact location of openings will be established on site by the trades concerned.
  - .10 Install all flashing plates, closures, and finishing channels.
  - .11 If low flute of deck does not close with perimeter angle, provide L40x40x3 welded to vertical leg of perimeter angle at 300 o.c. to provide welding base for deck. Use L75x51x5 long leg vertical for 75 deep deck under same conditions.
  - .12 Clean the new deck of all debris, welding rods, oil and grease or other materials likely to have a harmful effect on the application of the roofing system or bond to concrete.
  - .13 Weld light metal concrete screeds as detailed in typical detail 5.08 where required and

where heavy perimeter angles are not provided.

**3.3**    FIELD PAINTING

- .1    Field paint with a compatible zinc rich paint, all welds, burns, scratches or other defects of the zinc finish of the deck units for the roof system.

**3.4**    REPAIR AND MAKE GOOD

- .1    Just prior to installation of roofing, review all areas of roof deck for damage that affects the structural capacity or performance of the roofing system. Repair and make good all such damage to restore the deck.
  
- .2    Repair and make good all such damage to restore the deck.

**3.5**    CLEAN-UP

- .1    Remove any excess materials, debris from site.

**END OF SECTION 05 30 10**

**Part 1            General**

**1.1                DESCRIPTION OF WORK**

- .1        The work to be done under this section shall consist of the supply of all materials, labour, supervision, plant and equipment to construct all miscellaneous metal shown on the drawings and specified herein.
  
- .2        Carefully examine all drawings and the site to determine the extent of the work.
  
- .3        Ensure that all drawings and specification sections, including those for structural, mechanical and electrical work, are consulted to establish the Limits of work included in this section.
  
- .4        Provide all labour, materials, and equipment required or called for in this specification, or which is necessary, to complete the work without any extra cost. This work may required any or all, but not be limited to, any of the following
  - .1        Support brackets for millwork.
  - .2        All bollards at exterior equipment.
  - .3        Roof access ladder and roof mounted ladders and associated pieces.

**1.2                RELATED SECTIONS**

- .1        Section 01 33 00 - Submittal Procedures.
  
- .2        Section 03 30 00 - Cast-in-Place Concrete.
  
- .3        Section 05 12 23 - Structural Steel.
  
- .4        Section 06 20 00 – Finish Carpentry
  
- .5        Section 09 91 13 - Painting.

**1.3                REFERENCES**

- .1        American Society for Testing and Materials International, (ASTM)
  - .1        ASTM A53/A53M-02, Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Steamless.
  - .2        ASTM A269-02, Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service.
  - .3        ASTM A307-02, Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
  
- .2        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-1.40-97, Anti-corrosive Structural Steel Alkyd Primer.
  - .2        CAN/CGSB-1.181-92, Ready-Mixed, Organic Zinc-Rich Coating.

- .3 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel.
  - .2 CAN/CSA-G164-[M92(R1998)], Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3 CAN/CSA-S16.1-01, Limit States Design of Steel Structures.
  - .4 CSA W48-[01], Filler Metals and Allied Materials for Metal Arc Welding (Developed in co-operation with the Canadian Welding Bureau).
  - .5 CSA W59-[1989(R2001)], Welded Steel Construction (Metal Arc Welding) (Imperial Version).
- .4 The Environmental Choice Program
  - .1 CCD-047a-98, Paints, Surface Coatings.
  - .2 CCD-048-98, Surface Coatings - Recycled Water-borne.

#### **1.4 SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's:
    - .1 For finishes, coatings, primers and paints.
- .2 Shop Drawings
  - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures and stamped by a professional engineer licenced to practice in the province of Ontario..
  - .2 Indicate materials, core thicknesses, finishes, connections, joints, method of anchorage, number of anchors, supports, reinforcement, details, and accessories.

#### **1.5 QUALITY ASSURANCE**

- .1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- .1 Packing, Shipping, Handling and Unloading:
  - .1 Deliver, store, handle and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Storage and Protection:
  - .1 Cover exposed stainless steel surfaces with pressure sensitive heavy protection paper or apply strippable plastic coating, before shipping to job site.

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- .2 Leave protective covering in place until final cleaning of building. Provide instructions for removal of protective covering.

## **1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Steel sections and plates: to CAN/CSA-G40.20/G40.21, Grade 300W.
- .2 Steel pipe: to ASTM A53/A53M standard weight, black finish.
- .3 Welding materials: to CSA W59.
- .4 Welding electrodes: to CSA W48 Series.
- .5 Bolts and anchor bolts: to ASTM A307.
- .6 Aluminum sheet: proprietary utility sheet 12 mm (0.5") minimum thickness, colour from full range.
- .7 Stainless steel tubing: to ASTM A269, Type 302 Commercial grade with AISI No. 4 finish.
- .8 Grout: non-shrink, non-metallic, flowable, 15 MPa at 24 hours.

### **2.2 FABRICATION**

- .1 Fabricate work square, true, straight and accurate to required size, with joints closely fitted and properly secured.
- .2 Use self-tapping shake-proof round headed screws on items requiring assembly by screws or as indicated.
- .3 Where possible, fit and shop assemble work, ready for erection.
- .4 Ensure exposed welds are continuous for length of each joint. File or grind exposed welds smooth and flush.

### **2.3 FINISHES**

- .1 Galvanizing: hot dipped galvanizing with zinc coating 600g/m<sup>2</sup> to CAN/CSA-G164M.
- .2 Shop coat primer: to CAN/CGSB-1.40.
- .3 Zinc primer: zinc rich, ready mix to CAN/CGSB-1.181.

## **2.4 ISOLATION COATING**

- .1 Isolate aluminum from following components, by means of bituminous paint:
  - .1 Dissimilar metals except stainless steel, zinc, or white bronze of small area.
  - .2 Concrete, mortar and masonry.
  - .3 Wood.

## **2.5 SHOP PAINTING**

- .1 Apply one shop coat of primer to metal items, with exception of galvanized or concrete encased items.
- .2 Use primer unadulterated, as prepared by manufacturer. Paint on dry surfaces, free from rust, scale, grease. Do not paint when temperature is lower than 7° C (45° F).
- .3 Clean surfaces to be field welded; do not paint.
- .4 All exterior exposed metal to be galvanized.

## **2.6 ANGLE LINTELS**

- .1 Refer to structural steel division.

## **2.7 STAIR GUARDS AND HANDRAILS**

- .1 Fabricate as detailed.

## **2.8 ACCESS LADDERS**

- .1 Stringers: 75 mm x 12 mm (3.0" x 0.50") – Exterior
- .2 Steel Rungs: 19 mm (0.75") dia, welded to stringers @ 300 mm (12") on centre.
- .3 Brackets: sizes and shapes as indicated, weld to stringers at 600 mm (24") on centre, complete with fixing anchors to OBC SB-8.
- .4 Galvanize finish for exterior
- .5 Include ladder cage for exterior application.

## **2.9 SHIP LADDER**

- .1 Fabricate as detailed.

## **2.10 MILLWORK SUPPORT BRACKETS**

- .1 Supply and install Model #EH 1818 surface mounted counter supports in stock milled finish as manufactured by Rakks. On-line store at <http://store.rakks.com>.

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**2.11 BOLLARDS**

- .1 Fabricate from 6mm (0.25") thick galvanized steel pipe. Fill with concrete mounted 1200 mm (48") for frost coverage and paint. Locations as shown on drawings. Smooth concrete cap.

**2.12 CANTEVERED (HALF HEIGHT WALL) SUPPORT KNEE BRACE**

- .1 Fabricate wall braces for walls which do not extend to the structure above to prevent the wall from moving when lateral force is applied. Details shall be similar to the "SKB Knee Brace Kit" by Pittcon Industries. Brace shall be designed to fit within stud spacing and designed according to the floor structure.

**Part 3 Execution**

**3.1 ERECTION**

- .1 Do welding work in accordance with CSA W59 unless specified otherwise.
- .2 Erect metalwork square, plumb, straight, and true, accurately fitted, with tight joints and intersections.
- .3 Provide suitable means of anchorage acceptable to such as dowels, anchor clips, bar anchors, expansion bolts and shields, and toggles.
- .4 Exposed fastening devices to match finish and be compatible with material through which they pass.
- .5 Provide components for building by other sections in accordance with shop drawings and schedule.
- .6 Make field connections with bolts to CAN/CSA-S16.1, or weld.
- .7 Hand items over for casting into concrete or building into masonry to appropriate trades together with setting templates.
- .8 Touch-up rivets, field welds, bolts and burnt or scratched surfaces after completion of erection with primer.
- .9 Touch-up galvanized surfaces with zinc rich primer where burned by field welding.

**3.2 STAIR GUARD AND HAND RAILS**

- .1 Install guard and handrails to stairs as detailed.
- .2 Set railing standards in concrete. Grout to fill hole. Trowel surface smooth and flush with adjacent surfaces.

**3.3 ACCESS LADDERS/ SHIPS LADDER**

- .1 Install access ladders in locations as indicated, and elevator Pit as per manufactures instructions.

- .2 Erect ladders clear of wall on bracket supports as detailed.

### **3.4 BOLLARDS**

- .1 Install bollards in locations indicated.

### **3.5 PIPE RAILINGS/ CONTROL GATES**

- .1 Install pipe railings where indicated, refer to site plan. Hot dipped galvanized construction.

### **3.6 EXTERIOR GARBAGE ENCLOSURE**

- .1 Install miscellaneous galvanized hinges, gate structure, and slab edge angle as shown.

### **3.7 CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 74 19 – Construction/ Demolition Waste management and disposal
- .2        06 20 00 – Finish Carpentry
- .3        06 40 00 – Architectural Woodwork
- .4        Section 07 51 00 – Built-up Roof
- .5        Division 10 - Specialties

**1.2                REFERENCES**

- .1        Canadian Standards Association (CSA International)
  - .1        CSA B111-1974(R1998), Wire Nails, Spikes and Staples.
  - .2        CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .3        CSA O121-M1978(R1998), Douglas Fir Plywood.
  - .4        CAN/CSA-O141-91(R1999), Softwood Lumber.
  - .5        CSA O151-M1978(R1998), Canadian Softwood Plywood.
  - .6        CAN/CSA-O325.0-92(R1998), Construction Sheathing.
- .2        National Lumber Grades Authority (NLGA)
  - .1        Standard Grading Rules for Canadian Lumber 2000.

**1.3                QUALITY ASSURANCE**

- .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.
- .3        Plywood, OSB and wood based composite panel construction sheathing identification: by grade mark in accordance with applicable CSA standards.

**1.4                WASTE MANAGEMENT AND DISPOSAL**

- .1        Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

**Part 2            Products**

**2.1                LUMBER MATERIAL**

- .1        Lumber: unless specified otherwise, softwood, S4S, moisture content 19% or less in accordance with following standards:
  - .1        CAN/CSA-O141.

- .2 NLGA Standard Grading Rules for Canadian Lumber.
- .2 Furring, blocking, nailing strips, grounds, bucks, cants, curbs, backing and sleepers:
  - .1 S2S is acceptable for all
  - .2 Board sizes: "Standard" or better grade.
  - .3 Dimension sizes: "Standard" light framing or better grade.
  - .4 Post and timbers sizes: "Standard" or better grade.

## **2.2 PANEL MATERIALS**

- .1 Douglas fir plywood (DFP): to CSA O121, standard construction.
- .2 Canadian softwood plywood (CSP): to CSA O151, standard construction.
- .3 Plywood, OSB and wood based composite panels: to CAN/CSA-O325.
- .4 Fire Retardant Plywood Dricon® Product.

## **2.3 ACCESSORIES**

- .1 Nails, spikes and staples: to CSA B111.
- .2 Bolts: 12.5 mm (0.5") diameter unless indicated otherwise, complete with nuts and washers.
- .3 Proprietary fasteners: toggle bolts, expansion shields and lag bolts, screws and lead or inorganic fibre plugs, explosive actuated fastening devices, recommended for purpose by manufacturer.

## **2.4 FINISHES**

- .1 Galvanizing: to CAN/CSA-G164, use galvanized fasteners for exterior work interior highly humid areas, pressure- preservative, fire-retardant treated lumber.
- .2 Stainless steel: use stainless steel alloy for all others.

## **2.5 WOOD PRESERVATIVE**

- .1 Surface-applied wood preservative: clear or copper naphthenate or 5% pentachlorophenol solution, water repellent preservative.
- .2 Pentachlorophenol use is restricted to building components that are in ground contact and subject to decay or insect attack only. Where used, pentachlorophenol-treated wood must be covered with two coats of an appropriate sealer.
- .3 Structures built with wood treated with pentachlorophenol and inorganic arsenicals must not be used for storing food nor should the wood come in contact with drinking water.

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Treat surfaces 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.
  - .4 Treat material as indicated:
    - .1 Wood cants, fascia backing, curbs, nailers, sleepers on roof deck.
    - .2 Wood furring for blocking on outside surface of exterior masonry and concrete walls.
    - .3 Wood sleepers supporting wood subflooring over concrete slabs in contact with ground or fill.

### **3.2 INSTALLATION**

- .1 Comply with requirements of NBC, supplemented by the following paragraphs.
- .2 Install furring and blocking as required to space-out and support casework, cabinets, wall and ceiling finishes, backing in steel stud framing for surface mounted accessories, facings, fascia, soffit, siding and other work as required.
- .3 Align and plumb faces of furring and blocking to tolerance of 1:600.
- .4 Install bucks, nailers and linings to rough openings as required to provide backing for frames and other work.
- .5 Install wood cants, fascia backing, nailers, curbs and other wood supports as required and secure using galvanized fasteners.
- .6 Install wood backing, dressed, tapered and recessed slightly below top surface of roof insulation for roof hopper.
- .7 Install sleepers as indicated.
- .8 Use caution when working with particle board. Use dust collectors and high quality respirator masks.

### **3.3 ERECTION**

- .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 SCHEDULES**

- .1 Provide electrical equipment backboards for mounting electrical equipment as indicated. Use 19 mm (0.75") thick plywood on 19 x 38 mm (0.75" x 1.5") furring around spacing, perimeter and at maximum 300 mm (12") intermediate using DriCon® Fire Retardant plywood.
- .2 Provide "Book Shelving" plywood backboard in Room 222, 19mm x 1200 x 2400, complete perimeter for shelving brackets. Use DriCon® Fire Retardant 19mm plywood. Mount 300mm from floor.

**END OF SECTION**

**Part 1            General**

**1.1                SECTION INCLUDES (but not limited to)**

- .1        Standing and running trim.
- .2        Section 06 40 00 - Architectural woodwork
- .3        Badminton and volleyball equipment storage racks.
- .4        Shelving and coat rods.
- .5        Installation of chalk boards, white boards, and tack boards
- .6        Installation of finished hardware supplied in Section 08 71 00.
- .7        Installation of toilet and bath accessories including grab bars in Section 10 28 10.

**1.2                RELATED SECTIONS**

- .1        Section 06 10 11 – Rough Carpentry
- .2        Section 06 40 00 - Architectural Woodwork
- .3        Section 01 74 19 – Construction/ Demolition Waste Management and Disposal
- .4        Section 08 71 00 – Finish Hardware
- .5        Section 09 91 13 – Painting
- .6        Section 10 11 13 – White Boards, Chalk Boards and Tack Boards
- .7        Section 10 28 10 – Toilet and Bath Accessories

**1.3                REFERENCES**

- .1        American National Standards Institute (ANSI)
  - .1        ANSI A208.1-99, Particleboard.
  - .2        ANSI A208.2-94, Medium Density Fibreboard (MDF).
- .2        American Society for Testing and Materials (ASTM)
  - .1        ASTM E1333-96, Test Method for Determining Formaldehyde Concentrations in Air and Emissions Rates from Wood Products Using a Large Chamber.
- .3        Architectural Woodwork Manufacturers Association of Canada (AWMAC)
  - .1        AWMAC Quality Standards for Architectural Woodwork 2003.
- .4        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-11.3-M87, Hardboard.

- .5 Canadian Standards Association (CSA)
  - .1 CAN/CSA-A247-M86(R1996), Insulating Fibreboard.
  - .2 CSA B111-74(R1998), Wire Nails, Spikes and Staples.
  - .3 CAN/CSA-G164-M92(R1998), Hot Dip Galvanizing of Irregularly Shaped Articles.
  - .4 CSA O115-M82(R2001), Hardwood and Decorative Plywood.
  - .5 CSA O121-M78(R1998), Douglas Fir Plywood.
  - .6 CAN/CSA O141-91(R1999, Softwood Lumber.
  - .7 CSA O151-M78 (R1998), Canadian Softwood Plywood.
  - .8 CSA O153-M80 (R1998), Poplar Plywood.
  - .9 CSA Z760-94, Life Cycle Assessment.
- .6 International Organization for Standardization (ISO)
  - .1 ISO 14040-97, Environmental Management-Life Cycle Assessment - Principles and Framework.
  - .2 ISO 14041-98, Environmental Management-Life Cycle Assessment - Goal and Scope Definition and Inventory Analysis.
- .7 National Hardwood Lumber Association (NHLA)
  - .1 Rules for the Measurement and Inspection of Hardwood and Cypress January 1996.
- .8 National Lumber Grades Authority (NLGA)
  - .1 Standard Grading Rules for Canadian Lumber 2000.
- .9 Underwriters Laboratories of Canada (ULC)
  - .1 CAN4-S104-80(R1985), Fire Tests of Door Assemblies.
  - .2 CAN4-S105-85(R1992), Fire Door Frames, meeting the Performance Required by CAN4-S104.
- 1.4 SHOP DRAWINGS**
  - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Indicate details of construction, profiles, jointing, fastening and other related details.
  - .3 Indicate materials, thicknesses, finishes and hardware.
- 1.5 SAMPLES**
  - .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Submit duplicate samples: sample size 300 x 300 mm or 300 mm long unless specified otherwise of specified materials.
- 1.6 REGULATORY REQUIREMENTS**
  - .1 Wood fire rated frames and panels: listed and labelled by an organization accredited by Standards Council of Canada in conformance with CAN4-S104 and CAN4-S105 for ratings specified or indicated.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Protect materials against dampness during and after delivery.
- .3 Store materials in ventilated areas, protected from extreme changes of temperature or humidity.

## **1.8 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

## **Part 2 Products**

### **2.1 LUMBER MATERIAL**

- .1 Softwood lumber: unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:
  - .1 CAN/CSA-O141.
  - .2 NLGA Standard Grading Rules for Canadian Lumber.
  - .3 AWMAC custom grade, moisture content as specified.
- .2 Machine stress-rated lumber is acceptable.
- .3 Hardwood lumber: moisture content 19 % or less in accordance with following standards:
  - .1 National Hardwood Lumber Association (NHLA).
  - .2 AWMAC custom grade, moisture content as specified.
- .4 Manufacturing process must adhere to Lifecycle Assessment (LCA) Standards as per CSA Z760 LCA Standards.

### **2.2 SHEET MATERIAL**

- .1 Douglas fir plywood (DFP): to CSA O121, standard construction.
- .2 Canadian softwood plywood (CSP): to CSA O151, standard construction.
- .3 Hardwood plywood: to CSA O115.
- .4 Poplar plywood (PP): to CSA O153, standard construction.
- .5 Particleboard: to ANSI A208.1.
- .6 Hardboard: to CAN/CGSB-11.3.

- .7 Medium density fibreboard (MDF): to ANSI A208.2, density 640-800 kg/m<sup>3</sup>.
  - .1 Medium density fibreboard must:
    - .1 be manufactured such that formaldehyde emissions do not exceed 0.30 ppm (0.260 m<sup>2</sup>/m<sup>3</sup>) when tested in accordance with ASTM E1333.
- .8 Low density fibreboard: to CSA-A247M.
  - .1 Ensure fibreboard is not manufactured with binders, coatings or adhesives which contain resins or other compounds that have potential to release formaldehyde during final product's use.
- .9 Manufacturing process must adhere to Lifecycle Assessment Standards as CSA Z760 LCA Standards.

### **2.3 ACCESSORIES**

- .1 Nails and staples: to CSA B111; galvanized to CAN/CSA-G164 for exterior work, interior humid areas and for treated lumber; stainless steel finish elsewhere.
- .2 Wood screws: stainless steel, type and size to suit application.
- .3 Splines: metal.
- .4 Adhesive: recommended by manufacturer.
- .5 Use least toxic sealants, adhesives, sealers, and finishes necessary to comply with requirements of this section.

### **2.4 INTERIOR TRIM**

- .1 Standing and running trim to be AWMAC custom grade construction.
- .2 Trim to be size and species as detailed.
- .3 Set nails and screws, apply wood filler to indentations, sand smooth and leave ready to receive finish.

## **Part 3 Execution**

### **3.1 INSTALLATION**

- .1 Do finish carpentry to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
- .2 Scribe and cut as required, fit to abutting walls, and surfaces, fit properly into recesses and to accommodate piping, columns, fixtures, outlets, or other projecting, intersecting or penetrating objects.
- .3 Form joints to conceal shrinkage.

### **3.2 CONSTRUCTION**

- .1 Fastening.
  - .1 Position items of finished carpentry work accurately, level, plumb, true and fasten or anchor securely.
  - .2 Design and select fasteners to suit size and nature of components being joined. Use proprietary devices as recommended by manufacturer.
  - .3 Set finishing nails to receive filler. Where screws are used to secure members, countersink screw in round cleanly cut hole and plug with wood plug to match material being secured.
  - .4 Replace items of finish carpentry with damage to wood surfaces including hammer and other bruises.
- .2 Standing and running trim.
  - .1 Butt and cope internal joints of baseboards to make snug, tight, joint. Cut right angle joints of casing and base with mitred joints.
  - .2 Fit backs of baseboards and casing snugly to wall surfaces to eliminate cracks at junction of base and casing with walls.
  - .3 Make joints in baseboard, where necessary using a 45° scarf type joint.
  - .4 Install door and window trim in single lengths without splicing.
- .3 Shelving.
  - .1 Install shelving as detailed.
- .4 Hardware.
  - .1 Install as per schedule.
- .5 Products supplied under Division 10.
  - .1 Install as per schedule.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1    Section 01 33 00 - Submittal Procedures.
- .2    Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .3    Section 01 61 00 - Common Product Requirements.
- .4    Section 01 45 00 - Quality Control.
- .5    Section 07 92 10 - Joint Sealing.
- .6    Section 08 71 73 - Special Function Hardware.

**1.2            REFERENCES**

- .1    American National Standards Institute (ANSI)
  - .1    ANSI A208.1-[99], Particleboard.
  - .2    ANSI A208.2-[94], Medium Density Fiberboard (MDF).
- .2    American Society for Testing and Materials (ASTM)
  - .1    ASTM E1333-[96], Standard Test Method for Determining Formaldehyde Concentrations in Air and Emission Rates From Wood Products Using a Large Chamber.
  - .2    ASTM D5116-[97], Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
- .3    Architectural Woodwork Manufacturers Association of Canada (AWMAC)
  - .1    AWMAC Quality Standards for Architectural Woodwork.
- .4    Canadian General Standards Board (CGSB)
  - .1    CAN/CGSB-71.20-[M88], Adhesive, Contact, Brushable.
- .5    Canadian Standards Association (CSA)
  - .1    CSA B111-[74(R1998)], Wire Nails, Spikes and Staples.
  - .2    CSA O112.4-[M1977(R1999)], Standards for Wood Adhesives.
  - .3    CSA O115-[M1982(R2001)], Hardwood and Decorative Plywood.
  - .4    CSA O121-[M89(R1998)], Douglas Fir Plywood.
  - .5    CAN/CSA O141-[91R1999], Softwood Lumber.
  - .6    CSA O151-[M1978(R1998)], Softwood Plywood.
  - .7    CSA O153-[M1980(R1998)], Poplar Plywood.
  - .8    CSA Z760-[94], Life Cycle Assessment.
- .6    International Organization for Standardization (ISO)
  - .1    ISO 14040-[97], Environmental Management-Life Cycle Assessment - Principles and Framework.

- .2 ISO 14041-[98], Environmental Management-Life Cycle Assessment - Goal and Scope Definition and Inventory Analysis.
- .7 National Electrical Manufacturers Association (NEMA)
  - .1 NEMA LD-3-[95].
- .8 National Hardwood Lumber Association (NHLA)
  - .1 Rules for the Measurement and Inspection of Hardwood and Cypress [, January 1996.
- .9 National Lumber Grades Authority (NLGA)
  - .1 Standard Grading Rules for Canadian Lumber, 2000.

### **1.3 SHOP DRAWINGS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate details of construction, profiles, jointing, fastening and other related details.
  - .1 Scales: profiles full size, details 1/2 full size.
- .3 Indicate materials, thicknesses, finishes and hardware.
- .4 Indicate locations of service outlets in casework, typical and special installation conditions, and connections, attachments, anchorage and location of exposed fastenings.

### **1.4 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate samples: sample size 300 x 300 mm
- .3 Submit duplicate colour samples of laminated plastic for colour selection.
- .4 Submit duplicate samples of laminated plastic joints, edging, cutouts and postformed profiles.

### **1.5 MOCK-UPS**

- .1 Construct mock-ups in accordance with Section 01 45 00 - Quality Control.
- .2 Shop prepare one base cabinet unit, wall cabinet, counter top, shelving unit, convector cabinet, complete with hardware and shop applied finishes, and install on project in designated location.
- .3 Allow 24 hours for inspection of mock-up by Consultant before proceeding with this work.
- .4 When accepted, mock-up will demonstrate minimum standard for this work. Mock-up may not remain as part of finished work.

## **1.6 DELIVERY, STORAGE, AND HANDLING**

- .1 Deliver, handle, store and protect materials of this section in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Protect millwork against dampness and damage during and after delivery.
- .3 Store millwork in ventilated areas, protected from extreme changes of temperature or humidity.

## **1.7 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal and the
- .2 Separate wood waste in accordance with the Waste Management Plan and place in designated areas in the following categories for recycling: Solid wood/softwood/hardwood, composite wood, treated, painted, or contaminated wood.
- .3 Set aside damaged wood for acceptable alternative uses (e.g. bracing, blocking, cripples, bridging, finger-joining, or ties). Store this separated reusable wood waste convenient to cutting station and area of work.
- .4 Separate corrugated cardboard and place in designated areas for recycling.
- .5 Do not burn scrap at the project site.
- .6 Fold up metal banding, flatten, and place in designated area for recycling.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Softwood lumber: unless specified otherwise, S4S, moisture content 19% or less in accordance with following standards:
  - .1 CAN/CSA-O141.
  - .2 NLGA Standard Grading Rules for Canadian Lumber.
  - .3 AWMAC premium grade, moisture content as specified.
- .2 Machine stress-rated lumber is acceptable for all purposes.
- .3 The manufacturing process must adhere to Lifecycle Assessment (LCA) Standards as per CSA Z760 94 Life Cycle Assessment.
- .4 Hardwood lumber: moisture content 19% or less in accordance with following standards:
  - .1 National Hardwood Lumber Association (NHLA).
  - .2 AWMAC premium grade, moisture content as specified.
- .5 Douglas fir plywood (DFP): to CSA O121, standard construction.

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- .6 Canadian softwood plywood (CSP): to CSA O151, standard construction.
  - .7 Hardwood plywood: to CSA O115.
  - .8 Poplar plywood (PP): to CSA O153, standard construction.
  - .9 Interior mat-formed wood particleboard: to ANSI A208.1.
  - .10 Birch plywood: to AWMAC Select White.
  - .11 Fibreboard must contain less than 10 % roundwood by weight, using a weighted average over a three month period at each manufacturing location. (Roundwood refers to logs, with bark, delivered to a pulp mill, cut in lengths up to 3 m.)
  - .12 Hardboard
    - .1 to CAN/CGSB-11.3.
    - .2 manufactured such that formaldehyde emissions do not exceed 0.15 ppm [180 microg/m<sup>3</sup> when tested in accordance with ASTM E1333.
    - .3 if manufactured using a wet process:
      - .1 be made by a process that does not release matter in the undiluted product plant effluent generating a BOD5 in excess of [50] mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment;
      - .2 be made by a process that does not release TSS in excess of [60] mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment;
    - .4 contain at least 50 % recycled materials.
  - .13 Laminated plastic for flatwork: to NEMA LD3, Grade VGL.
  - .14 Laminated plastic for post forming work: to NEMA LD3, Grade VGL,
  - .15 Laminated plastic backing sheet: Grade BK, not less than 0.5 mm thick or same thickness and colour as face laminate.
  - .16 Laminated plastic liner sheet: Grade GP
  - .17 Thermofused Melamine: to NEMA LD3 Grade
    - .1 High wear resistant thermofused melamine: equal or exceed 400 cycles (Minimum standard for HPL abrasion test).
  - .18 Nails and staples: to CSA B111.
  - .19 Wood screws: type and size to suit application.
  - .20 Splines: metal.
  - .21 Sealant: Tremco Acrylic Latex- Translucent

- .22 Cabinet and drawer pulls: Contemporary Metal Handle Pull 332, Richelieu Product #33285195, 128mm c/c, brushed nickel, "D" handle and Modern Metal Knob – 8720.
- .23 Door Hinges at Cabinets: All hinges at doors to be Blum 'Modul' series throughout min. 107° opening at all standard cabinets.
- .24 Drawer Glides: All drawer glides to be side-mounted full extension ball bearing glides, with a capacity of 75 lbs per pair. Acceptable products include Accuride 2632 series as supplied by Richelieu.
- .25 Garment Hooks: Garment hooks to be double hooks similar to #0745-Z by Watrous.
- .26 Door/ Drawer Locks: All millwork locks for drawers & cabinets to be chrome plated, as supplied by Hardware Schedule.
- .27 Pilaster Strips: Pilaster strips at adjustable shelves to be clear aluminum finish throughout complete with aluminum support dips, 4 per shelf. Provide extra stock of clips to the quantity of 1 clip per every 2 shelves. All pilaster strips to be installed flush (recessed) with adjacent surfaces throughout.

## **2.2 MANUFACTURED UNITS (Plastic Laminate)**

- .1 Casework
  - .1 Fabricate caseworks to AWMAC custom quality grade.
  - .2 Furring, blocking, nailing strips, grounds and rough bucks and sleepers.
    - .1 S2S lumber
    - .2 Board sizes: "Standard" or better grade.
    - .3 Dimension sizes: "Standard" light framing or better grade.
  - .3 Framing, interiors and non exposed surfaces: Melamine-faced particle board as per "Formica Permalan Panels" 19 mm thick
  - .4 Case bodies (ends, divisions, bottoms and exposed).
    - .1 Particle board or MDF core with high pressure laminate finish.
      - .1 Moisture Resistant MDF or Marine grade plywood in wet applications (Kitchens, Kitchenettes, Washrooms and the like)
    - .2 Finished board to be min. 19mm thick.
    - .3 Plastic Laminate to be: [spec laminate colour] [from full range of Formica]
  - .5 Backs.
    - .1 Particle board or MDF core with high pressure laminate finish.
      - .1 Moisture Resistant MDF or Marine grade plywood in wet applications (Kitchens, Kitchenettes, Washrooms and the like)
    - .2 Finished Board to be min.12mm thick.
    - .3 Plastic Laminate to be: [spec laminate colour] [from full range of Formica]
  - .6 Shelving.
    - .1 Particle board or MDF core with high pressure laminate finish.
      - .1 Moisture Resistant MDF or Marine grade plywood in wet applications (Kitchens, Kitchenettes, Washrooms and the like)
    - .2 Finished Board to be min.12mm thick.

- .2 3/8" tempered glass ground and polished edges
- .3 PVC 3 mm nosing Type 1, Cherry wood half round nosing where indicated.
- .2 Casework Doors
  - .1 Particle board or MDF core with high pressure laminate finish.
    - .1 Moisture Resistant MDF or Marine grade plywood in wet applications (Kitchens, Kitchenettes, Washrooms and the like)
    - .2 Finished board to be min. 12mm thick.
    - .3 Plastic Laminate to be: [spec laminate colour] [from full range of Formica]
  - .2 1/4" tempered glass with edges grounded and polished smooth

## **2.4 EDGE BANDING/ RUNNING TRIM & RAILS**

- .1 PVC nosings heavy duty (3 mm)

## **2.5 FABRICATION**

- .1 Set nails and countersink screws apply stained wood filler to indentations, sand smooth and leave ready to receive finish.
- .2 Shop install cabinet hardware for doors, shelves and drawers. Recess shelf standards unless noted otherwise.
- .3 Shelving to cabinetwork to be adjustable unless otherwise noted.
- .4 Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes and other fixtures.
- .5 Shop assemble work for delivery to site in size easily handled and to ensure passage through building openings.
- .6 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.
- .7 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .8 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.
- .9 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .10 Apply laminated plastic liner sheet where indicated.

## **2.6 FINISHING**

- .1 Per Section 099000 Painting.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Do architectural woodwork to Quality Standards of the Architectural Woodwork Manufacturers Association of Canada (AWMAC), except where specified otherwise.
- .2 Install prefinished millwork at locations shown on drawings. Position accurately, level, plumb straight.
- .3 Fasten and anchor millwork securely. Provide heavy duty fixture attachments for wall mounted cabinets.
- .4 Use draw bolts in countertop joints.
- .5 Scribe and cut as required to fit abutting walls and to fit properly into recesses and to accommodate piping, columns, fixtures, outlets or other projecting, intersecting or penetrating objects.
- .6 At junction of plastic laminate counter back splash and adjacent wall finish, apply small bead of sealant.
- .7 Apply water resistant building paper over wood framing members in contact with masonry or cementitious construction.
- .8 Fit hardware accurately and securely in accordance with manufacturer's written instructions.

**3.2 CLEANING**

- .1 Clean millwork and cabinet work inside cupboards and drawers and outside surfaces.
- .2 Remove excess glue from surfaces.

**3.3 PROTECTION**

- .1 Protect millwork and cabinet work from damage until final inspection.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 33 00 - Submittal Procedures.
- .2        Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .3        Section 01 78 00 - Closeout Submittals.
- .4        Section 06 20 00 - Finish Carpentry.
- .5        Section 06 40 00 - Architectural Woodwork.

**1.2                REFERENCES**

- .1        American National Standards Institute (ANSI)
  - .1        ANSI 208.1-[99], Particleboard.
  - .2        ANSI A208.2-[02], Medium Density Fibreboard (MDF) for Interior Applications.
- .2        American Society for Testing and Materials International, (ASTM)
  - .1        ASTM D2832-[92(R1999)], Standard Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
  - .2        ASTM D5116-[97], Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
- .3        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-71.20-[M88], Adhesive, Contact, Brushable.
- .4        Canadian Standards Association (CSA International)
  - .1        CSA O112-[M1977(R2001)], Standards for Wood Adhesives.
  - .2        CSA O112.5-1.1-Series-M-[1977(R2001)], Urea Resin Adhesives for Wood (Room- and High-Temperature Curing).
  - .3        CSA O112.7-1.1-Series M-[1977(R2001)], Resorcinol and Phenol-Resorcinol Resin Adhesives for Wood (Room- and Intermediate-Temperature Curing).
  - .4        CSA O121-[M1978(R1998)], Douglas Fir Plywood.
  - .5        CAN/CSA O141-[91(R1999)], Softwood Lumber.
  - .6        CSA O151-[M1978(R1998)], Canadian Softwood Plywood.
  - .7        CSA O153-[M1980(R1998)], Poplar Plywood.
- .5        National Electrical Manufacturers Association (NEMA)
  - .1        NEMA LD3-[2000], High Pressure Decorative Laminates.

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### **1.3 SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for adhesives, solvents and cleaners.
- .2 Samples:
  - .1 Submit samples in accordance with Section 01 33 00- Submittal Procedures.
  - .2 Submit duplicate samples of joints, edging, cutouts and postformed profiles.
- .3 Manufacturer's Instructions:
  - .1 Submit manufacturer's installation instructions.
- .4 Closeout Submittals:
  - .1 Provide maintenance data for laminate work for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

### **1.4 QUALITY ASSURANCE**

- .1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

### **1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Storage and Protection:
  - .1 Deliver, handle, store and protect materials of this section in accordance with Section 01 61 00 - Common Product Requirements.
  - .2 Maintain relative humidity between 25 and 60% at 22 degrees C during storage and installation.

### **1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Divert wood cut-offs from landfill by disposal into on-site wood recycling bin.
- .2 Divert reusable materials for reuse at nearest used building materials facility or similar type facility.
- .3 Divert unused caulking, sealants, surface coatings and adhesive materials from landfill through disposal at a special wastes depot.

## **Part 2            Products**

### **2.1                MATERIALS**

- .1        Laminated plastic for flatwork:
  - .1            1.6 mm thick, based on colour ranges shown on drawings.
- .2        Plywood core: to CSA O121, CSA O151, CSA O153 solid two sides, 19 mm thick.
- .3        Particleboard core: to ANSI 208.1, sanded faces, of thickness indicated.
- .4        Laminated plastic adhesive: contact adhesive to CAN/CGSB-71.20,
- .5        Draw bolts and splines: as recommended by fabricator.
- .6        Solid Surfacing – Formica Signature Collection and Designer Series as per drawings.

### **2.2                FABRICATION**

- .1        Comply with NEMA LD 3, Annex A.
- .2        Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.
- .3        Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .4        Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface.
- .5        Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.
- .6        Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- .7        Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .8        Apply laminated plastic liner sheet where indicated.

## **Part 3            Execution**

### **3.1                MANUFACTURER'S INSTRUCTIONS**

- .1        Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

### **3.2                INSTALLATION**

- .1        Install work plumb, true and square, neatly scribed to adjoining surfaces.

- .2 Make allowances around perimeter where fixed objects pass through or project into laminated plastic work to permit normal movement without restriction.
- .3 Use draw bolts and splines in countertop joints. Maximum spacing 450 mm on centre, 75mm from edge. Make flush hairline joints.
- .4 Provide cutouts for inserts, grilles, appliances, outlet boxes and other penetrations. Round internal corners, chamfer edges and seal exposed core.
- .5 At junction of laminated plastic counter back splash and adjacent wall finish, apply small bead of sealant.
- .6 Site apply laminated plastic to units as indicated. Adhere laminated plastic over entire surface. Make corners with hairline joints. Use full sized laminate sheets. Make joints only where indicated. Slightly bevel arrises. Cap exposed edges with anodized aluminum extrusions.
- .7 For site application, offset joints in plastic laminate facing from joints in core.

### **3.3 PROTECTION**

- .1 Cover finished laminated veneered surfaces with heavy kraft paper or put in cartons during shipment. Protect installed laminated surfaces by approved means. Do not remove until immediately before final inspection.

### **3.4 CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Perform care and cleaning with NEMA LD 3, Annex B.
- .3 Remove traces of primer, caulking, epoxy and filler materials; clean doors and frames .

**END OF SECTION**

**Part 1            General**

**1.1            SECTION INCLUDES**

- .1    Below grade waterproofing and dampproofing
- .2    Plaza deck and planter drainage sheets.

**1.2            RELATED SECTIONS**

- .1    Section 07 11 13 - Bituminous Dampproofing.
- .2    Section 07 12 00 - Built-Up Bituminous Waterproofing.
- .3    Section 07 13 00 - Sheet Waterproofing.
- .4    Section 07 14 00 - Fluid-Applied Waterproofing.
- .5    Section 07 16 13 - Polymer Modified Cement Waterproofing.
- .6    Section 07 16 16 - Crystalline Waterproofing.
- .7    Section 07 16 19 - Metal Oxide Waterproofing.
- .8    Section 07 17 13 - Bentonite Panel Waterproofing.
- .9    Section 31 223 16 - Excavation.
- .10   Section 31 23 23 - Fill: Backfilling.
- .11   Section 33 46 00 – Sub drainage: Foundation perimeter drainage

**1.3            REFERENCES**

- .1    AATC 127 - Water Resistance: Hydrostatic Pressure Test; 1998.
- .2    ASTM C 1311 - Standard Specification for Solvent Release Sealants; 2002.
- .3    ASTM D 1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics; 2004a.
- .4    ASTM D 1621 - Standard Test Method for Compressive Properties Of Rigid Cellular Plastics; 2004a.
- .5    ASTM D 3776 - Standard Test Methods for Mass Per Unit Area (Weight) of Fabric; 1996 (Reapproved 2002).
- .6    ASTM D 3786 - Standard Test Method for Hydraulic Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method; 2006.

- .7 ASTM D 4355 - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture, and Heat in a Xenon Arc Type Apparatus; 2005.
- .8 ASTM D 4491 - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 1999a (Reapproved 2004).
- .9 ASTM D 4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2004.
- .10 ASTM D 4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 1991 (Reapproved 2003).
- .11 ASTM D 4716 - Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head; 2004.
- .12 ASTM D 4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile; 2004.
- .13 ASTM D 4833 - Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products; 2000.
- .14 ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials; 2005.
- .15 CCMC Technical Guide for Foundation Wall Drainage Systems – Dimpled Membranes. Master Format Section 02622.1; (Oct. 11, 2006).
- .16 CGSB 19-GP-14M - Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing; 1984

#### **1.4 SUBMITTALS**

- .1 See Section 01300 - Administrative Requirements, for submittal procedures.
- .2 Product Data: Manufacturer's data sheets on each product to be used, including:
  - .1 Preparation instructions and recommendations.
  - .2 Storage and handling requirements and recommendations.
  - .3 Installation methods.
  - .4 Specimen warranty.
- .3 Samples: 12 by 12 inch (300 by 300 mm) piece of sheet; minimum 12 inch (300 mm) long piece of strip; each type of fastener.
- .4 Test Reports: Evaluation service reports or other independent testing agency reports showing compliance with specified requirements.
- .5 Installer Qualifications: Include minimum of 5 project references.
- .6 Executed warranty

## **1.5 QUALITY ASSURANCE**

- .1 Installer Qualifications: Company specializing in performing work of this type and approved by the membrane manufacturer.
- .2 Manufacturer's Field Services: Provide the services of a representative accredited by the sheet manufacturer to examine substrates before starting installation, periodically review installation procedures, and review final installed systems.

## **1.6 DELIVERY, STORAGE, AND PROTECTION**

- .1 Deliver products to project site in original packaging with labels intact.
- .2 Store products in manner acceptable to membrane manufacturer.
- .3 When products must be stored for extended periods, keep out of direct sunlight and at temperatures above minus 22 degrees F (minus 30 degrees C).
- .4 Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

## **1.7 WARRANTY**

- .1 Manufacturer's Limited Product Warranty

## **Part 2 PRODUCTS**

### **2.1 MANUFACTURERS AND MATERIALS**

- .1 **Drainage Sheet Product:**
  - .1 Delta X Drain as manufactured by Cosella-Dörken Products Inc
  - .2 Mira Drain 6000 as manufactured by Carlisle Coatings and Waterproofing
  - .3 Mel-Drain as manufactured by W.R. Meadows
- .2 **Waterproofing Products:**
  - .1 Blueskin WP 200, Blueskin® WP 200 is a self-adhering composite membrane consisting of an SBS rubberized asphalt compound, integrally laminated to a blue, high-density polyethylene film. The membrane is specifically designed for self-adhering to a prepared substrate, and provides a high-performance waterproofing barrier.
    - .1 Acceptable Alternate: MEL-ROL, Self-Adhering Waterproofing Membrane as manufactured by W.R. Meadows
  - .2 Barricoat-S as manufactured by Carlisle Coatings and Waterproofing, spray applied rubberized asphalt membrane.

### **2.2 APPLICATIONS**

- .1 Foundation Wall Drainage Sheet: Install drainage sheet over waterproofing, from bottom of wall to grade level, and in locations indicated on the drawings.

- .2 Basement Floor: Install horizontal application drainage sheet between mud slab, gravel substrate, or compacted soil and finish slab.
- .3 Planters: Install drainage sheet inside planters, over waterproofing.
- .4 Lagging Walls: Install drainage sheet on entire surface of walls prior to installation of rebar and pouring of foundation walls.
- .5 Footings: Install water stops in accordance with Section 03 15 13.
- .6 Accessories as recommended by product manufacturer's installation instructions.

### **Part 3 EXECUTION**

#### **3.1 EXAMINATION**

- .1 Verify that substrates are sound enough to retain fasteners and suitable for bonding of sealant.
- .2 Verify that there are no active leaks within area to be covered.
- .3 Verify that perimeter foundation, or underslab drainage system has been properly installed.
- .4 Verify that finish grade elevations are clearly marked.
- .5 Do not begin installation until substrates have been properly prepared.
- .6 If substrate preparation is the responsibility of another trade, notify Architect of unsatisfactory preparation before proceeding.

#### **3.2 PREPARATION**

- .1 Clean surfaces "broom clean" prior to installation.
- .2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
  - .1 Remove projections larger than 1/4 inch (6 mm); remove sharp edges.
  - .2 In concrete and masonry, patch cracks and holes so that they provide suitable substrate as recommended by membrane manufacturer.
- .3 Mark installation locations on walls prior to starting installation.

#### **3.3 INSTALLATION**

- .1 Install in accordance with manufacturer's recommended procedure.
- .2 Do not install when:
  - .1 Ambient temperature is below minus 22 degrees F (minus 30 degrees C).
  - .2 Concrete has been cured for less than 3 days.
  - .3 Standing water is present.

- .3 General Sheet Installation: Start at lowest point and work to top, running length of sheets horizontally and overlapping upper sheets in shingle fashion at least 6 inches (150 mm); lap vertical joints at least 6 inches (150 mm).
  - .1 Install sheets without gaps, wrinkles, creases, or tears.
  - .2 Align and interlock overlapping layers.
  - .3 Secure to substrate at edges and in the field of the sheet using fasteners and methods recommended by sheet manufacturer; stagger fasteners in alternate rows.
  - .4 Flash and seal top edges, around openings and penetrations, and other locations recommended by manufacturer, in manner recommended by manufacturer.
- .4 Drainage Sheets: In addition to general sheet installation specified above:
  - .1 Install with cup side on side facing surface waterproofed.
  - .2 Unless otherwise indicated, fasten dimpled sheets using specified fasteners with dimpled washers interlocked with sheet at not more than 12 inches (305 mm) on center.
  - .3 At top, install with flat edge secured with DELTA®-MOLD STRIP. Fasten at not more than 8 inches (200 mm) on center.
  - .4 At all joints, apply continuous bead of sealant between layers and fasten through both layers with specified fasteners with dimpled washers.
  - .5 At vertical joints, overlap sheets at least 6 inches (150 mm) and interlock dimples, making full contact with sealant.
  - .6 At horizontal joints overlap upper sheet over flat flange of lower sheet and fasten through both sheets at lower edge of upper sheet at 36 inches (910 mm) on center.
  - .7 At inside and outside corners, install sheet as close to substrate as possible without breaking and fasten along both sides entire length of corner, not closer than 5 inches (125 mm) to corner.
  - .8 At bottom of walls, extend a single sheet from wall over footing to drainage pipe.
- .5 Drainage Sheet: in addition to general sheet installation:
  - .1 Install with protruding dimples and filter fabric on side facing away from the substrate, unless otherwise indicated.
  - .2 On lagging, pile, or earth forms, and other "blind" wall construction, install drainage sheet with filter fabric in contact with form; seal joints in dimpled sheet continuously with tape; anchorage to forms may be by adhesive if necessary.
  - .3 On low-slope split slab installations, install with filter fabric side up; seal dimpled sheets overlaps; anchor sheets sufficiently to prevent movement prior to and during installation of cover.
  - .4 At plaza deck, pavers are not to be installed directly on the drainage sheet. A buffer layer between the drainage membrane and the pavers must be installed. Install with filter fabric side up with butt joints rather than overlap joints.
  - .5 Use DELTA®-MOLD STRIP to enclose edges of drainage sheets; in fine silty clay soils, wrap exposed edges with filter fabric before installing DELTA®-MOLD STRIP.
  - .6 Cover sheet laps with filter fabric and do not leave dimpled sheet exposed.
  - .7 At bottom of walls, extend a single sheet from wall over footing to drainage pipe, if any.
- .6 Repairs to Dimpled Sheet: Apply patch made of same material interlocked, with continuous sealant bead around tear or penetration.
- .7 Repairs to Filter Fabric: Tape matching material over damaged area.

- .8 In blindside application, after installation of reinforcing bars, inspect drainage sheet and repair damaged sheet and fabric.

### **3.4 FIELD QUALITY CONTROL**

- .1 Provide the services of a manufacturer's representative to inspect substrates for suitability for installation, to review procedures during construction, and to review the finished work.
- .2 PROTECTION
- .3 Do not leave installed membrane exposed to sunlight for more than 30 days after installation; to cover, complete backfill operation or cover with protection board.
- .4 Prior to backfilling, inspect DELTA<sup>®</sup>-DRAIN for tears and other damage and repair.
- .5 Take care when backfilling to avoid damage to membrane; replace membrane damaged during backfilling.
- .6 Protect installed products until completion of project.
- .7 Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

**Part 1            General**

**1.1            SECTION INCLUDES**

- .1            Materials and installation for asphalt for use as dampproofing.

**1.2            RELATED SECTIONS**

- .1            Section 01 33 00 - Submittal Procedures.
- .2            Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .3            Section 01 51 00 - Temporary Utilities.
- .4            Section 01 61 00 - Common Product Requirements

**1.3            REFERENCES**

- .1            Canadian General Standards Board (CGSB)
  - .1            CAN/CGSB-37.2-M88, Emulsified Asphalt, Mineral-Colloid Type, Unfilled, for Dampproofing and Waterproofing and for Roof Coatings.
  - .2            CAN/CGSB 37.3-M89, Application of Emulsified Asphalts for Dampproofing or Waterproofing.
  - .3            CAN/CGSB 37.5-M89, Cutback Asphalt Plastic Cement.
  - .4            CGSB 37-GP-6Ma-83, Asphalt, Cutback, Unfilled, for Dampproofing.
  - .5            CGSB 37-GP-9Ma-83, Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
  - .6            CGSB 37-GP-11M-76(R1984)], Application of Cutback Asphalt Plastic Cement.
  - .7            CGSB 37-GP-12Ma-84, Application of Unfilled Cutback Asphalt for Dampproofing.
  - .8            CGSB 37-GP-15M-76(R1984), Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.
  - .9            CAN/CGSB 37.16-M89, Filled, Cutback, Asphalt for Dampproofing and Waterproofing.
  - .10          CGSB 37-GP-36M-76, Application of Filled Cutback Asphalts for Dampproofing and Waterproofing.
  - .11          CGSB 37-GP-37M77, Application of Hot Asphalt for Dampproofing or Waterproofing.
- .2            Health Canada
  - .1            Workplace Hazardous Materials Information System (WHMIS)
    - .1            Material Safety Data Sheets (MSDS).
- .3            National Research Council Canada (NRC)/Institute for Research in Construction (IRC)
  - .1            Canadian Construction Materials Centre (CCMC)

**1.4            PRODUCT DATA**

- .1            Submit product data in accordance with Section 01 33 00 - Submittal Procedures .

- .2 Submit WHMIS MSDS - Material Safety Data Sheets .
- .3 Submit product data sheets for bituminous dampproofing products. Including:
  - .1 Product characteristics.
  - .2 Performance criteria.
  - .3 Application methods.
  - .4 Limitations.
- .4 Manufacturer's Instructions: Provide to indicate special handling criteria, installation sequence, cleaning procedures.

### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, handle, store and protect materials in a manner to prevent damage, adulteration, deterioration, and soiling and labels intact. Do not remove from packaging or bundling until required for work.
- .2 Provide and maintain dry, off-ground weatherproof storage.
- .3 Store materials on supports to prevent deformation.
- .4 Remove only in quantities required for same day use.
- .5 Store materials in accordance with manufacturer's written instructions.

### **1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate waste materials for recycling in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .2 Remove from site and dispose of packaging materials at appropriate recycling facilities.
- .3 Divert unused bituminous dampproofing, sealing compounds and asphalt primer materials from landfill to recycling facility approved by Consultant.

### **1.7 PROJECT/SITE ENVIRONMENTAL REQUIREMENTS**

- .1 Temperature, relative humidity, moisture content.
  - .1 Apply dampproofing materials only when surfaces and ambient temperatures are within manufacturers' prescribed limits.
  - .2 Do not proceed with Work when wind chill effect would tend to set bitumen before proper curing takes place.
  - .3 Maintain air temperature and substrate temperature at dampproofing installation area above 5 degrees C for 24 hours before, during and 24 hours after installation.
  - .4 Do not apply dampproofing in wet weather.
- .2 Safety: Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of asphalt, sealing compounds, primers and caulking materials.

- .3 Ventilation:
  - .1 Ventilate area of Work as directed by Consultant by use of approved portable supply and exhaust fans.
  - .2 Ventilate enclosed spaces in accordance with Section 01 51 00 - Temporary Utilities.
  - .3 Provide continuous ventilation during and after dampproofing application. Run ventilation system 24 hours per day during installation; provide continuous ventilation for 7 days after completion of dampproofing installation.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Asphalt:
  - .1 Asphalt Primer: To CAN/CGSB-37.2 (cut 20% with potable water) for emulsified asphalt; to CAN/CGSB 37-GP-9Ma for cutback asphalt.
  - .2 Asphalt: Emulsified mineral colloid type, unfilled to CAN/CGSB-37.2 for temperatures above 5°C. For temperatures above 0°C but below 5°C, use cutback asphalt, filled, to CAN/CGSB-37.16.
- .2 Sealing compound: plastic cutback asphalt cement to CAN/CGSB-37.5.

## **Part 3 Execution**

### **3.1 WORKMANSHIP**

- .1 Keep hot asphalt:
  - .1 Below its flash point.
  - .2 At or below its final blowing temperature.
  - .3 Within its equiviscous temperature range at place of application.

### **3.2 PREPARATION**

- .1 Before applying dampproofing:
  - .1 Seal exterior joints between foundation walls and footings, joints between concrete floor slab and foundation and around penetrations through dampproofing with sealing compound.

### **3.3 APPLICATION**

- .1 Do dampproofing in accordance with [CAN/CGSB-37.3] [CGSB 37-GP-12Ma] [CGSB 37-GP-36M] [CGSB 37-GP-37M], below grade min. 300 mm to top of footing along complete foundation wall perimeter.
- .2 Do sealing work in accordance with [CGSB 37-GP-11M] except where specified otherwise.

- .3 Do priming of surface in accordance with [CGSB 37-GP-15M] except where specified otherwise.
- .4 Apply primer.
- .5 Apply dampproofing on exterior side of basement foundations against earth and elsewhere as indicated.
- .6 Apply in strict accordance with manufacturer's directions.
- .7 Before application, seal cracks, holes around pipes and other services passing through surfaces to be dampproofed, joints between concrete floor slab and foundation using sealing compound applied in accordance with manufacturer's instructions.
- .8 Terminate top of dampproofing as shown on drawings. Extend dampproofing down to footing, drape over top of and down exterior footing face.
- .9 Dampproofing shall consist of one prime coat and one full coat of bitumen.
- .10 For emulsified asphalt, apply primer at the rate of 1 - 1.5 l/m<sup>2</sup> | 2 - 3 gallons/100 sq.ft. For cutback asphalt, apply primer at the rate of 0.5 - 2 l/m<sup>2</sup> | 1 gallon/100 sq.ft.
- .11 For emulsified asphalt, apply top coat at the rate of 1 - 1.5 l/m<sup>2</sup> | 2 - 3 gallons/100 sq.ft.. For cutback asphalt apply topcoat at the rate of 1 - 1.5 l/m<sup>2</sup> | 2 - 3 gallons/100 sq.ft..
- .12 Apply coatings leaving no pinholes, breaks, or other defects. Take care that each succeeding coat is not applied until the preceding coat has set. Allow final coat to set before permitting backfilling to begin.
- .13 Apply two additional coats to vertical corners and construction joints for a minimum width of 200 mm on each side.
- .14 Apply protective board over dampproofing using dollops of bituminous dampproofing compound. Butt boards to moderate contact.
- .15 Coat the protective board with bituminous dampproofing compound to prevent curling should the board be exposed to sunlight more than 24 hours.
- .16 Apply dampproofing in accordance with applicable CGSB application standard.

Material		Application
CAN/CGSB-37.2	use	CAN/CGSB-37.3
CGSB 37-GP-6Ma	use	CGSB 37-GP-12M
CAN/CGSB-37.16	use	CGSB 37-GP-36M
CAN/CGSB-37.28	use	CAN/CGSB-37.3
CSA A123.4	use	CGSB 37-GP-37M

### 3.4 SCHEDULE

- .1 Apply continuous, uniform coating to entire exterior faces of foundation walls from 50 mm below finished grade level to and including tops of foundation wall footings.

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

**END OF SECTION**

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**Part 1            General**

**1.1            DESCRIPTION OF WORK**

- .1        The work shall consist of the following but not limited to supply and installation of rigid perimeter insulation for under slab and foundation walls as shown on the drawings.
- .2        The work shall consist of the following but not limited to supply and installation of rigid board insulation for cavity wall parapets and any other incidental conditions as shown on the drawings.

**1.2            RELATED SECTIONS**

- .1        Section 01 33 00 - Submittal Procedures.
- .2        Section 01 74 19 – Construction/ Demolition Waste Management and Disposal
- .3        Section 03 30 00 – Cast –In Place Concrete
- .4        Section 04 22 00 – Concrete Masonry
- .5        Section 07 26 00 - Vapor Retarders.
- .6        Section 07 51 12 Built-Up Bituminous Roofing

**1.3            REFERENCES**

- .1        American Society for Testing and Materials International, (ASTM).
  - .1        ASTM E96-00e1, Test Methods for Water Vapour Transmission of Materials.
  - .2        ASTM C208-95(R2001), Specification for Cellulosic Fiber Insulating Board.
  - .3        ASTM C591-01, Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation.
  - .4        ASTM C612-00a, Specification for Mineral Fibre Block and Board Thermal Insulation.
  - .5        ASTM C726-00a, Specification for Mineral Fiber Roof Insulation Board.
  - .6        ASTM C728-97e1, Specification for Perlite Thermal Insulation Board.
  - .7        ASTM C1126-00, Specification for Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation.
  - .8        ASTM C1289-02, Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
- .2        Canadian Gas Association (CGA).
  - .1        CAN/CGA-B149.1HB-00, Natural Gas and Propane Installation Code Handbook.
  - .2        CAN/CGA-B149.2-00, Propane Storage and Handling Code.
- .3        Canadian General Standards Board (CGSB).
  - .1        CGSB 71-GP-24M-77(R1983), Adhesive, Flexible, for Bonding Cellular polystyrene Insulation.

- .4 Underwriters Laboratories of Canada (ULC).
  - .1 CAN/ULC-S604-91, Type A Chimneys.
  - .2 CAN/ULC-S701-01, Thermal Insulation, Polystyrene, Boards and Pipe Coverings.
  - .3 CAN/ULC-S702-97, Thermal Insulation, Mineral Fibre, for Buildings.
  - .4 CAN/ULC-S704-01, Thermal Insulation Polyurethane and Polyisocyanurate, Boards, Faced.
- .5 Environmental Choice Program (EPC).
  - .1 CCD-016-97, Thermal Insulation.

#### **1.4 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

### **Part 2 Products**

#### **2.1 INSULATION**

- .1 Extruded polystyrene (XPS): to CAN/ULC-S701 for below grade.
  - .1 Type: Type 4 rigid, closed cell type, with integral high density skin.
  - .2 Compressive Strength: to ASTM D1621, minimum 210kPa
  - .3 Water Absorption: to ASTM D2842, 0.7% by volume maximum.
  - .4 Thermal Resistance: Long term aged RSI value of 0.87/25 mm, to ASTM C518
  - .5 Water vapour Permeance: to ASTM E96, 50 ng/Pas m<sup>2</sup>
  - .6 Size: 600 x 1220
  - .7 Thickness: 50mm
  - .8 Edges: square.
  - .9 Acceptable material: STYROFOAM™ Brand SM Extruded Polystyrene Foam Insulation by Dow Chemical Canada ULC or approved alternate.
- .2 Extruded polystyrene foam insulation to CAN/ULC-S701 for other applications.
  - .1 Type: Type 3, rigid, closed cell type, with integral high density skins.
  - .2 Compressive Strength: minimum 170 kPa.
  - .3 Water Absorption: to ASTM D2842, 0.7% by volume maximum
  - .4 Thermal Resistance: Long term aged RSI value of 0.87/25mm.
  - .5 Water Vapour Permeance: to ASTM E96, 90 ng/Pas m<sup>2</sup>
  - .5 Board Size: 600 X 2440 mm
  - .6 Thickness: 50mm.
  - .7 Edges: square
  - .7 Manufacturer and Product Name: STYROFOAM™ Brand CAVITYMATE™ Extruded Polystyrene Foam Insulation by Dow Chemical Canada ULC or approved alternate.

- .3 Mineral Fibre non-structural sheathing board to CAN/ULC S702
  - .1 Flame Spread Rating = 0, Smoke Development Index = 0 as per CAN ULC S102
  - .2 Density: 8 lbs/ft<sup>3</sup>
  - .3 Thermal Resistance: R4/inch
  - .4 Compressive Strength: 439psf @ 10% compression, 1065psf @ 25% compression
  - .5 Type: ComfortBoard 80 as manufactured by Roxul Canada Inc.

## **2.2 ADHESIVE**

- .1 Adhesive: to CGSB 71-GP-24M Type 1.

## **2.3 CLIPS AND FASTENERS**

- .1 Insulation clips: impale type, perforated 50 x 50 mm cold rolled carbon steel 0.8 mm thick, adhesive back, spindle of 2.5 mm diameter annealed steel, length to suit insulation, 25 mm diameter washers of self locking type.

## **Part 3 Execution**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

### **3.2 WORKMANSHIP**

- .1 Install insulation after building substrate materials are dry.
- .2 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .3 Fit insulation tight around electrical boxes, plumbing and heating pipes and ducts, around exterior doors and windows and other protrusions.
- .4 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN4-S604 type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 type B and L vents.
- .5 Cut and trim insulation neatly to fit spaces. Butt joints tightly, offset vertical joints. Use only insulation boards free from chipped or broken edges. Use largest possible dimensions to reduce number of joints.
- .6 Offset both vertical and horizontal joints in multiple layer applications.
- .7 Do not enclose insulation until it has been inspected and approved by Consultant.

### **3.3 EXAMINATION**

- .1 Examine substrates and immediately inform Consultant in writing of defects.
- .2 Prior to commencement of work ensure:
  - .1 Substrates are firm, straight, smooth, dry, free of snow, ice or frost, and clean of dust and debris.

### **3.3 RIGID INSULATION INSTALLATION**

- .1 Apply Type 1 adhesive to polystyrene insulation board in accordance with manufacturer's recommendations.
- .2 Imbed insulation boards into vapour barrier type adhesive, applied as specified, prior to skinning of adhesive.
- .3 In addition to adhesive, install mineral fibre insulation boards with insulation clips and disk, [2] per 600 x 1200 mm board minimum, fit boards tight, cut off fastener spindle 3 mm beyond disk.
- .4 Leave insulation board joints unbonded over line of expansion and control joints. Bond a continuous 150 mm wide 0.15 mm polyethylene strip over expansion and control joints using compatible adhesive before application of insulation.

### **3.4 PERIMETER FOUNDATION INSULATION**

- .1 Interior application: extend boards 600mm vertically below bottom of finish floor slab as indicated, installed on inside face of perimeter foundation walls.
- .2 Under slab application: extend boards 600mm in from perimeter foundation wall as indicated. Lay boards on level compacted fill.

### **3.5 CLEANING**

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

**END OF SECTION**

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**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 33 00 - Submittal Procedures.
- .2        Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .3        Section 07 26 00 - Vapour Retarders.
- .4        Section 08 44 13 – Glazed Aluminum Curtain Walls

**1.2                REFERENCES**

- .1        American Society for Testing and Materials International, (ASTM).
  - .1        ASTM C553-[02], Specification for Mineral Fibre Blanket Thermal Insulation for Commercial and Industrial Applications.
  - .2        ASTM C665-[01e1], Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.
  - .3        ASTM C1320-[99], Standard Practice for Installation of Mineral Fiber Batt and Blanket Thermal Insulation for Light Frame Construction.
- .2        Canadian Gas Association (CGA).
  - .1        CAN/CGA-B149.1HB-[00], Natural Gas and Propane Installation Code Handbook.
- .3        Canadian Standards Association (CSA International).
  - .1        CSA B111-[1974(R1998)], Wire Nails, Spikes and Staples.
- .4        Environmental Choice Program (EPC).
  - .1        CCD-016-[97], Thermal Insulation.
- .5        Underwriters Laboratories of Canada (ULC).
  - .1        CAN/ULC-S604-1991, Type A Chimneys.
  - .2        CAN/ULC-S702-1997, Standard for Mineral Fibre Thermal Insulation for Buildings.

The standard describes five types of mineral-fibre insulation. These CCMC Evaluation Listings refer only to preformed insulation, Types 1, 2 and 3. They are defined as follows:

    - .1        Type 1, which has no membrane;
    - .2        Type 2, which has a permeable membrane; and
    - .3        Type 3, which has a vapour barrier.

The Standard does not apply to insulation less than 25 mm thick, or to preformed insulation used above a roof deck.
- .6        National Building Code of Canada (NBC)
  - .1        The CAN/ULC-S702-97 standard is referenced in:
    - (a) NBC 1995 (April 2002 Revisions and Errata), Clause 5.3.1.2.(2)(j), Table 9.23.16.2.A. and Clause 9.25.2.2.(1)(g).
    - (b) NBC 2005, Division B, Table 5.10.1.1., Table 9.23.16.2.A. and Clause 9.25.2.2.(1)(d).

### **1.3 SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's Instructions:
  - .1 Submit manufacturer's installation instructions.

### **1.4 QUALITY ASSURANCE**

- .1 Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

### **1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

## **Part 2 Products**

### **2.1 INSULATION**

- .1 Blanket Mineral Fibre Blankets: to thicknesses 90mm and 150mm.
- .2 Noise Stop Blankets: to thickness 90mm and 150mm.
- .3 Fire Stop Blankets
- .4 Acceptable Manufacturers: Fiberglass Canada or Roxul.

### **2.2 ACCESSORIES**

- .1 Staples: 12 mm minimum leg.
- .2 Tape: as recommended by manufacturer.

## **Part 3 Execution**

### **3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

### **3.2 INSULATION INSTALLATION**

- .1 Install insulation to maintain continuity of thermal protection to building elements and spaces.
- .2 Fit insulation closely around electrical boxes, pipes, ducts, frames and other objects in or passing through insulation.
- .3 Do not compress insulation to fit into spaces.
- .4 Install insulation with factory applied vapour barrier facing warm side of building spaces and vapour permeable membrane facing cold side. Lap ends and side flanges of membrane over framing members. Retain in position with staples installed as recommended by manufacturer. Tape seal butt ends and lapped side flanges. Do not tear or cut vapour barrier.
- .5 Keep insulation minimum 75 mm from heat emitting devices such as recessed light fixtures, and minimum 50 mm from sidewalls of CAN/ULC-S604 Type A chimneys and CAN/CGA-B149.1 and CAN/CGA-B149.2 Type B and L vents.
- .6 Do not enclose insulation until it has been inspected and approved by Consultant.
- .7 Ensure all edges are closely abutted together.

### **3.3 CLEANING**

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

**END OF SECTION**

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**Part 1            General**

**1.1                REFERENCE**

- .1            Architectural Drawing A0-200 series – Fire Safety and OBC Matrix for required fire resistance rating.

**1.2                RELATED WORK**

- .1            Firestopping and smoke seals which relate to Mechanical Division 23 and Electrical Division 26 Systems, are covered in conjunction with this section.

**1.3                SHOP DRAWINGS & SAMPLES**

- .1            Submit shop drawings , product data and samples in accordance with Sections 01016 and 01340.
- .2            Provide details in shop drawings indicating all reinforcing, anchorage, fastenings and proposed method of installation for the various conditions within the project.
- .3            Where applicable provide manufacturer's printed product data illustrating systems to be used on this project.

**Part 2            Products**

**2.1                MATERIALS**

- .1            CAN4-S115-M85: Provide firestopping and smoke sealing systems in accordance with this standard.
  - .1            Materials (asbestos free) and systems fully capable of maintaining an effective barrier against gases, flame and smoke in compliance with this standard, not exceeding opening sizes stated and conforming to special requirements in Part 3.5.
  - .2            Service Penetration Assemblies: certified by this standard and used by ULC Guide No. 40 U19. Service components listed as certified in this guide are noted under Label Service of ULC/cUL.
- .2            Fire resistance rating of firestopping material assembly must meet or exceed the fire resistance rating of the floor or wall section being penetrated.
- .3            Firestopping and smoke seals at openings around penetrations for pipes, duct work and other mechanical items requiring sound and vibration control require an: elastomeric seal; do not use a cementitious or rigid seal at such locations.
- .4            Primers: to manufacturer's recommendation for specific material, substrate and end use.
- .5            Damming and backup materials, supports and anchoring devices: in accordance with the manufacturer's recommendations, and in strict accordance with tested assembly being installed as acceptable to authorities having jurisdiction.
- .6            Sealants: for vertical joints, shall be non-sagging type.

## **2.2 ACCEPTABLE MATERIALS & SYSTEMS**

- .1 Tremco Ltd. – Refer to plans for required fire resistance ratings and separations.
- .2 Metal Pipe, conduit
  - .1 Rigid - Fyre-Sil, Fyre-Sil S.L., TREMstop Acrylic, TREMstop IA, TREMstop WBM, Fyre-Shield
  - .2 Vibration or Moisture - Fyre-Sil, Fyre-Sil S.L., TREMstop Acrylic, TREMstop IA
- .3 Insulated Pipe - Fyre-Sil, Fyre-Sil S.L., TREMstop Acrylic, TREMstop IA, TREMstop WBM, TREMstop WS, TREMstop MCR, Fyre-Shield
- .4 Plastic Pipe - TREMstop IA, TREMstop D, Fyre-Can, TREMstop WS, Fyre-Can Sleeve, TREMstop MCR, TREMstop WBM
- .5 Cable Trays, Cables - Fyre-Sil, Fyre-Sil S.L., TREMstop FP, TREMstop M, TREMstop PS, TREMstop WBM, Fyre-Shield
- .6 Fire Rated Joints - Fyre-Sil, Fyre-Sil S.L., TREMstop Acrylic, TREMstop Acrylic Sprayable, DYmeric, DyMonic, DYmeric 511, THC 900
- .7 Exterior Perimeter Edge of Floor and Wall / Curtainwall: Roxul Safe with 3M FireDam Spray 200, 3M Fire Barrier Watertight Spray, similar to ULC FW-D-0004
- .8 Electrical device boxes in rated assemblies – HILTI Firestop Putty Pad CP 617, UL 263, CAN / ULC-S115, ASTM E84, ASTM G21
- .9 Note: Reference Drawing A0-200 series for required Fire Resistance Rating.

## **Part 3 Execution**

### **3.1 PREPARATION**

- .1 Examine sizes and conditions of voids to be filled to establish correct thicknesses and installation of material. Ensure that substrates and surfaces are properly clean and dry and meet manufacturer's instructions in all respects.
- .2 Maintain insulation around pipes and ducts penetrating fire separation (without interruption to vapour barrier).
- .3 Mask where necessary to avoid spillage and over coating onto adjoining surfaces; remove stains on adjacent surfaces.

### **3.2 INSTALLATION**

- .1 Install firestopping and smoke seal material and components in accordance with ULC/cUL certification and manufacturer's instructions.
- .2 Seal holes or voids made by through penetrations, poke-through termination devices, and unpenetrated openings or joints to ensure continuity and integrity of fire separation are maintained.

- .3 Provide temporary forming as required and remove forming only after materials have gained sufficient strength and after initial curing.
- .4 Tool or trowel exposed surfaces to a neat finish, removing excess compound promptly as work progresses and upon completion.

### **3.3 INSPECTION**

- .1 Advise [Consultant] when service penetration assemblies are in place and ready for inspection. Do not conceal or enclose firestopping materials prior to inspection by [Consultant].

### **3.4 SCHEDULE**

- .1 Firestop and Smoke Seal at:
  - .1 Penetrations through fire resistance rated masonry, concrete and gypsum board partitions and walls.
  - .2 Top of fire resistance rated masonry and gypsum board partitions.
  - .3 Intersection of fire resistance rated masonry and gypsum board partitions.
  - .4 Control and sway joints in fire resistance rated masonry and gypsum board partitions and walls.
  - .5 Openings and sleeves installed for future use through fire separations.
  - .6 Around mechanical and electrical assemblies penetrating fire separations.
  - .7 Rigid Ducts: greater than 129 cm<sup>2</sup>: firestopping to consist of bead of firestopping material between retaining angle and fire separation and between retaining angle and duct on each side of fire separation.

### **3.5 CLEAN UP**

- .1 Remove excess materials and debris and clean adjacent surfaces immediately after application.
- .2 Remove temporary dams after initial set of firestopping and smoke materials.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED PROVISIONS**

- .1            The general provisions of the contract, including the General Conditions, Supplementary Conditions and Division 1, General Requirements apply to the work specified in this section.

**1.2                RELATED WORK**

- .1            Section 04 05 10 – Masonry Procedures
- .2            Section 04 05 23 – Masonry Accessories
- .3            Section 04 22 00 – Concrete Masonry
- .4            Section 06 10 11 – Rough Carpentry
- .5            Section 07 21 19 – Foamed In Place Insulation
- .6            Section 07 92 10 – Joint Sealing
- .7            Section 08 11 14 – Metal Doors and Frames
- .8            Section 08 50 50 – Aluminum Windows
- .9            Section 08 90 00 – Louvres and Vents

**1.3                WORK INCLUDED**

- .1            This specification covers the installation of:
  - .1            **Bluskin® SA** is a self-adhering membrane consisting of an SBS rubberized compound which is integrally laminated to a blue cross laminated polyurethane film. This product is specifically designed to be self adhered to a prepared substrate to provide an air/ vapour/ water barrier. The sheet membrane is be used as a transition membrane between wall surfaces and columns, beams, lintels, floor slabs, openings at windows and door frames, and over parapets to extend the plane of air tightness and create a waterproof barrier
  - .2            **Blueskin® TWF** is a self adhered membrane consisting of an SBS rubberized asphalt compound which is integrally laminated to a yellow cross laminated polyethylene film. This product is specifically designed for use as a thru-wall flashing and dampproof course. The product is to be adhered to a prepared substrate of concrete, concrete block, wall surfaces and door and window heads as specified.
  - .3            **Dupont Flexwrap EZ** DuPont™ FlexWrap™ EZ is a flexible, self-adhered tape with a 100% butyl-based adhesive layer that creates an air and water-tight seal around penetrations of all different shapes and sizes. Used for flashing around many smaller wall protrusions like plumbing and HVAC components, vents, wires, exterior electrical outlets, exterior lights, and gas lines. DuPont™

FlexWrap™ EZ is a part of a complete DuPont™ Tyvek® Building Envelope Solution that helps to improve the energy efficiency and durability of buildings.

#### **1.4 SYSTEM DESCRIPTION**

- .1 Sub membrane primers shall be applied as specified.
- .2 Air barrier membranes shall be applied to prepared substrate as specified.
- .3 Foamed air barrier insulation shall be applied over membranes as specified.

#### **1.5 QUALITY ASSURANCE**

- .1 Applicator Qualifications:
  - .1 The applicator shall be familiar with and fully equipped to apply air barrier membranes and shall be familiar with good construction practices.
  - .2 The applicator shall be approved by Bakor and acceptable to Consultant for installation of air barrier membranes.
  - .3 A pre-job conference is recommended between Masonry Contractor, approved Air Barrier Contractor, Consultant and Manufacturer's Representative prior to installation of system to be arranged at suitable time by Contractor.

#### **1.6 DELIVERY, STORAGE, AND HANDLING**

- .1 Delivery of Materials:
  - .1 Materials shall be delivered to the jobsite in undamaged and original packaging indicating the name of the manufacturer and product.
- .2 Storage of Materials:
  - .1 Store roll materials on end in original packaging on pallets.
  - .2 Protect rolls from weather or store in an enclosed area not subject to heat over 40°C or under -10°C. Double stacked pallets are not recommended. If double stacking is necessary, use a plywood sheet to distribute the load.
  - .3 Store adhesive, solvents and primers at temperatures of 5°C (40°F) and above to facilitate handling. Keep away from open flame or excessive heat.
- .3 Handling of Materials:
  - .1 Protect rolls from direct sunlight until ready for use.
  - .2 Adhesive contains solvent and is flammable. Do not use near open flame or spark.

#### **1.7 SITE CONDITIONS**

- .1 Environmental Requirements:
  - .1 No installation work shall be performed during rainy or inclement weather and on frost covered or wet surfaces.
  - .2 Apply under dry conditions above -4°C

## 1.8 SCHEDULING

- .1 Work shall be so scheduled as to provide an air tight seal at the end of each working day on the area worked upon during the day.
- .2 Co-ordinate work of this section with all other applicable sections to ensure continuity of the air seal.

## Part 2 Products

### 2.1 MATERIALS

- .1 Refer to technical data sheets for physical properties of product.
- .2 **Membrane Flashing:** Bakor Blueskin® TWF for thru-wall flashing and dampproof course and over lintels at all door and window openings as detailed.
- .3 **Transition Membrane:** Bakor Blueskin® SA, for all transition flashing between walls and beams, columns, floors, at jamb perimeters of all doors, at jambs and sills at all windows and over all parapets as detailed.
- .4 **Membrane Adhesive:** Bakor Blueskin® LVC Adhesive is a quick drying, lower volatile compound (VOC) formulation, rubber based adhesive designed to enhance the adhesion of self-adhesive membranes such as Blueskin® SA or TWF.
- .5 **Membrane Primer:** Bakor Blueskin® Primer and Blueskin® Spray Prep is a rubber based adhesive primer for self-adhesive membranes such as Blueskin® SA.
- .6 **Membrane Primer:** Aquatac™ is a polymer emulsion based primer for self-adhesive membranes such as Blueskin® SA or TWF.
- .7 **Sealant:** HE925 – BES or Polybitume® 570-05 Sealant fully compatible with components of Bakor's Building Envelope Systems.
- .8 **Air / Vapour Barrier:** Air-Bloc 21 Air and Vapour Barrier and Insulation Adhesive is consistency, solvent type, synthetic rubber based for full bed adhesion.  
trowel

## Part 3 Execution

### 3.1 SUBSTRATE PREPARATION

- .1 Acceptable substrates are precast concrete, cast-in place concrete block, drywall and plywood.
- .2 All surfaces to receive Blueskin® SA or TWF membranes, Blueskin Primers or Adhesives, must be clean of oil, dust and excess mortar. Strike masonry joints flush. Concrete surfaces must be smooth and without large voids, spalled areas or sharp protrusions. Concrete must be cured a minimum of 14 days and must be dry before application. Where curing compounds are used, they must be clear resin based within oil, wax or pigments.

- .3 All surfaces to receive Blueskin® SA: Prime with Blueskin Primer, applied with lambs wool roller, brush or spray equipment at a rate of 1 litre per 2-6 m<sup>2</sup> depending on porosity and texture of surface and allowed to dry for 30 minutes before Blueskin® SA is applied. Ensure that all primed surfaces receive Blueskin® SA in the same day. Alternately, prime with Aquatac™. Allow to dry to a tacky film.
- .4 All surfaces to receive Blueskin® TWF: Apply Blueskin® Primer, Aquatac™ Primer or Hi-Tac Primer by brush or roller at a rate of approximately 7.2 m<sup>2</sup>/L (300 ft.<sup>2</sup>/gal.), depending on porosity and texture of surface and allowed to dry for 30 minutes before Blueskin® TWF is applied. Allow additional time for primer to set if wet to the touch or can be easily rubbed off. Ensure that all primed surfaces receive Blueskin® TWF in the same day.

### 3.2 APPLICATION

#### .1 Blueskin® SA: Transition Membrane

- .1 Refer to Blueskin® SA Guide Specification for detailed application information. Material should be conditioned at room temperature for ease of application.
- .2 Transition membrane must be lapped a minimum of 50 mm on both sides and end laps. Position membrane for alignment, remove protective film and press firmly in place. When membrane is entirely in place, roll membrane including seams with a counter top roller to ensure full contact. When using membrane with brick ties, position membrane, press in place and cut for ties or projections. Seal around any openings and at leading edge at the end of the days work Air-Bloc Polybitume® 570-05 or HE925 BES Sealant. Transition membranes applied to the underside of substrate requires mechanical fastening. Mechanical fastening must take place immediately after installation of membrane.
- .3 Detail work must be carefully carried out to ensure continuous air tightness of the membrane. It is recommended that mechanical attachment be made to window and door frames, or properly designed sealant joint be

all  
provided.

#### .2 Blueskin® TWF: Thru-Wall Flashing Membrane

- .1 Refer to Blueskin® TWF Guide Specification for detailed application information. Material should be conditioned at room temperature for ease of application.
- .2 Cut flashing membrane to the desired length and remove siliconized release paper. Position into place and apply positive pressure using a roller. Keep back 12 mm (0.5") to 25 mm (1.0") from outside face of wall or veneer. At all laps, seams penetrations, and along top edges of flashing membrane, apply a continuous bead of rubberized mastic such as Air-Bloc or Polybitume® 570-05. Form end dams as required and use rubberized mastic at laps.
- .3 Top or leading edge of membrane flashing must be sealed with a rubberized mastic such as Air-Bloc, Polybitume® 570-05 or HE925 BES Sealant to prevent rain water from migrating behind the membrane.
- .4 All laps, must be lapped a minimum of 50 mm (2") on both sides and end laps.

- .5 Masonry veneer walls without insulation: The flashing membrane should extend through the back-up block and be turned up on the inside surface.
- .6 Masonry veneer walls with insulation: The flashing membrane should extend a minimum of 200 mm (8") up the back-up wall and return into mortar joint a minimum of 25 mm (1").
- .7 The flashing membrane should be adhered to the back-up wall and to shelf angles with Air-Bloc 21 or as described in general application procedures.
- .8 Parapet Plate Flashing: Extend flashing membrane under parapet plate and return down to membrane roof. Carry down face cavity wall approximately 600 mm (24"). Extend through the width of the wall, when used as a damp proof course flashing.
- .6 On existing masonry walls extend a minimum of 400 mm (16") up the back-up wall and as indicated.

### **3.3 PROTECTION OF FINISHED WORK**

- .1 Blueskin® TWF or Bluskin® SA are not designed for permanent exposure. The membrane can be left exposed for six weeks, however, good construction practice calls for application of insulation as soon as possible to protect the air barrier from damage by other trades.

### **3.4 APPROVED ALTERNATES**

- .1 Alternates are subject to Section 00 21 13 for Instructions to Tenderers.
- .2 Accepted Alternate: **Air Shield™** and **“Thru Wall Flashing”** as manufactured by **W.R. Meadows of Canada™**

### **3.5 WARRANTY**

- .1 Warranty for product and installation are as specified in Division B for Supplementary Articles and General Conditions.

**END OF SECTION**



## **Section 074100: Architectural, Commercial & Industrial Applications**

### **Part 1 – General**

#### **1.01 General Requirements**

1. Supply **Kingspan KS Series** factory-assembled insulated wall and roof panel system as specified and as shown on drawings.

#### **1.02 Quality Assurance**

1. The **Kingspan KS Series** panels of Kingspan Insulated Panels Ltd., 8500 Keele St., Concord, Ontario, L4K 2A6 establish a standard of quality required for this project. Base materials will be those of Kingspan.
2. Alternate products pre-approved by the architect and meeting the specifications shall be considered. Approval will be issued via addendum. No verbal approval will be given.
3. Only polyurethane panels produced by the continuous in-line method for optimum uniformity and quality will be considered. Laminated or styrene core panels will not be accepted.
4. Work under this section shall be carried out by a contractor qualified by the panel manufacturer and having a minimum 5 years experience on projects of similar size and scope.

#### **1.03 Work Includes**

1. All steel faced, factory foamed polyurethane insulated panels for walls and roofs as detailed on drawings.
2. Accessories as necessary to install the panels as specified.
3. Sealants as required between metal panel components and between panels and adjoining construction except panel abutments to windows, doors and specialty items.
4. All metal flashing and trim required for installation of pre-formed composite panels where noted on drawings.

#### **1.04 Related Work by Others**

1. Supply and installation of roof capping, trim or flashing at parapet and wall-roof junctions.
2. Wood blocking.
3. Windows.
4. Doors.
5. In structural steel frame construction, supply and installation of supplementary structural steel support members for the composite panel system. These supplementary support members shall be supplied with slotted bolted connections allowing adjustment  $\pm 3/8$ " and erected to the tolerance

of CSA Standard S16.1. Structure shall be designed to accommodate AISC and ACI tolerances for dead and live load movement.

#### **1.05 Submittals**

##### **1. Shop Drawings**

- a) Furnish drawings showing panel layout, finishes, corners, custom geometry's, locations of openings etc. Provide detailed drawings of joints, anchorage system, sealants, edge conditions, closures and other details as may be required for a weather tight installation. Distinguish between factory and field assembled work. No panels shall be fabricated until shop drawings have been approved by the architect.

##### **2. Panel Sample**

- a) Submit full width panel sections of 8" long showing joints, insulation, profiles and finishes for architect's approval.

#### **1.06 Panel Performance Tests**

The following performance tests are considered the minimum acceptable requirements:

##### **1. Structural Test**

- a) **ASTM E72** - The design load / deflection criteria and fastening pattern shall be verified from witnessed / audited tests using the "Chamber Method" in accordance with ASTM E72. The deflection criteria shall be L/180 for walls and L/240 for roof assemblies.

##### **2. Air Infiltration and Water Penetration**

###### **a) Rainscreen principle conforming joint**

The rainscreen principle with pressure equalization chamber is present in all aspects of Kingspan insulated wall panel joint design to control rainwater penetration. The pressure equalization chamber is shielded from outside by an overlap between two impermeable panel facings thus minimizing rainwater passage into the joint driven by gravity and air pressure difference. Intercepted rainwater is drained effectively back to the exterior.

- b) **ASTM E283** - The air leakage shall not exceed 0.001cfm/sq. ft. of wall area at a pressure differential of 20psf when tested in accordance with ASTM E283.
- c) **ASTM E331** - There shall be no uncontrolled water penetration through the panel joints at a pressure differential of 20psf when tested in accordance with ASTM E331.
- d) **AAMA 501-94** - Methods of Test for Exterior Walls.

##### **3. Thermal Resistance Tests**

- a) **ASTM C518** Panels shall provide nominal thermal resistance of R=7.2 / inch thickness when tested in accordance with this standard.

**4. Fatigue Test**

- a) Positive wind pressure and negative wind pressure (suction) are continually bending interior and exterior composite panels. The panel shall withstand at least 2 million alternate cycles of L/180 deflection without any evidence of delamination, foam core cracking or permanent deformation.

**5. Freeze / Heat Cycling Test**

- a) Panels shall exhibit no delamination, surface blisters, permanent bowing or deformation when subjected to cyclic temperature extremes of -20°F (-29°C) to +180°F (+82°C) temperatures for twenty one (21), eight-hour cycles.

**6. Adhesion Test**

- a) **ASTM D1623** - Panels are tested adhesion in accordance with this standard.

**7. Humidity Test**

- a) Panels shall exhibit no delamination or metal interface corrosion when subjected to +140°F (+60°C) temperature and 100% relative humidity for a total of 1200 hours (50 days).

**8. Autoclave Test**

- a) Panels shall exhibit no delamination or shrinkage/melting of the foam core from the metal skins after being subjected in an autoclave to a pressure of 2psig (13.8kPa) at a temperature of +218°F (+103°C) for a period of 2 1/2 hours.

**9. Acoustics Test**

- a) **ASTM E90** Panels meet sound transmission STC-25 when tested in accordance with this standard.

**10. Toxicity Test**

- a) Panels shall meet the minimum standards of acceptance as required for fire gas toxicity established in article 15, part 1120 of the New York State Uniform Fire Prevention Code.

**1.07 Panel Fire Tests**

- 1. Kingspan panels meet specific building envelope performance criteria and requirements stipulated by US and Canadian building codes. Panels were tested in conformance to UL, ULC, FM, and ASTM approval standards, testing methods and procedures. Kingspan panels are listed and labeled by:
  - a) Factory Mutual (FM)
  - b) Warnock Hersey (WH)

**2. Fire Endurance Tests**

<b>CAN/ULC-S101</b>	Stay in Place Fire Test 10 minutes Panels remain in place for 10 minutes and no joint fastener required holding panel together
<b>CAN/ULC-S101</b>	Stay in Place Fire Test 15 minutes Panels remain in place for 15 minutes with stitching screws
<b>CAN/ULC-S126</b>	Fire Spread under Roof Deck Assemblies Test
<b>CAN/ULC-S127</b>	Standard Corner Wall Method of Test for Flammability Characteristics of Non-Melting Building Materials
<b>CAN/ULC-S134</b>	Standard Method of Fire Test for Exterior Wall Assemblies
Uniform Building Code (UBC) <b>UBC 26-3</b> [UL 1715]	Enclosed Room Fire Test
Uniform Building Code (UBC) <b>UBC 26-4</b>	Full Scale Multi-Story Fire Test
<b>ULC/ORD 376</b>	Fire Growth Full Scale Room

**3. Flame Spread Tests**

<b>CAN/ULC-S102</b>	Standard Method of Test for Surface Burning Characteristics of Building Materials and Assemblies Flame spread index less than 20. Smoke developed classification less than 350
<b>ASTM E84</b>	Standard Method of Test for Surface Burning Characteristics of Building Materials Flame spread index less than 20. Smoke developed classification less than 350

**4. Factory Mutual Approvals (FM)**

<b>FM Standard 4880</b> Approval for Class 1 fire classification [UL 1040]	Meet the FM Standard 4880 Approval requirements for Class 1 fire classification to a maximum height of 30 feet without sprinkler protection
<b>FM Standard 4880 (50')</b> Approval for Class 1 fire classification [UL 1040]	Meet the FM Standard 4880 Approval requirements for Class 1 fire classification to unlimited height
<b>FM Standard 4881</b> Approval for Class 1 Exterior Wall Systems	High Velocity Hurricane Zone with Large Missile Impact
<b>FM Standard 4471</b> Approval for Class 1 Panel Roofs	Panel roof meets the criteria for fire, wind, foot traffic, hail damage resistance, and water leakage resistance

**1.08 Warranty**

1. Panel manufacturer shall offer **one (1) year** limited warranty, commencing from date of shipment providing panels manufactured to be free from defects in materials and workmanship under normal use and service, excluding panel skin coating (paint finish) which is covered under a separate warranty.



## Specifications: USA/Canada Architectural, Commercial & Industrial Applications

### Part 2 – Products

#### 2.01 Panel Design

1. Factory fabricated panel shall be \_\_\_\_\_” thick as detailed on design drawings. Panels shall consist of roll formed steel face and liner sheets chemically fused to a foamed in place rigid polyurethane expanded foam core. Panels shall be single piece construction full height or may be stacked in multiple courses for most temperature applications (vertical and horizontal).
2. The steel facing sheets at the longitudinal edges of the panel shall have roll formed male and female interlocking geometry fully supported by the foamed in place insulation core. The insulation core shall be molded in a tongue and groove profiles shape to allow positive insulation to insulation contact in panels.
3. Select panel type required:
  - a) **Kingspan KS42 SHADOWLINE vertical panel** style with hidden joint fastener, designed for exterior wall, interior wall and ceiling applications.
    - Standard panel modular coverage 42” wide
    - Panel thickness available in 2”, 2 1/2”, 3”, 4”, 5” & 6”
    - **SHADOWLINE** profile 26Ga. Exterior - Stucco Embossed
    - **SHADOWLINE** profile 26Ga. Interior - Stucco Embossed

**KS42 SHADOWLINE** panels shall use fasteners and clips applied from the exterior and concealed in the panel side joint connecting both metal faces to the supporting steel structure. Fasteners used shall be #14 x \_\_\_\_\_ inch long Hex-head type “B” self-tapping with steel & neoprene washer and 12Ga. stainless steel clip supplied by panel manufacturer.

Sealant shall be applied on the warm side of the female end at panel joint. Factory applied sealant may be optional.

- b) **Kingspan KS42 CF FLUTED vertical panel** style with hidden joint feature and fastener, designed for exterior wall applications.
    - Standard panel modular coverage 42” wide
    - Panel thickness available in 2”, 3”, 4”, 5” & 6”
    - **FLUTED** profile 26Ga. Exterior - Stucco Embossed
    - **SHADOWLINE** profile 26Ga. Interior - Stucco Embossed

**KS42 CF FLUTED** panels shall use fasteners and clips applied from the exterior and concealed in the panel side joint connecting both metal faces to the supporting steel structure. Fasteners used shall be #14 x \_\_\_\_\_ inches long Wafer-head type “AB” Torx-drive “B” self-tapping with steel & neoprene washer and 12Ga. stainless steel clip supplied by panel manufacturer.

Sealant shall be applied on the warm side of the female end at panel joint. Factory applied sealant may be optional.

- c) **Kingspan KS45 SHADOWLINE vertical panel** style with low profile and double overlap tongue and groove side joint, designed for interior wall and ceiling applications.
    - Standard panel modular coverage 45 3/8” wide

- Panel thickness available in 2 3/4", 4" & 5"
- **SHADOWLINE** profile 26Ga. Exterior - Stucco Embossed (Non-embossed optional)
- **SHADOWLINE** profile 26Ga. Interior - Stucco Embossed (Non-embossed optional)

**KS45 SHADOWLINE** panels shall use through fasteners applied from the exterior connecting panel to the supporting steel structure. Fasteners used shall be #14 x \_\_\_\_\_ inches long Hex-head type "B" self-tapping with steel & neoprene washer supplied by panel manufacturer.

Sealant shall be applied on the warm side of the female end at panel joint. Factory applied sealant may be optional.

- d) **Kingspan KS42 CF SHADOWLINE vertical panel** style with hidden joint fastener, designed for exterior wall and interior wall applications.

- Standard panel modular coverage 42" wide
- Panel thickness available in 2", 3", 4", 5" & 6"
- **SHADOWLINE** profile 26Ga. Exterior - Stucco Embossed
- **SHADOWLINE** profile 26Ga. Interior - Stucco Embossed

**KS42 CF SHADOWLINE** panels shall use fasteners and clips applied from the exterior and concealed in the panel side joint, connecting both metal faces to the supporting steel structure. Fasteners used shall be #14 x \_\_\_\_\_ inches long Wafer-head type "AB" Torx-drive "B" self-tapping with steel & neoprene washer and 12Ga. stainless steel clip supplied by panel manufacturer.

Sealant shall be applied on the warm side of the female end at panel joint. Factory applied sealant may be optional.

- e) **Kingspan KS39 RW HIGH RIB wall & roof panel** style with high rib profile and standing nested lap seam at the joint with anti-siphon groove, designed for roof & wall applications.

- Standard panel modular coverage 38 7/8" wide
- Panel thickness available in 1 9/16", 2 3/4" & 4"
- **HIGH RIB** profile 26Ga. Exterior - Stucco Embossed (Non-embossed optional)
- **SHADOWLINE** profile 26Ga. Interior - Stucco Embossed (Non-embossed optional)

**KS39 RW HIGH RIB** panels shall use #14 x \_\_\_\_\_ inches long Hex-head type "B" self-tapping with steel & neoprene washer and saddle clips supplied by panel manufacturer. Fasteners and saddle clips shall be applied from the exterior at the panel joint connecting both metal faces to the supporting steel structure.

Sealant shall be applied on the warm side of the female end at panel joint. Factory applied sealant may be optional.

- f) **Kingspan KS42 MICRO-RIB panel** style with hidden joint fastener, designed for exterior wall applications.

- Standard panel modular coverage 42" wide, 36", 30" & 24" optional
- Panel thickness available in 2", 2 1/2", 3", 4", 5" & 6"
- **MICRO-RIB** profile 24Ga. Exterior - Stucco Embossed
- **SHADOWLINE** profile 26Ga. Interior - Stucco Embossed



## Insulated Panels

## Specifications: USA/Canada Architectural, Commercial & Industrial Applications

- Optional trim-less end at vertical joints, custom fabricated corners and aluminum extrusion profiles to fit panels are available
- 1/8" reveal vertical application
- 3/8" reveal horizontal application

**KS42 MICRO-RIB** panels shall use fasteners and clips applied from the exterior and concealed in the panel side joint, connecting both metal faces to the supporting steel structure. Fasteners used shall be #14 x \_\_\_\_ inches long Hex-head type "B" self-tapping with steel & neoprene washer and 12Ga. stainless steel clip supplied by panel manufacturer.

Sealant shall be applied on the warm side of the female end at panel joint. Factory applied sealant may be optional.

- g) **Kingspan KS36 FLAT EMBOSSED** panel style with hidden joint fastener, designed for exterior wall applications.

- Standard panel modular coverage 36" wide, 30" & 24" optional
- Panel thickness available in 2", 2 1/2", 3" & 4"
- **FLAT EMBOSSED** profile 22Ga. Exterior - Stucco Embossed
- **SHADOWLINE** profile 26Ga. Interior (22Ga. optional on Interior)
- Optional trim-less end at vertical joints, custom fabricated corners and aluminum extrusion profiles to fit panels are available
- 1/8" reveal vertical application
- 3/8" reveal horizontal application

**KS36 FLAT EMBOSSED** panels shall use fasteners and clips applied from the exterior and concealed in the panel side joint, connecting both metal faces to the supporting steel structure. Fasteners used shall be #14 x \_\_\_\_ inches long Hex-head type "B" self-tapping with steel & neoprene washer and 12Ga. stainless steel clip supplied by panel manufacturer.

Sealant shall be applied on the warm side of the female end at panel joint. Factory applied sealant may be optional.

- h) **Kingspan KS36 OPTIMO** panel style with hidden joint fastener, designed for exterior wall applications.

- Standard panel modular coverage 36" wide, 30" & 24" optional
- Panel thickness available in 2", 2 1/2", 3" & 4"
- **OPTIMO** profile 22Ga. Exterior – Flat Smooth
- **SHADOWLINE** profile 26Ga. Interior (22Ga. optional on Interior)
- Optional trim-less end at vertical joints, custom fabricated corners and aluminum extrusion profiles to fit panels are available
- 1/8" reveal vertical application
- 3/8" reveal horizontal application

**KS36 OPTIMO** panels shall use fasteners and clips applied from the exterior and concealed in the panel side joint, connecting both metal faces to the supporting steel structure. Fasteners used shall be #14 x \_\_\_\_ inches long Hex-head type "B" self-tapping with steel & neoprene washer and 12Ga. stainless steel clip supplied by panel manufacturer.

Sealant shall be applied on the warm side of the female end at panel joint. Factory applied sealant may be optional.



## Specifications: USA/Canada Architectural, Commercial & Industrial Applications

- i) **Kingspan KS36 STUCCOTHERM panel** style with hidden joint fastener, designed for exterior wall applications.
- Standard panel modular coverage 36" wide, 30" & 24" optional
  - Panel thickness available in 2", 2 1/2", 3" & 4"
  - **STUCCOTHERM** profile 22Ga. Exterior – Acrylic Stucco Finish
  - **SHADOWLINE** profile 26Ga. Interior (22Ga. optional on Interior)
  - Optional trim-less end at vertical joints, custom fabricated corners and aluminum extrusion profiles to fit panels are available
  - 1/8" reveal vertical application
  - 3/8" reveal horizontal application

**KS36 STUCCOTHERM** panels shall use fasteners and clips applied from the exterior and concealed in the panel side joint, connecting both metal faces to the supporting steel structure. Fasteners used shall be #14 x \_\_\_\_\_ inches long Hex-head type "B" self-tapping with steel & neoprene washer and 12Ga. stainless steel clip supplied by panel manufacturer.

Sealant shall be applied on the warm side of the female end at panel joint. Factory applied sealant may be optional.

### 2.02 Materials

1. Facing and liner sheets shall be steel with Stucco Embossed pattern. Steel shall be:
  - Tension leveled and conforming to ASTM A653 grade 33 (A) structural quality hot dipped galvanized coating to ASTM A924 Standard Specification for Steel Sheet, Zinc-Coating Galvanized with G-90 designation, or
  - Tension leveled conforming to ASTM A792/A792M-06a Standard Specification for Steel Sheet, 55 % Aluminum-Zinc Alloy-Coated by the Hot-Dip Process AZ50 / AZM150 GALVALUME® (55% aluminum, 45% zinc), or
  - Stainless steel Grade Type 304 conforming to ASTM A480 Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip with finish #4 or 2B.

#### Exterior and interior profiles

- i. "**SHADOWLINE**" profile shall have a low profile repeating on 3" centers and running the longitudinal direction of the panel. Low profiles shall be not more than 1/16" deep x 3/4" wide. The panel faces shall be Stucco Embossed. Panel faces can be optionally non-embossed.
- ii. "**FLUTED**" profile shall have four (4) deep flutes and four (4) low profile repeating on 10 1/2" centers and running the longitudinal direction of the panel. Flutes shall be not more than 9/32" deep x 2 1/2" wide with alternating low profiles not more than 1/16" deep x 3/4" wide. The panel faces shall be Stucco Embossed.
- iii. "**MICRO-RIB**" profile shall have a roll-formed design of 1/16" deep accordion flute striated profile repeating on 3/4" centers across the panel width and running the longitudinal direction of the panel. The panel faces shall be Stucco Embossed.

- iv. **“HIGH RIB”** profile shall have five (5) 1 ½” high standing ribs approximately 10” on center running the longitudinal direction of the panel. The panel faces shall be Stucco Embossed. Panel faces can be optionally non-embossed.
  - v. **“FLAT EMBOSSED”** profile shall have no ribs or striations. The panel faces shall be Stucco Embossed.
  - vi. **“OPTIMO”** profile shall have no ribs or striations. The panel faces shall be Smooth.
  - vii. **“STUCCOTHERM”** profile shall have no ribs. The panel face shall be sprayed with Acrylic Stucco Finish.
2. Fasteners: Refer to individual panel specifications above. Supplementary fastening, when required, shall be made with Tek fasteners into the interior panel face with reinforcing bars or with Fab-Lok fasteners spaced to meet code requirements and anticipated loads.
  3. Sealant used in warm side of panel joints shall be non-curing synthetic butyl sealant.
  4. Core material used in the panel shall be foamed in place multi-component polyurethane or isocyanurate polymeric resin insulation having the following typical physical properties.
  5. Foam Core Property Table:

	<b>Property</b>	<b>Results</b>	<b>Test Method</b>
a.	Closed cell	95%	ASTM D2856
b.	Density	2.2 – 2.8pcf (35.3 – 44.9kg/m <sup>3</sup> )	ASTM D1622
c.	Compressive Stress (Parallel to Rise)	42psi (289.5kPa)	ASTM D1621
	Compressive Stress (Perpendicular to Rise)	24psi (165.4kPa)	
d.	Shear Stress	17.5psi (120.6kPa)	ASTM C273
e.	Tensile Stress	40psi (275.7kPa)	ASTM D1623
f.	Oven Aging at 200°F (93°C) for 1 day	+1% vol. change	ASTM D2126
	Oven Aging at 200°F (93°C) for 7 days	+3% vol. change	
g.	Low Temperature Aging at -20°F (-29°C) for 1 day	0% vol. change	ASTM D2126
	Low Temperature Aging at -20°F (-29°C) for 7 days	0% vol. change	

### 2.03 Finishes

1. The exterior and interior faces of **Kingspan KS Series** foam panels and flashings shall receive factory applied coatings.
2. The exterior/interior facing to be one of the following:
  - a) **Silicone Modified Polyester** (standard for interior facing, optional for exterior facing)
    - A 1.0mil total coating made up of 0.2mil primer and 0.8mil top coat USDA, H of A approved for food contact areas.
  - b) **Epoxy Primer**



## Specifications: USA/Canada Architectural, Commercial & Industrial Applications

- A 0.2mil primer only finish for concealed areas or ready to receive site applied top coat
- c) **Plastisol**
  - A 4.0mil total coating made up of 0.2mil primer and 3.8mil top coat of vinyl Plastisol, USDA and H of A approved for food contact areas
- d) **Fluoropolymer**
  - A 1.0mil total coating made up of 0.2mil primer and 0.8mil 70% Kynar 500 color top coat. USDA approved in "Regal White" color
- e) **Duranar Plus**
  - A premium 1.6mil total coating made up of 0.8mil primer and 0.8mil 70% Kynar 500 or Hylar 5000 color top coat

### 2.04 Colors

- The exterior and interior faces of **Kingspan KS Series** foam panels and flashings shall receive factory applied colors:
  - a) Standard colors
  - b) Custom colors
  - c) Premium colors

## Part 3 – Execution

### 3.01 Inspection

1. Examine alignment of structural steel to ensure conformance to the tolerance requirements of CSA Standard S16.1 and/or AISC Code section 7.13 prior to panel installation and do not proceed until all observed defects are corrected by the contractor.

### 3.02 Installation

1. Install composite panels, clips, fasteners, joint fillers, trims, flashings and related sealants in accordance with approved shop drawings. Comply with panel manufacturers' general instructions and recommendations for installation and as applicable for project conditions to ensure low temperature and/or weatherproof performance of composite panel system.
2. Consult panel manufacturer for location, type, and frequency of fasteners.
3. Adjacent panels shall be mechanically interlocked at their vertical edges with the roll-formed tongue and groove profile.
4. Flashing and trim shall be installed true and in proper alignment. Sealant, foam and membrane shall be installed where indicated without skips and voids to ensure weather tightness and integrity of the vapor barrier.



## **Specifications: USA/Canada Architectural, Commercial & Industrial Applications**

### **3.03 Handling and Storage**

1. The panels shall be handled and stored in accordance with good construction practice to prevent permanent distortion and mechanical damage.

### **3.04 Damaged Materials**

1. Repair or replace damaged materials to the satisfaction of the Architect and/or owner. The cost of repairing or replacing damaged material will be charged to the responsible party.

### **3.05 Cleaning and Care**

1. After completing panel installation, strip interior protective film if so instructed by Architect and/or owner. Panel surface shall be free of deleterious material including dirt.
2. Wipe finished surfaces of filings caused by drilling or cutting to prevent any discoloration or rust stains resulting from the installation process.

**All specifications and designs are subject to change without notice. Contact Kingspan Insulated Panels Ltd. for the current set of specifications**

**End of Specifications**

## 1. GENERAL

### 1.1. SECTION INCLUDE

- 1.1.1. This section includes a description of the materials and installation procedures to perform the complete roof assembly installation of a new built-up roof system including but not limited to the vapour barrier, insulation, wood blocking, roofing membrane, associated membrane flashings and sheet metal the full extent of Drawings and Specifications.

### 1.2. RELATED SECTIONS

- 1.2.1. Section 00 21 13 - Instructions to Bidders  
1.2.2. Section 01 33 00 - Submittal Procedures.  
1.2.3. Section 01 45 00 - Quality Control  
1.2.4. Section 01 74 19 - Construction/Demolition Waste Management and Disposal.  
1.2.5. Section 01 78 00 - Closeout Submittals.  
1.2.6. Section 05 31 00 - Steel Decking:  
1.2.7. Section 06 10 11 - Rough Carpentry.  
1.2.8. Section 07 22 00 - Roof & Deck Insulation  
1.2.9. Section 07 62 00 - Sheet Metal Flashing and Trim.  
1.2.10. Section 07 92 10 - Joint Sealing.  
1.2.11. Section 22 42 01 - Plumbing Specialties and Accessories: drains, sumps, hoppers.

### 1.3. REFERENCES

- 1.3.1. American Society for Testing and Materials International, (ASTM).
- ASTM C36/C36M-[01], Standard Specification for Gypsum Wallboard.
  - ASTM C726-[00a], Standard Specification for Mineral Fiber Roof Insulation Board.
  - ASTM C 1177/C1177M-[01], Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
  - ASTM D41-[94(2002)e1], Standard Specification for Asphalt Primer Used in Roofing, Dampproofing, and Waterproofing.
  - ASTM D312-[00], Asphalt Used in Roofing.
  - ASTM D448-[03], Standard Classification for Sizes of Aggregate for Road and Bridge Construction.
  - ASTM D2178-[97a], Asphalt Glass Felt Used in Roofing and Waterproofing.
  - ASTM D6162-[00a], Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using a Combination of Polyester and Glass Fibre Reinforcements.
  - ASTM D6163-[00e1], Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fibre Reinforcements.
  - ASTM D6164-[00], Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
- 1.3.2. Canadian General Standards Board (CGSB).
- CAN/CGSB-37.5-[M89], Cutback Asphalt Plastic Cement.
  - CGSB 37-GP-9Ma-[83], Primer, Asphalt, Unfilled, for Asphalt Roofing, Dampproofing and Waterproofing.
  - CGSB 37-GP-15M-[84], Application of Asphalt Primer for Asphalt Roofing, Dampproofing and Waterproofing.

- CGSB 37-GP-19M-[85], Cement, Plastic, Cutback Tar.
  - CAN/CGSB-37.29-[M89], Rubber-Asphalt Sealing Compound.
  - CGSB 37-GP-56M-[80b(A1985)], Membrane, Modified, Bituminous, Prefabricated, and Reinforced for Roofing.
  - CAN/CGSB-51.33-[M89], Vapour Barrier Sheet, Excluding Polyethylene, for Use in Building Construction.
- 1.3.3. Canadian Roofing Contractors Association (CRCA).
- CRCA Roofing Specifications Manual-[1997].
- 1.3.4. Canadian Standards Association (CSA International).
- CAN/CSA-A123.3-[98], Asphalt Saturated Organic Roofing Felt.
  - CAN/CSA-A123.4-[98], Asphalt for Use in Construction of Built-Up Roof Coverings and Waterproofing Systems.
  - CSA A231.1-[99], Precast Concrete Paving Slabs.
  - CSA O121-[M1978(R1998)], Douglas Fir Plywood.
  - CSA O151-[M1978(R1998)], Canadian Softwood Plywood.
- 1.3.5. Department of Justice Canada (Jus).
- Canadian Environmental Protection Act, 1999 (CEPA).
- 1.3.6. Factory Mutual (FM Global).
- FM Approvals - Roofing Products.
- 1.3.7. Health Canada / Workplace Hazardous Materials Information System (WHMIS).
- Material Safety Data Sheets (MSDS).
- 1.3.8. Transport Canada (TC).
- Transportation of Dangerous Goods Act, 1992 (TDGA).
- 1.3.9. Underwriters Laboratories' of Canada (ULC).
- CAN/ULC-S704-[2001], Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.
  - CAN/ULC-S706-[02], Standard for Wood Fibre Thermal Insulation for Buildings

#### **1.4. SUBMITTALS**

- 1.4.1. Submittals shall be in accordance with Section 01 33 00 - Submittal Procedures.
- 1.4.2. Submit two copies of most recent technical roofing components data sheets describing materials' physical properties.
- 1.4.3. Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- 1.4.4. Indicate flashing, control joints, tapered insulation details.
- 1.4.5. Provide layout for tapered insulation.
- 1.4.6. Manufacturer's field report: in accordance with Section 01 45 00 - Quality Control.

#### **1.5. QUALITY ASSURANCE**

- 1.5.1. Submit laboratory test reports in accordance with Section 01 45 00 - Quality Control.
- 1.5.2. Convene pre-installation meeting one week prior to beginning waterproofing Work, with roofing contractor's representative and Consultant.
- 1.5.3. Verify project requirements.
- 1.5.4. Confirm all submittals are made.
- 1.5.5. Review installation and substrate conditions.
- 1.5.6. Co-ordination with other building sub trades.

- 1.5.7. Review manufacturer's installation instructions and warranty requirements.

#### **1.6. ROOFING REQUIREMENTS**

- 1.6.1. All work shall meet the requirements of the Ontario Building Code (latest edition), and the Canadian Roofing Contractors Association (C.R.C.A.), including all amendments up to the project dates.
- 1.6.2. Submit samples, data and test reports of materials as requested by the Owners Representative.
- 1.6.3. Provide a competent foreman to supervise all work and act as the Contractor's representatives unless designated otherwise.
- 1.6.4. Use only skilled trades people, experienced in type and class of work. Work shall be carried out in accordance with best standard practice of the industry.
- 1.6.5. In the event that the drawings and specifications differ from the manufacturer's printed instruction, to such a degree that the specified warranties may be affected, consult the Consultant for written instructions for approval prior to proceeding with the work.

#### **1.7. PREPARATION**

- 1.7.1. The Contractor is solely responsible for the disconnection, relocation and re-installation of all existing mechanical and electrical services as required. The contractor is responsible to verify the working condition of all the mechanical equipment they are required handle prior to any service disconnections. Once the equipment is reinstated the contractor will be responsible to ensure all services to the equipment are reconnected and the equipment is in the same working condition as originally found.
- 1.7.2. Ensure the Owner is aware of any such work that may affect the interior environment of the building prior to work commencement and disconnection or shut down of electrical and/or mechanical services.
- 1.7.3. Disconnection and reconnection of all electrical services to meet latest regulations of Canadian Electrical Code and applicable Municipal and Provincial Codes and Regulations. In each and every instance of application, Code, Regulation, Statute, By-law or Specification, the most stringent requirements shall apply.
- 1.7.4. Provide Owner with a schedule indicating time and dates for any work creating a disruption to the interior environment and obtain the Owner's written approval.

#### **1.8. PROTECTION**

- 1.8.1. Fire Extinguishers: maintain one cartridge operated type or stored pressure rechargeable extinguisher with hose and shut-off nozzle, on roof per torch applicator, within 6 m of torch applicator.
- 1.8.2. Maintain fire watch for 1 1/2 hour after each day's roofing operations cease.

#### **1.9. FIRE PREVENTATIVE MEASURES**

- 1.9.1. A minimum of one 4A40BC fire extinguisher with current charge tags intact is required for each torch on the site. The extinguisher at all times shall be within 6 m of the worker using the torch. The worker shall be able to demonstrate verbal competence in the use of the extinguisher upon request of the Consultant. Be advised the project may be delayed or shut down for non-compliance.
- 1.9.2. Do not store any roofing or equipment within 100 feet of the building when the roofing crew is not on site.
- 1.9.3. No materials are to be left on the ground overnight.
- 1.9.4. All propane tanks must be removed from the site each night.

- 1.9.5. All ladders accessing the site must be removed and secured each night. All ladder type hoists must be secured or removed to prevent others from accessing the roof site.

**1.10. WASTE MANAGEMENT AND DISPOSAL**

- 1.10.1. Separate waste materials for recycling in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.
- 1.10.2. Dispose of unused asphalt material at official hazardous material collections site approved by Consultant.
- 1.10.3. Divert unused gypsum materials from landfill to recycling facility as reviewed by Consultant.
- 1.10.4. Fold up metal banding, flatten and place in designated area for recycling.

**1.11. ROOF ASSEMBLY**

- 1.11.1. Supply all labour and materials necessary to complete the new Modified Bitumen Membrane Roof as specified and detailed in the areas as indicated on the Drawings. Typical Roof Assembly shall be:
- Steel Deck
  - 16mm (5/8") DensDeck Gypsum Roof Board (*delete if building is sprinklered*)
  - Vapour Barrier in fire retardant adhesive
  - 2 layers of Insulation:
    - Base Layer – 89mm (3.5") polyisocyanurate mechanically fastened
    - Top layer – 114mm (4.5") rockwool insulation with asphalt impregnated top layer mopped in Type III asphalt.
  - Tapered Insulation as indicated on roof plan drawing mopped in Type III asphalt
  - Self-adhesive membrane sheathing tape and flame stop
  - 2 ply torch modified bitumen roofing (Mop & Torch)

**1.12. SHOP DRAWINGS**

- 1.12.1. Submit, for approval, shop drawings for all prefabricated work.

**1.13. APPROVED LIST OF QUALIFIED ROOFERS**

- 1.13.1 Flynn Canada, Semple-Gooder, Masi Group Inc, Delta, Elite, Always, Atlas Apex, Can-Sky, Solar, T. Hamilton, CentiMark, Pollard and Viana.

**1.14. INSPECTION AND TESTING**

- 1.14.1. Inspection and testing of membrane roofing and associated work will be done by an Independent Consultant appointed by the Owner. Notify the Consultant at least 48 hours before Commencement of any roofing work. A pre-construction meeting shall be held on site after contract award and prior to site set-up. Contractor, Consultant, and Owner's representative are to be in attendance.
- 1.14.2. The Consultant reserves the right to have cut tests made to review quality of the work. Materials retrieved from the test cuts may be forwarded by the Consultant to an independent test facility for laboratory analysis. Cut tests are to be performed by the Contractor's forces, at the direction of the Consultant. Cost for test cutting and patching shall be borne by Contractor.
- 1.14.3. The Consultant shall be notified in the event that the specifications conflict with the Manufacturer's recommendations.

- 1.14.4 The inspection and testing service does not relieve the Contractor of his responsibility for quality control of production and for errors made by him.
- 1.14.5 Co-operate with the Consultant and afford all facilities necessary to permit full inspection of the work and testing of materials prior to their use. Act immediately upon instructions given by the Consultant.
- 1.14.6 Inspect and repair or replace any defective work prior to placing stone topping.
- 1.14.7 Wind Uplift Performance: Roofing system shall meet the intent of systems that have been successfully tested by a qualified testing and inspecting agency to resist wind uplift pressure calculated in accordance with ASCE 7

#### **1.15 SITE PRECAUTIONS**

- 1.15.4 Verify that surfaces and site conditions are ready to receive work and that the deck is fully supported and secured. This includes ensuring that where redundant rooftop mechanical equipment and/or redundant skylights are removed; the leftover roof deck opening must be closed completely prior to applying vapour barrier and roofing materials. Material to block in roof opening to match existing roof deck material.
- 1.15.5 Apply each part of roofing system only when surfaces are clean and dry, and free from dust and debris. The roof deck must be smooth prior to application of vapour barrier or gypsum sheathing.
- 1.15.6 All adjacent parts of the building shall be protected from damage caused by roofing operations. Cover walls and other surfaces in the vicinity of hoisting apparatus, kettles and disposal bins with heavy canvas or other suitable protective material. Any damage caused under this contract shall be repaired to match the original materials and appearance. (Use extra care not to damage roof parapets or roof curbs.)
- 1.15.7 Locate kettles, equipment and materials well away from the building in areas designated by the Consultant and/or Owner. Ensure that windblown fumes do not enter into the building, and that the kettles and tankers are located in such a way so as to avoid smoke discolouration to the building.
- 1.15.8 Conduct operations so as to leave deck exposed for minimum period of time. Protect, as required, to prevent infiltration of dust, debris, adhesive, asphalt, water or environmental damage to building interior.
- 1.15.9 Insulation shall not be left exposed to the elements nor shall more be laid than can be completely covered in the same day.
- 1.15.10 Provide temporary membrane to render all insulation watertight if for some unforeseen reason work cannot be completed as specified. Remove temporary membrane completely prior to any further re-roofing operations.
- 1.15.11 Where work must continue over finished roofing membrane, protect surface with minimum 12.5mm thick plywood sheets.
- 1.15.12 Strictly adhere to all safety guidelines for the torching of Modified Bituminous Membrane.
- 1.15.13 Any sharp projections, that in the opinion of the Consultant may penetrate the vapour barrier, shall be grounded smooth and flush.
- 1.15.14 All aspects of the re-roofing operation shall follow in close sequence. No part of the operation shall be so far ahead of the succeeding part that the latter cannot be finished that working day.

#### **1.16 DELIVERY AND STORAGE**

- 1.16.4 Deliver and store all materials in their original packaging bearing the manufacturer's name, the grade, weight and standards pertaining thereto as well as any other reference or markings considered standard.
- 1.16.5 Store and protect materials at all times on dry, well ventilated premises protected against the elements. Only materials to be used the same day shall be removed from storage. Shrink wrap will not be accepted as protection against weather and

materials packaged in this manner will require the installation of weather resistant tarps.

- 1.16.6 Any material damaged and/or exposed to the wet weather shall be removed from the work site at the discretion of the Consultant.
- 1.16.7 Stockpiling of materials on the roof will not be allowed, distribute material as directed by the Consultant.
- 1.16.8 Store rolls on ends with selvage edge up, one pallet high only.

### **1.17 COMPATIBILITY**

- 1.17.4 Compatibility between all components of roofing system is essential.
- 1.17.5 The Contractor shall be responsible for ensuring that all items he elects to use are compatible with each other.
- 1.17.6 Procure all roofing membranes from one manufacturer – Provide certificate by the manufacturer that all components are compatible with each other.

### **1.18 WARRANTY/GUARANTEE**

- 1.18.4 Contractor's Warranty
  - 1.18.4.1 Remedy all defects in the Built-up Roofing and Related Membrane Flashings installed hereunder which appear within a period of two (2) years from date of total completion.
  - 1.18.4.2 Pay for all damages resulting from aforementioned defects. Make all necessary repairs and replacements within 48 hours of receipt notification.
  - 1.18.4.3 Provide a written warranty confirming above, issued on the corporate letterhead and signed by an authorized signing officer.
  - 1.18.4.4 Nothing contained in this article shall be construed as in any way restricting or limiting the liability in common law and statutory liability of the Contractor.
- 1.18.5 Manufacturer's Warranty
  - 1.18.5.1 In addition to the contractor's warranty listed above, the Contractor shall provide a ten (10) year extended written manufacturer's Labour, Material, and Workmanship warranty issued on the manufacturer's corporate letterhead and signed by an authorized signing officer.
  - 1.18.5.2 Nothing contained in this article shall be construed as in any way restricting or limiting the liability in common law and statutory liability of the Manufacturer.
  - 1.18.5.3 Under the terms of the warranty, the Roofing Contractor shall provide: A list of all necessary materials/procedures - as required by the manufacturer to qualify for the warranty (and install such materials to the acceptance of the consultant and manufacturer).

## **2. MATERIAL**

### **2.1. MATERIALS**

- 2.1.1. Asphalt primer: Modified asphalt primer as per membrane manufacturer's printed requirements to CGSB 37-GP-9M.
- 2.1.2. Underlay / Thermal Barrier Sheathing Boards: 16mm (5/8") gypsum sheathing boards complete with glass matt face. Acceptable products: DensDeck as Manufactured by Georgia Pacific, Securock Gypsum Fibre Roof Board by CGC

- 2.1.3. Roof Vapour Retarder Membrane Adhesive: ULC listed fire retardant. As recommended by Roof vapour retarder membrane manufacturer.
- 2.1.4. Roof Vapour Retarder Membrane & Sheathing Tape: Kraft laminate vapour barrier reinforced with fibreglass yarn with adhesive as supplied by vapour barrier manufacturer.
- 2.1.5. SBS Modified Bitumen Base Sheet Membrane: Reinforced with 180 gram/m<sup>2</sup> glass mat with a minimum thickness of 3mm to CGSB 37-GP-56M. Sanded bottom surface, polyethylene top surface. Standard of acceptance: Bakor, Siplast, Soprema, Tremco, IKO, James Manville.
- 2.1.6. SBS Modified Bitumen Base Sheet Flashing Membrane: Reinforced with 180 gram/m<sup>2</sup> polyester mat with a minimum thickness of 3mm to CGSB 37-GP-56M. sanded bottom surface, polyethylene top surface. Standard of acceptance: Bakor, Siplast, Soprema, Tremco, IKO, James Manville.
- 2.1.7. SBS Modified Bitumen Cap Sheet and Cap Sheet Flashing Membrane: Class C, Grade 2 material, reinforced with 250 gram/m<sup>2</sup> polyester mat with a minimum thickness of 4mm to CGSB 37-GP-56M. Polyethylene bottom surface, Granule top surface. Standard of acceptance: Bakor, Siplast, Soprema, Tremco, IKO, James Manville. Colour to be approved by Consultant.
- 2.1.8. SELF-ADHERING TRANSITION MEMBRANE FLASHING:
  - 2.1.8.1. Where Asphalt or Torch application is required to tie-in adjacent systems after transition flashing is applied, use torchable self adhering Modified Bitumen Base Sheet Membrane: material, reinforced with 180 gram/m<sup>2</sup> polyester mat with a minimum thickness of 3mm with accompanying primer. Standard of acceptance: Bakor, Siplast, Soprema, Tremco, IKO, James Manville. Colour to be approved by Consultant. - As approved by roof membrane manufacturer.
  - 2.1.8.2. Where flashing membrane is applied after roofing is complete over parapets and as tie-ins to fenestrations, membrane to be comprised of polyethylene backed modified asphalt with a consistent layer of adhesive applied to one side with accompanying primer. Standard of Acceptance to be Ice and Water Shield as manufactured by Grace Construction Products Division, Colphene 1500 as manufactured by Soprema Waterproofing Inc., or Blueskin SA as manufactured by Bakor Inc. – As approved by roof membrane manufacturer.
- 2.1.9. Deck Sheathing 12.5 mm - 1/2" Dens Deck Prime – 1200mm x 2400mm – As manufactured by Georgia Pacific
- 2.1.10. SBS Modified Self Adhesive Membrane Sheathing Tape and Flame Stop Membrane: SBS modified bitumen membrane suitable for torching over and , consisting of polyethylene laminated top surface and siliconized release film on the bottom surface, meeting CGSB 37-GP-56M for low temperature flexibility. As recommended by membrane manufacturer.
- 2.1.11. Mastic: Designed for, and specifically compatible with Modified Bitumen Membrane – as per membrane manufacturers printed requirements.

2.1.12. Thermal Insulation:

<b>TABLE 2.1.12.A EFFECTIVE R-VALUES for HYBRID ROOF INSULATION</b>								
<i>(i) Effective R Value for rock wool insulation calculated based on ASTM C518 (C177) of 4.3 hr.ft².F/Btu at -4 degrees C.</i>								
<i>(ii) Effective R Value for Polyisocyanurate Insulation calculated based on NRCA's recommendation of 5.0 hr.ft².F/Btu for Winter Heating.</i>								
<i>(iii) Total thickness does not include underlayment sheathing board over metal decks, tapered products and roofing membrane.</i>								
<b>Design R Value</b>		<b>20</b>		<b>25</b>		<b>30</b>		<b>35</b>
<b>Top Layer Thickness (in)</b>	<b>2.5</b>	10.75	<b>3</b>	12.9	<b>3.5</b>	15.05	<b>4.5</b>	19.35
<b>Base layer Thickness (in)</b>	<b>2</b>	10.00	<b>2.5</b>	12.5	<b>3</b>	15	<b>3.5</b>	17.50
<b>Calculated R Value</b>		<b>20.75</b>		<b>25.4</b>		<b>30.05</b>		<b>36.85</b>
<b>Total Thickness (in)</b>	<b>4.5</b>		<b>5.5</b>		<b>6.5</b>		<b>8</b>	

**2.9.1. Base layer rigid insulation boards:**

- 2.9.1.1. Provide standard size preformed foamed plastic roof insulation boards supplied by roofing membrane manufacturer as suitable for roofing application and meeting minimum thicknesses indicated in Table 2.1.12.A for specified R Value.
- 2.9.1.2. Foamed plastic insulation board shall be a closed-cell polyisocyanurate foam core with integrally laminated inorganic coated-glass facer conforming to CAN/ULC-S704-03 Type 2 and Class 3, HCFC free, 138 kPa (20 psi) minimum compressive strength (at 10% deformation), CAN/ULC-S126-M86, LTTR value to CAN/ULC S770-00.

**2.9.2. Top layer rigid insulation boards:**

- 2.9.2.1. Provide standard size rock wool rigid non-combustible roof insulation boards supplied by roofing membrane manufacturer as suitable for roofing application and meeting minimum thicknesses indicated in Table 2.1.12.A for specified R value.
- 2.9.2.2. Rock wool rigid insulation boards intended for use with mechanically fastened or ballasted roofing membrane systems shall be TOPROCK DD, a rigid dual density rock wool insulation board manufactured by ROXUL Inc.
- 2.9.2.3. Rock wool rigid insulation boards intended for use with hot mop, torch applied or cold applied adhesive roofing membrane systems shall be TOPROCK DD Plus, a rigid dual density rock wool insulation board with bituminous coating manufactured by ROXUL Inc.
- 2.9.2.4. Top layer rock wool rigid insulation boards shall meet the following performance criteria:
- Minimum thickness: 50 mm (2 inches)
  - Thermal resistance to ASTM C518:
    - RSI 0.74 m2K/W at -4 °C.
    - RSI 0.72 m2K/W at 4 °C.
    - RSI 0.68 m2K/W at 24 °C.
    - RSI 0.64 m2K/W at 43 °C.
- 2.9.2.5. Complies with ASTM C 726 Standard Specifications for Mineral Fiber Roof Insulation Boards,
- 2.9.2.6. Non-combustible in accordance with CAN/ULC S114 Standard Method of Test for Determination of Non-Combustibility in Building Materials,
- 2.9.2.7. Class 1-NCC (non-combustible core) rated roof insulation in accordance with FM Approval 4450/4470,
- 2.9.2.8. Water absorption of less than 1.0 % in accordance with ASTM C209,

- 2.9.2.9. Recycled content: 40 % minimum,
- 2.9.2.10. Hail damage resistance: Class 1-SH in accordance with FM 4470,
- 2.9.2.11. Impact resistance: Class 4 in accordance with FM 4473, and UL 2218.
  
- 2.1.13. **Tapered insulation, crickets, tapered edge strips and flute fillers.**
  - 2.1.13.1. Tapered insulation shall be standard size factory cut non-combustible dual density rigid stone wool roof insulation boards manufactured from basalt rock and steel slag to ASTM C726 fabricated to slope of 1:48 (1/4 inch per 12 inches) unless otherwise indicated.
  - 2.1.13.2. Saddles, crickets, tapered edge strips, flute fillers and other insulation shapes shall be manufactured from basalt rock and steel slag to ASTM C726, factory cut rigid stone wool insulation where indicated on shop drawings for sloping to drain. Fabricate to slopes indicated and no less than 1:48 (1/4 inch per 12 inches) in addition to roof structure slope or to tapered insulation slope as applicable. Fabricate flute fillers to fit dimensions of roof deck flute width and depth.
  - 2.1.13.3. Provide combined layers of shaped insulation panels and top insulation layer in full pieces, fabricate tapered insulation boards in blocks with insulation top layer to avoid separate filler boards to a maximum board thickness of 6 inches.
  - 2.1.13.4. Provide bitumen coated insulation boards under roofing membrane systems intended to be hot mopped, torch applied and/or adhered direct to insulation board.
  
- 2.1.14. **Insulation fasteners:** FM Class 1 approved screw and primed plate fastener, which is supplied or approved by insulation and membrane manufacturer.
  
- 2.1.15. **Nails:** hot dipped galvanized steel, spiral head, 25mm nailing disc, minimum 25mm substrate penetration.
  
- 2.1.16. **Fasteners for masonry and concrete:** Tapcon fasteners with "Climaseal" corrosion resistant finish, or an approved equivalent, of sufficient length to provide a minimum 38 mm penetration into substrate.

### 3. EXECUTION

#### 3.1. EXAMINATION

- 3.1.1. Contractor and Manufacturer's representative shall examine site conditions and surfaces to ensure that they are suitable for the specified application, and in satisfactory condition for the commencement of the work of this section. Report any deficient conditions to the Consultant and Owner in writing. Only proceed with work once surfaces and conditions are deemed satisfactory.
- 3.1.2. Install continuous sheathing, wood blocking, studs, nailers and continuous shims as may be required. Allow for plywood expansion and unless specifically shown otherwise, curbs to provide 300mm clearance from roof.
- 3.1.3. Re-fasten to the satisfaction of the Consultant, any existing wood blocking which is to remain covered-in: nailers, base plates, plywood, shims, cants etc.

#### 3.2. PREPARATION

- 3.2.1. Complete roofing membrane to each day's termination point and install temporary water cut-off.
- 3.2.2. Remove water cut-off when work resumes.

- 3.2.3. Ensure that substrates are smooth, clean and dry.
- 3.2.4. Clean surfaces of all substances, which may be detrimental to the new roofing system.
- 3.2.5. Remove existing system in such a manner that debris does not collect under deck assemblies. Clean all debris which passes through the deck assembly.
- 3.2.6. At the instructions of the consultant, replace any existing gypsum sheathing which is found to be deteriorated.
- 3.2.7. Fill all voids and openings in system with mineral wool batt insulation such that debris and new material do not seep into structure.

**3.3. DECK SHEATHING BOARD**

- 3.3.1. Steel Deck – Typical New Construction
- 3.3.2. Apply Deck Sheathing Board with long axis of each sheet perpendicular to steel deck ribs.
- 3.3.3. Stagger end joints and support end joints on steel deck ribs. Where necessary cut sheathing to suit deck.
- 3.3.4. Mechanically attach with screws and plates to suit FM 1-60.
- 3.3.5. Install Kraft paper tape in a sprinkle mop of asphalt at all board joints to eliminate seepage.
- 3.3.6. Install any wood blocking necessary to support curbs, flashings, or as shown on drawings.
- 3.3.7. Install batt insulation at any openings in deck and carefully apply adhesive at openings to prevent bleeding of materials.

**3.4. PRIMER**

- 3.4.1. Apply primer to deck, exposed masonry, concrete, wood and metal surfaces which are to receive membrane in accordance with Manufacturer's requirements, and unless otherwise noted at a minimum rate of 0.25 litres/m<sup>2</sup>.
- 3.4.2. Prevent primer from entering building interior through openings and joints within the building construction.
- 3.4.3. Allow primer to cure prior to application of membrane.

**3.5. SBS MODIFIED SELF ADHESIVE AIR/VAPOUR TRANSITION MEMBRANE**

- 3.5.1. Install torchable SBS Modified Self Adhesive Membrane to act as flame stop at roof perimeters.
- 3.5.2. Install air/vapour barrier transition membranes to adjacent building envelope systems to ensure continuity of air and vapour barrier systems. Achieve intimate and durable bond at all terminations, and top dress all lap edges that are not secured with mechanical attachments.
- 3.5.3. Install batt insulation at any openings in deck and carefully apply materials at openings to prevent bleeding of asphalt through the deck.
- 3.5.4. Material and workmanship shall be in accordance with membrane manufacturer's requirements.
- 3.5.5. Install tape securely and continuously to any conditions where torching is to take place adjacent to - or near combustible materials to ensure no flame spread into roof assembly.

**3.6. THERMAL INSULATION**

- 3.6.1. Install thermal insulation to meet the minimum thickness specified and as required in the scope of work and indicated on the drawings.

- 3.6.2. Stagger all joints in insulation boards within each layer and between layers. Lay all joints tight and cut insulation accurately to fit site conditions. Repair any broken corners, and fill any gaps between board joints, or as required by the consultant.
- 3.6.3. In sump area around drain install tapered insulation as shown on drawings. Chamfer transition between insulation boards as detailed and reduce the thickness of the base insulation to accommodate the slopes.
- 3.6.4. Mechanically attach specified base layer to suit Factory Mutual 1-90 requirements. Apply a full mopping of asphalt at the rate of 1.2 kg/m<sup>2</sup> over the base layer and apply specified top layer of insulation while the asphalt is still fluid.
- 3.6.5. Immediately after placement of insulation panels, walk insulation into hot asphalt to achieve solid bond.
- 3.6.6. Ensure all board joints are snug. At all locations where gaps exist between adjacent boards or at adjacent details, fill voids with filler to suit

### **3.7. BASE SHEET**

- 3.7.1. Prime all surfaces to receive asphalt at the rate of 0.25 to 0.5L/m<sup>2</sup> ensuring a complete and continuous coverage of all surfaces. Allow to cure.
- 3.7.2. Relax base sheet by unrolling onto clean surface prior to installation. Time required for relaxation will vary with weather conditions. Align base sheet membrane perpendicular to slope.
- 3.7.3. Application of membranes shall be performed by skilled tradesmen in accordance with the manufacturer's recommendations.
- 3.7.4. Maximum tolerance for roll misalignment is 12mm. If the roll goes out of line by more than 12mm, cut and re-align.
- 3.7.5. Unroll base sheet dry onto substrate with first side lap lined up with drain centre (parallel to roof edge).
- 3.7.6. Overlap side laps by 75 mm. along lines provided for this purpose, and overlap end laps by 150 mm. Stagger end joints by at least 300 mm.
- 3.7.7. Re-roll base sheet and unroll again onto bed of hot asphalt. Do not apply Hot asphalt on side and end laps; they must be torched on the entire length of the selvage and at end side of roll.
- 3.7.8. Pour hot asphalt in front of each roll at a temperature of about 230°C and heat in kettle at about 250°C; minimum temperature at point of contact should be 220-230°C.
- 3.7.9. Do not spread more than 1.5 metres of hot asphalt in front of each roll. Below 15°C, do not spread more than one metre of hot asphalt in front of each roll.
- 3.7.10. Below 10°C, re-heat membrane underside asphalt by sweeping torch over roll's entire width and burn plastic film of top face in a zig-zag fashion. Ensure hot asphalt in kettle is in constant use to avoid distillation. Be careful not to direct flame toward the bitumen.
- 3.7.11. Avoid forming wrinkles, air pockets or fishmouths.
- 3.7.12. Constantly check the adhesion to be certain that proper bonding is achieved.
- 3.7.13. Extend base sheet 75mm past the top of the cant sheet and terminate.
- 3.7.14. Prior to cap sheet installation, ensure base sheet membrane is smooth, clean of surface debris, and free of unbonded areas, blisters, wrinkles, fishmouths, or underlying debris. Make repairs where required.

### **3.8. BASE SHEET MEMBRANE FLASHINGS**

- 3.8.1. Install base sheet flashing prior to application of cap sheet over the field of the roof.
- 3.8.2. Offset by a minimum 300mm flashing laps from the underlying membrane laps - such that laps are not superimposed.

- 3.8.3. Install membrane flashing with full roll widths perpendicular to the flashing condition. Torch apply in accordance with manufacturers written requirements.
- 3.8.4. Install reinforcing gussets at all inside and outside corners.
- 3.8.5. At all locations ensure that a base ply of modified bitumen is carried over curbs and parapets – completely covering outer face of flashed conditions.

### **3.9. CAP SHEET**

- 3.9.1. Torch application of membranes shall be performed by skilled tradesmen in accordance with the manufacturer's recommendations.
- 3.9.2. At all changes in plane torch apply 1 ply base sheet flashing strip, 500mm wide, as reinforcing.
- 3.9.3. Plan the membrane application so that the cap sheet laps are offset by 500mm from the laps of the base sheet. Mark a chalk line to start first 2 courses.
- 3.9.4. Unroll cap sheet membrane and align. Re-roll and commence application. At all times, where the membrane will overlap on the mineral surface, the granules shall be embedded prior to application.
- 3.9.5. Maximum tolerance for roll misalignment is 12mm. If the roll goes out of line by more than 12mm, cut and re-align.
- 3.9.6. With a torch, adhere cap sheet, granule side up. Simultaneously heat the top side of the base sheet and the underside of the cap sheet and slowly unroll while taking precautions not to stretch, burn, mark, or wrinkle the membrane. Constantly check the adhesion to be certain that proper bonding is achieved.
- 3.9.7. Side laps must cover the selvage edge and be a minimum of 75mm. End laps must be 150mm. At overlaps, granules must be embedded.

### **3.10. CAP SHEET MEMBRANE FLASHINGS**

- 3.10.1. Install cap sheet flashings as necessary. At all times, where the membrane will overlap on the mineral surface, the granules shall be embedded prior to application.
- 3.10.2. Using the propane torch, heat the back of the flashing strip and the underlying membrane until the bitumen flows. Press in firmly for proper adhesion while taking precautions not to stretch, burn, mark, or wrinkle the membrane. Use a wet sponge to tamp the membranes in place.
- 3.10.3. Extend flashings at least 38mm up and over parapets, canted edges, and curbs and face nail with 38mm common roofing nails, 100mm o/c. or as indicated on the Detail Drawings. Nominal height of wall flashings shall be 300mm from roof surface. Seal top edge of membrane flashing with Modified Mastic and mesh at all membrane flashing terminations where membrane flashings terminate at a reglet or on the face of a wall. Install 25 mm termination bar at all wall upturns fastening 300mm o/c.

### **3.11. ROOF DRAINS**

- 3.11.1. Ensure the integrity of the vapour barrier is maintained, at the drain opening.
- 3.11.2. Install membrane flashings in accordance with the details. Extend the membrane under the clamping ring.
- 3.11.3. Install roof drains at existing roof drain locations and where indicated on drawings, in strict accordance with manufacturer's recommendations.
- 3.11.4. Onto insulation surface, set drain, prime flange, secure to underlying drain support blocking. Set base ply membrane such that both base ply and finish joints do not intersect with clamping ring.
- 3.11.5. Prior to finish ply application, torch apply reinforced modified bitumen reinforcing membrane according to standard flashing detail. Trim membrane neatly.
- 3.11.6. Seal the roof drain insert to existing plumbing using the specified mechanical seal following the manufacturer's instructions. Set clamping ring.

**3.12. PENETRATION FLASHINGS**

- 3.12.1. Onto Base Sheet surface, set primed flanges and strip-in with base sheet flashing ply in strict accordance with manufacturer's recommendations
- 3.12.2. Note each successive ply on penetration flashing side shall extend at least 25mm beyond underlying ply, and each successive ply on roof membrane side shall extend at least 75mm beyond underlying ply.
- 3.12.3. Prior to finish ply application, torch apply reinforced modified bitumen reinforcing membrane according to manufacturers standard flashing detail. Trim membrane neatly.

**3.13. COMPLETION OF DAYS WORK**

- 3.13.1. Install water cut-offs at the end of each day's work; remove completely prior to continuing further roofing applications.
- 3.13.2. Inspect all laps of the membrane application to ensure they are properly bonded. Repair any deficiencies prior to leaving the site for the day.
- 3.13.3. Provide a 1.5 hour fire watch at the end of each day when torching membrane. Walk the day's entire production area to check for smoke and hot spots.

**END OF SECTION**

**Part 1            General**

**1.1                THIS SECTION INCLUDES**

- .1        Perimeter Metal
- .2        Metal Flashings on parapet walls
- .3        Metal counter flashings on vertical upstands and mechanical or electrical penetrations.

**1.2                RELATED WORK**

- .1        Division 4 – Masonry
- .2        Section 06 10 11 – Rough Carpentry
- .3        Section 05 50 00 – Metal Fabrications
- .4        Section 07 27 31 - Adhesive Grade Air Barrier Membrane and Thru-Wall Flashing
- .5        Section 07 42 43 – Composite Wall Panels
- .6        Section 07 46 13 – Preformed Metal Siding and Soffit
- .7        Section 07 51 00 – Built-Up Roofing
- .8        Section 07 52 00 – Modified Bitumen Roofing
- .9        Section 08 44 13 – Glazed Aluminum Curtain Wall
- .10      Section 08 50 50 – Aluminum Windows

**1.3                SUBMITTALS**

- .1        General: Submit listed submittals in accordance with Section 01 33 00 – Submittal Procedures.
- .2        Submit sufficient material samples as may be required by the Consultant.
- .3        Submit shop drawings including material finishes and dimensions.

**1.4                WASTE MANAGEMENT AND DISPOSAL**

Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

**1.5                PROCEDURE**

- .1        No metal flashing is to be installed before the membrane flashings have been inspected and approved.
- .2        Any concerns regarding the site conditions, specified materials or specified flashings should be brought to the attention of the consultant before proceeding with any installation.

## **1.6 WORKMANSHIP**

- .1 All work is to be executed by competent mechanics, skilled and specifically trained in the particular trade. Only first class workmanship will be accepted, not only with regard to safety, efficiency and durability, but also with regard to neatness and accuracy of detail. All unsatisfactory work is to be removed and new work re-installed at the expense of the contractor.
- .2 All applications shall be by mechanics skilled in this trade, certified by the roof membrane manufacturer and have a minimum of 5 years experience with the work to be done.

## **1.7 WARRANTIES AND GUARANTIES**

- .1 Provide a written warranty stating that the Contractor will warrant to repair, at its own expense, any actual roof leaks or deficiencies in the roofing membrane, flashing membrane and related sheet metal work resulting from faulty workman-ship for a period of 2 (two) years. After the effective date of the warranty.

## **Part 2 Products**

### **2.1 METAL FLASHINGS**

- .1 Metal flashing to be galvanized steel sheet metal corresponding to ASTM 525.81 with a zinc coating designation ZF275 (G90) and in Series 5000/8000 baked enamel, 24 gauge (.6 mm thick), pre-coated finish by Stelco or Dofasco.
- .2 Colour from full range of manufacturers options. Submit for Architect's approval.

### **2.2 CONTINUOUS CLEAT STARTER STRIP**

- .1 At parapets, install continuous 24 gauge (.6 mm thick) starter strip on exterior fascia to provide continuous support for lower edge of parapet flashing.

### **2.3 MECHANICAL FASTENERS**

- .1 Nails, screws, fasteners, and accessories to be compatible with the metal flashings.
- .2 Long enough to penetrate into the blocking or base as minimum of 25 mm.

### **2.4 UNDERLAYMENT**

- .1 In accordance with Section 07 27 31 – Adhesive Grade Air Barrier Membrane and Thru-Wall Flashing

### **2.5 ISOLATION COATING**

- .1 Alkali resistant bituminous paint

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**2.6 MASTIC/ ROOF CEMENT**

- .1 Conform to CAN/CGSB 37.5

**2.7 CAULKING**

- .1 Conform to CAN/CGSB 19.13 M87
- .2 One part polyurethane - TREMCO Vulkem 116

**Part 3 Execution**

**3.1 FABRICATION**

- .1 Fabricate metal flashings and other sheet metal work in accordance with applicable CRCA and as indicated.
- .2 Form pieces in 2400 mm maximum lengths. Make allowance for expansion at joints. Flashing lengths less than 1000mm will not be accepted.
- .3 Hem exposed edges on underside 12 mm. Miter and seal corners with sealant.
- .4 Form sections square, true and accurate to size, free from distortion and other defects detrimental to appearance or performance.
- .5 Apply isolation coating to metal surfaces to be embedded in concrete or mortar.

**3.2 INSTALLATION**

- .1 Install sheet metal work in accordance with CRCA FL series details,
- .2 Use concealed fastenings except where approved before installation.
- .3 Fasteners penetrations through roof membrane to be a minimum 200 mm (0.67") above the finished roof surface.
- .4 All counter-flashing parapet or perimeter edges shall have a continuous hook strip installed for the sheet metal flashings to be secured to.
- .5 Profile shall be bent as to provide straight, even and square roof finishes without "oil-canning" "dishing" "cupping" or other finish blemishes.
- .6 All sheet metal flashings shall be installed with provision of adequate expansion
- .7 Provide adequate slope to cap flashings sufficient to ensure moisture run off.
- .8 All sheet metal work will be installed with hemmed exposed edges. There will be no cut edges exposed.
- .9 Where sheet metal is in contact with masonry brick, concrete or wood surfaces, provide underlay under sheet metal. Secure in place and lap joints 100 mm (0.33").
- .10 Counter-flash bituminous flashings at intersections of roof with vertical surfaces and curbs.

- .11 Join flashing sections using S-lock forming tight fit over hook strips, minimum 25mm deep expansion locks.
- .12 Lock end joints and caulk with sealant.
- .13 All corner joints of the sheet metal flashings shall be mitered, and dovetailed to provide a proper and tight fit. After installation the joints shall be properly caulked to prevent water penetration.
- .14 Install surface mounted reglets true and level, and caulk top of reglet with sealant.
- .15 Insert metal flashing into reglets or under cap flashing to form weather tight junction.
- .16 Caulk flashing at reglet with sealant
- .17 All caulked joints to be in accordance with Section 07 92 10.

### **3.3 CLEANING**

- .1 Cleaning: Remove temporary coverings and protection of adjacent work areas. Repair or replace damaged installed products. Clean installed products in accordance with manufacturer's instructions prior to Consultant's acceptance. Remove construction debris from project site according to Section 01 74 19.

### **3.4 PROTECTION**

- .1 Protection: Protect installed product's finish surfaces from damage during construction.
  - .1 Institute protective measures as required to ensure that installed panels will not be damaged by work of other trades.

**END OF SECTION**

**Part 1            General**

**1.1                GENERAL**

- .1            Furnish all labour material and equipment for complete installation of aluminum siding and related work as shown on drawings or specified herein.

**1.2                REFERENCES**

- .1            CAN2-93.1 M85 and CGSB 93-GP-5M and CGSB-93-2-M91.

**1.3                SAMPLES**

- .1            Submit samples in accordance with General Conditions.

**Part 2            Products**

**2.1                MATERIALS**

- .1            Siding shall be made of 3105 aluminum sheet in equivalent, meeting the specification set forth in The Aluminum Standards Fourth Addition 1984, published by The aluminum Association; having minimum tensile strength of 29,000 psi, and a minimum yield strength of 28,000 psi.
- .2            Siding panels are designed for use in residential and light commercial applications with elevations up to 40° (12.191m).
- .3            Horizontal siding panels shall have interlocking horizontal edges, 3/8" (9.525mm) butt and a 0.94" (2.388mm) diameter circular weep holes spaced approximately 8" (203.2mm) centres in a shadow leg of every panel, thus allowing the wall to breath and to permit condensation and water vapour within the wall to escape. Elongated nailing slots shall be provided on approximately 1 ¼" (31.75mm) centres in the nail hem of all panels to permit proper expansion and contraction on the wall. The nail hem and bottom lock of all panels shall be notched on both ends to provide for the proper overlapping of adjacent panels.
- .4            The surface of the aluminum sheet is commercially free of streaks, blistering and other imperfections. The aluminum sheet is thoroughly cleaned, dried and coated with Betz Pre-treatment 1500 Oxide coating to assure maximum paint adhesion.
- .5            Aluminum sheet has a "2-Coat" Coating System. A thermo setting acrylic primer (base coat) is roller coated and baked at high temperatures for increased performance (corrosion resistant), followed by a thermo setting polyester (Polykote 9000) which is roller coated and baked over the primer for the outside coating.
- .6            Colour is controlled per ASTM D-1729-64, by approved colour difference meter and by visual match standards in a Macbeth Booth.
- .7            Specular gloss is determined per ASTM D523-62 at a gloss meter angle of 60 degrees.

- .8 Pencil hardness is equal to Eagle Turquoise HB minimum pencil per NCAA Technical Bulletin 11-12.
- .9 Cure test per NCCA Technical Bulletin 11-18 and able to withstand 100 double rubs of M.E.K. using cheese cloth mesh, size 28x24.
- .10 Humidity resistance test as per ASTM D-2247-87 and having no blistering, cracking, peeling loss or softening of the finish after 1,000 hours of exposure to 100% humidity at 100 degrees F +/- 5 degrees.
- .11 Salt spray resistance samples diagonally scored and subjected to a neutral salt solution spray per ASTM B-117, then taped with Scotch #610 cellophane tape or equivalent for 1000 hours over aluminum – no blistering and no loss of adhesion greater than 1/32" from score line.
- .12 Accelerated weathering has no cracking, blistering or adhesion loss of external coating system and no chalking greater than #8 rating per ASTM D-659 test procedure noted after 800 hours QUV testing by ASTM D-53 procedure.
- .13 All accessories used with aluminum siding shall be accessories designed for use with the siding and having the same finish.
- .14 Each soffit panel is configured in a 16" (406.4mm) wide panel in a two panel design. Soffit panels to be aerated (lanced) panels.
- .15 Fire resistance properties as per CAN/ ULC-5102.
  - Flame Spread: 11
  - Smoke Density: less than 5%
  - Ignition Properties: Self ignition did not occur. When ignited with a fire, after 15 seconds continued to burn for 2 feet (.6m) for one minute and then extinguished. Kaycan aluminum does not support combustion.
- .16 Acceptable Material: "Kaycan", SP-600-16, vented complete with all required accessories. Colour: Charcoal

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Confirm that all critical dimensions are as specified in the drawings.
- .2 Commencement of siding installation implies acceptance of the substrate as suitable to accept siding.
- .3 Any substrate flaws or defects must be repaired, and free from construction before the siding is applied.
- .4 Solid sheeting and a weather resistive barrier shall be provided behind the siding as required by the applicable code.

- .5 Install in accordance with the siding application manual and in accordance with the best practice. Special details shown on the drawings shall be included as part of installation.
- .6 Care must be taken in placing aluminum in contact with metals or materials not compatible with aluminum. Dissimilar materials shall be painted or otherwise protected when they are in contact with aluminum or when drainage from them passes over aluminum.
- .7 Upon completion, clean as necessary to remove all fingerprints and soiled area. Clean and remove all scrap, packaging and unused materials.

**END OF SECTION**

**1 General**

**1.1 REFERENCES**

- .1 Underwriters Laboratories of Canada (ULC)
  - .1 CAN/ULC-S101, 1989.
  - .2 CAN/ULC-S102, 1988.

**1.2 TEST REPORTS**

- .1 Submit product data including certified copies of test reports verifying fireproofing applied to substrate as constructed on project will meet or exceed requirements of Specification.
- .2 Submit test results in accordance with CAN/ULC-S101 for fire endurance and CAN/ULC-S102 for surface burning characteristics.
- .3 For assemblies not tested and rated, submit proposals based on related designs using accepted fireproofing design criteria.

**1.3 SAMPLES**

- .1 Submit duplicate 200 x 200 mm size sample of exposed fireproofing for approval of texture and colour.

**1.4 MOCK-UP**

- .1 Apply fireproofing to approximately 1 m<sup>2</sup> area of surfaces of mock-up-matching surface to be treated.
- .2 Allow 24 hours for inspection of mock-up by Consultant before proceeding with fireproofing work.

**1.5 PROTECTION**

- .1 At outdoor temperatures less than 5°C, ensure that a 5°C air and substrate temperature is maintained during and for 24 hours after application. Ensure that natural ventilation to properly dry the fireproofing during and subsequent to its application is provided. In enclosed areas lacking openings for natural ventilation, ensure that interior air is circulated and exhausted to the outside.
- .2 Provide temporary enclosures to prevent spray from contaminating air beyond application area.
- .3 Protect adjacent surfaces and equipment from damage by overspray, fall-out, and dusting of fireproofing materials.

**2 Products**

**2.1 MATERIALS**

- .1 Curing compound: type recommended by fireproofing manufacturer, qualified for use in ULC Designs specified.

- .2 Sealer: type recommended by fireproofing manufacturer, qualified for use in ULC Design specified.
- .3 Thin-Film Intumescent Coating: Intumescent Coating designated "A/D FireFilm III" applied in accordance with manufacturers instructions to the minimum dry film thickness. See attached background information.

### **3 Execution**

#### **3.1 PREPARATION**

- .1 Substrate shall be free of material, which would impair bond.
- .2 Verify that painted substrates are compatible and have suitable bonding characteristics to receive fireproofing.
- .3 Remove incompatible materials.
- .4 Ensure that items required to penetrate fireproofing are placed before installation of fireproofing.
- .5 Ensure that ducts, piping, equipment, or other items which would interfere with application of fireproofing are not positioned until fireproofing work is completed.

#### **3.2 APPLICATION**

- .1 Apply bonding adhesive or primer to substrate if recommended by manufacturer.
- .2 Apply fireproofing to correspond with tested assemblies, or acceptable calculation procedures to provide fire resistance ratings as per A0-100 series drawings.
- .3 Apply fireproofing over substrate, building up to required thickness to cover substrate with monolithic blanket of uniform density.

#### **3.3 INSPECTION AND SITE TESTS**

- .1 Inspection and testing of fireproofing will be carried out by Testing Laboratory designated by Consultant.
- .2 Owners will pay costs for testing under testing Allowance, Section 10 21 00.

#### **3.4 INSPECTION SERVICE**

- .1 Peto MacCallum Ltd. 905-561-2231
- .2 Trow Engineering 416-793-9800
- .3 McClymont and Rak Engineers 416-675-0160

#### **3.5 PATCHING**

- .1 Patch damage to fireproofing caused by testing or by other trades before fireproofing is concealed, or if exposed, before final inspection.

**END OF SECTION**



- .3 Fire Resistance: Provide fireproofing materials that have been listed and classified by one or more of the following testing authorities: Underwriters Laboratories of Canada (ULC), Underwriters Laboratories (UL), ITS (formerly Warnock Hersey) or other testing and inspecting agency acceptable to the architect and authorities having jurisdiction.
- .4 Packaging: All products must be packaged with proper identifications and approval indications acceptable to the testing and/or listing agency.
- .5 Asbestos: Manufacturer shall provide Certification that products supplied are 100% asbestos-free.
- .6 Steel Surfaces: **Structural steel and steel decking shall be unprimed.**
- .7 Painted Steel Surfaces: Steel surfaces requiring fireproofing that are painted and/or primed, shall meet ULC/UL requirements for application and adhesion characteristics. Provide certifications from fireproofing manufacturer of compatibility of fireproofing and painted systems. Restrictions published by ULC/UL shall apply.
- .8 Remedial Work: Steel surfaces with incompatible primers or paint shall have the existing coating removed, be lathed, or otherwise remedied within the requirements of ULC/UL, so that adequate and approved bonding can occur, acceptable to Authorities Having Jurisdiction.
- .9 Field Quality Assurance - NFCA 200 – “Field Quality Assurance Procedures for Application of Spray-Applied Fire Resistive Materials”.
- .10 Special inspections: Shall be conducted by an owner engaged ICC Certified Special Inspector for SFRM to perform code mandated inspections following SFRM application

## 1.7 PROJECT CONDITIONS

- .1 Environmental Limitations: Do not apply sprayed fireproofing material when ambient or substrate temperatures are 5°C (40°F) or lower, unless temporary heat and protection is provided to maintain temperatures at or above this level for 24 hours before, during and 24 hours after application of fireproofing. It is recommended that the corresponding area immediately above the structure to be sprayed be heated as well in order to control the temperature of the concrete floor slab and the structural steel.
- .2 Ventilation: Ventilate building spaces during and after application of fireproofing at a rate of four (4) air changes per hour until fireproofing is dry. If natural ventilation is insufficient, employ mechanical means as necessary.
- .3 Surfaces to be sprayed: Surfaces to be sprayed must be free of any substance that would impair proper adhesion.
- .4 Dedicated Pumping Station Area: The contractor shall make available to the fireproofing contractor suitable area(s) for permanent locations for mixing and pumping fireproofing. This site must be.
  - .1 Convenient to the structure
  - .2 Be able to accommodate delivery of product

- .3 Allow for space for truck storage and trailer parking, and for materials and equipment
- .4 Be well drained
- .5 Be near a suitable source of potable water of quantity required
- .6 Have a proper source of electrical power, if required
- .7 Provide temporary heat and ventilation to comply with manufacturers recommendations.

## **1.8 SEQUENCING**

- .1 Sequence and coordinate application of sprayed fireproofing with other related work specified in other Sections to comply with the following requirements
- .1 Provide temporary enclosure (partitions or tarps) for interior applications to prevent deterioration of applied materials exposed to unfavorable environmental conditions.
- .2 Avoid exposure of fireproofing to unnecessary damage or abrasion
- .3 Do not apply fireproofing to metal roof decking until roofing is complete including installation of air handling systems. Prohibit all roof traffic until application of fireproofing is completed and dry.
- .4 Do not apply fireproofing until all hangers, clips and other necessary supports are in place, requiring penetration of fireproofing if installed after the application of fireproofing.
- .5 Ducts, piping and other items that would interfere with the application of fireproofing shall not be installed, until application is completed.

## **1.9 APPLICATION PARAMETERS**

- .1 The fireproofing contractor shall be allowed to move freely to apply products as necessary. Materials stored on the floor, shall be protected by the contractor, or relocated if these materials prevent the proper application of fireproofing.
- .2 Patching, repairing and cleaning of fireproofing, due to damage done by others, shall be performed by the fireproofing applicator.
- .3 After completion of fireproofing, the fireproofing applicator shall remove all equipment, and broom sweep all floor areas of overspray materials.
- .4 Application of fireproofing shall not commence until the project is at a stage to allow the applicator to apply product continuously and efficiently, without undue interference and delay by other trades.
- .5 Conference: Convene a pre-installation conference to establish a procedure to maintain optimum working conditions and to coordinate this work with related an/or adjacent work.
- .6 Spray Applied Fire Resistive Materials (SFRM) shall be installed in accordance with NFCA – 100, “Standard Practice For The Application of Spray-Applied Fire Resistive Materials.

## 1.10 REFERENCED STANDARDS

- .1 ULC Fire Tests: Sprayed Fireproofing products must be tested and listed in compliance with the following National Standards of Canada
  - .1 CAN/ULC-S101, Standard Method of Fire Endurance Tests of Building construction and Materials.
  - .2 CAN/ULC-S102, Test for Surface Burning Characteristics
  
- .2 ASTM Fire Tests: Sprayed Fireproofing Products may be tested and listed in compliance with the following ASTM Testing Standards
  - .1 ASTM E 119, Fire Test of Building Construction and Materials (also known as UL 263).
  - .2 ASTM E 84, Test for Surface Burning Characteristics of Building Materials.
  
- .3 ASTM Physical Characteristics Standards
  - .1 **Noncombustibility**: ASTM E-136 Standard (Behavior of Materials in a Vertical Tube Furnace at 750° C). CAN/ULC-S114 is acceptable as well.
  - .2 **Density**: ASTM E-605 Standard for Thickness and Density of Sprayed Fire Resistive Materials Applied to Structural Members..
  - .3 **Adhesion/Cohesion**: ASTM E-736, Standard for Cohesion/Adhesion of Sprayed Fire Resistive Materials Applied to Structural Members.
  - .4 **Deflection**: ASTM E-759, Standard for Effect of Deflection of Sprayed Fire Resistive Materials Applied to Structural Members.
  - .5 **Impact**: ASTM E-760, Standard for Effect of Impact on Bonding of Sprayed Fire Resistive Materials Applied to Structural Members.
  - .6 **Compression**: ASTM E-761, Standard for Compressive Strength of Sprayed Fire Resistive Materials Applied to Structural Members.
  - .7 **Air Erosion**: ASTM E-859, Standard of Air Erosion on of Sprayed Fire Resistive Materials Applied to Structural Members.
  - .8 **Steel Substrate Corrosion**: ASTM E-937, Standard for Corrosion of Steel By Sprayed Fire Resistive Materials Applied to Structural Members.
  - .9 **Mold & Mildew Growth**: ASTM G-21, Standard for Determining Resistance of Materials to Fungi.
  
- .4 AWCI Inspection Standards: On-Site inspection of the sprayed fireproofing installation shall be conducted in accordance with: Technical Manual 12-A, Third Edition, "Standard Practice for the Testing and Inspection of Field Applied Sprayed Fire-Resistive Materials; an Annotated Guide".
  
- .5 NFCA 100 Standard Practice For The Application of Spray-Applied Fire Resistive Materials. NFCA 200 Quality Assurance Procedures for Application of Spray-Applied Fire Resistive Materials.

### **1.11 DOCUMENT SUBMITTALS**

- .1 Product Data: Submit manufacturer's product data, installation instructions, use and limitations for each material used, and applicable fire test designs, as listed by approved fire testing organization.
- .2 Fire Test Design Selection: Submit tested designs which apply to the project construction assemblies or details. The selected designs must have been tested in accordance with CAN/ULC-S101. The design selection priority must be respected, as follows:
  - .1 Direct reference: Use ULC tested designs which come from the ULC Fire Resistance Directory, or any UL design taken from the UL Fire Resistance Directory that is certified for Canada (cUL).
  - .2 If no designs are available from the CAN/ULC-S101 Canadian Test Standard, refer to any design tested upon the ASTM E-119 Testing Standard.
  - .3 If the project assembly or detail cannot be supported by any ULC, UL or ASTM tested design source, submit a technical proposal that best matches the project situations.
  - .4 Any alternate proposal must come from or be assisted by the Fireproofing manufacturer.
  - .5 Any structure system or element which does not meet the dimension requirements stated in the tested design must be protected by a thickness based upon its particular M/D Ratio.

### **1.12 WARRANTY**

- .1 General Warranty: Submit a written warranty, executed by the contractor and cosigned by the installer, agreeing to repair or replace sprayed fireproofing materials that fall within the specified warranty period.
  - .1 Failures include, but are not limited to cracking, flaking, eroding in excess of specified requirements, peeling and delaminating of sprayed fireproofing from substrates due to defective materials or installation.
  - .2 Not covered in this warranty are failures due to damage by others, such as occupants and owner maintenance personnel, exposure to environmental conditions other than those investigated and approved during fire-response testing, excessive flexing of floor systems, and work on said roof systems, and other causes not reasonable foreseeable under conditions of normal use.
- .2 Warranty Period: 1 (ONE) year, from date of substantial completion.

### **1.13 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver materials to the project in manufacturer's unopened packages, fully identified as to trade name, type, and other identifying data. Packaging shall bear the ULI or ITS labels and seals for fire resistance ratings.
- .2 Store materials at a temperature above 40 degrees F (4 degrees C) in a dry location, protected from the weather.

- .3 Damaged packages found unsuitable for use and any materials which have come into contact with contaminants prior to use shall be rejected and removed from the project.

## **Part 2 Products**

### **2.1 GENERAL**

- .1 All products shall be cementitious fireproofing materials. Physical properties shall be in accordance with below listed properties. Products shall be a proprietary mixture of gypsum and/or Portland cement, with lightweight\*\* aggregates, mixed with water to form a slurry for conveyance and application. Mineral fiber based products are not permitted.

### **2.2 STANDARD DENSITY CEMENTITIOUS FIREPROOFING**

- .1 Intended for Interior concealed locations or interior exposed but out of reach locations, and therefore not subjected to physical contact or abuse.

#### Physical Properties

- .1 CAN/ULC-S102 (or ASTM E 84): Flame Spread, 0 and Smoke Developed, 0, maximum.
  - .2 CAN/ULC-S114 (or ASTM E 136): Passes, and is determined non – combustible.
  - .3 ASTM E 605: Density shall be a minimum of 240 kg/m<sup>3</sup> [15 pcf].
  - .4 ASTM E 736: Cohesion/Adhesion shall be 9.5 kPa [200 psf], with 7.2 kPa (150 psf) minimum acceptable level; if primed steel is used, comply with requirements published by ULC / ULI.
  - .5 ASTM E 759: No cracking, spalling or delamination
  - .6 ASTM E 760: Impact: No delamination, cracking or spalling
  - .7 ASTM E 761: Compression shall be 112 kPa [500 psf] @ 10% deformation, minimum.
  - .8 ASTM E 859: Air Erosion shall be 0.00 g/sq.ft.
  - .9 ASTM E 937: No evidence of corrosion
  - .10 ASTM G 21: Mold Resistance: No evidence of growth
- .2 Acceptable Cementitious Products: TYPE 5GP™ as manufactured by A/D Fire Protection Systems (Canadian Licensee) and Southwest Fireproofing Products (original manufacturer), or approved equal.
- .3 Structural members not meeting minimum size requirements specified in a design shall receive a thickness of fireproofing consistent with the member's M/D ratio.
- .4 Exposed fire protection shall include, but are not limited to the following areas:
- .1 Beams, steel deck and floor joists where noted.

### **2.3 MISCELLANEOUS MATERIALS**

- .1 Provide the following items as standard procedure with each of the fireproofing systems, as recommended by the manufacturer for each condition and substrate.

- .2 Primers: Recommended Steel Primers as being listed on UL's Directory Category CGJM, or any primer for which adhesion/cohesion capabilities of the sprayed fire resistive material has been verified by the fireproofing manufacturer.
  
- .3 Adhesives: Provide adhesive as necessary to comply with fireproofing manufacturers' and fire test design requirements. Acceptable adhesives are:
  - .1 General: **TC-55™** water based acrylic adhesive, as manufactured by A/D Fire Protection systems.
  - .2 Per Fire Test Design and as required for all Steel Roof Decks: **Type DK™** Cementitious Spatter Coat, as manufactured by A/D Fire Protection Systems / Carboline,
  - .3 Or approved equal.
  
- .4 Lath: Provide expanded metal lath for areas where adhesion to substrate is questionable, for boxed applications, to comply with ULC/UL requirements for application to primer or painted steel, or as otherwise required by the fire test design information.
  
- .5 Reinforcements: Provide fiberglass mesh or wire lath for areas where adhesion is not compatible and for application of fireproofing to steel joists.
  
- .6 Mold Inhibitor: Provide factory added mold inhibitor tested in accordance with ASTM G 21 for areas such as hospitals, testing laboratories, health facilities and other areas of hygienic requirements.
  
- .7 Top Coats: Use as required and recommended by fireproofing manufacturer or compatible products.

## **2.4 MISCELLANEOUS SURFACE TREATMENTS**

- .1 Finished Surface Treatment: Use as required by architect and recommended by fireproofing manufacturer or compatible products.
  - .1 **TC-55™** spray applied latex-based elastomeric economical Surface Sealer/Hardener, as manufactured by A/D Fire Protection Systems / Carboline. Use at a rate recommended by the manufacturer for a medium coat.
  
- .2 Impact-Resistant Surface Treatment: Spray-On Polymerized Extra High Density Cementitious Surface Cladding Product to be applied over sprayed cementitious fireproofing.
  - .1 Acceptable Product: **Type HC™** (HARD CLAD) as manufactured by A/D Fire Protection Systems / Carboline and Southwest Fireproofing Products or approved equal.

## **Part 3 Execution**

### **3.1 PRE-INSTALLATION EXAMINATION**

- .1 The applicator and the contractor shall examine surfaces to be fire protected, and determined if the surfaces are satisfactory. Substrate conditions must comply with the following:

- .1 Substrates must be free of grease, oil, rolling compounds, incompatible primers, loose mill scale, dirt or any other foreign matter which would prevent proper bonding of fireproofing.
- .2 Structural steel shall be unprimed. Steel roof and floor decking shall be galvanized only.
- .3 Any objects such as hangers, piping attachments, and other suspended retainer devices shall be properly secured.
- .4 Ducts, piping, and other equipment shall not be placed or suspended until after application of the sprayed fireproofing materials.

### **3.2 PREPARATION**

- .1 Clean any substrate not ready to receive fireproofing. Consult with manufacturer if conditions exist that are not easily remedied.
- .2 Mask all work subjected to potential overspray during application. Provide temporary enclosure when necessary to temporarily confine fireproofing and protect the environment.
- .3 Assure maintenance of ambient temperatures, and/or heat and ventilation when required.
- .4 Apply the sprayed water-based or cementitious adhesive when necessary.

### **3.3 INSTALLATION, GENERAL**

- .1 Comply with manufacturers written application instructions and procedures for mixing, conveying and applying products, in accordance with the types of recommended equipment and specific procedures regarding the particular jobsite conditions.
- .2 If steel or concrete substrates have been coated with the sprayed water-based adhesive, apply the sprayed Fireproofing while the adhesive remains tacky.
- .3 Apply fireproofing materials to required thickness per approved fire test design information. Thicker applications may require multiple passes, allowing each coat to set between coats.
- .4 Provide a uniform surface matching ULC/cUL/UL design requirements. Apply product at the minimum density required by the fire test design, or greater.
- .5 Cure fireproofing to prevent premature drying if such site conditions apply.
- .6 Protect from freezing until cured - refer to Section 1.05 of this specification.

### **3.4 FIELD QUALITY CONTROL**

- .1 Testing Agency: The owner shall engage as ICC certified special inspector as the independent (third-party) testing agency to perform field quality inspections of applied fireproofing, and prepare reports.

- .2 Testing shall be done in accordance with the building code following procedure in AWCI Technical Manual 12-A, Third Edition, "Standard Practice for the Testing and Inspection of Field Applied Sprayed Fire-Resistive Materials; an Annotated Guide" and ASTM E 605.
- .3 Field Tests shall be done for [thickness] [and] [density].
- .4 Variances shall be corrected with the testing agency present, and while the applicator is performing work in the same area, to permit expedient corrections.
- .5 A schedule of tests to be performed shall be agreed upon by applicator, contractor and testing agency.

**3.5 CLEANING AND REPAIR**

- .1 After completion of each day's work, the applicator shall broom clean the area fireproofed. Finished surfaces that are not intended to receive fireproofing shall be masked.
- .2 All patching of damaged fireproofing shall be completed by the Fireproofing Trade Contractor.
- .3 Hand patches may be tolerated for very small-sized patches. Every patch over a square foot of area should be managed with spray equipment.

**3.6 SCHEDULE**

- .1 Fire resistance ratings, in hours, shall be as listed in the schedule/chart below, unless otherwise mentioned in the architectural drawings.

ELEMENT OR TYPE OF CONSTRUCTION	FIRE RESISTANCE RATINGS, hours) ***	FIRE TESTED DESIGN REFERENCE ****
Floor Assembly (Restrained)	1 hour	F818 + F906
Beams	1 hour	N809 + N810

**3.7 REFERENCES**

- .1 NFCA 100 Standard Practice For The Application of Spray-Applied Fire Resistive Materials
- .2 NFCA 200 Quality Assurance Procedures for Application of Spray-Applied Fire Resistive Materials

# TYPE FP

## 1. PRODUCT NAME:

A/D Type FP

## 2. PRODUCT DESCRIPTION

**Basic Use:** A/D Type FP is a sprayed fire resistive material intended for application to structural steel, concrete and other substrates. It provides excellent fire protection, thermal insulation and acoustic properties in one, high quality, 100% asbestos-free product.

### Composition and Materials:

A/D Type FP is a noncombustible blend of mineral wool, Portland cement and proprietary ingredients. Factory blended, it requires only the addition of water at the job site.

**Limitations:** A/D Type FP is not intended for direct exposure to weather or excessive physical abuse. Contact your A/D representative for alternative product recommendations.

**Packaging:** A/D Type FP is packaged in 18.6-kg (41 lb.) polyethylene bags.

**Color:** Grey.

## 3. TECHNICAL DATA

### Fire Resistance Ratings:

A/D Type FP has been subjected to numerous fire tests in accordance with CAN/ULC-S101 and ASTM E-119. Refer to ULC's "List of Equipment and Materials" and UL's "Fire Resistance Directory" for fire rated designs. Contact A/D for a list of current designs. See TABLE 4.

**Insulation:** As insulation, A/D Type FP provides a R value of R4 per inch ("K" value 0.25). This eliminates cold floors – for a much more comfortable environment – and also reduces energy costs. Being noncombustible, it needs no flame retardant additives and remains permanently fire resistive. Because of its sprayed joint-free application, it provides a continuous blanket of insulation, without thermal bridging through gaps and metal pins. And because it does not support fungus growth it is ideal for food storage. In tests by the ORTECH International (O.R.F), it maintained 97% of its thermal resistance in an environment with R.H. of 95%.

### Acoustical Treatment:

A/D Type FP can be applied to render a monolithic textured finish with high sound absorbency. Refer to Table 3.

**PHYSICAL PROPERTIES –TABLE 1**

Property/Test	A/D Type FP
Density, ASTM E605	10.1 lbs/ft <sup>3</sup> (165 kg/m <sup>3</sup> )
Combustibility, ASTM E136	Passed, noncombustible
Combustibility, CAN4-S114	Passed, noncombustible
Compressive Strength, ASTM E761	205lb/ft <sup>2</sup> (9.8 kPa)
Cohesion Adhesion, ASTM E736	203lb/ft <sup>2</sup> (9.7 kPa)
Impact, ASTM E760	Passed
Deflection, ASTM E759	Passed
Air Erosion, ASTM E859	0.02 g/ft <sup>2</sup> (0.235 g/m <sup>2</sup> ) @ 24hr
Surface Burning, ASTM E84	Flame Spread: 0, Smoke: 0

### Sound Isolation Data:

A/D Type FP is a highly efficient and low cost sound barrier. 1 inch (25 mm) of A/D Type FP can provide an STC up to 52. Cutouts for electrical boxes and joints are completely sealed by the spraying operation. The following STC values resulted when A/D Type FP was applied to the interior face of a partition consisting of a single layer of gypsum board on a metal or wood stud frame and tested in accordance with ASTM E90. Contact A/D for sound transmission loss data at specific frequencies.

**SOUND TRANSMISSION – TABLE 2**

Gypsum Board Thickness	A/D Type FP Thickness	STC
<b>2-1/2" (63 mm) metal studs, 24" (610 mm) O.C.</b>		
1/2" (13mm)	1/2" (13 mm)	45
1/2" (13mm)	7/8" (22 mm)	48
5/8" (16 mm)	3/4" (19 mm)	48
5/8" (16 mm)	1" (25 mm)	51
<b>2" x 4" (50x100 mm) wood studs, 16" (406 mm) O.C.</b>		
5/8" (16 mm)	1" (25 mm)	52

**SOUND ABSORPTION DATA - TABLE 3**

A/D Type FP Thickness	Mounting Method	Coefficient of Sound Absorption						NRC
		Frequency (Hertz)						
		125	250	500	1000	2000	4000	
3/8 in. (10 mm)	Solid	.28	.18	.28	.48	.74	.94	.45
1/2 in. (13 mm)	Solid	.28	.21	.42	.72	.92	1.04	.55
1 in. (25 mm)	Solid	.25	.37	.81	1.01	1.02	1.05	.80
1 in. (25 mm)	Metal Lath	.35	.96	1.03	.95	.96	1.05	1.00

Tests carried out by the National Research Council of Canada in Ottawa, Nov. 8, 1989

**4. INSTALLATION**

**Surface Preparation:**

Surfaces to receive A/D Type FP must be free of dirt, oil, grease, loose scale or other substances that may impair adhesion. Surfaces may be sprayed with Type TC55 adhesive per design requirements. Hangers, clips or other attachments must be in place prior to fireproofing application.

**Method:**

A/D Type FP is applied only by authorized applicators using specific "dry-mix" type fireproofing equipment.

**5. FINISHES**

A/D Type FP finishes vary according to particular end use requirements and application techniques. For normal fireproofing installations the product is

sprayed to the required density and water tamped. Where a harder finish is required the product may be board tamped and / or sealed at additional cost.

**6. AVAILABILITY AND COST**

**Availability:** A/D sales offices and technical representatives are located throughout North America

**7. MAINTENANCE**

No maintenance should be required. Damaged caused by other trades should be patched at the expense of trade causing damage.

**8. TECHNICAL SERVICE**

Please contact your nearest A/D representative or office

**ULI and ULC FIRE TEST DESIGNS - TABLE 4**

Construction Type	Rating(s), hours					Design No.	
	1	1.5	2	3	4	ULI	ULC
Protected Floor	-	U	U	R	-	D838	
	-	-	B	-	-		D842
	U	-	B	-	-		D848
	-	U	U	B	-	D849	D849
	U	-	B	-	-	D852	
	U	U	U	R	-	D863*	
	-	-	-	B	-		F803
	-	-	-	B	-		F804
	-	U	U	B	-		F808
	-	U	B	-	-		F809
	-	U	B	-	-		F811
	U	U	R	R	-	D864*	F817*
	B	-	-	-	-		F818*
Unprotected Floor	B	B	B	B	-	D918	
	B	B	R	R	-		F906*
Concrete Floor	B	B	R	-	-		I800*
Beams	U	-	U	U	-	N809	N809
	U	-	U	U	-	N810	N810
	U	U	U	-	-	N812	
Protected Roof	U	-	-	-	-	P824*	R806
	B	B	B	-	-	P828	
Metal Wall Assembly	B	B	B	B	B		W802*
Wide Flange Columns	B	B	B	B	B		Z805*
	-	-	B	B	B	X808	X820*
	-	-	B	B	B	X813	X821*
	-	-	B	B	B	X819	X822*
Pipe and Tube Columns	B	B	B	-	-		Z806*
	B	B	B	-	-		Z807*
	B	B	B	B	B		Z810

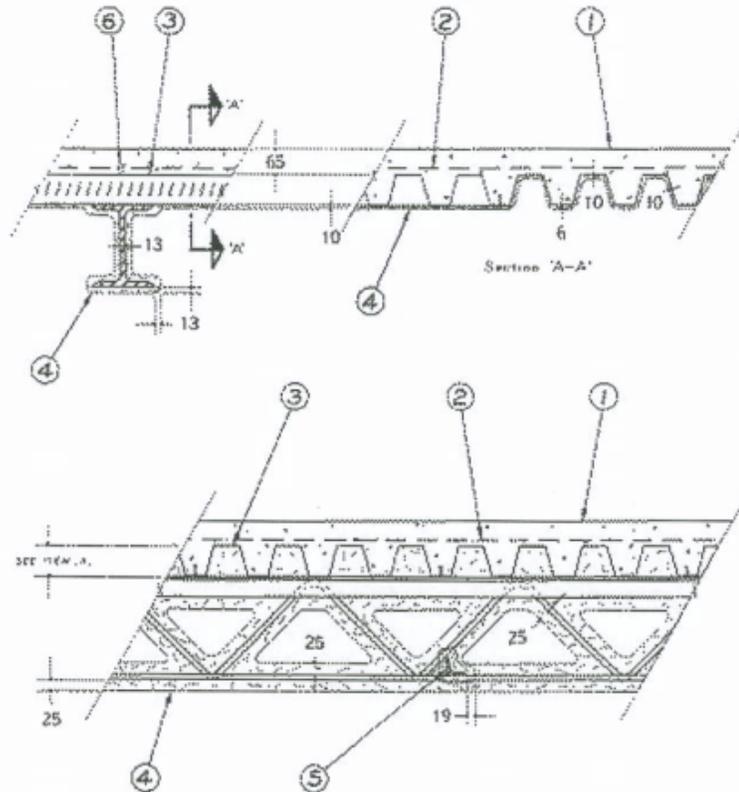
R = Restrained  
 U = Unrestrained  
 B = Both R and U

\* Our most frequently referenced designs are asterisked.



Head Office: 420 Tapscott Rd., Scarborough, Ontario M1B 1Y4  
 Tel: 800-263-4087 or 416-292-2361 Fax: 416-298-5887  
 Western & Central Canada: Tel: 800-650-0881, Fax: 613-841-7768  
 Eastern Canada: Tel: 800-914-6506, Fax: 450-661-8776  
[www.adfire.com](http://www.adfire.com)

ULC Design No. F818  
April 01, 2003  
Restrained Assembly Rating - 1 h  
Unrestrained Assembly Rating - 1 h  
Unrestrained Beam Rating - (See Table Below)



1. **Normal-Density or Low-Density Concrete** - Normal-density concrete, carbonate or siliceous aggregate,  $242\pm 50 \text{ kg/m}^3$ , 21 MPa nom compressive strength. Low-density concrete, expanded shale, clay, or slate aggregate by rotary kiln method,  $184\pm 50 \text{ kg/m}^3$ , 21 MPa nom compressive strength; or expanded blast furnace slag aggregate,  $1955\pm 50 \text{ kg/m}^3$  density, 21 MPa nom. compressive strength.
2. **Wire Fabric** - 152x152 P18.7/P18.7 steel wire.
3. **Steel Floor Units** - (Guide No. 40 U18.19). Composite or noncomposite floor units, all 0.76 mm thick fluted sections or alternating one 915 mm or 610 mm wide 0.76 mm fluted section to a maximum of one 610 mm wide 0.91 mm cellular section. Units welded to supports with 20 mm diam welds spaced at every other trough. Adjacent units crimped along joints at 450 mm OC. See individual manufacturer's listing for profiles that may be used in this design.

LES ACIERS CANAM, DIV OF LE GROUPE  
CANAM MANAC INC  
FLYNN CANADA LTD  
VICWEST CORP

ULC Design F818 continued...

- 4(a). **Spray-Applied Fire-Resistive Material** - (Guide No. 40 U18.6). "A/D Type FP" fibre for application with or without adhesive to steel surfaces in thicknesses indicated above. Fibre to have a min. average dry density of 165 kg/m<sup>3</sup> with a min individual value of 145 kg/m<sup>3</sup>. For method of density determination, refer to General Information Section under heading "Fire Resistance Ratings". Steel surfaces must be clean and free of dirt, loose scale and oily deposits.

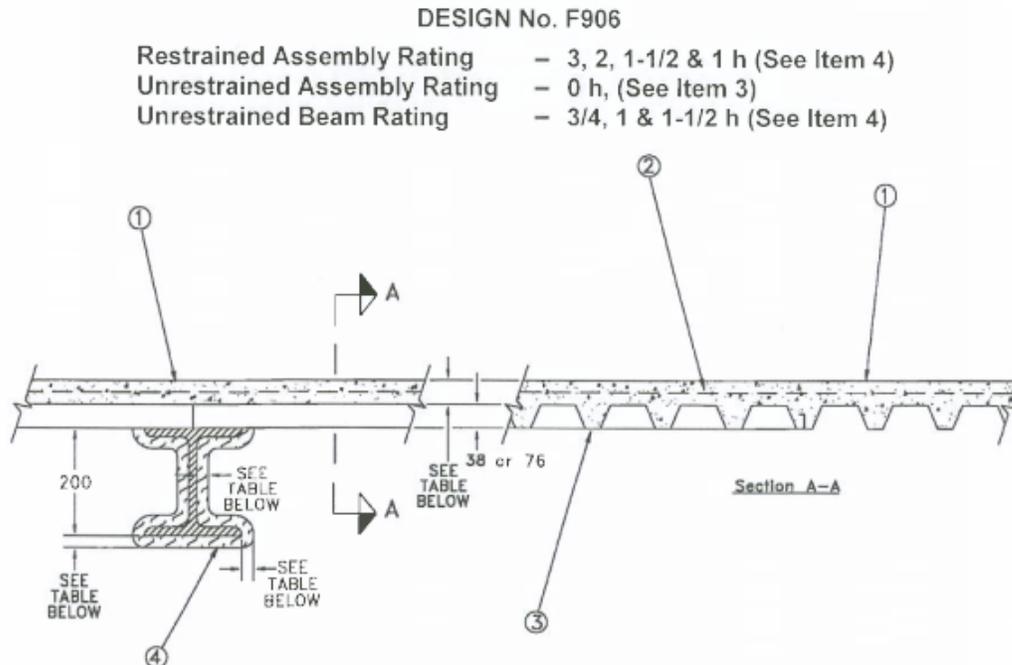
OR

- 4(b). **Spray-Applied Fire-Resistive Material** - (Guide No. 40 U18.6). "A/D Type 5" spray-applied fire-resistive material for application with or without adhesive to steel surfaces in thicknesses indicated above (fluted units only). Mixture to have a min average dry density of 272 kg/m<sup>3</sup> with a min individual value of 248 kg/m<sup>3</sup>. For method of density determination, refer to General Information Section under heading "Fire Resistance Ratings". Steel surfaces must be clean and free of dirt, loose scale and oily deposits.

**A/D FIRE PROTECTION SYSTEMS INC**

5. **Bridging** - Designed in accordance with the relevant provisions of Part 4 of the National Building Code of Canada, protected with 19 mm min "A/D Type FP" spray-applied fire-resistive material (Item 4a) with a min. average density of 165 kg/m<sup>3</sup>, or "A/D Type 5" spray-applied fire-resistive material (Item 4b) with a min. average density of 272 kg/m<sup>3</sup>.
6. **Shear Connectors** - (optional) - Studs, 13 mm dia. by 100 mm long, headed type. Welded to top flange of beam through the deck.

Unrestrained Beam Rating, h	Description of Beam
1	W200x31, min size
1	250 mm deep, open web steel joist, 9 kg/m min size, designed in accordance with the relevant provisions of Part 4 of the National Building Code of Canada.



**Beam – W200x42, Minimum Size.** (For Spray-Applied Fire-Resistive Material, see Item 4a or b);

**Beam – W150x18 and W150x37, Minimum Size.** (For Thin-Film Intumescent Coating, see Item 4c).

**1. Normal-Density or Low-Density Concrete** – Normal-density concrete, carbonate or siliceous aggregate,  $2400 \pm 50 \text{ kg/m}^3$  density, 24 MPa nominal compressive strength. Low-density concrete, expanded shale, clay or slate aggregate by rotary kiln method,  $1760 \pm 50 \text{ kg/m}^3$  density, 24 MPa nominal compressive strength, or, expanded blast furnace slag aggregate,  $1955 \pm 50 \text{ kg/m}^3$  density, 24 MPa nominal compressive strength.

**2. Wire Fabric** – 152 by 152 MW9.1xMW9.1 wire mesh.

• **3. Steel Floor Units** – (Guide No. 40 U18.19). Composite or noncomposite floor units. Any combination of 0.76 mm thick fluted sections or 0.91/0.91 mm thick cellular sections, welded to supports with 19 mm puddle welds spaced 300 mm OC. Adjacent units button punched or welded 915 mm OC along side joints. When the maximum clear span of the steel floor units is less than or equal to the tested span of 2900 mm, the unrestrained assembly rating is increased to 3/4 h, 1 h or 1-1/2 h to match the unrestrained beam rating.

See individual manufacturer's listing for those profiles that may be used in this Design.

CMRM, a Division of the RollForm Group of Samuel Manu-Tech Inc.

LES ACIERS CANAM, Division de le Groupe Canam Manac Inc.

PEERLESS ENTERPRISES, Division of Tectum Limited

VICWEST, a Division of Jenisys Engineered Products

continued...

- **4. (a) Spray-Applied Fire-Resistive Material** – (Guide No. 40 U18.6). Fibre material (A/D Type FP) applied to minimum W200x42 steel beam surfaces that are clean and free of dirt, loose scale or oily deposits. Applied to the thickness indicated below. When fluted steel floor units are used, the space between the units and top flange of the beam shall be filled. Fibre to have a minimum average dry density of 165 kg/m<sup>3</sup> with no individual value less than 145 kg/m<sup>3</sup>. For method of density determination, refer to General Information Section under heading "Fire Resistance Ratings".

A/D FIRE PROTECTION SYSTEMS

Restrained Assembly Rating, h	Unrestrained Assembly Rating, h	Unrestrained Beam Rating, h	Min Concrete Cover Thickness, mm		Min Thickness of Spray-Applied Fire-Resistive Material on Beam, mm
			Normal-Density	Low-Density	
3	0 (see Item 3)	1-1/2	140	110	22
2	0 (see Item 3)	1	114	85	13
1-1/2	0 (see Item 3)	1	100	71	13
1	0 (see Item 3)	1	83	64	13

OR

- (b) **Spray-Applied Fire-Resistive Material** (see table below) – (Guide No. 40 U18.6). "A/D Type 5" spray-applied fire-resistive material for application with or without adhesive to steel surfaces in thicknesses indicated above and in the following table (fluted units only). Mixture to have a minimum average dry density of 272 kg/m<sup>3</sup> with a minimum individual value of 248 kg/m<sup>3</sup>. Area between fluted and top flange of beam to be filled. For method of density determination, refer to General Information Section under heading "Fire Resistance Ratings". Steel surfaces must be clean and free of dirt, loose scale and oily deposits.

A/D FIRE PROTECTION SYSTEMS

Restrained Assembly Rating, h	Unrestrained Assembly Rating, h	Unrestrained Beam Rating, h	Min Concrete Cover Thickness, mm		Min Thickness of Spray-Applied Fire-Resistive Material on Beam, mm
			Normal-Density	Low-Density	
3	0 (see Item 3)	1-1/2	140	110	22
2	0 (see Item 3)	1	114	85	13
1-1/2	0 (see Item 3)	1	100	71	13
1	0 (see Item 3)	1	83	64	13

OR

- (c) **Thin-Film Intumescent Coatings** – (Guide No. 40 U18.12.9). Intumescent coating designated "A/D FIREFILM®II" applied to steel beams in accordance with manufacturer's instructions to the minimum dry film thicknesses shown below:

A/D FIRE PROTECTION SYSTEMS

continued...

**For W150x18**

Restrained Assembly Rating, h	Unrestrained Assembly Rating, h	Unrestrained Beam Rating, h	Min Concrete Cover Thickness, mm		Min Dry Thickness of A/D FIREFILM <sup>®</sup> II on Beam, mm
			Normal- Density	Low- Density	
2	0 (see Item 3)	1	114	85	1.65
1-1/2	0 (see Item 3)	1	100	71	1.65
1	0 (see Item 3)	1	83	64	1.65
3/4	0 (see Item 3)	3/4	83	64	1.14

**For W150x37**

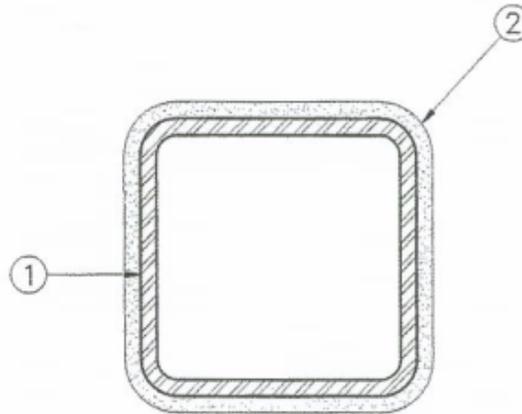
Restrained Assembly Rating, h	Unrestrained Assembly Rating, h	Unrestrained Beam Rating, h	Min Concrete Cover Thickness, mm		Min Dry Thickness of A/D FIREFILM <sup>®</sup> II on Beam, mm
			Normal- Density	Low- Density	
1-1/2	0 (see Item 3)	1	114	85	1.14
1	0 (see Item 3)	1	83	64	1.14

**5. Shear Connectors** (optional) (not shown) – Studs 13 mm diameter by 100 mm long, headed type. Welded to top flange of beam through steel floor units.

**6. Finish Coating** (not shown) – Silicon alkyd designated "A/D COLORCOAT<sup>®</sup>" topcoat applied over intumescent coating (Item 4c) to maximum thickness of 0.05 mm.

**ULC Design No. Z629**  
 November 25, 2005

Ratings – 3/4, 1, 1-1/2, 2 and 3 h (See Item 2)



1. **Steel Column** — Square, hollow structural section (HSS) with M/D as specified in Item 2. All columns should be free of dirt, loose scale and oily deposits.

2. **Thin-Film Intumescent Coatings** — CAVCC (Guide No. 40 U18.12.9). Intumescent coating designated "A/D FIREFILM III", applied in accordance with manufacturer's instructions to the minimum dry film thicknesses shown below. Column surfaces should be primed as per manufacturer's instructions.

Ratings, h	Min Column Size, mm	Min M/D	Required Min Dry Film Thickness, mm
3/4	HSS 203 x 203 x 13 mm	90	0.89
1	HSS 203 x 203 x 13 mm	90	1.14
1-1/2	HSS 203 x 203 x 13 mm	90	2.40
2	HSS 203 x 203 x 13 mm	90	4.72
3	HSS 203 x 203 x 13 mm	90	8.22

M = Mass of column section, kg/m.

D = Heated perimeter of column section, m.

**A/D FIRE PROTECTION SYSTEMS INC**

3. **Finish Coating** – (not shown) – Silicone alkyd paint designated "A/D COLORCOAT".

**END OF SECTION**

**Part 1            General**

**1.1            SECTION INCLUDES**

- .1            Materials, preparation and application for caulking and sealants for all divisions.

**1.2            RELATED SECTIONS**

- .1            Section 01 33 00 - Submittal Procedures.
- .2            Section 01 45 00 - Quality Control.
- .3            Section 01 61 00 - Common Product Requirements.

**1.3            REFERENCES**

- .1            American Society for Testing and Materials International, (ASTM)
  - .1            ASTM C919-02, Standard Practice for Use of Sealants in Acoustical Applications.
- .2            Canadian General Standards Board (CGSB)
  - .1            CGSB 19-GP-5M-1984, Sealing Compound, One Component, Acrylic Base, Solvent Curing (Issue of 1976 reaffirmed, incorporating Amendment No. 1).
  - .2            CAN/CGSB-19.13-M87, Sealing Compound, One-component, Elastomeric, Chemical Curing.
  - .3            CGSB 19-GP-14M-1984, Sealing Compound, One Component, Butyl-Polyisobutylene Polymer Base, Solvent Curing (Reaffirmation of April 1976).
  - .4            CAN/CGSB-19.17-M90, One-Component Acrylic Emulsion Base Sealing Compound.
  - .5            CAN/CGSB-19.24-M90, Multi-component, Chemical Curing Sealing Compound.
- .3            Department of Justice Canada (Jus)
  - .1            Canadian Environmental Protection Act, 1999 (CEPA).
- .4            General Services Administration (GSA) - Federal Specifications (FS)
  - .1            FS-SS-S-200-E(2)1993, Sealants, Joint, Two-Component, Jet-Blast-Resistant, Cold Applied, for Portland Cement Concrete Pavement.
- .5            Health Canada/Workplace Hazardous Materials Information System (WHMIS)
  - .1            Material Safety Data Sheets (MSDS).
- .6            Transport Canada (TC)
  - .1            Transportation of Dangerous Goods Act, 1992 (TDGA).

#### **1.4 SUBMITTALS**

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Manufacturer's product to describe.
  - .1 Caulking compound.
  - .2 Primers.
  - .3 Sealing compound, each type, including compatibility when different sealants are in contact with each other.
- .3 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .4 Submit duplicate samples of each type of material and colour.
- .5 Cured samples of exposed sealants for each color where required to match adjacent material.
- .6 Submit manufacturer's instructions in accordance with Section 01 33 00 - Submittal Procedures.
  - .1 Instructions to include installation instructions for each product used.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver, handle, store and protect materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver and store materials in original wrappings and containers with manufacturer's seals and labels, intact. Protect from freezing, moisture, water and contact with ground or floor.

#### **1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

#### **1.7 PROJECT CONDITIONS**

- .1 Environmental Limitations:
  - .1 Do not proceed with installation of joint sealants under following conditions:
    - .1 When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4° C.
    - .2 When joint substrates are wet.
- .2 Joint-Width Conditions:
  - .1 Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.
- .3 Joint-Substrate Conditions:
  - .1 Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

## **1.8 ENVIRONMENTAL REQUIREMENTS**

- .1 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of Material Safety Data Sheets (MSDS) acceptable to Labour Canada.
- .2 Conform to manufacturer's recommended temperatures, relative humidity, and substrate moisture content for application and curing of sealants including special conditions governing use.

## **1.9 WARRANTY**

- .1 Contractor hereby warrants that caulking will not leak, crack, crumble, melt, shrink, run, loose adhesion, or stain adjacent surfaces for a period of three (3) years after substantial completion.

## **Part 2 Products**

### **2.1 SEALANT MATERIALS**

- .1 Do not use caulking that emits strong odours, contains toxic chemicals or is not certified as mould resistant in air handling units.
- .2 When low toxicity caulks are not possible, confine usage to areas which offgas to exterior, are contained behind air barriers, or are applied several months before occupancy to maximize offgas time.
- .3 Where sealants are qualified with primers use only these primers.

### **2.2 SEALANT SELECTION**

- .1 Perimeters of exterior openings where frames meet exterior facade of building (i.e. brick, block, precast masonry): **Sealant type: Vulkem 921 by Tremco.**
- .2 Control and expansion joints in exterior surfaces of unit masonry walls: Sealant type: **Vulkem 911 by Tremco.**
- .3 Seal interior perimeters of exterior openings as detailed on drawings: Sealant type: **Vulkem 921 by Tremco.**
- .4 Expansion and control joints on the interior of exterior precast, architectural wall panels: **Sealant type: Vulkem 911 by Tremco.**
- .5 Joints of underside of precast beams or planks: Sealant type: **Vulkem 911 by Tremco.**
- .6 Control and expansion joints on the interior of exterior surfaces of unit masonry walls: Sealant type: **Vulkem 911 by Tremco.**

- .7 Interior control and expansion joints in floor surfaces: Sealant type: **Vulkem 911 by Tremco.**
- .8 Perimeters of interior frames, as detailed and itemized: Sealant type: **Vulkem 921 by Tremco.**
- .9 Interior masonry vertical control joints (block-to-block, block-to-concrete, and intersecting masonry walls): Sealant type: **Vulkem 911 by Tremco.**
- .10 Perimeter of bath fixtures (e.g. sinks, tubs, urinals, stools, waterclosets, basins, vanities): Sealant type: **Tremsil 200 by Tremco.**
- .11 Music Room – Practice Rooms, masonry concrete blocks, both sides of wythes to underside of steel roof deck complete room perimeter: Sealant Type – **Acoustical Sealant - Tremco**

### **2.3 JOINT CLEANER**

- .1 Non-corrosive and non-staining type, compatible with joint forming materials and sealant recommended by sealant manufacturer.
- .2 Primer: as recommended by manufacturer.

### **Part 3 Execution**

#### **3.1 PROTECTION**

- .1 Protect installed Work of other trades from staining or contamination.

#### **3.2 SURFACE PREPARATION**

- .1 Examine joint sizes and conditions to establish correct depth to width relationship for installation of backup materials and sealants.
- .2 Clean bonding joint surfaces of harmful matter substances including dust, rust, oil grease, and other matter which may impair Work.
- .3 Do not apply sealants to joint surfaces treated with sealer, curing compound, water repellent, or other coatings unless tests have been performed to ensure compatibility of materials. Remove coatings as required.
- .4 Ensure joint surfaces are dry and frost free.
- .5 Prepare surfaces in accordance with manufacturer's directions.

**3.3 PRIMING**

- .1 Where necessary to prevent staining, mask adjacent surfaces prior to priming and caulking.
- .2 Prime sides of joints in accordance with sealant manufacturer's instructions immediately prior to caulking.

**3.4 BACKUP MATERIAL**

- .1 Apply bond breaker tape where required to manufacturer's instructions.
- .2 Install joint filler to achieve correct joint depth and shape, with approximately 30% compression.

**3.5 MIXING**

- .1 Mix materials in strict accordance with sealant manufacturer's instructions.

**3.6 APPLICATION**

- .1 Sealant.
  - .1 Apply sealant in accordance with manufacturer's written instructions.
  - .2 Mask edges of joint where irregular surface or sensitive joint border exists to provide neat joint.
  - .3 Apply sealant in continuous beads.
  - .4 Apply sealant using gun with proper size nozzle.
  - .5 Use sufficient pressure to fill voids and joints solid.
  - .6 Form surface of sealant with full bead, smooth, free from ridges, wrinkles, sags, air pockets, embedded impurities.
  - .7 Tool exposed surfaces before skinning begins to give slightly concave shape.
  - .8 Remove excess compound promptly as work progresses and upon completion.
- .2 Curing.
  - .1 Cure sealants in accordance with sealant manufacturer's instructions.
  - .2 Do not cover up sealants until proper curing has taken place.
- .3 Cleanup.
  - .1 Clean adjacent surfaces immediately and leave Work neat and clean.
  - .2 Remove excess and droppings, using recommended cleaners as work progresses.
  - .3 Remove masking tape after initial set of sealant.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 04 21 13 - Brick Masonry
- .2        Section 04 22 00 – Concrete Masonry
- .3        Section 05 41 00 – Light Gauge Structural Framing
- .4        Section 07 92 10 - Joint Sealing
- .5        Section 08 44 13 – Glazed Aluminum Curtain Walls
- .6        Section 08 80 50 – Glazing and Mirrors
- .7        Section 08 71 10 – Finish Hardware
- .8        Section 09 91 13 - Painting.
- .9        Section 26: Electronic Safety and Security.

**1.2                REFERENCES**

- .1        American Society for Testing and Materials (ASTM International)
  - .1        ASTM A653/A653M-01a, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .2        ASTM B29-92(1997), Specification for Refined Lead.
  - .3        ASTM B749-97, Specification for Lead and Lead Alloy Strip, Sheet and Plate Products.
- .2        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-1.181-99, Ready-Mixed Organic Zinc-Rich Coating.
  - .2        CGSB 41-GP-19Ma-84, Rigid Vinyl Extrusions for Windows and Doors.
- .3        Canadian Standards Association (CSA International)
  - .1        G40.20/G40.21-98, General Requirements for Rolled or Welded Structural Quality Steel/Structural Quality Steel.
  - .2        CSA W59-M1989(R2001), Welded Steel Construction (Metal Arc Welding) (etric Version).
- .4        Canadian Steel Door Manufacturers' Association, (CSDMA).
  - .1        CSDMA, Specifications for Commercial Steel Doors and Frames, 1990.
  - .2        CSDMA, Recommended Selection and Usage Guide for Commercial Steel Doors, 1990.
- .5        National Fire Protection Association (NFPA)
  - .1        NFPA 80-2007, Standard for Fire Doors and Fire Windows.
  - .2        NFPA 252-2008, Standard Methods of Fire Tests of Door Assemblies.

- .6 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN4-S104-M80 (R1985), Fire Tests of Door Assemblies.
  - .2 CAN4-S105-85 (R1992), Fire Door Frames Meeting the Performance Required by CAN4-S104.
  - .3 CAN4-S106-M80, Standard Method for Fire Tests of Window and Glass Block Assemblies.
- .7 CAN/ULC-S701-01, Thermal Insulation, Polystyrene, Boards and Pipe Covering.
- .8 CAN/ULC-S702-97, Thermal Insulation, Mineral Fibre, for Buildings.
- .9 CAN/ULC-S704-01, Thermal Insulation, Polyurethane and Polyisocyanurate Boards, Faced.

### **1.3 DESIGN REQUIREMENTS**

- .1 Design exterior frame assembly to accommodate to expansion and contraction when subjected to minimum and maximum surface temperature of -35°C to 35°C.
- .2 Maximum deflection for exterior steel entrance screens under wind load of 1.2 kPa not to exceed 1/175th of span.

### **1.4 SUBMITTALS**

- .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Indicate each type of door, material, steel core thicknesses, mortises, reinforcements, location of exposed fasteners, openings, glazing, louvres, arrangement of hardware and fire rating and finishes.
- .3 Indicate each type of frame material, core thickness, reinforcements, glazing stops, location of anchors and exposed fastenings, reinforcing, firerating and finishes.
- .4 Include schedule identifying each unit, with door marks and numbers relating to numbering on drawings and door schedule.
- .5 Submit test and engineering data, and installation instructions.

### **1.5 REQUIREMENTS**

- .1 Steel fire rated doors and frames: labeled and listed by an organization accredited by Standards Council of Canada in conformance with CAN4-S104M for ratings specified or indicated.
- .2 Provide fire labeled frame products for those openings requiring fire protection ratings, as scheduled. Test products in strict conformance with CAN4-S104, and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Exterior Steel Doors:
    - .1 Doors to be fabricated from tension levelled steel to ASTM A924-97(M-galvanized to ASTM A653-97(M-97), Commercial Steel (CS), Type B, coating designation A40 (ZF120), known commercially as paintable Galvanneal.
  - .2 Exterior Steel Doors:
    - .1 Doors to be fabricated from tension levelled steel to ASTM A924-97(M-97), galvanized to ASTM A653-97(M-97), coating designation A40 (ZF 120), known commercially as Galvaneel.
  - .3 Steel Frames:
    - .1 Frame product to be fabricated from tension levelled steel to ASTM A924-97(M-97), galvanized to ASTM A653-97(M-97), Commercial Steel (CS), Type B, coating designation A40 (ZF120), known commercially as paintable Galvanneal.
  - .4 Acoustic Doors:
    - .1 1 3/4" Sound-Tech Express Acoustical Door System by Ceco Door-Assa Abloy. Factory glazed systems, acoustical steel glass kit, STC 40, complete with perimeter sound seals, bottom seals, and thresholds to sizes shown on door schedule. Model N8/48, 16 gauge zinc coated steel, prime painted and "colour style" finish coat. Colour by Architect, Standard Colour Range.
    - .2 Frames, 16ga, double rabbet profile continuous welded construction.  
Acceptable Products:  
MBico: 1-888-423-2224  
Ceco Door/ Assa Abloy: 416-749-2111 Ext. 4229
  - .4 Acceptable Materials: Fleming + Baron, Steelcraft or approved alternate.
- 2.2 DOOR CORE MATERIALS**
- .1 Honeycomb construction:
    - .1 Structural small cell, 24.5 mm (1") maximum kraft paper 'honeycomb', weight: 36.3 kg (80 lb.) per ream minimum, density: 16.5 kg/m3 (1.03 pcf) minimum sanded to required thickness.

- .2 Stiffened: face sheets welded core.
  - .1 Fibreglass: to CAN/ULC-S702, semi-rigid density 24 kg/m<sup>3</sup>.
  - .2 Expanded polystyrene: Rigid extruded, fire retardant, closed cell, Type 1, density 16 to 32 kg/m<sup>3</sup> (1 to 2 pcf), thermal values, RSI 1.06, (R6.0), (minimum), conforming to CAN/ULC-S701.
  - .3 Polyisocyanurate: rigid foam, closed cell, faced board, thermal value RSI 2.17 (R12.3), (minimum), density 32 kg/m<sup>3</sup> conforming to CAN/ULC-S704.
- .3 Temperature rise rated (TRR):
  - .1 Solid slab core of non-combustible, inorganic composite to limit temperature rise on the "unexposed" side of door to 250°C at 60 minutes.
  - .2 Core to be tested as part of a complete door assembly, in accordance with CAN4-S104, ASTM E152 or NFPA 252, covering Standard Method of Tests of Door Assemblies and listed by nationally recognized testing agency having factory inspection service.

### **2.3 ADHESIVES**

- .1 Honeycomb cores and steel components: heat resistant, spray grade, resin reinforced neoprene/rubber (polychloroprene) based, low viscosity, contact cement.
- .2 Polystyrene and polyurethane cores: heat resistant, epoxy resin based, low viscosity, contact cement.
- .3 Lock-seam doors: fire resistant, resin reinforced polychloroprene, high viscosity, sealant/adhesive.

### **2.4 PRIMER**

- .1 Touch-up prime CAN/CGSB-1.181.

### **2.5 PAINT**

- .1 Field paint steel doors and frames in accordance with Sections 09 91 13 - Painting. Protect weatherstrips from paint. Provide final finish free of scratches or other blemishes.

### **2.6 ACCESSORIES**

- .1 Door silencers: single stud rubber/neoprene type.
- .2 Exterior and interior top and bottom caps: steel.
- .3 Fabricate glazing stops as formed channel, minimum 16 mm height, accurately fitted, butted at corners and fastened to frame sections with counter-sunk oval head sheet metal screws.
- .4 Door bottom seal: as per hardware schedule.
- .5 Metallic paste filler: to manufacturer's standard.

- .6 Fire labels: metal riveted.
- .7 Sealant: As per Section 07 92 10.
- .8 Glazing: As per Section 08 80 50.
- .9 Make provisions for glazing as indicated and provide necessary glazing stops.
  - .1 Provide removable stainless steel glazing beads for use with glazing tapes and compounds and secured with countersunk stainless steel screws.
  - .2 Design exterior glazing stops to be tamperproof and provide Thermal Lite Kits to accommodate glazing units.

## **2.7 FRAMES FABRICATION GENERAL**

- .1 Fabricate frames in accordance with CSDMA specifications.
- .2 Fabricate frames to profiles and maximum face sizes as indicated.
- .3 Exterior frames: 16 gauge reinforced with vertical stiffeners fully welded at 150mm (0.5") on centre.
- .4 Interior frames: 16 gauge with mechanically interlocked longitudinal edges.
- .5 Blank, reinforce, drill and tap frames for mortised, templated hardware, and electronic hardware using templates provided by finish hardware supplier. Reinforce frames for surface mounted hardware.
- .6 Protect mortised cutouts with steel guard boxes.
- .7 Prepare frame for door silencers. Install three (3) on strike jamb for single door and two (2) on head for double doors.
- .8 Manufacturer's nameplates on frames and screens are not permitted.
- .9 Conceal fastenings except where exposed fastenings are indicated.
- .10 Provide factory-applied touch up primer at areas where zinc coating has been removed during fabrication.
- .11 Insulate exterior frame components with polyurethane insulation.
- .12 Exterior frames to be thermally broken.

## **2.8 FRAME ANCHORAGE**

- .1 Provide appropriate anchorage to floor and wall construction.
- .2 Locate each wall anchor immediately above or below each hinge reinforcement on hinge jamb and directly opposite on strike jamb.

- .3 Provide two (2) anchors for rebate opening heights up to 1520 mm and one (1) additional anchor for each additional 760 mm of height or fraction thereof.
- .4 Locate anchors for frames in existing openings not more than 150 mm from top and bottom of each jambs and intermediate at 660 mm o.c. maximum.

## **2.9 FRAMES: WELDED TYPE**

- .1 Welding in accordance with CSA W59.
- .2 Accurately mitre or mechanically joint frame product and securely weld on inside of profile.
- .3 Cope accurately and securely weld butt joints of mullions, transom bars, centre rails and sills.
- .4 Grind welded joints and corners to a flat plane, fill with metallic paste and sand to uniform smooth finish.
- .5 Securely attach floor anchors to inside of each jamb profile.
- .6 Weld in two (2) temporary jamb spreaders per frame to maintain proper alignment during shipment.
- .7 Securely attach lead to inside of frame profile from return to jamb soffit (inclusive) on door side of frame only.

## **2.10 DOOR FABRICATION GENERAL**

- .1 Exterior Steel Doors:
  - .1 Doors to be 16 gauge swing type, flush, 44mm (1.75") thick with provisions for glazed and/ or louvred openings as per schedule.
  - .2 Doors to be internally reinforced with 20 gauge continuous interlocking steel stiffeners at 150mm (0.5") on center, securely welded to each face sheet at 150mm (0.5") on center maximum, with voids between stiffeners filled and sound deadened with honeycomb core laminated under pressure to each face sheet.
  - .3 Longitudinal edges of exterior doors to be continuously welded the full height of the door, filled and ground smooth with no visible seams.
  - .4 Provide flush PVC steel top caps.
  - .5 Doors to be thermally broken.
  - .6 Doors to be equipped with continuous hinges. Refer to Section 0871 10 – Finish Hardware.

- .2 Interior Steel Doors:
- .1 Doors to be 18 gauge swing type, flush, 44mm (1.75") thick with provisions for glazed and/ or louvred openings as per schedule.
  - .2 Longitudinal edges of doors to be mechanically interlocked adhesive assisted with edge seams tack welded and sanded flush with no visible seam.
- .3 Interior and Exterior Steel Doors:
- .1 Doors to be blank, reinforced, drilled and tapped for fully templated mortised hardware and electronic hardware
  - .2 Factory prepare holes 12.7 mm diameter and larger except mounting and through-bolt holes, on site, at time of hardware installation.
  - .3 Provide factory-applied touch-up primer at areas where zinc coating has been removed during fabrication.
  - .4 Provide fire labelled doors for those openings requiring fire protection ratings, as scheduled. Test such products in strict conformance with CAN4-S104 and list by nationally recognized agency having factory inspection service and construct as detailed in Follow-Up Service Procedures/Factory Inspection Manuals issued by listing agency to individual manufacturers.
  - .5 Blank, reinforce, drill doors and tap for mortised, templated hardware and electronic hardware.
  - .6 Doors: manufacturers' proprietary construction, tested and/or engineered as part of a fully operable assembly, including door, frame, gasketing and hardware in accordance with ASTM E330.
  - .7 Manufacturer's nameplates on doors are permitted only on hinge side of door.
  - .8 Doors to be bevelled 3mm in 50mm (0.125" in 0.25") on both lock and hinge edges.
  - .9 Top and bottom of doors to be provided with projection welded, inverted 16 gauge end channels.
  - .10 Hinge reinforcing to be 10 gauge steel, high frequency type for templated 114mm (0.39") hinges, convertible from standard to heavy weight.
  - .11 Cylinder lock, ASA strike and flush bolt reinforcing to be 12 gauge minimum.
  - .12 Mortise locking and surface mounted hardware reinforcing to be 16 gauge minimum.
  - .13 Doors to be provided with integral 14 gauge steel closer reinforcing channel at top of door.

## **2.11 THERMALLY BROKEN DOORS AND FRAMES**

- .1 Fabricate thermally broken doors by using insulated core and separating exterior parts from interior parts with continuous interlocking thermal break.
- .2 Thermal break: rigid polyvinylchloride extrusion conforming to CGSB 41-GP-19Ma.
- .3 Fabricate thermally broken frames separating exterior parts from interior parts with continuous interlocking thermal break.
- .4 Apply insulation.

## **Part 3 Execution**

### **3.1 INSTALLATION GENERAL**

- .1 Install labeled steel fire rated doors and frames to NFPA 80 except where specified otherwise.
- .2 Install doors and frames to CSDMA Installation Guide.

### **3.2 FRAME INSTALLATION**

- .1 Set frames plumb, square, level and at correct elevation.
- .2 Secure anchorages and connections to adjacent construction.
- .3 Brace frames rigidly in position while building-in. Install temporary horizontal wood spreader at third points of door opening to maintain frame width. Provide vertical support at centre of head for openings over 1200 mm (48") wide. Remove temporary spreaders after frames are built-in.
- .4 Make allowances for deflection of structure to ensure structural loads are not transmitted to frames.
- .5 Caulk perimeter of frames between frame and adjacent material.
- .6 Maintain continuity of air barrier and vapour retarder.

### **3.3 DOOR INSTALLATION**

- .1 Install doors and hardware in accordance with hardware templates and manufacturer's instructions, in steel frames as indicated on the drawings and in the Door Schedule. Refer to Section 08 71 10 for Finish Hardware.

- .2 Provide even margins between doors and jambs and doors and finished floor and thresholds as follows.
  - .1 Hinge side: 1.0 mm.
  - .2 Latchside and head: 1.5 mm.
  - .3 Finished floor, and thresholds: 13 mm.
- .3 Adjust operable parts for correct function.
- .4 Install louvers as per Division 23.
- .5 Install insulated hollow metal doors in aluminum curtain walls as indicated on the drawings and in the Door Schedule. Refer to Section 08 71 10 for Finish Hardware.

**3.4 FINISH REPAIRS**

- .1 Touch up with primer finishes damaged during installation.
- .2 Fill exposed frame anchors and surfaces with imperfections with metallic paste filler and sand to a uniform smooth finish.

**3.5 GLAZING**

- .1 Install glazing for doors and frames in accordance with Section 08 80 50 – Glazing and Mirrors.

**END OF SECTION**

**Part 1            General**

**1.1                SUMMARY**

- .1    Section includes:
  - .1    Fire rated and Non-fire rated wall access panels
  - .2    Fire rated ceiling access panels
  - .3    Related hardware and attachments.
- .2    Related Sections:
  - .1    Section 09 21 16 – Gypsum Board Assemblies
  - .2    Section 09 22 27 – Acoustical Suspension
  - .3    Section 09 91 13 – Painting
  - .4    Division 23 – Mechanical
  - .5    Division 26 – Electrical

**1.2                SYSTEM DESCRIPTION**

- .1    Design Requirements:
  - .1    Verification: Obtain specific locations and sizes for required access doors and frames from trades, including mechanical and electrical, requiring access to concealed equipment and indicate on submittal schedule.

**1.3                SUBMITTALS**

- .1    Comply with Section 01 33 00 Submittal Procedures.
- .2    General: In accordance with conditions of Division 1 specifications

**1.4                QUALITY ASSURANCE**

- .1    Comply with Section 01 00 05 General Instruction and Section 01 00 10 General Work.
- .2    Single Source Responsibility: Obtain access door and panel units, and frames for entire Project from 1 source and 1 single manufacturer.
- .3    Fire-Resistance Ratings: Wherever a fire-resistance classification is indicated, provide access door and panel assemblies with panel door, frame, hinge, and latch from manufacturer listed in Underwriter's Laboratories (UL), "Building Materials Directory" for rating shown.
  - .1    Provide 90 minute UL label at 2-hour rated partitions.
  - .2    Provide 3 hour Warnock Hersey label at horizontal applications, up to 24 inch wide x 36 inch high.
  - .3    Provide 2 hour Warnock Hersey label at horizontal applications greater than 24 inch wide x 36 inch high.
- .4    Size Variations: Obtain Architect's acceptance and approval of manufacturer's standard size units that may vary slightly from sizes indicated on Drawings.

- .5 Coordination: Provide inserts and anchoring devices that will be built into other Work for installation of access door assemblies. Coordinate delivery with other Work to avoid delay.

## **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Comply with Section 01 00 05 General Instruction and Section 01 00 10 General Work.
- .2 Package and ship per manufacturer's recommendations.
- .3 Store per manufacturer's instructions.
  - .1 Store in dry area out of direct sunlight.

## **1.6 WARRANTY**

- .1 Warrant materials and workmanship against defects after completion and final acceptance of Work.
  - .1 Repair defects, or replace with new materials, faulty materials or workmanship developed during the guarantee period at no expense to Owner.
  - .2 Access Panel Warranty: 1 year from date of Substantial Completion of Project.

## **1.7 TESTING STANDARDS**

- .1 Complies with ASTM E – 152, NFPA 252, UBC 43.7 and UL 263 Horizontal Application.

## **Part 2 Products**

### **2.1 MANUFACTURERS**

- .1 Subject to compliance with requirements, provide products from the following manufacturer:
  - .1 Nystrom Building Products  
1701 Madison Street NE  
Minneapolis, MN 55413-1400  
Toll Free Hotline: 800-547-2635  
Toll Free Fax: 800-317-8770  
Direct Phone: 612-781-7850  
Direct Fax: 612-781-1363  
E-Mail: [info@nystrom.com](mailto:info@nystrom.com)  
Internet: [www.nystrom.com](http://www.nystrom.com)
  - .2 Specifications and Drawings are based on manufacturer's proprietary literature from Nystrom Building Products. Other manufacturers shall comply with minimum levels of material, color selection, and detailing indicated in Specifications or on Drawings. Architect will be sole judge of appropriateness of substitutions.

**2.2 MATERIALS**

- .1 Commercial quality, cold steel sheet with baked on rust inhibitive gray primer.
- .2 Galvanized, bonderized steel with baked on rust inhibitive gray primer.

**2.3 FABRICATION**

- .1 Manufacture each access panel assembly as an integral unit ready for installation.
- .2 Welded construction: Furnish with a sufficient quantity of 1/4 inch mounting holes to secure access panels to types of supports indicated.
- .3 Recessed panel: Form face of panel to provide specified recess for application of finish material. Reinforce panel as required to prevent buckling.
- .4 Furnish number of latches required to hold door in flush, smooth plane when closed.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Comply with Section 01 00 05 General Instruction and Section 01 00 10 General Work.
- .2 Verify that rough openings for door and frame are correctly sized and located.
- .3 Verify mechanical and electrical requirements for ceiling or wall access panels.

**3.2 PREPARATION**

- .1 Advise installers of work relating to access panel installation including rough opening dimensions, locations of supports, and anchoring methods. Coordinate delivery with other work to avoid delay.

**3.3 INSTALLATION**

- .1 Install access door and frame units per manufacturer's written instructions.
- .2 Install frames plumb and level in opening. Secure rigidly in place.
- .3 Position units to provide convenient access to concealed Work requiring access.
- .4 Fire-rated units: Include UL or Warnock-Hersey labels.

**3.4 ADJUST AND CLEAN**

- .1 Adjust panel after installation for proper operation.
- .2 Remove and replace panels or frames that are warped, bowed, or damaged.

**END OF SECTION**

**Part 1 GENERAL**

**1.1 SECTION INCLUDES**

- .1 Steel Sectional Overhead Doors.
- .2 Glazed Aluminum Sectional Overhead Doors.
- .3 Electric Operators and Controls.
- .4 Operating Hardware, tracks, and support.

**1.2 RELATED SECTIONS**

- .1 Section 03 30 00 - Cast-in-Place Concrete.
- .2 Section 04 22 00 - Concrete Masonry.
- .3 Section 05 50 00 - Metal Fabrications.
- .4 Section 06 11 00 - Wood Framing.
- .5 Section 07 90 00 - Joint Sealing
- .6 Section 08 71 00 – Finish Hardware.
- .7 Section 09 90 13 - Painting

**1.3 REFERENCES**

- .1 ANSI/DASMA 102 - American National Standard Specifications for Sectional Overhead Type Doors.

**1.4 DESIGN / PERFORMANCE REQUIREMENTS**

- .1 Wiring Connections: Requirements for electrical characteristics.
  - .1 Confirm with electrical drawings and specification's.
- .2 Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

**1.5 SUBMITTALS**

- .1 Submit under provisions of Section 01 30 00.
- .2 Product Data: Manufacturer's data sheets on each product to be used, including:
  - .1 Preparation instructions and recommendations.
  - .2 Storage and handling requirements and recommendations.
  - .3 Installation methods.
- .3 Shop Drawings: Indicate plans and elevations including opening dimensions and required tolerances, connection details, anchorage spacing, hardware locations, and installation details.
- .4 Manufacturer's Certificates: Certify products meet or exceed specified requirements.

- .5 Operation and Maintenance Data.

## **1.6 QUALITY ASSURANCE**

- .1 Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum five years documented experience.
- .2 Installer Qualifications: Authorized representative of the manufacturer with minimum five years documented experience.
- .3 Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories, Inc. acceptable to authority having jurisdiction as suitable for purpose specified.

## **1.7 DELIVERY, STORAGE, AND HANDLING**

- .1 Store products in manufacturer's unopened labeled packaging until ready for installation.
- .2 Protect materials from exposure to moisture until ready for installation.
- .3 Store materials in a dry, ventilated weathertight location.

## **1.8 PROJECT CONDITIONS**

- .1 Pre-Installation Conference: Convene a pre-installation conference just prior to commencement of field operations, to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.

## **1.9 WARRANTY**

- .1 Warranty: Manufacturer's limited door and operators System warranty for 10 year against delamination of polyurethane foam from steel face and all other components for 3 years or 20,000 cycles, whichever comes first.
- .2 Warranty: Manufacturer's limited door and operators System warranty for 10 years against delamination of polystyrene foam from steel face.

## **Part 2 PRODUCTS**

### **2.1 MANUFACTURERS**

- .1 Acceptable Manufacturer: Steel Craft Door Products Ltd. as available through Overhead Door Company of St.Catharines, Unit 1, 13 Seapark Drive, St. Catharines, ON, Phone: 905-682-5591 Fax: 905-682-3122
- .2 Alternates: Submit alternates as defined in Section 00 21 13 – Instructions to Tenderers.

### **2.2 GLAZED ALUMINUM SECTIONAL OVERHEAD DOORS**

- .1 Glazed Sectional Overhead Doors: 511 Series Aluminum Doors by Overhead Door Corporation. Units shall have the following characteristics:
- .2 Door Assembly: Stile and rail assembly secured with 1/4 inch (6 mm).diameter through rods.
  - .1 Panel Thickness: 1-3/4 inches (44 mm).
  - .2 Center Stile Width: 21/32 inch (17 mm).

- .3 End Stile Width: 2-3/4 inches (70 mm).
- .4 Intermediate Rail Pair Width: 1-3/8 inches (35 mm).
- .5 Top Rail Width:
  - .1 2-3/8 inches (60 mm).
- .6 Bottom Rail Width:
  - .1 2-3/8 inches (60 mm).
- .7 Aluminum Panels: 0.050 inch (1.3 mm) thick, aluminum.
- .8 Stiles and Rails: 6063 - T6 aluminum.
- .9 High cycle spring: 100,000 cycles
- .10 Glazing:
  - .1 1/2 inch (12.5 mm) Tempered Insulating glass.
- .11 Finish and Color:
  - .1 Anodized Finish: Clear anodized.
  - .2 Anodized Finish: Bronze anodized.
  - .3 Powder coat finish bronze light.
  - .4 Powder coat finish bronze medium.
  - .5 Powder coat finish bronze dark.
  - .6 Powder Coating Finish: Color as selected by Architect from manufacturer's standard colors.
- .12 Hardware: Galvanized steel hinges and fixtures. Ball bearing rollers with hardened steel races.
- .13 Lock: Interior galvanized single unit.
- .14 Weatherstripping:
  - .1 Flexible bulb-type strip at bottom section.
  - .2 Flexible Jamb seals.
  - .3 Flexible Header seal.
- .15 Track: Provide track as recommended by manufacturer to suit loading required and clearances available.
- .16 Manual Operation: Pull rope.
- .17 Manual Operation: Chain hoist.
- .18 Electric Motor Operation: Provide UL listed electric operator, size and type as recommended by manufacturer to move door in either direction at not less than 2/3 foot nor more than 1 foot per second. Operator shall meet UL325/2010 requirements for continuous monitoring of safety devices.
  - .1 Entrapment Protection: Required for momentary contact, includes radio control operation.
  - .2 Pneumatic sensing edge up to 18 feet (5.5 m) wide. Constant contact only complying with UL 325/2010.
  - .3 Electric sensing edge monitored to meet UL 325/2010.
  - .4 Photoelectric sensors monitored to meet UL 325/2010.
- .19 Operator Controls:
  - .1 Push-button operated control stations with open, close, and stop buttons.

- .2 Key operated control stations with open, close, and stop buttons.
- .3 Push-button and key operated control stations with open, close, and stop buttons.
- .4 Surface mounting.
- .5 Both interior and exterior location.
- .20 Special Operation:
  - .1 Pull switch.
  - .2 Vehicle detector operation.
  - .3 Radio control operation.
  - .4 Card reader control.
  - .5 Photocell operation.
  - .6 Door timer operation.
  - .7 Commercial light package.
  - .8 Explosion and dust ignition proof control wiring.

### **Part 3 EXECUTION**

#### **3.1 EXAMINATION**

- .1 Do not begin installation until openings have been properly prepared.
- .2 Verify wall openings are ready to receive work and opening dimensions and tolerances are within specified limits.
- .3 Verify electric power is available and of correct characteristics.
- .4 If preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### **3.2 PREPARATION**

- .1 Clean adjacent surfaces thoroughly prior to installation.
- .2 Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

#### **3.3 INSTALLATION**

- .1 Install overhead doors and track in accordance with approved shop drawings and the manufacturer's printed instructions.
- .2 Coordinate installation with adjacent work to ensure proper clearances and allow for maintenance.
- .3 Anchor assembly to wall construction and building framing without distortion or stress.
- .4 Securely brace door tracks suspended from structure. Secure tracks to structural members only.
- .5 Fit and align door assembly including hardware.
- .6 Coordinate installation of electrical service. Complete power and control wiring from disconnect to unit components.

**3.4 CLEANING AND ADJUSTING**

- .1 Adjust door assembly to smooth operation and in full contact with weatherstripping.
- .2 Clean doors, frames, glass and polycarbonate according to manufacturer's instructions.
- .3 Remove temporary labels and visible markings. Do not remove polycarbonate care and maintenance label required to maintain warranty.

**3.5 PROTECTION**

- .1 Do not permit construction traffic through overhead door openings after adjustment and cleaning.
- .2 Protect installed products until completion of project.
- .3 Touch-up, damaged coatings and finishes and repair minor damage before Substantial Completion.

**END OF SECTION**

- .1 LEED® Canada-NC Version 1.0-[2004], LEED (Leadership in Energy and Environmental Design): Green Building Rating System Reference Package For New Construction and Major Renovations including Addendum 2007.
  
- .5 Canadian General Standards Board (CGSB).
  - .1 CAN/CGSB-12.8-[97], Insulating Glass Units.
  - .2 CAN/CGSB-12.20-[M89], Structural Design of Glass for Buildings.
  - .3 CAN/CGSB-19.13-[M87], Sealing Compound, One-Component, Elastomeric, Chemical Curing.
  
- .6 CSA International (CSA)
  - .1 CAN/CSA-A440
  - .2 CAN/CSA-S157 [2005], Strength Design in Aluminum.
  - .3 CAN/CSA W59.2 [M1991(R2003)], Welded Aluminum Construction.
  
- .7 Environmental Choice Program (ECP)
  - .1 CCD-45-[1995], Sealants and Caulking Compounds.
  
- .8 Underwriter's Laboratories of Canada (ULC)
  - .1 CAN/ULC-S710.1 [2005], Standard for Thermal Insulation – Bead-Applied One Component Polyurethane Air Sealant Foam, Part 1: Materials Standard for Thermal Insulation - Bead - Applied One Component Polyurethane Air Sealant Foam, Part 1: Materials.

#### **1.4 ADMINISTRATIVE REQUIREMENTS**

- .1 Co-ordination: Co-ordinate work of this Section with work of other trades for proper time and sequence to avoid construction delays.
  
- .2 Pre-installation Meeting: Convene pre-installation meeting after Award of Contract and one week prior to commencing work of this Section to verify project requirements, substrate conditions and coordination with other building sub-trades, and to review manufacturer's written installation instructions.
  - .1 Co-ordinate with other similar pre-installation meetings
  - .2 Notify attendees 2 weeks prior to meeting and ensure meeting attendees include as minimum:
    - .1 Owner
    - .2 Consultant
    - .3 Glazing subcontractor;
    - .4 Manufacturer's Technical Representative.
  - .3 Ensure meeting agenda includes review of methods and procedures related to aluminum window installation including co-ordination with related work.
  - .4 Record meeting proceedings including corrective measures and other actions required to ensure successful completion of work and distribute to each attendee within 1 week of meeting.

## **1.5 ACTION AND INFORMATIONAL SUBMITTALS**

- .1 Make submittals in accordance with Contract Conditions and Section [01 33 00 Submittal Procedures].
- .2 Product Data: Submit product data including manufacturer's literature for aluminum window frames, glazing, components and accessories, indicating compliance with specified requirements and material characteristics.
  - .1 Submit list on window manufacturer's letterhead of materials, components and accessories to be incorporated into Work.
  - .2 Include product names, types and series numbers.
  - .3 Include contact information for manufacturer and their representative for this Project.
- .3 Shop Drawings: Submit drawings stamped and signed by Professional Engineer registered or licensed in Province of Ontario, Canada.
  - .1 Indicate materials and details in full size scale for head, jamb and sill, profiles of components, interior and exterior trim, junction between combination units, elevations of unit, anchorage details, description of related components and exposed finishes, fasteners, and caulking.
  - .2 Indicate location of manufacturer's nameplates.
  - .3 Show size and location of seismic restraints. Include seismic design calculations
- .4 Samples:
  - .1 Submit duplicate 300 x 300 mm (12 x 12 inches) sample sections showing prefinished aluminum surface, finish, colour and texture, and including frame corner details
  - .2 Submit duplicate 300 x 300 mm (12 x 12 inches) sample sections of insulating glass unit showing glazing materials and edge and corner details.
- .5 Test Reports:
  - .1 Submit test reports showing compliance with specified performance characteristics and physical properties including air and water infiltration.
- .6 Field Reports: Submit manufacturer's field reports within 3 days of manufacturer representative's site visit and inspection.
- .7 Installer Qualifications:
  - .1 Submit letter verifying installer's experience with work similar to work of this Section

## **1.6 CLOSEOUT SUBMITTALS**

- .1 .Operation and Maintenance Data: Supply maintenance data for windows for incorporation into manual specified in Section [01 78 00 Closeout Submittals].

- .2 Record Documentation: In accordance with Section [01 78 00 Closeout Submittals].
  - .1 List materials used in windows work.
  - .2 Warranty: Submit warranty documents specified.

## **1.7 DELIVERY STORAGE AND HANDLING**

- .1 Delivery and Acceptance Requirements:
  - .1 Deliver material in accordance with Section 01 61 00 Common Product Requirements.
  - .2 Deliver aluminum windows in manufacturer=s original packaging with identification labels intact and in sizes to suit project.
  - .3 Brace frames to maintain squareness and rigidity during shipment
- .2 Material Handling: To AAMA CW-10.
- .3 Storage and Handling Requirements: Store materials off ground and protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
  - .1 Material storage: To AAMA CW-10.
- .4 Packaging Waste Management:
  - .1 Separate and recycle waste packaging materials in accordance with Section [01 74 19 Construction Waste Management and Disposal].
  - .2 Remove waste packaging materials from site and dispose of packaging materials at appropriate recycling facilities.

## **1.8 WARRANTY**

- .1 Project Warranty: Refer to Contract Conditions for project warranty provisions.
- .2 Manufacturer's warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to and not intended to limit other rights Owner may have under Contract Conditions.
- .3 Warranty period: 5 years commencing on Date of Substantial Performance of Work.
  - .1 Insulating glass units: [10] years, on Date of Substantial Performance of Work.

## **Part 2 Products**

### **2.1 MANUFACTURER**

- .1 Manufacturer: Alumicor Limited, 290 Humberline Drive, Toronto, Ontario, Canada M9W 5S2, Phone: (416) 745-4222 or (877) ALUMICOR, e-mail: [info@Alumicor.com](mailto:info@Alumicor.com), URL: [www.Alumicor.com](http://www.Alumicor.com).

### **2.2 DESCRIPTION**

- .1 Thermally broken, aluminum framed, windows with double glazed insulating glass units with concealed tamperproof fasteners.

## **2.3 DESIGN CRITERIA**

- .1 .Design aluminum components to CAN/CSA S157
- .2 Window Classification: To CAN/CSA A440/A440.1.
  - .1 Air tightness: Fixed.
  - .2 Water tightness: [B7].
  - .3 Wind load resistance: [C5].
  - .4 Condensation resistance: Temperature Index, I=58 minimum.

## **2.4 WINDOW MATERIALS**

- .1 Main Frame: Extruded aluminum: To ASTM B221, 6063 alloy with T5 or T6 temper.
  - .1 Main Frame Depth: 5 ¾.
  - .2 Interior colour: Anodised Aluminum.
  - .3 Exterior colour: Anodised Aluminum.
- .2 Insulating glass units: In accordance with Section 08 80 50 – Glazing.

## **2.5 FIXED WINDOWS**

- .1 Acceptable Material: Alumicor Ltd., FeatureLine 990 Series.

## **2.6 WINDOW FABRICATION**

- .1 Fabricate windows to CAN/CSA A440/A440.1.
  - .1 Do glazing in accordance with Section 08 80 00 – Glazing.
- .2 Fabricate aluminum assemblies of extruded sections to sizes and profiles indicated.
  - .1 Ensure vertical and horizontal members are tubular extrusions designed for shear block and/or screw spline corner construction.
  - .2 Install exterior feature caps as indicated.
- .3 Construct units square, plumb and free from distortion, waves, twists, buckles or other defects detrimental to performance or appearance.
  - .1 Brace frames to maintain squareness and rigidity during installation.
- .4 Fabricate units square and true with tolerance of plus or minus 1.5 mm (0.06 inches) maximum for units with diagonal measurement of 1800 mm (6 feet) maximum and plus or minus 3 mm (0.125 inches) maximum for units with diagonal measurement greater than 1800 mm (6 feet).
- .5 Accurately fit and secure joints and corners.
  - .1 Ensure joints are flush, hairline, and weatherproof.
- .6 Face dimensions detailed are maximum permissible sizes.

- .7 Use only concealed tamperproof fasteners
  - .1 Where fasteners cannot be concealed, countersunk screws finished to match adjacent material may be used upon receipt of written approval from Consultant.
- .8 Visible manufacturer's labels are not permitted

## **2.7 FINISHES**

- .1 Exterior exposed aluminum surfaces: To AAMA 2605, 3-coat, thermal setting enamel consisting of primer, colour coat and clear coat.
- .2 Exterior exposed aluminum surfaces: To AA DAF-45-M12C22A31, Architectural Class II, clear anodized [10 µm (0.0004 inches)] minimum thickness.
  - .1 Acceptable material: Alumicor Ltd., Class II Anodic Finish.
- .3 Interior exposed aluminum surfaces: To [AAMA 2603, 1-coat pigmented organic thermal setting finish] [AAMA 2604, 2-coat].
  - .1 Acceptable material; PPG Industries Inc., [Duracron] [Duramar].
- .4 Interior exposed aluminum surfaces: To AA DAF-45-M12C22[A41][A44], Architectural Class I, anodized [18 µm (0.0007 inches)] minimum thickness coloured [clear].
  - .1 Acceptable material: Alumicor Ltd., Class I Anodic Finish.
- .5 Interior exposed aluminum surfaces: To AA DAF-45-M12C22A31, Architectural Class II, clear anodized [10 µm (0.0004 inches)] minimum thickness.
  - .1 Acceptable material: Alumicor Ltd., Class II Anodic Finish.

## **2.8 AIR BARRIER AND VAPOUR RETARDER**

- .1 Equip window frames with site installed [air barrier] [and] [vapour retarder] material for sealing to building [air barrier] [and] [vapour retarder] as follows:
  - .1 Material: identical to, or compatible with, building air barrier and vapour retarder materials to provide required air tightness and vapour diffusion control throughout exterior envelope assembly.
  - .2 Material width: adequate to provide required air tightness and vapour diffusion control to building [air barrier] [and] [vapour retarder] from interior.

## **2.9 ACCESSORIES**

- .1 Gasketing: To [CCD-45] Black EPDM gaskets.
- .2 Setting Blocks: To [CCD-45] and [ASTM D2240], neoprene, Shore A Durometer hardness.
- .3 Spacers: To [CCD-45] and [ASTM D2240], neoprene, Shore A Durometer hardness.
- .4 Sealant: To [CAN/CGSB-19.13], Class 40, one-component, cold-applied, non-sagging silicone.
  - .1 Acceptable material: Dow Corning 795.
- .5 Sealant Bond Breaker: Open cell foam backer rod sized to suit project requirements.

- .6 Flashings: 3mm (0.125 inches) thick aluminum flashing to profiles indicated [and in accordance with Section 07 62 00 Sheet Metal Flashing and Trim].
- .7 Liquid Foam Insulation: Single component, moisture cure, low expansion rate spray-in-place polyurethane liquid foam insulation to ULC-S710.1 and in accordance with manufacturer's written recommendations.
- .8 Fasteners: Tamperproof, cadmium plated stainless steel [300] [or] [400] series to meet window requirements and as recommended by manufacturer.

## **2.10 PRODUCT SUBSTITUTIONS**

- .1 Substitutions: In accordance with Section 01 23 13 - Product Substitution Procedures
- .2 Ensure components come from one manufacturer.

## **Part 3 EXECUTION**

### **3.1 INSTALLERS**

- .1 Use only installers with 2 years minimum experience in work similar to work of this Section.

### **3.2 EXAMINATION**

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

### **3.3 WINDOW INSTALLATION**

- .1 Install windows in accordance with manufacturer's written instructions and to CAN/CSA A440/A440.1.
- .2 Arrange components to prevent abrupt variation in colour.
- .3 Co-ordinate attachment and seal of perimeter vapour retarder in accordance with Section 07 26 00 – Vapour Retarders.

- .4 Co-ordinate attachment and seal of perimeter air barrier in accordance with Section [07 27 00 – Air Barriers].

### **3.4 SILL INSTALLATION**

- .1 Install aluminum sills with uniform wash to exterior, level in length, straight in alignment with plumb upstands and faces.
- .2 Cut sills to fit
- .3 Secure sills in place with anchoring devices located at ends [and joints of continuous sills] and evenly spaced [600] mm ([24] inches) on centre in between.
- .4 Fasten [expansion joint cover plates] [and] [drip deflectors] with tamperproof, self-tapping cadmium plated stainless steel screws.
- .5 Maintain [6 to 9] mm ([0.25 to 0.375] inches) space between butt ends of continuous sills. For sills over 1200 mm in length, maintain 3 to 6 mm space at each end.

### **3.5 CAULKING**

- .1 Apply sealant in accordance with Section [07 92 00 - Joint Sealing]. Conceal sealant within window units except where exposed use is approved in writing by Consultant.
- .2 Seal joints between windows and window sills with sealant. Bed sill expansion joint cover plates and drip deflectors in bedding compound.
  - .1 Caulk between sill upstand and window frame. Caulk butt joints in continuous sills.

### **3.6 FIELD QUALITY CONTROL**

- .1 Field Inspection: Coordinate field inspection in accordance with Section [01 45 00 Quality Control].
- .2 Site Installation Tolerances: Install windows square and true with tolerance of plus or minus 1.5 mm (0.06 inches) maximum for units with diagonal measurement of 1800 mm (6 feet) maximum and plus or minus 3 mm (0.125 inches) maximum for units with diagonal measurement greater than 1800 mm (6 feet).
- .3 Manufacturer's Services:
  - .1 Coordinate manufacturer's services with Section [01 45 00 - Quality Control].
  - .2 Submit to Consultant a written agreement from the manufacturer to perform the manufacturer's services.
  - .3 Schedule manufacturer's review of work procedures at stages listed:
    - .1 Product Application: [1] off site review[s].

- .2 Fabrication and Handling: [1] review[s] at authorized installers fabrication facilities.
- .3 Installation: [3] site reviews at [commencement of Work] [50% completion of Work] [Upon completion of Work].
- .4 Submit manufacturer's written reports to Consultant describing:
  - .1 The scope of work requested.
  - .2 Date, time and location.
  - .3 Procedures performed.
  - .4 Observed or detected non-compliances or inconsistencies with manufacturers' recommended instructions.
  - .5 Limitations or disclaimers regarding the procedures performed.
  - .6 Obtain reports within seven days of review and submit immediately to Consultant.

### **3.7 CLEANING**

- .1 Progress Cleaning: Perform cleanup as work progresses [in accordance with Section 01 74 00 - Cleaning and Waste Management].
  - .1 Remove sealant and caulking drippings as work progresses.
  - .2 Leave work area clean end of each day.
- .2 Final leaning: Upon completion, remove surplus materials, rubbish, tools, and equipment [in accordance with Section 01 74 00 – Cleaning and Waste Management].
- .3 Waste Management:
  - .1 Co-ordinate recycling of waste materials with 01 74 19 Construction Waste Management and Disposal.
  - .2 Collect recyclable waste and dispose of or recycle field generated construction waste created during construction or final cleaning related to work of this Section.
  - .3 Remove recycling containers and bins from site and dispose of materials at appropriate facility.

### **3.8 PROTECTION**

- .1 Protect installed windows and components from damage during construction.
- .2 Repair damage to adjacent materials caused by aluminum window installation.

**END OF SECTION**

**Part 1            General**

**1.1                GENERAL REQUIREMENTS**

- .1            Division One, General Requirements is part of this Section and shall apply as if repeated here.
- .2            Throughout the specification, types of materials are specified by manufacturer's name and catalogue number in order to establish standards of quality and performance and not for the purpose of limiting competition. Unless specifically stated otherwise, the bidder may use the alternate products specified, except that the burden is upon the bidder to prove such quality. Supply samples if required, to permit a fair evaluation of the proposed substitute with respect to quality, serviceability, warranty and cost.

**1.2                WORK INCLUDED IN THIS SECTION**

- .1            Supply to the site, all finish hardware specified complete with templates and installation instructions, together with all required screws, expansion shields, anchors and other related accessories for satisfactorily attaching or installing all hardware. Supply and install power door operators and accessories where listed in the Finishing Hardware Schedule.
- .2            Package hardware separately for each opening and state clearly on each package the number and description of the opening for which the hardware is intended.

**1.3                HARDWARE CONSULTANT**

- .1            Furnish the services of a fully experienced Architectural Hardware Consultant (A.H.C.) to be in attendance at all times during installation at normal working hours to coordinate and check shop drawings and provide consultation services when required and on-site inspections.
- .2            All hardware shall be inspected after installation by the Manufacturer's and/or Owner's representative who shall certify in writing to the Owner, that all hardware has been supplied and installed in accordance with the specifications and Hardware List, and are functioning properly.
- .3            At project completion instruct the Owner's Representative on all aspects of maintenance and adjustments of all Finish Hardware.
- .4            Following award of contract, arrange to meet with Owner & Hardware Consultant to finalize the keying schedule.

**1.4                COORDINATION**

Coordinate the hardware with other allied trades such as carpentry, millwork, aluminum door and screens, hollow metal doors and frames, electrical and others.

**1.5                HANDLING AND STORAGE**

- .1            Handle and store materials on job site in such a manner that no damage will be done to the materials.

- 
- .2 Deliver and store materials undamaged in a dry area.
  - .3 Wrap all hardware in separate packages complete with all trimming and screws required for each item, distinctly labeled and numbered for each opening to correspond with the final reviewed Finish Hardware Schedule.

#### **1.6 HARDWARE REINFORCEMENT**

- .1 Provision of hardware reinforcing required as to provide a firm support for hardware is under other sections of these specifications, however, it shall be the responsibility of this section to check that all doors, frames and panels are reinforced in a satisfactory manner to provide a firm support. Report any doors, frames or panels, which have not been adequately reinforced.

#### **1.7 FIRE AND BUILDING CODES**

- .1 All hardware shall comply with applicable fire and building codes and requirements of local authority having jurisdiction over hardware. All electrical items must have CSA approval.

#### **1.8 BARRIER FREE REQUIREMENTS**

- .1 The building is designed to meet the needs of barrier free access. All hardware shall be supplied and installed in accordance with the Ontario Building Code and CAN/CSA-B61-M90.

#### **1.9 SUBMITTALS**

- .1 Shop Drawings
  - .1 It shall be the responsibility of the hardware supplier to examine the plans and schedules to satisfy itself that all hardware listed can be used as specified.
  - .2 Prepare and submit to the Architect for review, 3 copies of hardware schedule showing all hardware required for each opening.
  - .3 Fully detail schedule as to actual factory catalogue numbers quantities, hardware locations, etc. Include cut sheets of each item of hardware.
  - .4 Arrange schedule in the same format and numerical sequence as that in the accompanying schedule.
  - .5 All pages of the schedule shall be printed on 8-1/2" x 11" sized paper.
  - .6 Within 7 days after receiving reviewed hardware schedule, supply 2 copies of the schedule to the Architect. Bind in a hard cover with provision for insertion of additional pages.
- .2 Samples
  - .1 Submit samples of the complete line of hardware and finishes to the Architect in accordance with Section 013300, if and when requested, to accompany any proposal for substitution. Fully label each sample as to manufacturer, type, size, and location for which its use is proposed.
  - .2 Remove samples from the Architect's office promptly upon request of Architect.
  - .3 Substitute new samples for any samples which are not considered by the Architect to be equal to the hardware scheduled. Final approved samples will be retained by the Architect/Consultant until the project is completed.

- .4 Do not order hardware from the manufacturers until the samples have been approved by the Architect/Consultant, and the hardware and finishes supplied are identical with the approved samples.

.3 For Maintenance Use

- .1 Submit the following to the Owner/Architect:
  - .1 One set wrenches for locksets, exit devices and door closers.
  - .2 Three sets of manufacturer's installation instructions for locksets.
  - .3 Three sets of manufacturer's instructions in regard to proper care of hardware including lubrication of locksets, exit devices and door closers.
  - .4 One complete set of template schedules.
  - .5 Catalogue cuts of all hardware installed.

**1.10 CHANGES**

- .1 Check all changes to the work of this section, that may be issued and revise the reviewed hardware schedule accordingly. Submit all revisions to the hardware schedule to the Architect for review.

**1.11 WARRANTY**

- .1 Submit a warranty in accordance with Section 017800, covering the repair or replacement of defective work within specified periods.
- .2 Provide total warranty of 5 years for locksets and exit devices, 10 years for door closers, and 2 years for other hardware. Hinges require a written warranty from the manufacturer for the lifetime of the hinges. Provide a one year parts and labour warranty for power door operators and accessories.
- .3 State in the warranty that any defective (material and operation) item of hardware shall be replaced immediately upon notification that item is defective.

**1.12 DEFINITION OF FINISHES AND SYMBOLS**

AL, 689	Aluminum Paint
CP	Prime Paint
C15, 619	Dull-Nickel Plated
C32D, 630	Dull-Stainless Steel
C28, 628	Satin Finish Aluminum - Anodized
C26D, 626	Dull-Chromium Plated
CA, AL	Aluminum Anodized
STS	Self-Tapping Screws
WS/S	Wood Screws and Shields
SB	Sex Bolts
SB & MS	Sex Bolts & Machine Screws
TB Only	Thru Bolt Only
NRP	Non Removable Pin
RH	Right Hand
RHR	Right Hand Reverse
LH	Left Hand
LHR	Left Hand Reverse
SLC	Strike Lip Length to Centre
FMS	Full Machine Screws
AMS	Arm Machine Screws

MS	Machine Screws
TMS	Template Machine Screws
KA	Keyed Alike
KD	Keyed Different
FBB	Template - Ball Bearing
TBGN	Grommet Nuts & Machine Screws
HO	Hold Open

**1.13 HARDWARE LOCATION**

- .1 Building standard for all hardware shall be as follows:
- |                     |                                                                         |
|---------------------|-------------------------------------------------------------------------|
| Door Levers         | [1067 mm/42"] Centre line from finish floor                             |
| Deadlock Cylinder   | [1200 mm/48"] from centre line of strike to finish floor                |
| Deadlatch Cylinder  | [1200 mm/48"] from centre line of strike to finish floor                |
| Door Pulls          | [1100 mm/43"] from centre line of pull to finish floor                  |
| Pushplates          | [1100 mm/43"] from centre line of plate to finish floor                 |
| Panic Bolts         | [1100 mm/39"] from centre line of crossbar to finish floor              |
| Mortise Night       | [1200 mm/48"] from centre line of strike to finish floor Latches        |
| Top Hinges          | [190 mm/7-1/2"] Down from top of door to top of hinge                   |
| Bottom Hinges       | [206 mm/8"] Up from finish floor to bottom of hinge                     |
| Intermediate Hinges | Equally spaced between top and bottom hinges                            |
| Floor Stops         | Maximum [152 mm/6"] from lock edge when door is in fully open position. |
| Exit Devices        | To manufacturer's instructions                                          |
| Kickplates          | Maximum [3 mm / 1/8"] from bottom of door to bottom of kickplates.      |

**Part 2 Products**

Products and alternates listed are the standard of the Niagara Parks Commission. No deviations from the established manufacturers will be permitted.

**2.1 HINGES**

- .1 Hinges are to be three knuckle slim line hinges which concealed bearings where listed.

<u>Product Listed</u>	<u>Alternate</u>	<u>Alternate</u>
McKinney	Stanley	Hager
TA714	CB1900	BB700
TA386	CB1961	BB850

TA786                      CB1901                      BB750

.2      Continuous Hinges are to be stainless steel pin and barrel construction, c/w 0.25" diameter stainless steel pin , 14 gauge stainless steel hinge leaves and adjustable fasteners.

.3      Product Listed                      Acceptable Alternate

Markar FM-300 Gallery Specialty Hdwe. CH-941 C32D x ADJ Fasteners

**2.2                      LOCKS/ LATCHES**

.1      Locks and latches are to be lever handle cylindrical lock as listed. Provide lock/latch functions as listed.

Product Listed                      No Substitute

Sargent 11 Line

**2.3                      EXIT DEVICES**

.1      All exit devices to be slim line push bars style.

Product Listed                      No Substitute

Sargent 80 Series

**2.4                      DOOR CLOSERS**

.1      Door closers are to be sized and handed for each door unless otherwise noted. Provide full covers for door closers.

Product Listed                      Acceptable Alternate

LCN                      Sargent  
4041 Series                      351 Series

1461 Series                      1431 Series

**2.5                      OVERHEAD HOLDERS & STOPS**

.1      Not used in this project.

**2.6                      MISCELLANEOUS**

.1      Supply all miscellaneous products listed in the Hardware Schedule as listed or sources by approved equal.

<u>Product</u>	<u>Manufacturer Listed</u>	<u>Acceptable Alternate</u>
Door Pulls	CBH Mfg Inc.	Standard, Hager
Push/Kickplates	CBH Mfg Inc	Standard, Hager
Weatherstrip	KN Crowder	Pemko, Zero, Nat'l Guard

Power Door Operators    Horton Automatics, Record

**2.7                      KEYING**

.1      Factory register all locks to suit existing keying system. Construction masterkey all locks. Provide 2 cut keys per cylinder and 12 Construction Mastekeys.

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## 2.8 SUPPLEMENTARY MATERIAL REQUIREMENTS

- .1 The following supplements Finish Hardware Schedule. Where conflict occurs, the Finish Hardware Schedule shall govern:
  - .1 Locks and Latches
    - .1 Supply cylindrical locks and latches as specified complete with cylinders levers as shown.
    - .2 Strike shall be ASA standard size with curved lip strikes for latch bolts and no lip strikes for dead bolts. Supplied complete with wrought boxes finished to match strike.
    - .3 Supply strikes in stainless steel C32D.
    - .4 Where lever handles are specified, locks and latches shall be specially designed for lever handles.
  - .2 Exit Devices:
    - .1 Exit devices shall be approved, labelled device for fire rated and exit doors.
  - .3 Closers
    - .1 All door closers shall be hydraulically controlled and full rack and pinion in operation.
    - .2 Each closer shall have adjustable general speed, latch speed and back check control.
    - .3 Supply special closer keys and wrenches as usually packed with closers.
    - .4 Supply all necessary attaching brackets, mounting channels, cover plates, etc. where necessary for correct application of door closers.
  - .4 Thresholds
    - .1 Supply thresholds in required widths and lengths to suit door openings.
    - .2 Cut ends of thresholds to follow exactly the door frame profile.
  - .5 Pulls, Pushplates, Kickplates
    - .1 Supply plates complete with double-sided tape.  
Door pulls shall have Through Bolt mounting.
    - .2 Length of kickplates shall be [38 mm|1-1/2"] less than door width for single door and [25 mm| 1"] less than door width for door in pairs.
    - .3 All stainless steel plates are to be .050 thick and of one manufacturer's product, free from burrs and sharp edges. Use Type 304 stainless steel only.
    - .4 Provide pushplates and kickplates with temporary strippable plastic coating.
  - .6 Stop, Stays and Holders:
    - .1 Supply floor stops Cast Bronze, dull or polished finish.
  - .7 Seals, Thresholds:
    - .1 All seals, (sound, light, weather) to be black sponge neoprene with aluminum extrusions of the same gauge, dimensions, quality and finish of those specified.
    - .2 Supply thresholds complete with countersunk holes, and with screws and anchors as required for proper anchorage.
    - .3 Modify sills to receive flush finish of adjacent floor finish.

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## **2.9 TEMPLATES**

- .1 All hardware applied to metal doors and frames shall be made to template. Furnish templates, together with instructions necessary for door and frame preparation.

## **2.10 FASTENERS**

- .1 Provide screws, bolts, expansion shields, and other fastening devices as required for the satisfactory installation and operation of the hardware. Provide Robertson or Phillips heads.
- .2 Fastening devices shall be of the same finish as the hardware which is to be fastened.
- .3 Where a pull is scheduled on one side of the door and a pushplate on the other side, issue installation directions to the trade responsible for fixing, so that the pull is secured through the door from the reverse side, and the pushplate installed to cover the screws. Supply flush pulls with machine screws for attaching as specified above.
- .4 For fastenings in concrete for floor stops and thresholds, use machine screws in expansion shields.

## **2.11 KEYING**

- .1 All locks shall be grandmasterkeyed, masterkeyed and/or keyed alike in groups to later instructions.
- .2 Supply 2 keys per lock. Stamp each key DO NOT DUPLICATE, on one side and on the other with a keyset symbol consisting of not more than four letters or numbers.
- .3 Supply keys, including a grandmaster and masterkeys, packed in separate envelopes for each group (key symbol) marked with the architectural door number(s) operated by the keys.
- .4 Deliver all permanent keys to the Owner and obtain a signature for same.
- .5 Prepare an itemized keying chart for the Owners approval.
- .6 Supply the following:
  - .1 4 Grand Master Keys - Stamp DO NOT DUPLICATE
  - .2 4 Master Keys per group. Stamp DO NOT DUPLICATE
  - .3 2 Change Keys per cylinder.

## **Part 3 Execution**

### **3.1 INSPECTION**

- .1 The consultant will inspect all the door openings to ensure the specified products are supplied and installed in accordance with the manufacturers instructions. A written report will be furnished to the Architect detailing openings where products are missing, installed incorrectly or in need of proper adjustment. All items listed in the report shall be corrected immediately.

### **3.2           INSTALLATION**

- .1       This portion of work is to bid as a supply and install package. Installers must follow all manufacturers' instructions including door closer adjustment, handing of locksets as required, and degree of door swing. Advise the consultant if door frames are not square and plumb and prevent proper door hardware installation .package. The hardware supplier shall obtain a copy of ANSI/DHI A115.1G-94, "Installation Guide for Doors and Hardware" for the use of their installers.. It is the intent of this document to be used as a reference guide in the proper handling, storage and installation of finishing hardware, and doors and frames. This document can be obtained through the Door and Hardware Institute.
- .2       Use only the original manufactures fasteners for the installation of all hardware products. Drill and tap doors and frames, where required, to properly install finishing hardware products.
- .3       Mount hardware to suit door elevations.
- .4       Manufacturers of specified products are responsible to instruct hardware installers in the proper installation methods of their products.

### **3.3           HARDWARE SCHEDULE**

- .1       See attached Schedule of Finishing Hardware.

**END OF SECTION**

**Part 1            General**

**1.1            DESCRIPTION OF WORK**

- .1    The work shall consist of the following but not limited to:
  - .1    Glass or other glazing for all hollow metal doors and frames, aluminum curtain wall, aluminum windows, and any other similar or supplementary work shown on the drawings, both interior and exterior units, including single and double glazed insulated units.
  - .2    Wall mounted mirrors other than washroom accessories as noted on the drawings.
  - .3    Mirrors as noted in Washroom Accessories Schedule.

**1.2            RELATED SECTIONS**

- .1    Section 04 22 00 – Concrete Masonry
- .2    Section 06 10 11 – Rough Carpentry
- .3    Section 08 11 14 – Metal Doors and Frames
- .4    Section 08 44 13 – Glazed Aluminum Curtain Walls
- .5    Section 08 55 00 – Aluminum Windows
- .6    Section 09 91 13 - Painting

**1.3            REFERENCES**

- .1    American National Standards Institute (ANSI).
  - .1    ANSI/ASTM E330-02, Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
- .2    American Society for Testing and Materials International, (ASTM).
  - .1    ASTM C542-94(1999), Specification for Lock-Strip Gaskets.
  - .2    ASTM D790-02, Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
  - .3    ASTM D1003-00, Test Method for Haze and Luminous Transmittance of Plastics.
  - .4    ASTM D1929-96(R2001)e1, Test Method for Determining Ignition Temperature of Plastics.
  - .5    ASTM D2240-02b, Test Method for Rubber Property - Durometer Hardness.
  - .6    ASTM E84-01, Test Method for Surface Burning Characteristics of Building Materials.
  - .7    ASTM F1233-98, Test Method for Security Glazing Materials and Systems.
- .3    Canadian General Standards Board (CGSB).
  - .1    CAN/CGSB-12.1-M90, Tempered or Laminated Safety Glass.
  - .2    CAN/CGSB-12.2-M91, Flat, Clear Sheet Glass.

- .3 CAN/CGSB-12.3-M91, Flat, Clear Float Glass.
- .4 CAN/CGSB-12.4-M91, Heat Absorbing Glass.
- .5 CAN/CGSB-12.5-M86, Mirrors, Silvered.
- .6 CAN/CGSB-12.6-M91, Transparent (One-Way) Mirrors.
- .7 CAN/CGSB-12.8-97, Insulating Glass Units.
- .8 CAN/CGSB-12.9-M91, Spandrel Glass.
- .9 CAN/CGSB-12.10-M76, Glass, Light and Heat Reflecting.
- .10 CAN/CGSB-12.11-M90, Wired Safety Glass.
- .11 CAN/CGSB-12.12-M90, Plastic Safety Glazing.
- .12 CAN/CGSB-12.13-M91, Patterned Glass.
- .4 Canadian Standards Association (CSA International).
  - .1 CSA A440.2-98, Energy Performance Evaluation of Windows and Sliding Glass Doors.
  - .2 CSA Certification Program for Windows and Doors 2000.
- .5 Environmental Choice Program (ECP).
  - .1 CCD-045-95, Sealants and Caulking.
- .6 Flat Glass Manufacturers Association (FGMA).
  - .1 FGMA Glazing Manual - 1997.
- .7 Laminators Safety Glass Association (LSGA).
  - .1 LSGA Laminated Glass Design Guide 2000.

#### **1.4 SYSTEM DESCRIPTION**

- .1 Performance Requirements:
  - .1 Provide continuity of building enclosure vapour and air barrier using glass and glazing materials as follow:
    - .1 Utilize inner light of multiple light sealed units for continuity of air and vapour seal.
  - .2 Size glass to withstand wind loads, dead loads and positive and negative live loads as measured in accordance with ANSI/ASTM E330.
  - .3 Limit glass deflection to flexural limit of glass with full recovery of glazing materials.

#### **1.5 SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:
  - .1 Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.

- .3 Manufacturer's Instructions:
  - .1 Submit manufacturer's installation instructions.
- .4 Closeout Submittals:
  - .1 Provide maintenance data including cleaning instructions for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

## **1.6 GLASS BREAKAGE**

- .1 The contractor shall be responsible for all glass broken or unsuitable due to faulty installation or manufacturer's error or product failure.

## **1.7 GLASS DESIGN**

- .1 Glazing Contractor shall be responsible for proper glass thickness and rating design as required by Codes. Report any discrepancies noted to Architect during tender period.

## **1.8 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

## **Part 2 Products**

### **2.1 MATERIALS: FLAT GLASS**

- .1 Float glass: to CAN/CGSB-12.3, Glazing quality, 6 mm thick.
- .2 Sheet glass: to CAN/CGSB-12.2, AA-Special selected, 6 mm thick.
- .3 Safety glass: to CAN/CGSB-12.1, transparent, 6 mm thick.
  - .1 Type 1-tempered
- .4 Silvered mirror glass: to CAN/CGSB-12.5, 6 mm thick in all locations shown on drawings.
- .5 Wired glass: to CAN/CGSB-12.11, 6 mm thick for rated doors and screens.
  - .1 Type 1-Polished both sides (transparent).
  - .2 Wire mesh styles 3-Square.
- .6 Ceramic Glass: to CAN/ULC-S106, S104, Transparent 5mm thick
  - .1 Door and Sidelight Applications Acceptable Products: Keralite Select Filmed, Firelite NT, **Safti First Fire Rated Glass Products.**
  - .2 Transoms Acceptable Products: Keralite Select Standard, Firelite

### **2.2 MATERIALS: SEALED INSULATING GLASS AND SPANDREL GLASS**

- .1 Insulating glass fiberglass window and curtain wall systems: to CAN/CGSB-12.8, double unit, 25 mm overall thickness.

- .1 Glass: to CAN/CGSB-12.3.
- .2 Glass: Dual chamber, Heat Mirror IG by Eastman, nonmetallic spacer, 90% argon filled glazing units.
- .2 Insulating glass for exterior doors and screens: to CAN/CGSB-12.8, double unit, 25 mm overall thickness.
  - .1 Glass: to CAN/CGSB-12.3.
  - .2 Glass: Dual chamber, Heat Mirror IG by Eastman, nonmetallic spacer, 90% argon filled glazing units.
- .3 Balcony divider glazing: 6mm tempered laminate glass. Glass to be pinhead obscure pattern for privacy.
- .4 Balcony railing glazing: Shall conform to OBC SB-13 as summarized below;
  - .1 Glass located beyond the edge of a floor or within 50 mm of the edge of a floor – **heat strengthened laminated glass.**
  - .2 Glass located more than 50 mm inward from the edge of a floor – **Heat strengthened laminated glass**
  - .3 Glass located more than 150 mm inward from the edge of a floor – **6mm max tempered glass.**

## **2.3 FIBREGLASS WINDOW GLASS**

- .1 Fibreglass windows shall be triple glazed units;
  - .1 Exterior: 4mm Cardinal Low E 272 (2)
  - .2 Middle: 4mm Clear
  - .3 Interior: 4mm Cardinal Low E 272 (5)
  - .4 Misc.: Krypton or Argon Filled (where required), Warm Edge Super Spacer 1 3/8" overall thickness

## **2.4 ACCESSORIES**

- .1 Setting blocks: Neoprene Shore A durometer hardness to ASTM D2240, to suit glazing method, glass light weight and area.
- .2 Spacer shims: Shore A durometer hardness to ASTM D2240, 75 mm long x one half height of glazing stop x thickness to suit application. Self adhesive on one face.
- .3 Glazing tape:
  - .1 Preformed butyl Shore A durometer hardness to ASTM D2240; coiled on release paper.
- .4 Glazing splines: resilient polyvinyl chloride, extruded shape to suit glazing channel retaining slot.
- .5 Glazing clips: manufacturer's standard type.
- .6 Lock-strip gaskets: to ASTM C542.
- .7 Mirror attachment accessories:
  - .1 Stainless steel clips.

- .2 Plastic rosettes.
- .3 Mirror adhesive, chemically compatible with mirror coating and wall substrate.

**Part 3 Execution**

**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

**3.2 EXAMINATION**

- .1 Verify that openings for glazing are correctly sized and within tolerance.
- .2 Verify that surfaces of glazing channels or recesses are clean, free of obstructions, and ready to receive glazing.

**3.3 PREPARATION**

- .1 Clean contact surfaces with solvent and wipe dry.
- .2 Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- .3 Prime surfaces scheduled to receive sealant.

**3.4 INSTALLATION: EXTERIOR - DRY METHOD (PREFORMED GLAZING)**

- .1 Perform work in accordance with FGMA Glazing Manual IGMAC and Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- .2 Cut glazing tape to length; install on glazing light. Seal corners by butting tape and sealing junctions with sealant.
- .3 Place setting blocks at quarter points, with edge block maximum 150mm (0.5") from corners.
- .4 Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
- .5 Install removable stops without displacing glazing tape. Exert pressure for full continuous contact.
- .6 Trim protruding tape edge.

**3.5 INSTALLATION: INTERIOR - DRY METHOD (TAPE AND TAPE)**

- .1 Perform work in accordance with FGMA Glazing Manual IGMAC and Laminators Safety Glass Association - Standards Manual for glazing installation methods.
- .2 Cut glazing tape to length and set against permanent stops, projecting 1.6 mm above sight line.

- .3 Place setting blocks at 1/4 points, with edge block maximum 150 mm from corners.
- .4 Rest glazing on setting blocks and push against tape for full contact at perimeter of light or unit.
- .5 Place glazing tape on free perimeter of glazing in same manner described.
- .6 Install removable stop without displacement of tape. Exert pressure on tape for full continuous contact.
- .7 Knife trim protruding tape.

**3.6 INSTALLATION: MIRRORS**

- .1 Set mirrors with adhesive, applied in accordance with adhesive manufacturer's instructions.
- .2 Set mirrors with clips. Anchor rigidly to wall construction.
- .3 Set in frame.
- .4 Place plumb and level.

**3.7 CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Remove traces of primer, caulking.
- .3 Remove glazing materials from finish surfaces.
- .4 Remove labels after work is complete.
- .5 Clean glass and mirrors using approved non-abrasive cleaner in accordance with manufacture's instructions.
- .6 Upon completion of installation, remove surplus materials, rubbish, tools and equipment barriers.

**3.8 PROTECTION OF FINISHED WORK**

- .1 After installation, mark light with an "X" by using removable plastic tape or paste.

**END OF SECTION**

**Part 1            General**

**1.1            RELATED SECTIONS**

- .1    Section 04 21 13 – Brick Masonry
- .2    Section 04 22 00 – Concrete Masonry
- .3    Section 04 73 13 – Calcium Silicate Manufactured Stone Masonry
- .4    Section 05 41 00 – Light Gauge Structural Framing
- .5    Section 07 46 13 – Preformed Metal Siding and Soffit
- .6    Section 07 92 10 - Joint Sealing
- .7    Section 09 91 13 – Painting
- .8    Division 23 – Heating, Ventilating & Air Conditioning

**1.2            REFERENCES**

- .1    Aluminum Association
  - .1    Designation System for Aluminum Finishes - 1997.
- .2    American Society for Testing and Materials (ASTM)
  - .1    ASTM A 167-94, Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
  - .2    ASTM A 366M-91(R1993), Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality.
  - .3    ASTM A 653/A653 M-90, Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
  - .4    ASTM B 32-95, Specification for Solder Metal.
  - .5    ASTM B 370-92, Specification for Copper Sheet and Strip for Building Construction.
  - .6    ASTM D 523-89(1993), Test Method for Specular Gloss.
  - .7    ASTM D 822-89, Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
- .3    Canadian General Standards Board (CGSB)
  - .1    CGSB 1-GP-121M-93, Vinyl, Pretreatment Coating for Metals (Vinyl Wash Primer).
- .4    CAN/CGSB-93.1-M85, Sheet Aluminum Alloy, Prefinished, Residential.

**1.3            SHOP DRAWINGS**

- .1    Submit shop drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2    Indicate fabrication and erection details, including anchorage, accessories, and finishes.

#### **1.4 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Submit duplicate samples of each type of louvre and vent showing colour and finish.
- .3 Show frame detail, screening and finish.

#### **1.5 CLOSEOUT SUBMITTALS**

- .1 Provide operation and maintenance data for manual or motorized operated louvres for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

### **Part 2 Products**

#### **2.1 MATERIALS**

- .1 Galvanized steel sheet: commercial quality to ASTM A 526M with Z275 zinc coating.
- .2 Steel sheet: commercial quality to ASTM A 366 with Class I matte finish.
- .3 Aluminum sheet: mill finish plain utility sheet.
- .4 Aluminum extrusions: Aluminum Association alloy AA6063-T5.
- .5 Solder: to ASTM B 32, 50% tin and 50% lead.
- .6 Flux: suitable for materials to be soldered.
- .7 Nails and fasteners: same material as fabricated items.
- .8 Gaskets: vinyl.
- .9 Primer: to CGSB 1-GP-121M for aluminum surfaces.
- .10 General
  - .1 **Storm Resistant Louvre by C/S Group or approved equal.**
  - .2 **Fixed Drainable Louver Model RS-5300**
  - .3 Depth: to suit wall condition
  - .4 Blade Style: Drainable
  - .5 % Free Area: 50.4%
- .11 Frames and blades to be 6063 alloy 2.06 mm (0.082") thick.
- .12 Mullions to be sliding interlock type.
- .13 Louvres to have 6 mm mesh removable mill finish aluminum bird and bug screens.
- .14 Design free area to suit Section 23 requirements.

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**2.2 FINISHES**

- .1 Finish exposed surfaces of aluminum components in accordance with Aluminum Association Designation System for Aluminum Finishes.
- .2 Appearance and properties of anodized finishes designated by the Aluminum Association as Architectural Class 1, Architectural Class 2, and Protective and Decorative.
- .3 Colour to match surface penetration.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Install louvres and vents where indicated.
- .2 Set adjustable louvre blades for uniform alignment in open and closed positions.
- .3 Adjust louvres so moving parts operate smoothly.
- .4 Attach bird, insect screen to inside face of louvre or vent.
- .5 Repair damage to louvres and vents to match original finish.

**3.2 TEST DATA**

- .1 Submit test data showing that the louvers meet the published data of the model specified.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 04 22 00 – Concrete Masonry
- .2        Section 05 41 00 – Light Gauge Structural Steel Framing
- .3        Section 06 10 11 – Rough Carpentry
- .4        Section 07 92 10 – Joint Sealing
- .5        Section 09 91 13 - Painting

**1.2                REFERENCES**

- .1        Aluminum Association
  - .1        Designation for Aluminum Finishes-1997.
- .2        American Society for Testing and Materials International, (ASTM)
  - .1        ASTM C36/C36M-01, Specification for Gypsum Wallboard.
  - .2        ASTM C79/C79M-01, Standard Specification for Treated Core and Non-treated Core Gypsum Sheathing Board.
  - .3        ASTM C442/C442M-01, Specification for Gypsum Backing Board, Gypsum Coreboard, and Gypsum Shaftliner Board.
  - .4        ASTM C475-01, Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
  - .5        ASTM C514-01, Specification for Nails for the Application of Gypsum Board.
  - .6        ASTM C557-99, Specification for Adhesives for Fastening Gypsum Wallboard to Wood Framing.
  - .7        ASTM C630/C630M-01, Specification for Water-Resistant Gypsum Backing Board.
  - .8        ASTM C840-01, Specification for Application and Finishing of Gypsum Board.
  - .9        ASTM C931/C931M-01, Specification for Exterior Gypsum Soffit Board.
  - .10      ASTM C954-00, Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
  - .11      ASTM C960/C960M-01, Specification for Pre-decorated Gypsum Board.
  - .12      ASTM C1002-01, Specification for Steel Self-Piercing Tapping Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
  - .13      ASTM C1047-99, Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.
  - .14      ASTM C1280-99, Specification for Application of Gypsum Sheathing Board.
  - .15      ASTM C1177-01, Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
  - .16      ASTM C1178/C1178M-01, Specification for Glass Mat Water-Resistant Gypsum Backing Board.

- .3 Association of the Wall and Ceilings Industries International (AWEI)
- .4 Canadian General Standards Board (CGSB)
  - .1 CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
  - .2 CAN/CGSB-71.25-M88, Adhesive, for Bonding Drywall to Wood Framing and Metal Studs.
- .5 Underwriters' Laboratories of Canada (ULC)
  - .1 CAN/ULC-S102-1988(R2000), Surface Burning Characteristics of Building Materials and Assemblies.

### **1.3 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver materials in original packages, containers or bundles bearing manufacturers brand name and identification.
- .2 Store materials inside, level, under cover. Keep dry. Protect from weather, other elements and damage from construction operations and other causes.
- .3 Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal accessories and trim from being bent or damaged.

### **1.4 SITE ENVIRONMENTAL REQUIREMENTS**

- .1 Maintain temperature minimum 10 degrees C, maximum 21 degrees C for 48 hours prior to and during application of gypsum boards and joint treatment, and for at least 48 hours after completion of joint treatment.
- .2 Apply board and joint treatment to dry, frost free surfaces.
- .3 Ventilation: Ventilate building spaces as required to remove excess moisture that would prevent drying of joint treatment material immediately after its application.

### **1.5 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Standard and fire board: to ASTM C36/C36M regular, and 16 mm, Type X, 1200 mm wide x maximum practical length, ends square cut, edges rounded.
- .2 Gypsum exterior sheathing board: to ASTM C79/C79M, Georgia Pacific DENS Glass Gold or CGC Securock™ glass mat sheathing, 16 mm thick, Type X, 1200 mm wide x maximum practical length.

- .3 Water-resistant board: to ASTM C630/C630M regular, 16 mm thick and Type X, 16 mm thick, 1200 mm wide x maximum practical length. (use in new washroom areas)
- .4 Abuse Resistant Board: To CAN/ULC-S102-M88 ASTM C36/ C36N. Acceptable Material: Fiberock® Abuse-Resistant Drywall by CGC or Tough-Rock by Georgia-Pacific or approved alternate. Use on all framing over structural steel lintels and columns.
- .5 Metal furring runners, hangers, tie wires, inserts, anchors: to CSA A82.30.
- .6 Drywall furring channels: 0.5 mm core thickness galvanized steel channels for screw attachment of gypsum board.
- .7 Resilient clips : 0.5 mm base steel thickness galvanized steel for resilient attachment of gypsum board.
- .8 Nails: to ASTM C514.
- .9 Steel drill screws: to ASTM C1002.
- .10 Stud adhesive: to CAN/CGSB-71.25.
- .11 Laminating compound: as recommended by manufacturer, asbestos-free.
- .12 Casing beads, corner beads, control joints and edge trim: to ASTM C1047, metal, zinc-coated by hot-dip process 0.5 mm base thickness, perforated flanges, one piece length per location.
- .13 Cornice cap: 12.7 mm deep x partition width, of 1.6 mm base thickness galvanized sheet steel, prime painted. Include splice plates for joints.
- .14 Shadow mould: 35 mm high, snap-on trim, of 0.6 mm base steel thickness galvanized sheet pre-finished in satin enamel.
- .15 Sealants: in accordance with Section 07 92 10 - Joint Sealing.
- .16 Polyethylene: to CAN/CGSB-51.34, Type 2.
- .17 Insulating strip: rubberized, moisture resistant, 3 mm thick closed cell neoprene strip, 12 mm wide, with self sticking permanent adhesive on one face, lengths as required.
- .18 Joint compound: to ASTM C475, asbestos-free.
- .19 J-Molds to suit Board width.
- .20 D-200 to suite Board width.
- .21 Studio Wall Feature Modular Panel 300.35.SF by 3Form in 4'x8' sheets back fastened. Pattern Type: Carve, Colour: Crystal White.

## **2.2 FINISHES**

- .1 Texture finish (if required): asbestos-free standard white texture coating and primer-sealer, recommended by gypsum board manufacturer.

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**Part 3 Execution**

**3.1 ERECTION**

- .1 Do application and finishing of gypsum board in accordance with ASTM C840 except where specified otherwise.
- .2 Do application of gypsum sheathing in accordance with ASTM C1280.
- .3 Erect hangers and runner channels for suspended gypsum board ceilings in accordance with ASTM C840 except where specified otherwise.
- .4 Support light fixtures by providing additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.
- .5 Install work level to tolerance of 1:1200.
- .6 Frame with furring channels, perimeter of openings for access panels, light fixtures, diffusers, grilles.
- .7 Install 19 x 64 mm furring channels parallel to, and at exact locations of steel stud partition header track.
- .8 Furr for gypsum board faced vertical bulkheads within and at termination of ceilings.
- .9 Furr above suspended ceilings for gypsum board fire and sound stops and to form plenum areas as indicated.
- .10 Install wall furring for gypsum board wall finishes in accordance with ASTM C840, except where specified otherwise.
- .11 Furr openings and around built-in equipment, cabinets, access panels, on four sides. Extend furring into reveals. Check clearances with equipment suppliers.
- .12 Furr duct shafts, beams, columns, pipes and exposed services where indicated.
- .13 Erect drywall resilient furring transversely across studs, spaced maximum 600 mm on centre and not more than 150 mm from ceiling/wall juncture. Secure to each support with 25 mm drywall screw.
- .14 Install 150 mm continuous strip of 12.7 mm gypsum board along base of partitions where resilient furring installed.

**3.2 APPLICATION**

- .1 Do not apply gypsum board until bucks, anchors, blocking, sound attenuation, electrical and mechanical work are approved.
- .2 Apply single layer gypsum board to metal furring or framing using screw fasteners, screw fasteners for second layer. Maximum spacing of screws 300 mm on centre.
  - .1 Single-Layer Application:
    - .1 Apply gypsum board on ceilings prior to application of walls in accordance with ASTM C840.

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- .2 Apply gypsum board vertically or horizontally, providing sheet lengths that will minimize end joints.
  - .2 Double-Layer Application:
    - .1 Install gypsum board for base layer and exposed gypsum board for face layer.
    - .2 Apply base layer to ceilings prior to base layer application on walls; apply face layers in same sequence. Offset joints between layers at least 250 mm.
    - .3 Apply base layers at right angles to supports unless otherwise indicated.
    - .4 Apply base layer on walls and face layers vertically with joints of base layer over supports and face layer joints offset at least 250 mm with base layer joints.
  - .3 Apply single layer gypsum board to concrete block surfaces, where indicated, using laminating adhesive.
    - .1 Comply with gypsum board manufacturer's recommendations.
    - .2 Brace or fasten gypsum board until fastening adhesive has set.
    - .3 Mechanically fasten gypsum board at top and bottom of each sheet.
  - .4 Exterior Soffits and Ceilings: Install exterior gypsum board perpendicular to supports; stagger end joints over supports. Install with 6 mm gap where boards abut other work.
  - .5 Apply water-resistant gypsum board where wall tiles to be applied and adjacent to slop sinks janitors closets. Apply water-resistant sealant to edges, ends, cut-outs which expose gypsum core and to fastener heads. Do not apply joint treatment on areas to receive tile finish.
  - .6 Apply 12 mm diameter bead of acoustic sealant continuously around periphery of each face of partitioning to seal gypsum board/structure junction where partitions abut fixed building components. Seal full perimeter of cut-outs around electrical boxes, ducts, in partitions where perimeter sealed with acoustic sealant.
  - .7 Install ceiling boards in direction that will minimize number of end-butt joints. Stagger end joints at least 250 mm.
  - .8 Install gypsum board on walls vertically to avoid end-butt joints. At stairwells and similar high walls, install boards horizontally with end joints staggered over studs, except where local codes or fire-rated assemblies require vertical application.
  - .9 Install gypsum board with face side out.
  - .10 Do not install damaged or damp boards.
  - .11 Locate edge or end joints over supports. Stagger vertical joints over different studs on opposite sides of wall.

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### 3.3 INSTALLATION

- .1 Erect accessories straight, plumb or level, rigid and at proper plane. Use full length pieces where practical. Make joints tight, accurately aligned and rigidly secured. Mitre and fit corners accurately, free from rough edges. Secure at 150 mm on centre.
- .2 Install casing beads around perimeter of suspended ceilings.
- .3 Install casing beads where gypsum board butts against surfaces having no trim concealing junction and where indicated. Seal joints with sealant.
- .4 Install insulating strips continuously at edges of gypsum board and casing beads abutting metal window and exterior door frames, to provide thermal break.
- .5 Install shadow mould at gypsum board/ceiling juncture as indicated. Minimize joints; use corner pieces and splicers.
- .6 Construct control joints of preformed units set in gypsum board facing and supported independently on both sides of joint.
- .7 Provide continuous polyethylene dust barrier behind and across control joints.
- .8 Locate control joints where indicated at approximate 10 m spacing on long corridor runs and at approximate 15 m spacing on ceilings.
- .9 Install control joints straight and true.
- .10 Construct expansion joints as detailed, at building expansion and construction joints. Provide continuous dust barrier.
- .11 Install expansion joint straight and true.
- .12 Install cornice cap where gypsum board partitions do not extend to ceiling.
- .13 Fit cornice cap over partition, secure to partition track with two rows of sheet metal screws staggered at 300 mm on centre.
- .14 Splice corners and intersections together and secure to each member with 3 screws.
- .15 Install access doors to electrical and mechanical fixtures specified in respective sections.
  - .1 Rigidly secure frames to furring or framing systems.
- .16 Finish face panel joints and internal angles with joint system consisting of joint compound, joint tape and taping compound installed according to manufacturer's directions and feathered out onto panel faces.

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- .17 Gypsum Board Finish: finish gypsum board walls and ceilings to following levels in accordance with Association of the Wall and Ceiling Industries (AWCI) International Recommended Specification on Levels of Gypsum Board Finish:
- .1 Levels of finish:
    - .1 Level 0: No taping, finishing or accessories required.
    - .2 Level 1: Embed tape for joints and interior angles in joint compound. Surfaces to be free of excess joint compound; tool marks and ridges are acceptable.
    - .3 Level 2: Embed tape for joints and interior angles in joint compound and apply one separate coat of joint compound over joints, angles, fastener heads and accessories; surfaces free of excess joint compound; tool marks and ridges are acceptable.
    - .4 Level 3: Embed tape for joints and interior angles in joint compound and apply two separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
    - .5 **Level 4: (Required throughout unless noted otherwise)** Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; surfaces smooth and free of tool marks and ridges.
    - .6 Level 5: Embed tape for joints and interior angles in joint compound and apply three separate coats of joint compound over joints, angles, fastener heads and accessories; apply a thin skim coat of joint compound to entire surface; surfaces smooth and free of tool marks and ridges.
  - .18 Finish corner beads, control joints and trim as required with two coats of joint compound and one coat of taping compound, feathered out onto panel faces.
  - .19 Fill screw head depressions with joint and taping compounds to bring flush with adjacent surface of gypsum board so as to be invisible after surface finish is completed.
  - .20 Sand lightly to remove burred edges and other imperfections. Avoid sanding adjacent surface of board.
  - .21 Completed installation to be smooth, level or plumb, free from waves and other defects and ready for surface finish.
  - .22 Apply one coat of white primer sealer over surface to be textured. When dry apply textured finish in accordance with manufacturer's instructions.
  - .23 Mix joint compound slightly thinner than for joint taping.
  - .24 Apply thin coat to entire surface using trowel or drywall broad knife to fill surface texture differences, variations or tool marks.
  - .25 Allow skim coat to dry completely.

- .26 Remove ridges by light sanding or wiping with damp cloth.
- .27 Provide protection that ensures gypsum drywall work will remain without damage or deterioration at time of substantial completion.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 04 22 00 – Concrete Masonry
- .2        Section 05 41 00 – Light Gauge Structural Steel Framing
- .3        Section 06 10 11 – Rough Carpentry
- .4        Section 07 92 10 – Joint Sealing
- .5        Section 09 21 16 - Gypsum Board Assemblies.

**1.2                REFERENCES**

- .1        American Society for Testing and Materials International, (ASTM).
  - .1        ASTM C645-[00], Specification for Nonstructural Steel Framing Members.
  - .2        ASTM C754-[00], Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products.
- .2        Canadian General Standards Board (CGSB).
  - .1        CAN/CGSB-1.40-[97], Primer, Structural Steel, Oil Alkyd Type.
- .3        Environmental Choice Program (ECP).
  - .1        CCD-047a -[98], Paints - Surface Coatings.
  - .2        CCD-048-[98], Surface Coatings - Recycled Water-borne.

**1.3                QUALITY ASSURANCE**

- .1        Test Reports: certified test reports showing compliance with specified performance characteristics and physical properties.
- .2        Certificates: product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3        Pre-Installation Meetings: conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

**1.4                WASTE MANAGEMENT AND DISPOSAL**

- .1        Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.

**Part 2            Products**

**2.1                MATERIALS**

- .1        Non-load bearing channel stud framing: to ASTM C645, 64, 89 and 150 mm stud size, roll formed from 0.53 mm thickness hot dipped galvanized steel sheet, for screw attachment of gypsum board. Knock-out service holes at 460 mm centres.

- .2 Floor and ceiling tracks: to ASTM C645, in widths to suit stud sizes, 32 mm flange height.
- .3 Metal channel stiffener: 1.4 mm thick cold rolled steel, coated with rust inhibitive coating.
- .4 Acoustical sealant: to CGSB 19-GP-21M..
- .5 Insulating strip: rubberized, moisture resistant 3 mm thick foam strip, 12 mm wide, with self sticking adhesive on one face, lengths as required.

### **Part 3 Execution**

#### **3.1 ERECTION**

- .1 Align partition tracks at floor and ceiling and secure at 600 mm on centre maximum.
- .2 Install damp proof course under stud shoe tracks of partitions on slabs on grade.
- .3 Place studs vertically at 400 mm on centre and not more than 50 mm from abutting walls, and at each side of openings and corners. Position studs in tracks at floor and ceiling. Cross brace steel studs as required to provide rigid installation to manufacturer's instructions.
- .4 Erect metal studding to tolerance of 1:1000.
- .5 Attach studs to bottom, ceiling track using screws.
- .6 Co-ordinate simultaneous erection of studs with installation of service lines. When erecting studs ensure web openings are aligned.
- .7 Co-ordinate erection of studs with installation of door/window frames and special supports or anchorage for work specified in other Sections.
- .8 Provide two studs extending from floor to ceiling at each side of openings wider than stud centres specified. Secure studs together, 50 mm apart using column clips or other approved means of fastening placed alongside frame anchor clips.
- .9 Install heavy gauge single jamb studs at openings.
- .10 Erect track at head of door/window openings and sills of sidelight/window openings to accommodate intermediate studs. Secure track to studs at each end, in accordance with manufacturer's instructions. Install intermediate studs above and below openings in same manner and spacing as wall studs.
- .11 Frame openings and around built-in equipment, cabinets, access panels, on four sides. Extend framing into reveals. Check clearances with equipment suppliers.
- .12 Provide 40 mm stud or furring channel secured between studs for attachment of fixtures behind lavatory basins, toilet and bathroom accessories, and other fixtures including grab bars and towel rails, attached to steel stud partitions.

- .13 Install steel studs or furring channel between studs for attaching electrical and other boxes.
- .14 Extend partitions to ceiling height except where noted otherwise on drawings.
- .15 Maintain clearance under beams and structural slabs to avoid transmission of structural loads to studs. Use 50 mm leg ceiling tracks. Use double track slip joint as indicated.
- .16 Install continuous insulating strips to isolate studs from uninsulated surfaces.
- .17 Install two continuous beads of acoustical sealant under studs and tracks around perimeter of sound control partitions.

### **3.2 CLEANING**

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

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 05 41 00 – Light Gauge Structural Steel Framing
- .2        Section 09 21 16 - Gypsum Board Assemblies
- .3        Section 09 51 13 - Acoustical Panel Ceilings
- .4        Section 09 91 13 – Painting
- .5        Section 09 96 59 – High-Build Glazed Coatings
- .6        Division 21 – Fire Suppression
- .7        Division 23 – Mechanical
- .8        Division 26 - Electrical

**1.2                REFERENCES**

- .1        American Society for Testing and Materials (ASTM International)
  - .1        ASTM C635-00, Specifications for the Manufacture, Performance and Testing of Metal Suspension Systems for Acoustical Tile and Lay-In Panel Ceilings.
  - .2        ASTM C636-96, Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels.

**1.3                DESIGN REQUIREMENTS**

- .1        Maximum deflection: 1/360th of span to ASTM C635 deflection test.

**1.4                SUBMITTALS**

- .1        Comply with Section 01 33 00 Submittal Procedures.

**1.5                QUALITY ASSURANCE**

- .1        Comply with Section 01 00 05 General Instruction and Section 01 00 10 General Work.

**1.6                DELIVERY, STORAGE AND HANDLING**

- .1        Comply with Section 01 00 05 General Instruction and Section 01 00 10 General Work.
- .2        Package and ship per manufacturer's recommendations.
  - .1        Store per manufacturer's instructions.

**1.7                WARRANTY**

- .1        Warrant materials and workmanship against defects after completion and final acceptance of Work.

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**1.8 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

**Part 2 Products**

**2.1 MATERIALS**

- .1 Intermediate duty system to ASTM C635.
- .2 Basic materials for suspension system: commercial quality cold rolled steel.
- .3 Suspension system: non fire rated, made up as follows:
  - .1 Directional exposed tee bar grids.
    - .1 Acceptable material: Standard Prelude 15/16" (23.8 mm) Exposed tee grid by Armstrong Ceilings.
    - .2 Acceptable material: Suprafine 9/16" (15mm) Exposed tee grid by Armstrong Ceilings.
    - .3 Equals by Certainteed or USG are to be approved by consultant.
  - .4 Exposed grid components: shop painted satin sheen white colour. Components die cut. Main tee with double web, rectangular bulb and 25 mm rolled cap on exposed face. Cross tee with rectangular bulb; web extended to form positive interlock with main tee webs; lower flange extended and offset to provide flush intersection.
  - .5 Hanger wire: galvanized soft annealed steel wire.
    - .1 3.6 mm diameter for access tile ceilings.
    - .2 to ULC design requirements for fire rated assemblies.
    - .3 2.6 mm diameter for other ceilings.
  - .6 Hanger inserts: purpose made.
  - .7 Carrying channels: 38 x mm channel, of painted steel.
  - .8 Accessories: splices, clips, wire ties, retainers and wall moulding flush, to complement suspension system components, as recommended by system manufacturer.
  - .9 Allow for curved trim at bullnose block locations.
  - .10 Capz Hardware Components as required for system as listed below.
  - .11 Components: All main beams and cross tees shall be commercial quality hot-dipped galvanized steel as per ASTM A 653. Main beams and cross tees are double-web steel construction with 15/16 inch type exposed flange design. Exposed surfaces chemically cleansed, capping pre-finished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
  - .12 Structural Classification: ASTM C 635, Intermediate Duty.
  - .13 Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.

- .14 Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.
- .15 Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft temper, pre-stretched, with a yield stress load of at least three times design load, but not less than 12 gauge.
- .16 Accessories:
  - .1 QSUTC: Galvanized steel, attachment clip to fasten grid to structure.
  - .2 ARBRKT: Galvanized steel, adjustable hanger bracket to fasten grid to structure.
  - .3 ARSTUD: Galvanized steel, with (1/4-20 threads x 1 inch long) used to secure panel to grid.
  - .4 ARCAP: Aluminum, screws through the panel on the 1/4-20 stud and have 1-1/4 inch diameter face to align and support the panel. Available in white or silver.
  - .5 ARPLUG: Galvanized steel, locks the cross tee tabs on outside rows of mains. Only work with Armstrong XL cross tee end details.

**Part 3 Execution**

**3.1 INSTALLATION**

- .1 Installation: in accordance with ASTM C636 except where specified otherwise.
- .2 Install suspension systems to manufacturer's instructions and Certification Organizations tested design requirements.
- .3 Do not erect ceiling suspension systems until work above ceiling has been inspected by Consultant.
- .4 Secure hangers to overhead structure using attachment methods acceptable to Consultant.
- .5 Install hangers spaced at maximum 1200 mm centres and within 150 mm from ends of main tees.
- .6 Lay out system according to reflected ceiling plan.
- .7 Ensure suspension systems are co-ordinated with location of related components.
- .8 Install wall moulding to provide correct ceiling height.
- .9 Completed suspension systems to support super-imposed loads, such as lighting fixtures diffusers grilles and speakers.
- .10 Support at light fixtures and diffusers with additional ceiling suspension hangers within 150 mm of each corner and at maximum 600 mm around perimeter of fixture.

- .11 Interlock cross member to main runner to provide rigid assembly.
- .12 Frame at openings for light fixtures, air diffusers, speakers and at changes in ceiling heights.
- .13 Install access splines to provide 50 percent ceiling access.
- .14 Finished ceiling system to be square with adjoining walls and level within 1:1000.
- .15 Expansion joints.
  - .1 Erect two main runners parallel, 50 mm apart, on building expansion joint line. Lay in strip of acoustic tile/board, 25% narrower than space between 2 'T' bars.
  - .2 Supply and install "Z" shaped metal trim pieces at each side of expansion joint. Design to accommodate plus or minus 25 mm movement and maintain visual closure. Finish metal components to match adjacent exposed metal trim. Provide backing plates behind butt joints.

### **3.2 CLEANING**

- .1 Touch up scratches, abrasions, voids and other defects in painted surfaces.
- .2 Comply with manufacturers' written instructions for cleaning and touch up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

**END OF SECTION**

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**Part 1                    General**

**1.1                    RELATED SECTIONS**

- .1                    Section 03 30 00 – Cast-In Place Concrete
- .2                    Section 04 22 00 – Concrete Masonry
- .3                    Section 07 92 10 - Joint Sealing.
- .4                    Section 09 21 16 – Gypsum Board assemblies
- .5                    Section 09 65 19 – Resilient Tile Flooring
- .6                    Section 09 91 13 – Painting
- .7                    Division 23 - Plumbing

**1.2                    REFERENCES**

- .1                    American National Standards Institute (ANSI)/Ceramic Tile Institute (CTI)
  - .1                    ANSI A108.1-99, Specification for the Installation of Ceramic Tile (Includes ANSI A108.1A-C, 108.4-.13, A118.1-.10, ANSI A136.1).
  - .2                    CTI A118.3-92, Specification for Chemical Resistant, Water Cleanable Tile Setting and Grouting Epoxy and Water Cleanable Tile Setting Epoxy Adhesive (included in ANSI A108.1).
  - .3                    CTI A118.4-92, Specification for Latex Portland Cement Mortar (included in ANSI A108.1).
  - .4                    CTI A118.5-92, Specification for Chemical Resistant Furan Resin Mortars and Grouts for Tile Installation (included in ANSI A108.1).
  - .5                    CTI A118.6-92, Specification for Ceramic Tile Grouts (included in ANSI A108.1).
- .2                    American Society for Testing and Materials (ASTM International) International
  - .1                    ASTM C144-99, Specification for Aggregate for Masonry Mortar.
  - .2                    ASTM C 207-[91(1997)], Specification for Hydrated Lime for Masonry Purposes.
  - .3                    ASTM C847-95(2000), Specification for Metal Lath.
  - .4                    ASTM C979-99, Specification for Pigments for Integrally Coloured Concrete.
- .3                    Canadian General Standards Board (CGSB)
  - .1                    CAN/CGSB-51.34-M86(R1988), Vapour Barrier, Polyethylene Sheet for Use in Building Construction.
  - .2                    CGSB 71-GP-22M-78, Adhesive, Organic, for Installation of Ceramic Wall Tile.
  - .3                    CAN/CGSB-75.1-M88, Tile, Ceramic.
  - .4                    CAN/CGSB-25.20-95, Surface Sealer for Floors.

- 4 Canadian Standards Association (CSA International)
  - .1 CAN/CSA-A3000-98], Cementitious Materials Compendium (Consists of A5-98, A8-98, A23.5-98, A362-98, A363-98, A456.1-98, A456.2-98, A456.3-98).
  - .2 CSA A123.3-98, Asphalt Saturated Organic Roofing Felt.
  
- 5 Terrazzo Tile and Marble Association of Canada (TTMAC)
  - .1 Tile Specification Guide 09300 2000, Tile Installation Manual.
  - .2 Tile Maintenance Guide 2000.

### **1.3 PRODUCT DATA**

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Include manufacturer's information on:
  - .1 Ceramic tile, marked to show each type, size, and shape required.
  - .2 Chemical resistant mortar and grout (Epoxy and Furan).
  - .3 Cementitious backer unit.
  - .4 Dry-set Portland cement mortar and grout.
  - .5 Divider strip.
  - .6 Elastomeric membrane and bond coat.
  - .7 Reinforcing tape.
  - .8 Leveling compound.
  - .9 Latex-Portland cement mortar and grout.
  - .10 Commercial Portland cement grout.
  - .11 Organic adhesive.
  - .12 Slip resistant tile.
  - .13 Waterproofing isolation membrane.
  - .14 Fasteners.

### **1.4 SAMPLES**

- .1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Base tile: submit duplicate 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.
- .3 Floor tile: submit duplicate 300 x 300 mm sample panels of each colour, texture, size, and pattern of tile.
- .4 Adhere tile samples to 11 mm thick plywood and grout joints to represent project installation.

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**1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Deliver materials in containers with labels legible and intact and grade-seals unbroken.
- .2 Store material so as to prevent damage or contamination.
- .3 Store materials in a dry area, protected from freezing, staining and damage.
- .4 Store cementitious materials on a dry surface.

**1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

**1.7 ENVIRONMENTAL CONDITIONS**

- .1 Maintain air temperature and structural base temperature at ceramic tile installation area above 12° C for 48 h before, during, and 48 h after, installation.
- .2 Do not install tiles at temperatures less than 12° C or above 38° C.
- .3 Do not apply epoxy mortar and grouts at temperatures below 15° C or above 25° C.

**1.8 EXTRA MATERIAL**

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide minimum 2% of each type and colour of tile required for project for maintenance use. Store where directed.
- .3 Maintenance material to be of same production run as installed material.

**Part 2 Products**

**2.1 FLOOR TILE**

- .1 **PT1** - Porcelain tile: to CAN/CGSB-75.1, Type 3, Class MR, 600 x 1220 mm (12"x24") size, matte finish, colour as selected by Consultant.
  - 1) Acceptable Material: Manufacturer: Atlas, Series: Seastone Series porcelain tile as distributed by Centura
    - a. Allow for 2 colours.
    - b. See drawings for pattern

**2.2 WALL TILE**

- .1 **CT1** – Cermaic tile: to CAN/CGSB-75.1, Type 3, Class MR, 76.2mm x152.4 mm (3"x6") size, gloss finish, colour as selected by Consultant.
  - 2) Acceptable Material: Manufacturer: Incepa, Series: Ice Field Brite as distributed by Centura.
    - a. Plain White
    - b. See drawings for pattern

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### **2.3 MORTAR AND ADHESIVE MATERIALS**

- .1 Acceptable material: Mapei - Kerapoxy Premium epoxy mortar or approved alternate.

### **2.4 GROUT**

- .1 Acceptable material: Mapei – Kerapoxy Premium epoxy grout or approved alternate.
  - .1 Colour selected by consultant from full range.
- .2 Grout Sealer: Apply clear water based grout sealer in accordance with grout manufacturer's recommendations on all applications.

### **2.5 ACCESSORIES**

- .1 Tile Movement Joint: Supply and install Schluter® DILEX-AKWS anodized aluminum tile movement joint. Size to suit application and location. Refer to floor pattern drawing for location. Colour to be selected from full colour range for thermoplastic rubber insert.
- .2 Floor tile underlayment mat: Supply and install Schluter Ditra or approved equal under all floor tile installations. Installation is to be as per manufacturers printed instructions.
- .3 Floor tile Waterproofing: In all shower and wet location where tile is specified supply and install Schluter-KERDI waterproofing system under tile. Include complete system with all accessories, trims, adhesives, corners for a complete waterproof installation.
- .4 Transition Strips: Supply and install Schluter® RENO-RAMP, and/or SCHIENE, satin anodized aluminum transition strips sized to suit the intended application.
- .5 Nosing Strips: Supply and install Schluter® TREP-B satin anodized aluminum nosing strips sized to suit the intended application. Colour to be selected from full colour range for thermoplastic rubber insert. Install on all porcelain tile tread nosings.
- .6 Co-ordinate with floor drain and cleanout floor flanges heights.

### **2.6 CLEANING COMPOUNDS**

- .1 Specifically designed for cleaning masonry and concrete and which will not prevent bond of subsequent tile setting materials including patching and leveling compounds and elastomeric waterproofing membrane and coat.
- .2 Materials containing acid or caustic material are not acceptable.

## **Part 3 Execution**

### **3.1 WORKMANSHIP**

- .1 Do tile work in accordance with TTMAC Tile Installation Manual 2000, "Ceramic Tile", except where specified otherwise.
- .2 Apply tile to clean and sound surfaces.
- .3 All floor tile applications of individually laid tile to have grout widths of 5mm maximum.
- .4 Fit tile around corners, fittings, fixtures, drains and other built-in objects. Maintain uniform joint appearance. Cut edges smooth and even. Do not split tiles.

- .5 Maximum surface tolerance 1:800.
- .6 Make joints between tile uniform and approximately 1.5 mm wide, plumb, straight, true, even and flush with adjacent tile. Ensure sheet layout not visible after installation. Align patterns.
- .7 Lay out tiles so perimeter tiles are minimum 1/2 size.
- .8 Sound tiles after setting and replace hollow-sounding units to obtain full bond.
- .9 Install divider strips at junction of tile flooring and dissimilar materials.
- .10 Allow minimum 24 h after installation of tiles, before grouting.
- .11 Clean installed tile surfaces after installation and grouting cured.

**END OF SECTION**



- .5 Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.

#### **1.4 QUALITY ASSURANCE**

- .1 Comply with Section 01 00 05 General Instruction and Section 01 00 10 General Work
- .2 Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

#### **1.5 DELIVERY, STORAGE AND HANDLING**

- .1 Comply with Section 01 00 05 General Instruction and Section 01 00 10 General Work.
- .2 Package and ship per manufacturer's recommendations.
  - .1 Store per manufacturer's instructions.

#### **1.6 WARRANTY**

- .1 Warrant materials and workmanship against defects after completion and final acceptance of Work.
- .2 Warranty Period:
  - .1 Acoustical Panels: Ten (10) years from date of substantial completion
  - .2 Attachment devices: Ten (10) years from date of substantial completion

#### **1.7 EXTRA MATERIALS**

- .1 Provide extra materials of acoustic units in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide acoustical units amounting to 2% of gross ceiling area (minimum 1 carton) for each pattern and type required for project.
- .3 Extra materials to be from same production run as installed materials.
- .4 Clearly identify each type of acoustic unit, including colour and texture.
- .5 Deliver to Owner, upon completion of the work of this section.
- .6 Store where directed by Owner.

#### **1.8 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

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**Part 2 Products**

**2.1 MATERIALS**

- .1 Acceptable material by Armstrong or approved alternate:
  - .1 S.A.T. Type 1: Lyra High CAC manufactured by Armstrong No. 8373 24x48x, 15/16 square lay in tile NRC = 0.95 by Armstrong (8373)

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Do not install acoustical panels and tiles until work above ceiling has been inspected by all Consultants.

**3.2 INSTALLATION**

- .1 Install acoustical panels and tiles in ceiling suspension system.
- .2 In fire rated ceiling systems, secure lay-in panels with hold-down clips and protect over light fixtures, diffusers, air return grilles and other appurtenances according to Certification Organizations design requirements.

**3.3 APPLICATION**

- .1 Install acoustic units to clean, dry and firm substrate.
- .2 Install acoustical units. Refer to reflected ceiling plan.
- .3 Scribe acoustic units to fit adjacent work. Butt joints tight, terminate edges with moulding.

**3.4 INTERFACE WITH OTHER WORK**

- .1 Co-ordinate ceiling work to accommodate components of other sections, such as light fixtures, diffusers, speakers, sprinkler heads, to be built into acoustical ceiling components.

**3.5 ADJUSTMENT AND CLEANING**

- .1 Replace damaged and broken panels.
- .2 Comply with manufacturers' written instructions for cleaning and touch up of minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 03 30 00 – Cast-In Place Concrete
- .2        Section 04 22 00 – Concrete Masonry
- .3        Section 07 92 10 - Joint Sealing.
- .4        Section 09 21 16 – Gypsum Board assemblies
- .5        Section 09 30 13 – Porcelain Tile
- .6        Section 09 65 30 – Acoustical
- .7        Section 09 91 23 – Painting

**1.2                REFERENCES**

- .1        American Society for Testing and Materials (ASTM International)
  - .1        ASTM F1066-99, Specification for Vinyl Composition Floor Tile.
  - .2        ASTM F1344-00, Specification for Rubber Tile.
- .2        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-25.20-95, Surface Sealer for Floors.
  - .2        CAN/CGSB-25.21-95, Detergent-Resistant Floor Polish.

**1.3                CLOSEOUT SUBMITTALS**

- .1        Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

**1.4                WASTE MANAGEMENT AND DISPOSAL**

- .1        Separate and recycle waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

**1.5                ENVIRONMENTAL REQUIREMENTS**

- .1        Maintain air temperature and structural base temperature at flooring installation area above 20°C for 48 hours before, during and for 48 hours after installation.

**1.6                EXTRA MATERIALS**

- .1        Provide maintenance materials of resilient tile flooring, base and adhesive in accordance with Section 01 78 00 - Closeout Submittals.
- .2        Provide 2 m<sup>2</sup> of each colour, pattern and type flooring material required for this project for maintenance use.

- .3 Extra materials to be from same production run as installed materials.
- .4 Clearly identify each container of material and each container of adhesive.
- .5 Deliver to Owner, upon completion of the work of this section.
- .6 Store where directed by Owner.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Resilient base:
  - .1 **RB #1** - Johnsonite 4" (100mm) high cove rubber Wall Base.
    - .1 Colour to be selected from manufacturers full range.
  - .2 Primers and adhesives: recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade.

## **Part 3 Execution**

### **3.1 INSPECTION**

- .1 Ensure substrate is dry, by using test methods recommended by manufacturer.

### **3.2 SUB-FLOOR TREATMENT**

- .1 Remove substrate ridges and bumps. Fill low spots, cracks, joints, holes and other defects with manufacturers recommended filler.
- .2 Clean substrate and apply filler; trowel to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.
- .3 Old material to be removed by trained personnel (may contain asbestos).
- .4 Remove or treat old adhesives to prevent residual, old adhesives from bleeding through to new base and/or interfering with the bonding of new adhesives.

### **3.3 BASE APPLICATION**

- .1 Provide a high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to the outside. Do not let contaminated air re-circulate through a district or whole building air distribution system. Maintain extra ventilation for at least one month following building occupation.
- .2 Apply adhesive uniformly using recommended trowel in accordance with manufacturer's printed instructions. Do not spread more adhesive than can be covered by base before initial set takes place.
- .3 Lay out base to keep number of joints at minimum. Base joints at maximum length available or at internal or premoulded corners.

- .4 Continue base through areas to receive movable type partitions without interrupting base pattern.
- .5 Clean substrate and prime with one coat of adhesive.
- .6 Apply adhesive to back of base.
- .7 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
- .8 Install straight and level to variation of 1:1000.
- .9 Millwork base corners are to extend a minimum of 610mm continuously from all corners and returns.
- .10 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .11 Millwork base is to be mitered at all interior and exterior corners or prefabricated internal and external corners are to be purchased.
- .12 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles, minimum 300 mm each leg. Wrap around toeless base at external corners.
- .13 Install toeless type base before installation of carpet on floors.

### **3.4 INITIAL CLEANING AND WAXING**

- .1 Remove excess adhesive from base and wall surfaces without damage.
- .2 Clean, seal and wax floor and base surface to flooring manufacturer's instructions. In carpeted areas clean, seal and wax base surface before carpet installation.

### **3.5 PROTECTION OF FINISHED WORK**

- .1 Protect new base from time of final set of adhesive until final inspection.
- .2 Prohibit traffic on floor for 48 hours after installation.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 03 30 00 – Cast-In Place Concrete
- .2        Section 04 22 00 – Concrete Masonry
- .3        Section 07 92 10 - Joint Sealing.
- .4        Section 09 21 16 – Gypsum Board assemblies
- .5        Section 09 30 13 – Porcelain Tile
- .6        Section 09 65 13 – Resilient Base
- .7        Section 09 65 30 – Acoustical
- .8        Section 09 91 13 – Painting

**1.2                REFERENCES**

- .1        American Society for Testing and Materials (ASTM International)
  - .1        ASTM F1066-99, Specification for Vinyl Composition Floor Tile.
  - .2        ASTM F1344-00, Specification for Rubber Tile.
- .2        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-25.20-95, Surface Sealer for Floors.
  - .2        CAN/CGSB-25.21-95, Detergent-Resistant Floor Polish.

**1.3                CLOSEOUT SUBMITTALS**

- .1        Provide maintenance data for resilient flooring for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

**1.4                WASTE MANAGEMENT AND DISPOSAL**

- .1        Separate and recycle waste materials in accordance with Section 01 74 19 - Waste Management and Disposal.

**1.5                ENVIRONMENTAL REQUIREMENTS**

- .1        Maintain air temperature and structural base temperature at flooring installation area above 20°C for 48 hours before, during and for 48 hours after installation.

**1.6                EXTRA MATERIALS**

- .1        Provide maintenance materials of resilient tile flooring, base and adhesive in accordance with Section 01 78 00 - Closeout Submittals.
- .2        Provide 2 m<sup>2</sup> of each colour, pattern and type flooring material required for this project for maintenance use.

- .3 Extra materials to be from same production run as installed materials.
- .4 Clearly identify each container of floor tile and each container of adhesive.
- .5 Deliver to Owner, upon completion of the work of this section.
- .6 Store where directed by Owner.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Rubber Sheet Flooring (At Landings):
  - .1 Johnsonite Microstone speckled – Hammered Finish
  - .2 Colour to be selected by consultant from manufacturers full range.
- .2 Rubber Stair Tread: Rubber square nose, full tread deep, surface black carborundum strips:
  - .1 Johnsonite – VIHMT – Visually Impaired – Microtone Speckled hammered.
  - .2 Colour to be selected by consultant from manufacturers full range.
- .3 Rubber Stair Riser:
  - .1 Install Rubber Base as the stair riser. Johnsonite 4" (100mm) high cove rubber Wall Base.
  - .2 Consultant to select colour from manufacturers full range of colours.
- .4 Primers and adhesives: recommended by flooring manufacturer for specific material on applicable substrate, above, at or below grade.
- .5 Sub-floor cementitious leveler: as recommended by flooring manufacturer for use with their product.
- .1 Wax: Resilient Tile Wax is to be installed as per manufacturers printed instructions.
- .2 Sealer: Resilient Tile Sealer is to be applied as per manufacturers printed instructions.

## **Part 3 Execution**

### **3.1 INSPECTION**

- .1 Ensure concrete floors are dry, by using test methods recommended by tile manufacturer.

### **3.2 SUB-FLOOR TREATMENT**

- .1 Remove sub-floor ridges and bumps. Fill low spots, cracks, joints, holes and other defects with sub-floor filler.
- .2 Clean floor and apply filler; trowel and float to leave smooth, flat hard surface. Prohibit traffic until filler cured and dry.

- .3 Old vinyl flooring to be removed by trained personnel (may contain asbestos).
- .4 Remove or treat old adhesives to prevent residual, old flooring adhesives from bleeding through to new flooring and/or interfering with the bonding of new adhesives.
- .5 Seal concrete to flooring manufacturer's printed instructions.

### **3.3 APPLICATION**

- .1 Provide a high ventilation rate, with maximum outside air, during installation, and for 48 to 72 hours after installation. If possible, vent directly to the outside. Do not let contaminated air re-circulate through a district or whole building air distribution system. Maintain extra ventilation for at least one month following building occupation.
- .2 Apply adhesive uniformly using recommended trowel in accordance with flooring manufacturer's instructions. Do not spread more adhesive than can be covered by flooring before initial set takes place.
- .3 Lay flooring with joints parallel to building lines to produce symmetrical tile pattern. Border tiles minimum half tile width.
- .4 Install flooring to square grid pattern with all joints aligned with pattern grain parallel for all units and parallel to length of room.
- .5 As installation progresses, and after installation, roll flooring in 2 directions with 45 kg minimum roller to ensure full adhesion.
- .6 Cut tile and fit neatly around fixed objects.
- .7 Install feature strips and floor markings where indicated. Fit joints tightly.
- .8 Install flooring in pan type floor access covers. Maintain floor pattern.
- .9 Continue flooring through areas to receive movable type partitions without interrupting floor pattern.
- .10 Terminate flooring at centerline of door in openings where adjacent floor finish or colour is dissimilar.
- .11 Install metal edge strips at unprotected or exposed edges where flooring terminates.
- .12 Primers and adhesives: of types recommended by resilient flooring manufacturer for specific material on applicable substrate, above, on or below grade.

### **3.4 BASE APPLICATION**

- .1 Lay out base to keep number of joints at minimum. Base joints at maximum length available or at internal or premoulded corners.
- .2 Clean substrate and prime with one coat of adhesive.
- .3 Apply adhesive to back of base.
- .4 Set base against wall and floor surfaces tightly by using 3 kg hand roller.
- .5 Install straight and level to variation of 1:1000.

- .6 Millwork base corners are to extend a minimum of 610mm continuously from all corners and returns.
- .7 Scribe and fit to door frames and other obstructions. Use premoulded end pieces at flush door frames.
- .8 Millwork base is to be mitered at all interior and exterior corners or prefabricated internal and external corners are to be purchased.
- .9 Cope internal corners. Use premoulded corner units for right angle external corners. Use formed straight base material for external corners of other angles, minimum 300 mm each leg. Wrap around toeless base at external corners.
- .10 Install toeless type base before installation of carpet on floors.

### **3.5 NOSING APPLICATION**

- .1 Install as per manufacturers printed instructions.

### **3.6 INITIAL CLEANING AND WAXING**

- .1 Remove excess adhesive from floor, base and wall surfaces without damage.
- .2 Clean, seal and wax floor and base surface to flooring manufacturer's instructions. In carpeted areas clean, seal and wax base surface before carpet installation.

### **3.7 PROTECTION OF FINISHED WORK**

- .1 Protect new floors from time of final set of adhesive until final inspection.
- .2 Prohibit traffic on floor for 48 hours after installation.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 04 22 00 – Concrete Masonry
- .2        Section 05 50 00 – Metal Fabrications
- .3        Section 06 20 00 – Finish Carpentry
- .4        Section 06 40 00 – Architectural Woodwork
- .5        Section 08 11 14 – Metal Doors and Frames
- .6        Section 08 31 00 – Service Access Doors and Frames
- .7        Section 09 21 16 – Gypsum Board Assemblies

**1.2                REFERENCES**

- .1        Architectural Painting Specifications Manual, Master Painters Institute (MPI).
- .2        Systems and Specifications Manual, SSPC Painting Manual, Volume Two, Society for Protective Coatings (SSPC).
- .3        Test Method for Measuring Total Volatile Organic Compound Content of Consumer Products, Method 24 (for Surface Coatings) of the Environmental Protection Agency (EPA).
- .4        National Fire Code of Canada.

**1.3                QUALITY ASSURANCE**

- .1        Contractor shall have a minimum of five years proven satisfactory experience. When requested, provide a list of last three comparable jobs including, job name and location, specifying authority, and project manager.
- .2        Qualified journeymen who have a "Tradesman Qualification Certificate of Proficiency" shall be engaged in painting work. Apprentices may be employed provided they work under the direct supervision of a qualified journeyman in accordance with trade regulations.
- .3        Conform to latest MPI requirements for exterior painting work including preparation and priming.
- .4        Materials (primers, paints, coatings, varnishes, stains, lacquers, fillers, thinners, solvents, etc.) shall be in accordance with MPI Painting Specification Manual "Approved Product" listing and shall be from a single manufacturer for each system used.
- .5        Other paint materials such as linseed oil, shellac, turpentine, etc. shall be the highest quality product of an approved manufacturer listed in MPI Painting Specification Manual and shall be compatible with other coating materials as required.

.6 Retain purchase orders, invoices and other documents to prove conformance with noted MPI requirements when requested by Consultant.

.7 Standard of Acceptance:

.1 Walls: No defects visible from a distance of 1000 mm at 90° to surface.

.2 Soffits: No defects visible from floor at 45° to surface when viewed using final lighting source.

.3 Final coat to exhibit uniformity of colour and uniformity of sheen across full surface area.

#### **1.4 ENVIRONMENTAL PERFORMANCE REQUIREMENTS**

.1 Provide paint products meeting MPI "Environmentally Friendly" E1 ratings based on VOC (EPA Method 24) content levels.

#### **1.5 SUBMITTALS**

.1 Submit product data and manufacturer's installation/application instructions for paints and coating products to be used in accordance with Section 01 33 00 - Submittal Procedures.

.2 Upon completion, submit records of products used. List products in relation to finish system and include the following:

.1 Product name, type and use.

.2 Manufacturer's product number.

.3 Colour numbers.

.4 MPI Environmentally Friendly classification system rating.

.5 Manufacturer's Material Safety Data Sheets (MSDS).

#### **1.6 SAMPLES**

.1 Submit samples in accordance with Section 01 33 00 - Submittal Procedures.

.2 Submit duplicate 200 x 300 mm sample panels of each paint, stain, clear coating special finish with specified paint or coating in colours, gloss/sheen and textures required to MPI Painting Specification Manual standards submitted on the following substrate materials:

.1 3 mm plate steel for finishes over metal surfaces.

.2 13 mm birch plywood for finishes over wood surfaces.

.3 50 mm concrete block for finishes over concrete or concrete masonry surfaces.

.4 13 mm gypsum board for finishes over gypsum board and other smooth surfaces.

.3 When approved, samples shall become acceptable standard of quality for appropriate on-site surface with one of each sample retained on-site.

.4 Submit full range of available colours where colour availability is restricted.

**1.7 EXTRA MATERIALS**

- .1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Submit one - four litre can of each type and colour of finish coating. Identify colour and paint type in relation to established colour schedule and finish system.
- .3 Deliver to Contractor and store where directed.

**1.8 DELIVERY, HANDLING AND STORAGE**

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements.
- .2 Deliver and store materials in original containers, sealed, with labels intact.
- .3 Labels shall clearly indicate:
  - .1 Manufacturer's name and address.
  - .2 Type of paint or coating.
  - .3 Compliance with applicable standard.
  - .4 Colour number in accordance with established colour schedule.
- .4 Remove damaged, opened and rejected materials from site.
- .5 Provide and maintain dry, temperature controlled, secure storage.
- .6 Observe manufacturer's recommendations for storage and handling.
- .7 Store materials and supplies away from heat generating devices.
- .8 Store materials and equipment in a well ventilated area with temperature range 7°C to 30°C.
- .9 Store temperature sensitive products above minimum temperature as recommended by manufacturer.
- .10 Keep areas used for storage, cleaning and preparation, clean and orderly to approval of Consultant. After completion of operations, return areas to clean condition to approval of Consultant.
- .11 Remove paint materials from storage only in quantities required for same day use.
- .12 Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling storage, and disposal of hazardous materials.

- .13 Fire Safety Requirements:
  - .1 Provide one 9 kg Type ABC fire extinguisher adjacent to storage area.
  - .2 Store oily rags, waste products, empty containers and materials subject to spontaneous combustion in ULC approved, sealed containers and remove from site on a daily basis.
  - .3 Handle, store, use and dispose of flammable and combustible materials in accordance with the National Fire Code of Canada.

## 1.9 SITE REQUIREMENTS

- .1 Heating, Ventilation and Lighting:
  - .1 Ventilate enclosed spaces.
  - .2 Perform no painting work unless adequate and continuous ventilation and sufficient heating facilities are in place to maintain ambient air and substrate temperatures above 10°C for 24 hours before, during and after paint application until paint has cured sufficiently.
  - .3 Where required, provide continuous ventilation for seven days after completion of application of paint.
  - .4 Coordinate use of existing ventilation system with General Contractor and ensure its operation during and after application of paint as required.
  - .5 Provide temporary ventilating and heating equipment where permanent facilities are not available or supplemental ventilating and heating equipment if ventilation and heating from existing system is inadequate to meet minimum requirements.
  - .6 Perform no painting work unless a minimum lighting level of 323 Lux is provided on surfaces to be painted. Adequate lighting facilities shall be provided by General Contractor.
- .2 Temperature, Humidity and Substrate Moisture Content Levels:
  - .1 Unless specifically pre-approved by specifying body, Paint Inspection Agency and, applied product manufacturer, perform no painting work when:
    - .1 ambient air and substrate temperatures are below 10°C.
    - .2 substrate temperature is over 32°C unless paint is specifically formulated for application at high temperatures.
    - .3 substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's prescribed limits.
    - .4 the relative humidity is above 85% or when dew point is less than 3°C variance between air/surface temperature.
    - .5 rain or snow are forecast to occur before paint has thoroughly cured or when it is foggy, misty, raining or snowing at site.
  - .2 Perform no painting work when maximum moisture content of substrate exceeds:
    - .1 12% for concrete and masonry (clay and concrete brick/block).
    - .2 15% for wood.
    - .3 12% for plaster and gypsum board.

- .3 Conduct moisture tests using a properly calibrated electronic Moisture Meter, except test concrete floors for moisture using a simple "cover patch test".
- .4 Test concrete, masonry and plaster surfaces for alkalinity as required.
- .3 Surface and Environmental Conditions:
  - .1 Apply paint finish only in areas where dust is no longer being generated by related construction operations or when wind or ventilation conditions are such that airborne particles will not affect quality of finished surface.
  - .2 Apply paint only to adequately prepared surfaces and to surfaces within moisture limits noted herein.
  - .3 Apply paint only when previous coat of paint is dry or adequately cured.
  - .4 Apply paint finishes only when conditions forecast for entire period of application fall within manufacturer's recommendations.
  - .5 Do not apply paint when:
    - .1 Temperature is expected to drop below 10<sup>0</sup>C before paint has thoroughly cured.
    - .2 Substrate and ambient air temperatures are expected to fall outside MPI or paint manufacturer's limits.
    - .3 Surface to be painted is wet, damp or frosted.
  - .6 Provide and maintain cover when paint must be applied in damp or cold weather. Heat substrates and surrounding air to comply with temperature and humidity conditions specified by manufacturer. Protect until paint is dry or until weather conditions are suitable.
  - .7 Schedule painting operations such that surfaces exposed to direct, intense sunlight are scheduled for completion during early morning.
  - .8 Remove paint from areas which have been exposed to freezing, excess humidity, rain, snow or condensation. Prepare surface again and repaint.
  - .9 Paint occupied facilities in accordance with approved schedule only. Schedule operations to approval of the Owner such that painted surfaces will have dried and cured sufficiently before occupants are affected.

#### **1.10 WASTE MANAGEMENT AND DISPOSAL**

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .2 Paint, stain and wood preservative finishes and related materials (thinners, solvents, etc.) are regarded as hazardous products and are subject to regulations for disposal. Information on these controls can be obtained from Provincial Ministries of Environment and Regional levels of Government.
- .3 Material which cannot be reused must be treated as hazardous waste and disposed of in an appropriate manner.
- .4 Place materials defined as hazardous or toxic waste, including used sealant and adhesive tubes and containers, in containers or areas designated for hazardous waste.

- .5 To reduce the amount of contaminants entering waterways, sanitary/storm drain systems or into the ground the following procedures shall be strictly adhered to:
  - .1 Retain cleaning water for water-based materials to allow sediments to be filtered out.
  - .2 Retain cleaners, thinners, solvents and excess paint and place in designated containers and ensure proper disposal.
  - .3 Return solvent and oil soaked rags used during painting operations for contaminant recovery, proper disposal, or appropriate cleaning and laundering.
  - .4 Dispose of contaminants in an approved legal manner in accordance with hazardous waste regulations.
  - .5 Empty paint cans are to be dry prior to disposal or recycling (where available).
- .6 Where paint recycling is available, collect waste paint by type and provide for delivery to recycling or collection facility.
- .7 Set aside and protect surplus and uncontaminated finish materials. Deliver to Owner.
- .8 Close and seal tightly partly used sealant and adhesive containers and store protected in well ventilated fire-safe area at moderate temperature.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Painting materials such as primers, paints, rust-inhibiting agents, stains, fillers, topcoats, lacquers, etc. to be supplied by either: Benjamin Moore, Sherwin Williams, Para, Pittsburg, Pratt & Lambert or Glidden ICI only.
- .2 Paint materials for paint systems shall be products of a single manufacturer.
- .3 Only qualified products with E2 "Environmentally Friendly" rating are acceptable for use on this project.
- .4 Paints, coatings, adhesives, solvents, cleaners, lubricants, and other fluids, shall:
  - .1 be water-based.
  - .2 be non-flammable
  - .3 be manufactured without compounds which contribute to ozone depletion in the upper atmosphere.
  - .4 be manufactured without compounds which contribute to smog in the lower atmosphere.
  - .5 do not contain toxic metal pigments.
- .5 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).

- .6 Water-borne surface coatings must not be formulated or manufactured with aromatic solvents, formaldehyde, halogenated solvents, mercury, lead, cadmium, hexavalent chromium or their compounds.
- .7 Water-borne surface coatings and recycled water-borne surface coatings must have a flash point of 61.0°C or greater.
- .8 Both water-borne surface coatings and recycled water-borne surface coatings must be made by a process that does not release:
  - .1 Matter in undiluted production plant effluent generating a 'Biochemical Oxygen Demand' (BOD) in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
  - .2 Total Suspended Solids (TSS) in undiluted production plant effluent in excess of 15 mg/L to a natural watercourse or a sewage treatment facility lacking secondary treatment.
- .9 Water-borne paints and stains, recycled water-borne surface coatings and water borne varnishes must meet a minimum "Environmentally Friendly" E2 rating.
- .10 Recycled water-borne surface coatings must contain 50% post-consumer material by volume.
- .11 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 50.0 ppm weight/weight total product.
  - .3 Cadmium in excess of 1.0 ppm 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.
- .12 The following must be performed on each batch of consolidated post-consumer material before surface coating is reformulated and canned. These tests must be performed at a laboratory or facility which has been accredited by the Standards Council of Canada.
  - .1 Lead, cadmium and chromium are to be determined using ICP-AES (Inductively Coupled Plasma - Atomic Emission Spectroscopy) technique no. 6010 as defined in EPA SW-846.
  - .2 Mercury is to be determined by Cold Vapour Atomic Absorption Spectroscopy using Technique no. 7471 as defined in EPA SW-846.
  - .3 Organochlorines and PCBs are to be determined by Gas Chromatography using Technique no. 8081 as defined in EPA SW-846.

## 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 five accent colours. No more than ten colours will be selected for the entire project and no more than five 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 a restricted range of colours, selection will be based on the limited range.
- .5 Second coat in a 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 Paste, powder or catalyzed paint mixes shall be mixed in strict accordance with manufacturer's written instructions.
- .3 Where thinner is used, addition shall not exceed paint manufacturer's recommendations. Do not use kerosene or any such organic solvents to thin water-based paints.
- .4 Thin paint for spraying according in strict 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 GLOSS/SHEEN RATINGS**

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

Gloss Level Category/	Units @ 60E/	Units @ 60E/
G1 - matte finish	0 to 5	max. 10
G2 - velvet finish	0 to 10	10 to 35
G3 - eggshell finish	10 to 25	10 to 35
G4 - satin finish	20 to 35	min. 35
G5 - semi-gloss finish	35 to 70	
G6 - gloss finish	70 to 85	
G7 - high gloss finish	> 85	

- .2 Gloss level ratings of painted surfaces shall be as specified herein.
- .3 All corridors and public areas shall have semi-gloss finish. All other areas to be satin finish.

### **2.5 EXTERIOR FINISHES**

- .1 Exposed Steel Lintels, Non-prefinished metal louvres, and miscellaneous unfinished steel items:
  - .1 1 coat Sherwin Williams "Kem Kromik" Universal Metal Primer (alkyd), B50 Series.

- .2 2 coats Sherwin Williams "Industrial Enamel" topcoat (alkyd), B54 Series, gloss finish.
- .2 Miscellaneous Ferrous Metals:
  - .1 1 coat Sherwin Williams "Kem Kromik" Universal Metal Primer (alkyd), B50 Series.
  - .2 2 coats Sherwin Williams "Industrial Enamel" topcoat (alkyd), B54 Series, gloss finish.
- .3 Steel Doors and Frames:
  - .1 1 coat Sherwin Williams "Kem Kromik" Universal Metal Primer, B50 Series.
  - .2 2 coats Sherin Williams "Industrial Enamel" top coat (alkyd), B54 Series , gloss finish, spray applied.
- .4 Exterior Wood:
  - .1 Sand and prep all blistering and peeling area for Consultant' review prior to finish.
  - .2 2 coats Sherwin Williams "Duration Exterior Latex Coating", satin finish.
- .5 Textured Architectural Coating:
  - .1 Fill all voids in poured concrete with hydraulic cement patching compound
  - .2 Minimum 3 coats Niagara Protective Coatings "Liquistone 50" exterior textured wall coating, applied at spread rate of 80 – 120 sq. ft. per gallon, minimum 10 mil dft. Per coat; coating to be pre-pigment to match Consultant supplied sample; total number of coats to be applied should adequately conceal spiral sono-tube impressions throughout.

## **2.6 INTERIOR FINISHES**

- .1 Gypsum Wall Board Walls
  - .1 1 coat Sherwin Williams "Prep Rite 200" Primer, B28W200 Series
  - .2 2 coats Sherwin Williams "Harmony" Low-VOC Interior Acrylic, B9 Series, satin finish. Allow for 2 colours.
- .2 Gypsum Wall Board Ceilings & Bulkheads:
  - .1 1 coat Sherwin Williams "Prep Rite 200" Primer, B28W200 Series.
  - .2 2 coats Sherwin Williams "Harmony" Low-VOC Interior Acrylic, B9 Series, flat finish.
- .3 Steel Door and Frames and Miscellaneous Non-prefinished Steel items:
  - .1 1 coat Sherwin Williams "Kem Kromik" Universal Metal Primer, B50 Series, spray applied
  - .2 2 coats Sherwin Williams "Industrial Enamel" topcoat (alkyd) B54 Series, gloss finish, spray applied.
- .4 Galvanized and Zinc coated Metals:
  - .1 2 coat Sherwin Williams "Galvite HS" primer, B50 Series, spray applied.
  - .2 2 coats Sherwin Williams "Industrial Enamel" topcoat (alkyd), B54 Series, gloss finish, spray applied.

- .5 Exposed Underside of Metal Deck, Open Web Steel Joists, Exposed Ducts, ect.:
  - .1 2 coats Sherwin Williams "Waterbourne Acrylic Dryfall", B42 Series, eggshell finish, spray applied.
- .6 Concrete Horizontal Surfaces:
  - .1 Sealer: INT 3.2F Concrete floor sealer.

### **Part 3 Execution**

#### **3.1 GENERAL**

- .1 Perform preparation and operations for exterior painting in accordance with MPI Painting Specifications Manual except where specified otherwise.
- .2 Apply paint materials in accordance with paint manufacturer's written application instructions.

#### **3.2 EXISTING CONDITIONS**

- .1 Investigate existing substrates for problems related to proper and complete preparation of surfaces to be painted. Report to Consultant damages, defects, unsatisfactory or unfavourable conditions before proceeding with work.
- .2 Conduct moisture testing of surfaces to be painted using a properly calibrated electronic moisture meter, except test concrete floors for moisture using a simple "cover patch test" and report findings to Consultant. Do not proceed with work until conditions fall within acceptable range as recommended by manufacturer.
- .3 Maximum moisture content as follows:
  - .1 Stucco: 12%.
  - .2 Concrete: 12%.
  - .3 Clay and Concrete Block/Brick: 12%.
  - .4 Wood: 15%.

#### **3.3 PROTECTION**

- .1 Protect existing building surfaces and adjacent structures from paint spatters, markings and other damage by suitable non-staining covers or masking. If damaged, clean and restore such surfaces as directed by Consultant.
- .2 Protect items that are permanently attached such as Fire Labels on doors and frames.
- .3 Protect factory finished products and equipment.
- .4 Protect passing pedestrians, building occupants and general public in and about the building.
- .5 Removal of light fixtures, surface hardware on doors, and other surface mounted equipment, fittings and fastenings shall be done prior to undertaking painting operations by General Contractor. Items shall be securely stored and re-installed after painting is completed by General Contractor.

- .6 Move and cover exterior furniture and portable equipment as necessary to carry out painting operations. Replace as painting operations progress.
- .7 As painting operations progress, place "WET PAINT" signs in pedestrian and vehicle traffic areas to approval of Consultant.

### **3.4 CLEANING AND PREPARATION**

- .1 Clean and prepare exterior surfaces in accordance with MPI Painting Specification Manual requirements. Refer to the MPI Manual in regard to specific requirements and as follows:
  - .1 Remove dust, dirt, and other surface debris by wiping with dry, clean cloths or compressed air.
  - .2 Wash surfaces with a biodegradable detergent (and bleach where applicable) and clean warm water using a stiff bristle brush to remove dirt, oil and other surface contaminants.
  - .3 Rinse scrubbed surfaces with clean water until foreign matter is flushed from surface.
  - .4 Allow surfaces to drain completely and allow to dry thoroughly.
  - .5 Prepare surfaces for water-based painting, water-based cleaners should be used in place of organic solvents.
  - .6 Use trigger operated spray nozzles for water hoses.
  - .7 Many water-based paints cannot be removed with water once dried. However, minimize the use of kerosene or any such organic solvents to clean up water-based paints.
- .2 Prevent contamination of cleaned surfaces by salts, acids, alkalis, other corrosive chemicals, grease, oil and solvents before prime coat is applied and between applications of remaining coats. Apply primer, paint, or pretreatment as soon as possible after cleaning and before deterioration occurs.
- .3 Where possible, prime surfaces of new wood surfaces before installation. Use same primers as specified for exposed surfaces.
  - .1 Apply vinyl sealer to MPI #36 over knots, pitch, sap and resinous areas.
  - .2 Apply wood filler to nail holes and cracks.
  - .3 Tint filler to match stains for stained woodwork.
- .4 Sand and dust between coats as required to provide adequate adhesion for next coat and to remove defects visible from a distance up to 1000 mm.
- .5 Clean metal surfaces to be painted by removing rust, loose mill scale, welding slag, dirt, oil, grease and other foreign substances in accordance with MPI requirements. Remove traces of blast products from surfaces, pockets and corners to be painted by [brushing with clean brushes] [blowing with clean dry compressed air], or [brushing/vacuum cleaning].
- .6 Touch up of shop primers with primer as specified in applicable section. Major touch-up, including cleaning and painting of field connections, welds, rivets, nuts, washers, bolts, and damaged or defective paint and rusted areas, shall be by supplier of fabricated material.

- .7 Do not apply paint until prepared surfaces have been accepted by the Inspecting Agency.

### **3.5 APPLICATION**

- .1 Method of application to be as approved by Consultant. Apply paint by brush, roller, air sprayer, or airless sprayer. Conform to manufacturer's application instructions unless specified otherwise.
- .2 Brush and Roller Application:
- .1 Apply paint in a uniform layer using brush and/or roller of types suitable for application.
  - .2 Work paint into cracks, crevices and corners.
  - .3 Paint surfaces and corners not accessible to brush using spray, daubers and/or sheepskins. Paint surfaces and corners not accessible to roller using brush, daubers or sheepskins.
  - .4 Brush and/or roll out runs and sags, and over-lap marks. Rolled surfaces shall be free of roller tracking and heavy stipple unless approved by Consultant.
  - .5 Remove runs, sags and brush marks from finished work and repaint.
- .3 Spray Application:
- .1 Provide and maintain equipment that is suitable for intended purpose, capable of properly atomizing paint to be applied, and equipped with suitable pressure regulators and gauges.
  - .2 Keep paint ingredients properly mixed in containers during paint application either by continuous mechanical agitation or by intermittent agitation as frequently as necessary
  - .3 Apply paint in a uniform layer, with overlapping at edges of spray pattern.
  - .4 Brush out immediately runs and sags.
  - .5 Use brushes to work paint into cracks, crevices and places which are not adequately painted by spray.
- .4 Use dipping, sheepskins or daubers only when no other method is practical in places of difficult access and only when specifically authorized by Consultant.
- .5 Apply coats of paint as a continuous film of uniform thickness. Repaint thin spots or bare areas before next coat of paint is applied.
- .6 Allow surfaces to dry and properly cure after cleaning and between subsequent coats for minimum time period as recommended by manufacturer.
- .7 Sand and dust between coats to remove visible defects.
- .8 Finish surfaces both above and below sight lines as specified for surrounding surfaces, including such surfaces as projecting ledges.
- .9 Finish top, bottom, edges and cutouts of doors after fitting as specified for door surfaces.

### **3.6 MECHANICAL/ELECTRICAL EQUIPMENT**

- .1 Unless otherwise specified, paint exterior exposed conduits, piping, hangers, ductwork and other mechanical and electrical equipment with colour and finish to match adjacent surfaces, except as noted otherwise.

- .2 Touch up scratches and marks on factory painted finishes and equipment with paint as supplied by manufacturer of equipment.
- .3 Do not paint over nameplates.
- .4 Paint fire protection piping.
- .5 Paint steel electrical light standards. Do not paint outdoor transformers and substation equipment.

**3.7 FIELD QUALITY CONTROL**

- .1 Field inspection of exterior painting operations to be carried out by independent inspection firm as designated by Consultant.
- .2 Advise Consultant when each surface and applied coating is ready for inspection. Do not proceed with subsequent coats until previous coat has been approved.
- .3 Co-operate with inspection firm and provide access to areas of work.

**3.8 RESTORATION**

- .1 Clean and re-install all hardware items removed before undertaken painting operations.
- .2 Remove protective coverings and warning signs as soon as practical after operations cease.
- .3 Remove paint splashing 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**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1            Section 04 22 00 – Concrete Masonry
- .2            Section 09 91 13 - Painting

**1.2                REFERENCES**

- .1            Canadian General Standards Board (CGSB)
  - .1            CAN/CGSB-1.186-1996, High Performance Glazed Coating System, Interior.

**1.3                CLOSEOUT SUBMITTALS**

- .1            Provide maintenance data for coatings for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

**1.4                DELIVERY, STORAGE AND HANDLING**

- .1            Deliver and store materials undamaged in original containers with labels and seals intact.
- .2            Store materials in in a single designated area having ambient temperature of a minimum of 15° C (59° F).

**1.5                WASTE MANAGEMENT**

- .1            Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.

**1.6                ENVIRONMENTAL REQUIREMENTS**

- .1            Safety.
  - .1            Comply with requirements of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of materials.
  - .2            Ensure no open flame heating devices are used.
  - .3            Post “Wet Coating” signs and “No Smoking” signs while work is in progress and while coating is curing.
  - .4            Discourage occupancy of treated space until volatile materials are no longer being emitted and there is no odour.
  - .5            Protect adjacent surfaces not scheduled to receive coating from damage.
  - .6            Erect suitable barriers to prevent traffic and other trades from working in areas during application of coating.
  - .7            Provide adequate respiratory protection to exposed individuals.

- .2 Ventilation.
  - .1 Provide ventilation continuously during and after coating application. Run system 24 hours per day during application; provide continuous ventilation for 7 days after completion of application.
  - .2 Maintain a reasonably dust free atmosphere during application.
- .3 Temperature.
  - .1 Maintain temperatures in area to receive coating at a minimum of 15° C (59° F) air temperature for at least 24 hours prior, during and until the applied coatings have cured.
  - .2 Maintain minimum temperature 10° C (50° F) within area of installation until final acceptance of building.

### **1.7 QUALITY ASSURANCE**

- .1 Application of coatings shall be carried out by skilled applicators approved by the manufacturer in accordance with manufacturers current written instructions.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Interior high build glazed coating materials: to CAN/CGSB-1.186 in colour and texture selected by Consultant from full range of colours and textures.
- .2 New concrete block walls: HBGC.
  - .1 Prime coat: cementitious type – Block Filler.
    - .1 Paint: Latex Paint – Flat finish. Colour selected by Architect. Refer to painting section.
  - .2 Finish coat: semi-gloss finish. Poly-Teks Glaze
  - .3 Acceptable material: Poly-Teks Glaze W.B. by Niagara Protective Coatings with compatible block filler and clear coat.
- .3 Existing masonry and GWB walls: HBGC.
  - .1 Prepare surface as per section 09 21 16, Gypsum Board Assemblies and section 04 22 00 masonry.
    - .1 Paint: Latex Paint – Flat finish. Colour selected by Architect. Refer to painting section.
  - .2 Finish coat: semi-gloss finish. Poly-Teks Glaze.

**Part 3 Execution**

**3.1 EXAMINATION**

- .1 Surfaces to be coated shall be sound, clean, non-dusting, cured, free from oil and efflorescence or any other contaminants.
- .2 Report to Consultant all defects and unsatisfactory conditions. Commencement of work implies acceptance of existing conditions.
- .3 Concrete must be cured 28 days with no more than 3% moisture content prior to coating application.

**3.2 PREPARATION**

- .1 Prepare surfaces in accordance with CAN/CGSB-1.186.
- .2 Mask surrounding surfaces to provide neat, clean juncture lines.
- .3 Protect adjacent surfaces and equipment from damage by overspray.
- .4 Remove any contamination, including grease and oil using an industrial cleaner
- .5 Mechanical abrasions of the concrete surfaces is required to remove any loose, poorly bonded finishes and also create a surface profile for a mechanical bond. This will require the use of shot-blast machinery, sandblasting, scarifiers or diamond grinding.
- .6 Ensure the method of mechanical abrasions are dust free.
- .7 Patch any uneven or damaged concrete prior to application of coating.

**3.3 MIXING**

- .1 Prepare and mix materials and apply each component of coating system in accordance to manufacturer's instructions.

**3.4 APPLICATION**

- .1 Apply coating to produce smooth surface, uniform in sheen, colour and finish, free from marks, dirt, particles, runs, crawls, curling, holes, air pockets and other defects and to achieve smoothness index in accordance with CAN/CGSB-1.186.
- .2 Apply coatings in accordance to manufacturer's current written instructions.

**3.5 CURING**

- .1 Coatings will be tack free within 10-12 hours at 22° C (72° F). Coating will support light traffic at 24 hours and will reach full cure and full chemical resistance in 7 days.

**3.6 CLEANING**

- .1 Clean surfaces to coating manufacturer's printed instructions.

**END OF SECTION**

**Part 1            General**

**1.1                RELATED SECTIONS**

- .1        Section 01 33 00 - Submittal Procedures.
- .2        Section 01 74 19 - Construction/Demolition Waste Management And Disposal.
- .3        Section 01 78 00 - Closeout Submittals.
- .4        Section 06 20 00 - Finish Carpentry.
- .5        Section 06 40 00 - Architectural Woodwork.

**1.2                REFERENCES**

- .1        American National Standards Institute (ANSI)
  - .1        ANSI 208.1-[99], Particleboard.
  - .2        ANSI A208.2-[02], Medium Density Fibreboard (MDF) for Interior Applications.
- .2        American Society for Testing and Materials International, (ASTM)
  - .1        ASTM D2832-[92(R1999)], Standard Guide for Determining Volatile and Nonvolatile Content of Paint and Related Coatings.
  - .2        ASTM D5116-[97], Standard Guide For Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products.
- .3        Canadian General Standards Board (CGSB)
  - .1        CAN/CGSB-71.20-[M88], Adhesive, Contact, Brushable.
- .4        Canadian Standards Association (CSA International)
  - .1        CSA O112-[M1977(R2001)], Standards for Wood Adhesives.
  - .2        CSA O112.5-1.1-Series-M-[1977(R2001)], Urea Resin Adhesives for Wood (Room- and High-Temperature Curing).
  - .3        CSA O112.7-1.1-Series M-[1977(R2001)], Resorcinol and Phenol-Resorcinol Resin Adhesives for Wood (Room- and Intermediate-Temperature Curing).
  - .4        CSA O121-[M1978(R1998)], Douglas Fir Plywood.
  - .5        CAN/CSA O141-[91(R1999)], Softwood Lumber.
  - .6        CSA O151-[M1978(R1998)], Canadian Softwood Plywood.
  - .7        CSA O153-[M1980(R1998)], Poplar Plywood.
- .5        National Electrical Manufacturers Association (NEMA)
  - .1        NEMA LD3-[2000], High Pressure Decorative Laminates.

### **1.3 SUBMITTALS**

- .1 Product Data:
  - .1 Submit manufacturer's printed product literature, specifications and data sheet in accordance with Section 01 33 00 - Submittal Procedures.
  - .2 Submit two copies of WHMIS MSDS - Material Safety Data Sheets in accordance with Section 01 33 00 - Submittal Procedures. Indicate VOC's for adhesives, solvents and cleaners.
- .2 Samples:
  - .1 Submit samples in accordance with Section 01 33 00- Submittal Procedures.
  - .2 Submit duplicate samples of joints, edging, cutouts and postformed profiles.
- .3 Manufacturer's Instructions:
  - .1 Submit manufacturer's installation instructions.
- .4 Closeout Submittals:
  - .1 Provide maintenance data for laminate work for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

### **1.4 QUALITY ASSURANCE**

- .1 Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
- .2 Certificates: Product certificates signed by manufacturer certifying materials comply with specified performance characteristics and criteria and physical requirements.
- .3 Pre-installation Meetings: Conduct pre-installation meeting to verify project requirements, manufacturer's installation instructions and manufacturer's warranty requirements.

### **1.5 DELIVERY, STORAGE, AND HANDLING**

- .1 Storage and Protection:
  - .1 Deliver, handle, store and protect materials of this section in accordance with Section 01 61 00 - Common Product Requirements.
  - .2 Maintain relative humidity between 25 and 60% at 22 degrees C during storage and installation.

### **1.6 WASTE MANAGEMENT AND DISPOSAL**

- .1 Divert wood cut-offs from landfill by disposal into on-site wood recycling bin.
- .2 Divert reusable materials for reuse at nearest used building materials facility or similar type facility.
- .3 Divert unused caulking, sealants, surface coatings and adhesive materials from landfill through disposal at a special wastes depot.

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**Part 2 Products**

**2.1 MATERIALS**

- .1 Laminated plastic for flatwork:
  - .1 1.6 mm thick, based on colour ranges shown on drawings.
- .2 Plywood core: to CSA O121, CSA O151, CSA O153 solid two sides, 19 mm thick.
- .3 Particleboard core: to ANSI 208.1, sanded faces, of thickness indicated.
- .4 Laminated plastic adhesive: contact adhesive to CAN/CGSB-71.20,
- .5 Draw bolts and splines: as recommended by fabricator.

**2.2 FABRICATION**

- .1 Comply with NEMA LD 3, Annex A.
- .2 Obtain governing dimensions before fabricating items which are to accommodate or abut appliances, equipment and other materials.
- .3 Ensure adjacent parts of continuous laminate work match in colour and pattern.
- .4 Veneer laminated plastic to core material in accordance with adhesive manufacturer's instructions. Ensure core and laminate profiles coincide to provide continuous support and bond over entire surface.
- .5 Form shaped profiles and bends as indicated, using postforming grade laminate to laminate manufacturer's instructions.
- .6 Use straight self-edging laminate strip for flatwork to cover exposed edge of core material. Chamfer exposed edges uniformly at approximately 20 degrees. Do not mitre laminate edges.
- .7 Apply laminate backing sheet to reverse side of core of plastic laminate work.
- .8 Apply laminated plastic liner sheet where indicated.

**Part 3 Execution**

**3.1 MANUFACTURER'S INSTRUCTIONS**

- .1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and data sheets.

**3.2 INSTALLATION**

- .1 Install work plumb, true and square, neatly scribed to adjoining surfaces.
- .2 Make allowances around perimeter where fixed objects pass through or project into laminated plastic work to permit normal movement without restriction.

- .3 Use draw bolts and splines in countertop joints. Maximum spacing 450 mm on centre, 75mm from edge. Make flush hairline joints.
- .4 Provide cutouts for inserts, grilles, appliances, outlet boxes and other penetrations. Round internal corners, chamfer edges and seal exposed core.
- .5 At junction of laminated plastic counter back splash and adjacent wall finish, apply small bead of sealant.
- .6 Site apply laminated plastic to units as indicated. Adhere laminated plastic over entire surface. Make corners with hairline joints. Use full sized laminate sheets. Make joints only where indicated. Slightly bevel arrises. Cap exposed edges with anodized aluminum extrusions.
- .7 For site application, offset joints in plastic laminate facing from joints in core.

### **3.3 PROTECTION**

- .1 Cover finished laminated veneered surfaces with heavy kraft paper or put in cartons during shipment. Protect installed laminated surfaces by approved means. Do not remove until immediately before final inspection.

### **3.4 CLEANING**

- .1 Perform cleaning after installation to remove construction and accumulated environmental dirt.
- .2 Perform care and cleaning with NEMA LD 3, Annex B.
- .3 Remove traces of primer, caulking, epoxy and filler materials; clean doors and frames .

**END OF SECTION**

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PART 1: GENERAL

1.1 GENERAL REQUIREMENTS

- .1 Conform to requirements specified under Division 1.

1.2 SCOPE OF THE WORK

.1 Work Included

Provide all plant, labour, equipment and materials to carry out the work of this section. The work includes, but is not limited to, the following:

- Grubbing, stripping and stockpiling of topsoil
- Excavation and disposal
- Backfill and compaction
- Rough grading to make ready for application of topsoil for seed or sod
- Removal and disposal of existing foundations.
- Dewatering Perimeter drainage

.2 Related Work Specified Elsewhere

- .1 Cast-in-Place Concrete - Section 03 30 00
- .2 Excavations and Backfill for Mechanical & Electrical Services - Division 15 & 16.
- .3 Asphalt – by Civil Consultant
- .4 Concrete Walks and Curbs – by Civil Consultant
- .5 Site Services – by Civil Consultant
- .6 Finish Grading and Landscaping – by Landscape Consultant
- .7 Underfloor insulation – Section 7

1.3 APPLICABLE STANDARDS

- .1 Ontario Building Code.
- .2 The Construction Safety Act, local by-laws and all other regulations of the Ontario Ministry of Labour relating to the work of this Section.
- .3 OPSS Forms 1010, and 1010, Material Specification for Aggregates-General and Granular A, B, M, and Select respectively.

1.4 SUB-SURFACE CONDITIONS

- .1 The buildings foundations have been designed for a bearing resistance (SLS) of 144 kPa (3000 psf) and a factored bearing resistance (ULS) of 190 kPa (4000 psf) on undisturbed native soil U.N.O on plan. All bearing resistances are to be verified by a geotechnical investigation after excavation and reported to VBSA.
- .2 The information given in this report was obtained for the use of the Owner in the execution of the design. It is presented in good faith to assist the Contractor. No guarantee is made or implied as to its detailed accuracy for every site location. It is incumbent upon the Contractor to make any additional tests to obtain any additional information deemed necessary for the proper execution of the work, at no additional cost to the Owner.

1.5 DRAWINGS

- .1 Examine the drawings forming a part of this Contract and conform to the requirements of all such drawings.

1.6 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with the General Conditions for any shoring schemes proposed, for review by the Consultant.
- .2 Shop drawings are to bear the stamp of a Professional Engineer licensed to practice in Ontario and who has experience in this type of work.
- .3 The Consultant's review of shop drawings will not relieve the Contractor of his responsibility for ensuring that his work is complete, accurate and in accordance with the drawings and specifications

1.7 COORDINATION AND COOPERATION

- .1 Coordinate the work of this Section with the work of all other Sections in accordance with the General Conditions.
- .2 Coordination and cooperation is particularly important with Landscaping, Asphalt Paving, Cast-in-Place Concrete, and excavation for Mechanical Electrical trades.

1.8 EXAMINATION

- .1 Examine the site for the purpose of determining the conditions prevailing there, which may affect the work of this Section, including available access to the site, existing contours, existing services, etc.
- .2 Determine the nature and locations of all existing services below and above ground, which may affect the work of this Section.

1.9 SPECIAL CONDITIONS

- .1 The Contractors attention is drawn to existing grade elevations in the vicinity of the new building. After removal of topsoil, soft spots, and otherwise unsuitable material the Contractor must manage existing site excavated materials, and imported materials, to bring grades up to finished elevations shown Architectural drawings.

1.10 PRICES

.1 Unit Prices

- .1 Provide unit prices for items listed in tender form
  - .1 Include all costs as outlined in Division 1
  - .2 Additional payment will not be made for accidental over-excavation by the Contractor.

PART 2: PRODUCTS

2.1 MATERIALS

.1 Granular Fills - Class 'A' and Class 'B':

Imported in accordance with current OPSS Form 1010. with the added requirement that material to be deposited within the building must be clean with no asphalt or other contaminates on or mixed with the soil. Granular 'B' material to have a maximum aggregate size of 50mm.

.2 Granular Fill - Class PR:

Imported, well-graded, compactable stony pit-run granular material with a maximum aggregate size of 50mm and a maximum 8% silt fraction as approved by the soils consultant.

.3 Site Excavated Sand Material:

Existing excavated on-site native sand to gravelly silt (approved by the geotechnical consultant) may be stockpiled for reuse as engineered fill provided that the soil is within 3% of the optimum moisture content. (Note that the moisture content and compactability of the fill material may have to be adjusted by drying out the material and /or mixing with other material prior to its use as backfill.)

.4 Crushed Clear Stone:

Clean, screened crushed stone, well graded in size between 10mm and 25mm, with sufficient angular particles rather than round, to ensure proper compaction.

.5 Granular materials shall be free draining and not susceptible to frost action as determined by current M.T.C. Standards. All granular materials to be used within the building shall also be free of asphalt or other contaminates on or mixed with the soil.

.6 Submit representative samples of each class of proposed material to the Inspection Company for testing and approval for use on this project. Mark samples as to source of supply, including pit locations.

.7 Supply only those materials approved for use on this project by the Inspection Company.

.8 Lean Concrete Fill

15Mpa with 125mm slump

.9 Weeping Tile: – 100mm diameter perforated Big-O, or approved equal.

.10 Geotextile Fabric: - Terrafix 270R or equal.

2.2 FABRICATION

.1 Mixing, transportation, placing, curing, and protection of concrete in accordance with Division 3

2.3 SOURCE QUALITY CONTROL

.1 All materials shall be subject to test and inspection by a Testing and Inspection Company appointed by the Owner.

.2 Cost of testing will be paid by the Owner.

.3 Provide access to pits or quarries for the personnel of the Inspection Company.

.4 Provide representative samples of materials as may be required by the Inspection Company at no additional cost to the Owner.

PART 3: EXECUTION

3.1 GRUBBING AND CLEARING

.1 Grub and clear the site of trees, shrubs, existing foundations to be removed, debris and obstructions, unless clearly noted elsewhere to be retained.

- .2 Remove and dispose of all material listed in items A. away from the site.

### 3.2 STRIPPING AND STORAGE OF TOPSOIL

- .1 Carefully strip the topsoil from areas affected by new construction.
- .2 Stockpile the topsoil on the site at a location or locations approved by the Architect for later use on this project. At the completion of construction, excess material is to be removed from site at the Contractor's expense.
- .3 Maintain topsoil stockpiles separate from any other stockpiles and protect from contamination.
- .4 Prevent silt runoff from stockpiles and site with the use of silt fences and/or straw bale barricades.

### 3.3 EXCAVATION FOR FOOTINGS

- .1 Footings are designed for a maximum Serviceability Limit State (SLS) bearing pressure of 144 kPa (3,000 psf), and an Ultimate Limit State (ULS) bearing pressure of 190 kPa (4000 psf) on undisturbed native very dense silt till as stated in the geotechnical report.
- .2 Notify the Engineer of any unusual soil conditions encountered during excavation so that corrective action may be taken, if necessary.
- .3 Where excavations for footings are accidentally over-excavated, fill the over-excavated portion with lean concrete fill to the founding elevation shown on the plans, at no additional cost to the Owner.
- .4 Provide excavations for footings of sufficient width for the construction and inspection of formwork and the satisfactory and safe execution of the work. In general, provide not less than 450 clear of all construction.
- .5 Trim the bottom of all excavations true to line and grade, and remove all loose, wet, soft or unsatisfactory material.
- .6 Install footings at lower elevations prior to installing adjacent footings at higher elevations to ensure that bearing capacity of upper levels is not adversely disturbed.
- .7 Notify the Testing Company when each phase of the excavation is completed so that bearing surfaces may be inspected.
- .8 All excavations into native subsoil are to be carried out using a smooth-blade bucket to preclude disturbance of the subgrade by normal bucket teeth.
- .9 Protect all soils supporting footings and slab on grade against penetration of frost and rain before, during and after placement of concrete.
- .10 Unless noted otherwise on plan the drawings indicate footings bearing down onto the approved native till material at elevation bubbles indicated on the Foundation Plan.
- .11 Below slab-on-grade areas, remove all recycled asphalt, along with all organic, soft, wet, frozen and otherwise deleterious materials within the perimeter of the building footprint.

- .12 Wet founding surfaces sensitive to disturbance shall be covered with a 50mm mat of lean mix concrete immediately after they are exposed and approved in order to protect the integrity of the subgrade from disturbance due to construction activities and ponding water.
- .13 After construction of forms minimize disturbance of subgrade within footing forms. If soils within footings become disturbed remove all loose material with hand shovels down to sound soil.

### 3.4 PUMPING AND DEWATERING

- .1 Keep all excavations, pits and trenches free from accumulations of water from all sources, including ground water, rain and surface water, at all times by pumping or other methods satisfactory to the Geotechnical Engineer.
- .2 Conduct dewatering operations, when required, in such a manner as to avoid damage to work under construction or existing adjacent structures and so as not to weaken the strength of bearing soils or to endanger the stability of banks or slopes.

### 3.5 BACKFILL AND COMPACTION

- .1 After the construction of footings, walls or piers, and the approval of the work by the Consultant, backfill and compact interior side of foundation walls with granular 'B' material compacted to 98% SPMDD to the elevations shown on the drawings.
- .2 Backfill and compact in equal lifts on each side of walls below grade. Maximum grade difference on opposite sides of wall is not to exceed 450. Do not backfill basement walls that are to be laterally supported at the top of the wall until such lateral support, in the form of the first-floor framing, is cast and cured.
- .3 Deposit and spread granular materials in uniform layers not exceeding 300 (loose measurement) in depth.
- .4 Compact all granular materials to not less than 98% of Standard Proctor Maximum Dry Density, except as noted on drawings or specifications. Maintain optimum water content for proper compaction by the addition of water as required.
- .5 Compact using approved vibratory plate tampers or vibratory rollers, except when working close to silt or other materials which may be adversely affected by vibration; in which case, use approved non-vibratory rollers to avoid disturbance of the sub-grade.
- .6 Immediately below sidewalks, place a 150 layer of Granular 'A' compacted to 98% of Standard Proctor Maximum Dry Density.
- .7 Backfill below landscaped areas on the exterior side of the wall exclusive of the basement area can consist of approved site excavated native sands materials, approved pit run, or granular 'B' materials compacted in 300 lifts to 96% standard proctor maximum dry density. Slope grade away from the building as shown on Architectural site plan and building sections.
- .8 Backfill exterior side of all foundation walls below sidewalks can consist of approved site excavated native sand, approved free draining pit run material, or imported granular 'B', compacted in 300 deep lifts to 98% standard proctor maximum dry density. Backfill to extend up to the underside of a 150 granular 'A' layer below the sidewalk.
- .9 Backfill on the exterior side of the foundation walls below paved areas can consist of approved site excavated native sand, approved free draining pit run material, or imported granular 'B', placed and compacted in 300 deep lifts to 98% maximum standard proctor maximum dry density. Backfill to extend up to the underside of pavement granular base.

- .10 Protect all fill materials supporting slab on grade against penetration of frost and rain before during and after placement of concrete.
- .11 Refer to typical details for backfill adjacent to basement wall below landscaped areas for minimum width of free draining granular material. This material can consist of approved site excavated native sand, approved pit run materials, or imported granular 'B', placed and compacted in 300 deep lifts to 98% maximum standard proctor maximum dry density.
- .12 Place weeping tile behind all basement and retaining walls as indicated in typical detail. Completely wrap geotextile fabric around stone cover and lap a minimum of 16" (400mm).

### 3.6 SUB-FLOOR GRANULAR FILL

- .1 Proof roll all existing fill materials with a minimum 1.2m diameter heavy roller and sub-excavate any spongy, soft or wet spots.
- .2 Provide a minimum of 200 of compacted clear stone under the slab-on-grade.
- .3 Fill below clear stone layer to consist of Granular 'B' material down to approved subgrade for footings bearing on undisturbed soil. Compact Granular 'B' in 300 maximum loose lifts to 98% standard proctor maximum dry density.
- .4 Take care not to damage any underfloor mechanical and electrical systems.
- .5 Remove clay, silt, dirt, and construction debris from the granular layers.
- .6 Ensure all electrical and mechanical piping runs in granular layers below the underside of the floor slab.
- .7 In areas where continuous sub-floor insulation is required grade and compact flat such that there are no gaps or voids between the insulation and finished sub floor grading. If necessary, use well graded sand materials that can be more closely graded after compaction such as to eliminate any such gaps below insulation layer.

### 3.7 GRADING

- .1 Rough grade outside the foundation walls (where applicable) to the lines and grades shown on the final site plan.
- .2 Rough grade to within 150 below the underside of exterior sidewalks and place layer of Granular 'A'

### 3.8 FIELD QUALITY CONTROL

- .1 All materials and workmanship shall be subject to test and inspection by a Testing and Inspection Company appointed by the Consultant.
- .2 The cost of testing, except as noted in paragraph 3.8.3 will be paid through a cash allowance.
- .3 Material or workmanship which fails to achieve the specified standards shall be re-compacted or replaced as directed by the Consultant and additional tests made. The cost of such additional testing and the cost of remedial action shall be at no additional cost to the Owner.
- .4 The foundation subgrade will be inspected by the Inspection Company immediately following final preparation of the excavation by the Contractor. The Inspection Company may direct that the depth of excavation be increased to reach a competent bearing stratum if existing soil conditions at the specified elevation are not satisfactory.

3.9 CLEAN-UP

- .1 At the completion of the work in this Section, remove from the site any excess materials, debris and equipment.

**END OF SECTION 31 23 00**

**Part 1 General**

**1.1 GENERAL REQUIREMENTS**

- .1 Conform to requirements specified under Division 1.

**1.2 SCOPE OF WORK**

.1 Work Included

Provide all plant, labour, equipment and materials to carry out the work of this section. The work includes, but is not limited to, the following:

- Grubbing, stripping and stockpiling of topsoil
- Excavation and disposal
- Backfill and compaction
- Rough grading to make ready for application of topsoil for seed or sod
- Removal and disposal of existing foundations
- Dewatering

.2 Related Work Specified Elsewhere

- .1 Cast-in-Place Concrete - Division 3
- .2 Excavations and Backfill for Mechanical & Electrical Services - Division 15 & 16.
- .3 Asphalt, curbs - Division 31
- .4 Site Services - Division 31
- .5 Finish Grading - Division 31
- .6 Landscape – refer to landscape architectural drawings.

**1.3 APPLICABLE STANDARDS**

- .1 Ontario Building Code
- .2 The Construction Safety Act, local by-laws and all other regulations of the Ontario Ministry of Labour relating to the work of this Section.
- .3 OPSS Forms 1010, and 1010, Material Specification for Aggregates-General and Granular A, B, M, and Select respectively.

**1.4 SUB-SURFACE CONDITIONS**

- .1 Sub-surface investigations to be conducted by the owner and coordinated with General Contractor and Structural engineer.

## **1.5 DRAWINGS**

- .1 Examine the drawings forming a part of this Contract and conform to the requirements of all such drawings.

## **1.6 COORDINATION AND COOPERATION**

- .1 Coordinate the work of this Section with the work of all other Sections in accordance with the General Conditions.
- .2 Coordination and cooperation are particularly important with Landscaping, Asphalt Paving, Cast-in-Place Concrete, and excavation for Mechanical Electrical trades.

## **1.7 EXAMINATION**

- .1 Examine the site for the purpose of determining the conditions prevailing there, which may affect the work of this Section, including available access to the site, existing contours, existing services, etc.
- .2 Determine the nature and locations of all existing services below and above ground, which may affect the work of this Section.

## **1.8 SPECIAL CONDITIONS**

- .1 The Contractors attention is drawn to existing grade elevations in the vicinity of the new building. After removal of topsoil, soft spots, and otherwise unsuitable material the Contractor must manage existing site excavated materials, and imported materials, to bring grades up to finished elevations shown Architectural and/or Site Service drawings.

## **1.9 PRICES**

- .1 Unit Prices
  1. Provide unit prices for items listed in tender form
  2. Include all costs as outlined in Division 1
  3. Additional payment will not be made for accidental over-excavation by the Contractor.

## **Part 2 Products**

### **2.1 MATERIALS**

- .1 Granular Fills - Class 'A' and Class 'B':

Imported in accordance with current OPSS Form 1010, with the added requirement that material to be deposited within the building must be clean with no asphalt or other contaminants on or mixed with the soil.
- .2 Granular Fill - Class PR:

Imported, well-graded, compactable stony pit-run granular material with a maximum 8% silt fraction as approved by the soils consultant.

- .3      Crushed Stone:  
  
Clean, screened 19mm crushed stone meeting the requirements of OPSS 1004 for 19mm Type II clear stone.
- .4      Approved Site Excavated Materials:
- .1      Site excavated rubble fills free of asphalt, organic silty clay, and any other deleterious materials can be targeted for recycling by crushing and screening to a granular fill material.
- .2      Organic silty clay material is to be separated from other fill materials down to the native silty clay layer. (Organic silty clay is to be used only under landscaped areas and berms away from the building.
- .3      Native silty clay material will be suitable under them 200 layer of clear stone in slab-on-grade areas of the building. Drying or mixing of this material as directed by the Geotechnical Engineer is required before it is allowed for below slab fill.
- .4      Written approval from the Geotechnical Engineer is required for all site excavated material. Written approval must contain information such as description on if the material is to be modified in any way, placing location and placing procedures.
- .5      Granular materials shall be free draining and not susceptible to frost action as determined by current M.T.C. Standards. All granular materials to be used within the building shall also be free of asphalt or other contaminates on or mixed with the soil
- .6      Submit representative samples of each class of proposed material to the Geotechnical Inspection Company for testing and approval for use on this project. Mark samples as to source of supply, including pit locations.
- .7      Supply only those materials approved for use on this project by the Inspection Company.
- .8      Lean Concrete Mix  
  
15 MPa with 125mm slump
- .9      Weeping Tile: – 100mm diameter perforated Big-O, or approved equal.
- .10     Geotextile Fabric: - Terrafix 270R or equal.

## **2.2 FABRICATION**

- .1      Mixing, transportation, placing, curing, and protection of concrete in accordance with Division 3

## **2.3 SOURCE QUALITY CONTROL**

- .1      All materials shall be subject to test and inspection by a Testing and Inspection Company appointed by the Owner.
- .2      Cost of testing will be paid by the Owner.
- .3      Provide access to pits or quarries for the personnel of the Inspection Company.
- .4      Provide representative samples of materials as may be required by the Inspection

Company at no additional cost to the Owner.

### **Part 3 Execution**

#### **3.1 GRUBBING AND CLEARING**

- .1 Grub and clear the site of trees, shrubs, existing foundations to be removed, debris and obstructions, unless clearly noted elsewhere to be retained.
- .2 Remove and dispose of all material listed in items A. away from the site.

#### **3.2 STRIPPING OF TOPSOIL**

- .1 Carefully strip the topsoil from areas affected by new construction.
- .2 Stockpile the topsoil on the site at a location or locations approved by the Architect and General Contractor for later use on this project. At the completion of construction, excess material is to be removed from site at the Contractor's expense. Note that because of the 'tight' nature of the site, temporary removal off site of top soil material may be required if storage areas designated by the Architect are used by the General Contractor for other purposes.
- .3 Maintain topsoil stockpiles separate from any other stockpiles and protect from contamination.
- .4 Prevent silt runoff from stockpiles and site with the use of silt fences and/or straw bale barricades.

#### **3.3 EXCAVATION**

- .1 Footings are designed to bear at least 1200mm within in the undisturbed Silty Clay Layer for a maximum safe allowable bearing pressure of 287 kPa for the Serviceability Limit State (SLS) and 430 kPa for the Ultimate Limit State (ULS).
- .2 Notify the Engineer of any unusual soil conditions encountered during excavation so that corrective action may be taken, if necessary.
- .3 Where excavations for footings are accidentally over-excavated, fill the over-excavated portion with lean concrete fill to the founding elevation shown on the plans, at no additional cost to the Owner.
- .4 Provide excavations for footings of sufficient width for the construction and inspection of formwork and the satisfactory and safe execution of the work. In general, provide not less than 450 clear of all construction.
- .5 Trim the bottom of all excavations true to line and grade, and remove all loose, wet, soft or unsatisfactory material.
- .6 Install footings at lower elevations prior to installing adjacent footings at higher elevations to ensure that bearing capacity of upper levels is not adversely disturbed.
- .7 Notify the Testing Company when each phase of the excavation is completed so that bearing surfaces may be inspected.
- .8 All excavations into native subsoil are to be carried out using a smooth-blade bucket to preclude disturbance of the subgrade by normal bucket teeth.

- .9 Protect all soils supporting footings and slab on grade against penetration of frost and rain before, during and after placement of concrete.
- .10 Unless noted otherwise on plan the drawings indicate footings bearing down onto the approved undisturbed silty clay layer at elevation bubbles indicated on the foundation plan.
- .11 Below slab-on-grade areas excavate down a minimum of 200mm below underside of slab on grade or as required to, remove all fill materials and organic silty clay material down to native silty clay. Once removals are complete proof roll subgrade with a heavy roller or a loaded tandem axle truck. Sub-excavate any soft or wet spots as identified by the Geotechnical Engineer and replace with granular 'B' material, approved 'PR' material or approved native silty clay material compacted to 98% standard proctor maximum dry density.
- .12 After construction of forms minimize disturbance of subgrade within footing forms. If soils within footings become disturbed remove all loose material with hand shovels down to sound soil.

### **3.4 PUMPING AND DEWATERING**

- .1 Keep all excavations, pits and trenches free from accumulations of water from all sources, including ground water, perched groundwater, rain and surface water, at all times by pumping or other methods satisfactory to the Geotechnical Engineer.
- .2 Conduct dewatering operations, when required, in such a manner as to avoid damage to work under construction or existing adjacent structures and so as not to weaken the strength of bearing soils or to endanger the stability of banks or slopes.

### **3.5 BACKFILL AND COMPACTION**

- .1 After the construction of footings, walls or piers, and the approval of the work by the Consultant, backfill and compact interior side of foundation walls with granular 'B' material, approved pi run material or approved native silty clay materials to the elevations shown on the drawings.
- .2 Backfill and compact in equal lifts on each side of walls below grade. Maximum grade difference on opposite sides of non-retaining or basement walls is not to exceed 450. Do not backfill basement walls that are to be laterally supported at the top of the wall until such lateral support, in the form of the first floor framing, is cast and cured.
- .3 Deposit and spread backfill materials in uniform layers not exceeding 250mm (loose measurement) in depth.
- .4 Compact all interior materials to not less than 98% of Standard Proctor Density, except as noted on drawings or specifications. Maintain optimum water content for proper compaction by the addition of water as required.
- .5 Compact using approved vibratory plate tampers or vibratory rollers, except when working close to silt or other materials which may be adversely affected by vibration; in which case, use approved non-vibratory rollers to avoid disturbance of the sub-grade.
- .6 Immediately below sidewalks, place a 150 layer of Granular 'A' compacted to 98% of Standard Proctor Density.

- .7 Backfill below landscaped areas on the exterior side of the wall exclusive of the basement area can consist of approved native silty clay compacted in 250 lifts to 96% standard proctor maximum dry density. Slope grade away from the building as shown on Architectural site plan and building sections.
- .8 Backfill on exterior side of all foundation walls below sidewalks and paved areas, exclusive of areas adjacent to basement walls, can consist of approved site excavated native silty clay materials, imported granular 'B', or approved 'PR' materials compacted in 250 deep lifts to 97% standard proctor maximum dry density with the upper 600mm compacted to 98% standard proctor maximum dry density. Backfill to extend up to the underside of a 150 granular 'A' layer below the sidewalk.
- .9 Backfill on exterior side of all foundation walls adjacent to basement walls, can consist of free draining imported granular 'B', or approved 'PR' materials for the 920mm wide drainage zone identified in typical detail 2.02. The same material as described in the previous sentence or approved native silty clay materials is suitable for back fill for the outer zone backfill identified in typical detail 2.02. All materials are to be compacted in 250 deep lifts (loose measurement) to 98% standard proctor maximum dry density
- .10 Backfill on the interior side of all foundation walls up to the underside of the 200 clear stone layer to consist of approved site excavated native silty clay materials, granular 'B' material or approved pit run material placed and compacted in 250 deep loose lifts to 98% standard proctor maximum dry density.
- .11 Use hand operated compaction equipment within the lesser of 3m or the height of the wall, for pit walls, foundation walls and retaining walls.
- .12 Protect all fill materials supporting slab on grade against penetration of frost and rain before, during and after placement of concrete.
- .13 Place weeping tile behind all basement, and retaining walls as indicated in on drawings or typical detail. Completely wrap geotextile fabric around stone cover and lap a minimum of 400mm.

### **3.6 SUB-FLOOR GRANULAR FILL**

- .1 In presence of the Geotechnical Engineer proof roll all approved subgrades with a heavy roller or loaded tandem axle truck and subexcavate any soft or wet spots as directed by Geotechnical Engineer.
- .2 Provide a minimum of 200mm of 19mm clear stone material under the slab-on-grade compacted to 98% standard proctor dry maximum density.
- .3 Fill below 200 stone layer to consist of approved pit run, or granular 'B' material, or approved site excavated native silty clay down to approved subgrade for footings bearing on undisturbed soil. Compact granular materials in 250 maximum loose lifts to 98% standard proctor dry density.
- .4 Take care not to damage any under-floor mechanical and electrical systems.
- .5 Remove clay, silt, dirt, and construction debris from the granular layers.
- .6 Ensure all electrical and mechanical piping runs in granular layers below the underside of the floor slab.

### **3.7 GRADING**

- .1 Rough grade outside the foundation walls (where applicable) to the lines and grades shown on the final site plan.
2. Rough grade to within 150 below the underside of exterior sidewalks and place layer of Granular 'A'

### **3.8 FIELD QUALITY CONTROL**

1. All materials and workmanship shall be subject to test and inspection by a Testing and Inspection Company appointed by the Consultant.
- .2 The cost of testing, except as noted in paragraph 3.8.3 will be paid through a cash allowance.
- .3 Material or workmanship which fails to achieve the specified standards shall be re-compacted or replaced as directed by the Consultant and additional tests made. The cost of such additional testing and the cost of remedial action shall be at no additional cost to the Owner.
- .4 The foundation subgrade will be inspected by the Inspection Company immediately following final preparation of the excavation by the Contractor. The Inspection Company may direct that the depth of excavation be increased to reach a competent bearing stratum if existing soil conditions at the specified elevation are not satisfactory.

### **3.9 CLEAN-UP**

- .1 At the completion of the work in this Section, remove from the site any excess materials, debris and equipment.

**END OF SECTION**

### **List of Drawings Schedule**

The following is the list of drawings sheets included for this project which have been attached to this RFP document:

- 24175 S1.0 to S5.5 Structural
- WEGO Garage Addition- Phase 1 A0-000 to A9-300

# WEGO Garage Addition- Phase 1

Niagara Parks Commission

7805 Niagara River Pkwy, Niagara Falls, ON



**DRAWING LIST**

#	SHEET NAME
01- Architectural - Raimondo + Associates Architects Inc.	
A0-000	Title Page
A0-100	Assemblies + Legends
A0-200	Occupant Loads, Exits + FRR Plans
A1-000	Overall Site Plan + Zoning Info
A1-100	Site Plan Details
A2-000	Foundation Plans
A2-100	Floor Plans
A2-200	Roof Plans
A2-300	Enlarged 1st Floor Plan
A2-301	Enlarged 2nd Floor Plan
A2-302	Enlarged Interior 1st & 2nd Floor Plans
A2-400	RCP, 1st & 2nd Levels
A3-000	Building Elevations
A3-100	Enlarged Elevations
A4-000	Building Sections (Large Scale)
A4-001	Building Sections (Large Scale)
A4-100	Wall Sections (Large Scale)
A5-000	Universal Washroom Floor Plan & Elevations
A5-100	W/R and PBX Floor Plan & Elevations
A5-200	Lunch Room Floor Plan & Elevations
A5-300	Enlarged Section Details
A6-000	Stair Plans + Sections
A7-100	Door + Frame Schedules
A7-300	Windows + Interior Screens Schedule
A9-000	Barrier Free Details
A9-100	TYPICAL MILLWORK DETAILS
A9-200	Typical Roof Details
A9-201	Typical Roof Details
A9-300	Typical Stair + Railing Details

#	SHEET NAME
02- Structural VanBoxmeer Stranges Antonio	
S1.0	Foundation Plan
S1.1	2nd Floor Framing Plan
S1.2	Partial Roof Framing Plan
S2.1	Schedules
S2.2	Schedules
S2.3	Schedules
S3.1	Elevations
S3.2	Elevations
S3.3	Elevations
S4.1	Sections
S4.2	Sections
S4.3	Sections
S4.4	Sections
S4.5	Sections
S4.6	Sections
S5.1	Typical Details
S5.2	Typical Details
S5.3	Typical Details
S5.4	Typical Details
S5.5	Typical Details

#	SHEET NAME
03- ARC Engineering Inc.	
M-100	Schedules & Legends
M-101	Schedules
M-102	Details 1
M-103	Details 2
M-104	Controls
M-105	Specifications 1
M-106	Specifications 2
M-150	Mechanical Site Plan
M-200	Plumbing Demolition
M-210	Foundation Drainage Plan
M-211	Ground Floor Plumbing and Drainage Plan
M-212	Second Floor Plumbing and Drainage Plan
M-250	Ground Floor Fire Protection Plan
M-251	Second Floor Plumbing and Drainage Plan
M-300	Ground Floor HVAC Plan
M-301	Second Floor HVAC Plan
M-400	Ground Floor Hydronic Distribution Plan
M-401	Second Floor Hydronic Distribution Plan and Schematic
M-410	Radiant Heat Piping Plan

#	SHEET NAME
04- SEI Electrical Engineering	
E001	Electrical General Notes and Legends
E002	Electrical Schedules
E050	Electrical Specifications
E051	Electrical Specifications
E200	Ground Floor Lighting Plan
E201	Second Floor Lighting Plan
E300	Ground Floor Power and Systems Plan
E301	Second Floor Power and Systems Plan
E500	Single Line Diagram and Panel Schedules
E550	Electrical Panel Schedules
E600	Fire Alarm Riser and Zone Schedule
E700	Electrical Details
E701	Electrical Details

**ISSUED DRAWINGS LIST**

Issued for Tender	Dec.04,2024
Issued For Client Review	May 24, 2024
Issued For Client Review	May 10, 2024

Autodesk Docs://24-006 - NPC - WEGO Garage Niagara Falls/24-006 - NPC - WEGO Garage Niagara Falls\_12-12-2024.rvt

SHEET NAME

Title Page

# RAIMONDO + ASSOCIATES

4687 QUEEN STREET, STUDIO 2  
 NIAGARA FALLS, ONTARIO  
 L2E 2L9



TEL | 905-357-4441  
 FAX | 905-357-9203  
 EMAIL | mail@raimondoarchitects.com  
 WEB | www.raimondoarchitects.com

**ARCHITECTS INC.**

SHEET #

A0-000

#	Pound OR Number
&	And
@	At
ACT	Acoustic Ceiling Tile
AD	Area Drain
AFF	Above Finished Floor
ALUM	Aluminum
ANOD	Anodized
BSMT	Basement
BYND	Beyond
BOT	Bottom
CIP	Cast In Place
CHNL	Channel
CJ	Control Joint
CLG	Ceiling
CLR	Clear
CMU	Concrete Masonry Unit
COL	Column
COMPR	Compressible
CONC	Concrete
CONT	Continuous
CPT	Carpet
CT	Ceramic Tile
CTYD	Courtyard
DBL	Double
DEMOL	Demolish or Demolition
DEMO	Demolition
DIA	Diameter
DIM	Dimension
DIMS	Dimensions
DN	Down
DR	Door
DRW	Drawing
EA	Each
EJ	Expansion Joint
EL	Elevation
ELEC	Electrical
ELEV	Elevator or Elevation
EPDM	Ethylene Propylene Diene M-Class (Roofing)
EQ	Equal
EXIST	Existing
EXP JT	Expansion Joint
EXT	Exterior
FD	Floor Drain or Fire Department
FEC	Fire Extinguisher Cabinet
FIXT	Fixture
FLR	Floor
FM	Filled Metal
FO	Face Of
FND	Foundation
GA	Gauge
GALV	Galvanized
GWB	Gypsum Wall Board
HC	Hollow Core
HI	High
HMT	Hollow Metal
HPT	High Point
HR	Hour
HVAC	Heating, Ventilating, And Air Conditioning
IRGWB	Impact Resistant Gypsum Wall Board
ILO	In Lieu Of
INSUL	Insulated or Insulation
INT	Interior
LO	Low
MAX	Maximum
MO	Masonry Opening
MECH	Mechanical
MEMBR	Membrane
MIN	Minimum
MRGWB	Moisture-Resistant Gypsum Wall Board
MTL	Metal
NIC	Not In Contract
NO	Number
NOM	Nominal
OC	On Center
OH	Opposite Hand
OZ	Ounce
PCC	Pre-Cast Concrete
PLUMB	Plumbing
PLYD	Plywood
PT	Pressure Treated
PNT	Paint or Painted
PVC	Polyvinyl Chloride
RBR	Rubber
RCP	Reflected Ceiling Plan
RD	Road Drain
REQD	Required
RM	Room
SIM	Similar
SPEC	Specifier or Specification
SPK	Sprinkler or Speaker
SSTL	Stainless Steel
STC	Sound Transmission Coefficient
STL	Steel
STRUCT	Structure or Structural
T&G	Tongue And Groove
TELE	Telephone
TLT	Toilet
TO	Top Of
TOC	Top Of Concrete
TOS	Top Of Steel
TPD	Toilet Paper Dispenser
TD	Telephone/Data
TYP	Typical
UNO	Unless Noted Otherwise
UIS	Underside
VIF	Verify In Field
VP	Vision Panel
W/	With
WD	Wood

<b>W01</b>	CIP concrete wall (see structural for thickness) exterior waterproofing, blueskin wp (or comparable) delta ms foundation protection membrane min. R-15 continuous 3" rigid insulation on exterior (see plan for locations)
R-VALUE	R10
FIRE RATING	
STC RATING	
ULC LISTING	
<b>W03</b>	Concrete Masonry (loadbearing) & (Non loadbearing) 200mm (8") CMU (see structural for thickness) & 250mm (10") CMU (see structural for thickness)
R-VALUE	
FIRE RATING	2 HR
STC RATING	
ULC LISTING	
<b>W05</b>	Prefabricated Structural Steel System (Refer to structural for more information)  Structure Steel System  Z-Girt channel system, per prefabricated system
R-VALUE	
FIRE RATING	
STC RATING	
ULC LISTING	
<b>W07</b>	Insulated Metal Panel (non-loadbearing) (Refer to specifications for more information)  Assembly: Floor 1mm (1/8") - Exterior metal panel 127mm (5") - Insulation Foam by "Kingspan's QuadCore Technology" 1mm (1/8") - Exterior metal panel
R-VALUE	40
FIRE RATING	
STC RATING	
ULC LISTING	
<b>W09</b>	metal stud (non-loadbearing) 13 mm (1/2") gwb 92 mm (3 5/8") metal studs @ 406 mm (16") o/c 13 mm (1/2") gwb
R-VALUE	
FIRE RATING	
STC RATING	
ULC LISTING	
<b>W10</b>	metal stud (non-loadbearing) Metal 13 mm (1/2") gwb 92 mm (3 5/8") metal studs @ 406 mm (16") o/c 13 mm (1/2") gwb
R-VALUE	
FIRE RATING	
STC RATING	
ULC LISTING	

**Wall Type Legend**

<b>P06b</b>	metal stud (non-loadbearing) 13 mm (1/2") gwb 92 mm (3 5/8") metal studs @ 406 mm (16") o/c 13 mm (1/2") gwb
R-VALUE	
FIRE RATING	
STC RATING	
ULC LISTING	
<b>P09</b>	metal stud (non-loadbearing) 13 mm (1/2") gwb 92 mm (3 5/8") metal studs @ 406 mm (16") o/c 13 mm (1/2") gwb
R-VALUE	
FIRE RATING	
STC RATING	
ULC LISTING	
<b>P05a</b>	metal stud (non-loadbearing) 13 mm (1/2") gwb 92 mm (3 5/8") metal studs @ 406 mm (16") o/c 13 mm (1/2") gwb
R-VALUE	
FIRE RATING	
STC RATING	
ULC LISTING	
<b>SW1</b>	Shaft Wall (non-loadbearing) 16 mm (5/8") gwb - type x 64 mm (2 1/2") CGC C-H studs, 25 ga. spaced 610mm (24") o/c 25 mm (1") thick by nom. 610 mm (24") wide gyp. liner panels friction fit
R-VALUE	
FIRE RATING	1 HR
STC RATING	CANULC-S101
ULC LISTING	Certified for Canada
<b>DW2a</b>	metal stud (non-loadbearing) 16 mm (5/8") gwb - type-x (taped) 16 mm (5/8") gwb - type-x 150 mm (6 in.) deep, 20 ga. steel stud spaced max. 610 mm (24 in.) o/c mineral wool batt insulation 16 mm (5/8") gwb - type-x 16 mm (5/8") gwb - type-x (taped)  note: only one electrical device box per stud cavity <b>(OBC SB-2 - Assembly S9a)</b>
R-VALUE	
FIRE RATING	2 HR
STC RATING	59
ULC LISTING	

<b>C01a</b>	1 layer of 13 mm (1/2") gypsum board
R-VALUE	
FIRE RATING	
STC RATING	
ULC LISTING	
<b>C05a</b>	22 mm (7/8") furring channel 16 mm (5/8") gwb - type-x 16 mm (5/8") gwb - type-x
R-VALUE	
FIRE RATING	1 HR
STC RATING	
ULC LISTING	<b>(OBC SB-2 TABLE 2.3.12)</b>
<b>SAT1</b>	Typ. all corridors unless noted 2x4 scored tile selection by owner
R-VALUE	
FIRE RATING	
STC RATING	
ULC LISTING	
<b>R01a</b>	2 ply modified bitumen roofing membrane 75 mm (3") insulation board (see specifications) 58 mm (1 1/2") polystyrene insulation (R7.5) 50 mm (2") polystyrene insulation (R10) 50 mm (2") polystyrene insulation (R10) 50 mm (2") polystyrene insulation (R10) 1 1/2" metal decking
R-VALUE	35
FIRE RATING	
STC RATING	
ULC LISTING	

<b>FL1</b>	CIP Radiant Heated Slab on Grade -150mm cast in-place concrete slab smooth surface finish - 2 layers of Welded Wire Fabric (see structural for reinforcing). - cont. 10 mil. poly vapour barrier - 51mm (2") rigid insulation (R10) for 610mm (24") of building exterior at u/s of slab. - 300mm Layer of Granular "A" (see structural for backfill options).
R-VALUE	R10
FIRE RATING	
STC RATING	
ULC LISTING	
<b>FL2</b>	Precast Hollowcore slab (non-loadbearing) - 25mm Concrete Topping Smooth Finish. - 290mm hollowcore precast concrete slab. (Refer to structural for more information). *Contractor to send over shop drawings for review prior to installation*
R-VALUE	
FIRE RATING	
STC RATING	
ULC LISTING	

<b>FL1</b>	CIP Radiant Heated Slab on Grade -150mm cast in-place concrete slab smooth surface finish - 2 layers of Welded Wire Fabric (see structural for reinforcing). - cont. 10 mil. poly vapour barrier - 51mm (2") rigid insulation (R10) for 610mm (24") of building exterior at u/s of slab. - 300mm Layer of Granular "A" (see structural for backfill options).
R-VALUE	R10
FIRE RATING	
STC RATING	
ULC LISTING	
<b>FL2</b>	Precast Hollowcore slab (non-loadbearing) - 25mm Concrete Topping Smooth Finish. - 290mm hollowcore precast concrete slab. (Refer to structural for more information). *Contractor to send over shop drawings for review prior to installation*
R-VALUE	
FIRE RATING	
STC RATING	
ULC LISTING	

**Floor Type Legend**

**Ceiling Type Legend**

**Roof Type Legend**

- OVERALL PROJECT GENERAL NOTES:**
1. ALL DRAWINGS ARE TO BE READ AS A COMPLETE PACKAGE, INCLUDING COORDINATION WITH THE SPECIFICATIONS.
  2. FOR ALL MECHANICAL SERVICES REFER TO MECHANICAL PLANS.
  3. FOR ALL STRUCTURAL SERVICES REFER TO STRUCTURAL PLANS.
  4. FOR ALL ELECTRICAL SERVICES REFER TO ELECTRICAL PLANS.
  5. EXTERIOR WALL DIMENSIONS SHOWN ARE TAKEN TO THE EXPOSED FACE OF MASONRY VENEER, INSIDE FACE OF CONCRETE BLOCK AND THE CENTERLINE OF OPENING UNLESS NOTED OTHERWISE.
  6. INTERIOR DIMENSIONS SHOWN ARE TAKEN TO THE FACE OF WOOD STUD, CONCRETE BLOCK AND THE CENTERLINE OF PLUMBING FIXTURES UNLESS NOTED OTHERWISE.
  7. ALL EXPOSED INTERIOR GWB FINISHES SHALL BE TAPED, FILLED, SANDED AND MADE GOOD FOR FINISH UNLESS NOTED OTHERWISE.
  8. REFER TO DRAWINGS A0-100 & A0-101 FOR REQUIRED FIRE SEPARATIONS AND FIRE RESISTANCE RATINGS OF FLOORS AND SUPPORTING ASSEMBLIES.
  9. REFER TO FLOOR PLANS FOR ALL DOOR AND SCREEN NUMBERS & LOCATIONS. REFER TO DRAWING & SPECS FOR INTERIOR FINISH SCHEDULE AND CEILING HEIGHTS.
  11. ALL DIMENSIONS TO BE SITE VERIFIED.
  12. FINISH ALL SIDES ON 1/2 HEIGHT WALLS.
  13. UNDERSIDE OF ALL STAIRWELLS TO BE FINISHED WITH 5/8" GYPSUM BOARD ON 7/8" FURRING CHANNELS @ 24" ON CENTRE

- GENERAL CEILING NOTES:**
1. FURTHER INFORMATION ON CEILINGS AND FINISHES REFER TO ROOM FINISH SCHEDULE IN SPECS.
  2. REFER TO SPECIFICATIONS FOR DESCRIPTION OF CEILING TILE TYPES.
  3. REFER TO ELECTRICAL DRAWINGS FOR LIGHTING TYPE DESCRIPTIONS.
  4. REFER TO MECHANICAL DRAWINGS FOR AIR DIFFUSER AND VENT DESCRIPTIONS.
  5. REFER TO DRAWING A0.1 & A0.2 FOR REQUIRED FIRE SEPARATIONS AND FIRE RESISTANCE RATINGS OF FLOORS AND SUPPORTING ASSEMBLIES.
  6. REFER TO DRAWING A2.0 FOR EXTERIOR AND INTERIOR WALL TYPES LEGEND, RELATED NOTES AND ABBREVIATIONS.
  7. REFER TO DRAWINGS A2.0 - A2.5 FOR ALL DOOR AND SCREEN NUMBERS & LOCATIONS.
  8. REFER TO ELEVATIONS DRAWING A3.0 & A3.1 FOR WINDOW TAGS AND EXTERIOR FINISH SCHEDULE.
  9. REFER TO SPECS FOR INTERIOR FINISH SCHEDULE AND CEILING HEIGHTS.

- WALL TYPE ASSEMBLY NOTES**
1. REFER TO STRUCTURAL DWGS FOR REINFORCEMENT.
  2. SEE SPECIFICATIONS FOR TRANSITION MEMBRANES.
  3. REFER TO FINISH SCHEDULE FOR ALL FINISHES.
  4. ALL WALLS EXTEND TO U/S OF ROOF DECK OR FLOOR STRUCTURE ABOVE UNLESS NOTED OTHERWISE.
  5. ALL GWB MATERIALS TO RECEIVE 1 COAT PRIME + 2 COATS OF PAINT - UNLESS NOTED OTHERWISE.

**BUILDING ENVELOPE REQUIREMENTS- SB-10- Niagara Falls- 3600 Degree Day Below 18 Degs**

**CLIMATE ZONE 5 (NON-RESIDENTIAL)- Table 5.5-5 in 2017- supercedes Table 5.5-5 in 2013**

OPAQUE ELEMENTS:	MAX.U	MAX. R-VALUE
ROOF (INSULATION ENTIRELY ABOVE DECK)	U-0.039	R37.5 CI (Min. R-35)
WALLS ABOVE GRADE (OTHER)	U-0.080	R40 CI (Min. R13 +R12 CI)
WALLS BELOW GRADE (BELOW GRADE WALL)	C-0.092	R15 CI (Min. R15)
SLAB ON GRADE (UNHEATED)	F-0.540	R15 CI (Min. R10)
OPAQUE DOORS (SWINGING)	U-0.45	
<b>FENESTRATION:</b>	<b>MAX.U</b>	<b>MAX. SHGC</b>
NON-METAL FRAMING	U-0.29	0.4
METAL FRAMING (CURTAINWALL/ STOREFRONT)	U-0.38	0.4
METAL FRAMING (ENTRANCE DOOR)	U-0.69	0.4
METAL FRAMING	U-0.45	0.4



**CLIENT NAME**  
Niagara Parks Commission

**PROJECT NAME**  
WEGO Garage Addition-Phase 1

**PROJECT ADDRESS**  
7805 Niagara River Pkwy, Niagara Falls, ON

**SHEET NAME**  
Assemblies + Legends

**DRAWN BY:** Author

**DATE:** 12/12/2024 1:21:23 PM

**SCALE:** 1 : 25

**PROJECT NO.:** 24-006

**CHECKED:** Checker

DRAWINGS ARE NOT VALID FOR CONSTRUCTION UNTIL SEALED AND SIGNED BY THE ARCHITECT.  
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THESE DESIGN DOCUMENTS ARE PREPARED SOLELY FOR THE USE BY THE PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS ENTERED INTO A CONTRACT AND THERE ARE NO REPRESENTATIONS OF ANY KIND MADE BY THE DESIGN PROFESSIONAL TO ANY PARTY WITH WHOM THE DESIGN PROFESSIONAL HAS NOT ENTERED INTO A CONTRACT.

**SHEET #**

# A0-100

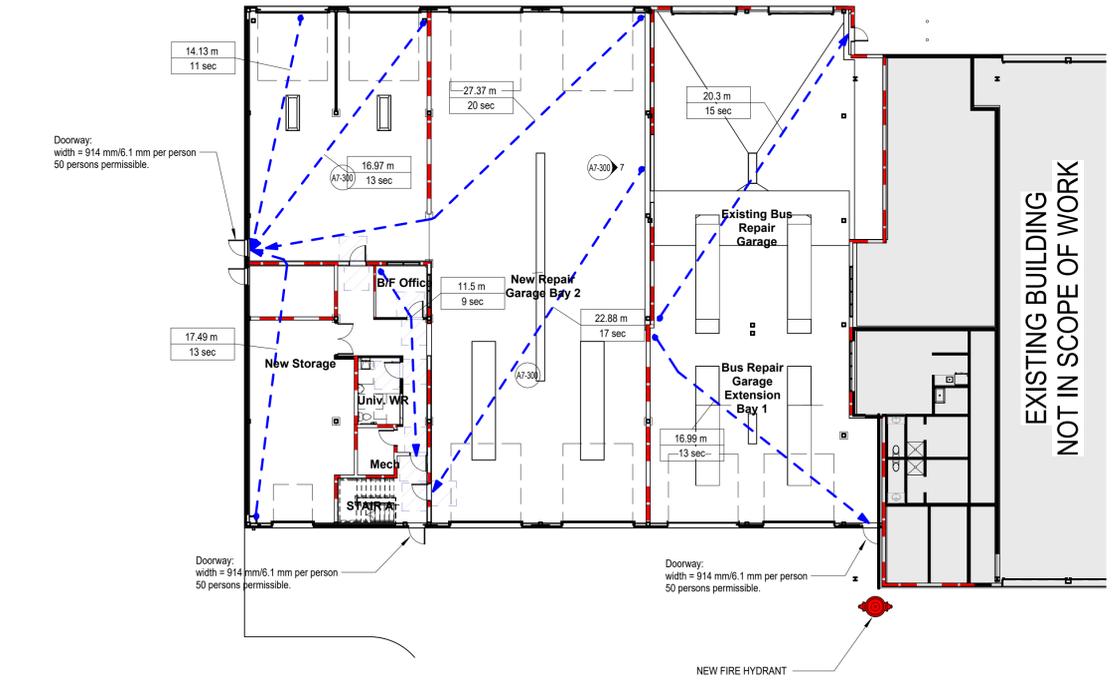
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A. May 10, 2024 Issued For Client Review  
 B. May 24, 2024 Issued For Client Review  
 C. Dec.04,2024 Issued for Tender

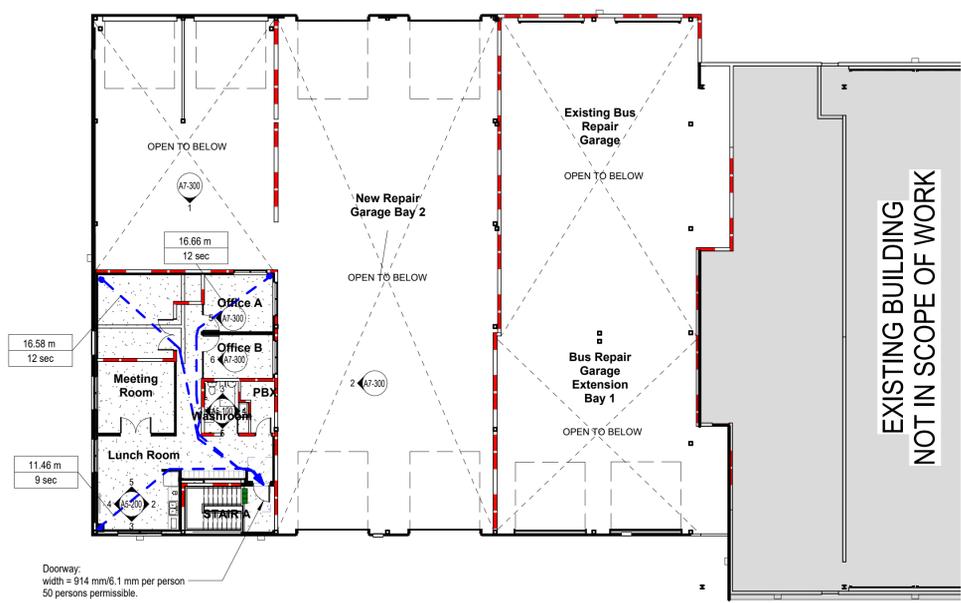
Autodesk Docs://24-006 - NPC - WEGO Garage Niagara Falls24-006 - NPC - WEGO Garage Niagara Falls 12-12-2024.rvt

NOTE: FOR 1 HOUR ASSEMBLY, MIN ONE LAYER OF 16 mm (5/8") THICK GYPSUM BOARD IS REQUIRED. (SEE ARCH. ASSEMBLY SCHED. FOR ADDITIONAL DRYWALL REQUIREMENTS TO MEET STC REQUIREMENTS)	
<b>BW-S-0001</b>	TYP. FIRE STOPPING @ METAL STUD DEMISING WALL (BOTTOM OF WALL ASSEMBLY @ CONCRETE FLOOR)
1HR & 2HR FRR	
NOTE: FOR 1 HOUR ASSEMBLY, MIN ONE LAYER OF 16 mm (5/8") THICK GYPSUM BOARD IS REQUIRED. (SEE ARCH. ASSEMBLY SCHED. FOR ADDITIONAL DRYWALL REQUIREMENTS TO MEET STC REQUIREMENTS)	
<b>HW-D-0209</b>	TYP. FIRE STOPPING @ METAL STUD DEMISING WALL (TOP OF WALL ASSEMBLY @ CONCRETE FLOOR ABOVE)
1HR & 2HR FRR	
<b>FRC-H1</b>	FIRE RESISTANCE RATING = 1 HOUR
	ASSEMBLY: intumescent painted HSS steel column to achieve F.R.R. (size varies - see structural)
<b>ULC - Z611</b>	
<b>FRB-W1</b>	FIRE RESISTANCE RATING = 2 HOUR
	ASSEMBLY: 5/8" gypsum board - type-x (joints finished) 5/8" gypsum board - type-x (joints finished) steel angles (1" & 2" legs - 25 ga.) located not less than 1/2" from beam flanges steel beam (size varies - see structural) steel decking floor assembly (see architectural drawings for additional information)
<b>ULC O501</b>	
<b>FRC-H2</b>	FIRE RESISTANCE RATING = 1 HOUR
	ASSEMBLY: 1/2" gypsum board - type-x (joints finished) 1/2" gypsum board - type-x (joints finished) (gypsum board held in place w/ paper masking tape & horizontal joints staggered 24" between layers) steel column (HSS 4x4x1/8) steel column cover (either 24 ga. L-shape snap lock or 22 ga. L-shape lap joint)
<b>UL X526 (steel column cover)</b>	

Occupancy	Level	Area	Type of Use of Building or Floor Area or Part of Floor Area (Rooms)	Area per Person, m <sup>2</sup>	Area Occupant Load	# of Persons of Each Sex	Minimum # of Water Closets	Additional # of Water Closets	Totals
	1st Floor Level	397.66 m <sup>2</sup>	6. Industrial uses - storage garages	46	9	1. up to 9	1	0	1



**First Floor Level (FRR)**  
scale: 1 : 200



**Second Floor Level (FRR)**  
scale: 1 : 200

Description of Finish	Time, min
11.0 mm (7/16") Douglas Fir Plywood Phenolic Bonded	10 (1)
14.0 mm (9/16") Douglas Fir Plywood Phenolic Bonded	15 (1)
12.7 mm (1/2") Type-X Gypsum Wall Board	25
15.9 mm (5/8") Type-X Gypsum Wall Board	40
Double 12.7 mm (1/2") Type-X Gypsum Wall Board	80 (2)

**Notes to Table 2.3.4.A.:**  
 (1) Non-loadbearing walls only, stud cavities filled with mineral wool conforming to CAN/ULC-S701, "Mineral Fibre Thermal Insulation for Buildings", and having a mass of not less than 2 kg/m<sup>2</sup>, with no additional credit for insulation according to Table 2.3.4.D.  
 (2) Applied to non-loadbearing steel frame walls only

	1 HOUR FIRE RESISTANCE RATING
	PATH / DIRECTION OF TRAVEL
	EXIT
#	# OF OCCUPANTS
#	# OF OCCUPANTS EXITING THROUGH DOORS
	(F) FIRE EXTINGUISHER CABINET (SEE DETAIL)
	Fire Extinguisher (see mech)

Mark	Level	Length
	2nd Floor Level	16584
	2nd Floor Level	11457
	2nd Floor Level	16665
	1st Floor Level	11504
	1st Floor Level	17491
	1st Floor Level	22876
	1st Floor Level	27374
	1st Floor Level	16972
	1st Floor Level	14132
	1st Floor Level	16995
	1st Floor Level	20296

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**CLIENT NAME**  
Niagara Parks Commission

**PROJECT NAME**  
WEGO Garage Addition-Phase 1

**PROJECT ADDRESS**  
7805 Niagara River Pkwy, Niagara Falls, ON

**SHEET NAME**  
Occupant Loads, Exits + FRR Plans

**DRAWN BY:** Author  
**DATE:** 12/12/2024 1:21:27 PM  
**SCALE:** As Indicated  
**PROJECT NO.:** 24-006  
**CHECKED:** Checker

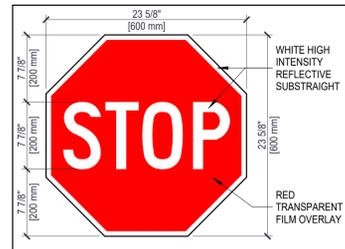
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**SHEET #**

**A0-200**

**REV. #**





**NOTE:**  
SIGN COLORS MUST BE AS INDICATED  
SIGN MUST BE ERCTED ON THE RIGHT SIDE FACING APPROACHING TRAFFIC, AT A POINT NOT LESS THAN 1.5m AND NOT MORE THAN 15m FROM THE INTERSECTION ROADWAY  
SIGN SHALL BE ERCTED SO THAT THE LEFT EDGE OF THE SIGN SHALL BE NOT MORE THAN 4m FROM THE EDGE OF THE ROADWAY  
SIGN SHALL BE ERCTED SO THAT THE BOTTOM EDGE IS NOT LESS THAN 1.5m AND NOT MORE THAN 2.5m ABOVE THE LEVEL OF THE ROADWAY

**MOUNTING:**  
FLEXIBLE P.E. POST WITH SURFACE MOUNT BASE - EPOXY TO PAVEMENT SURFACE

TYPICAL STOP SIGN S-SN1



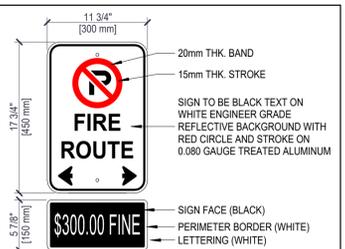
**NOTE:**  
SIGN COLOURS MUST BE INDICATED.  
SIGN MAY BE MADE WITH REFLECTIVE MATERIAL. SIGN MUST BE AT LEAST 300mm (12") X 450mm (18")  
THE SIGN SHALL BE MOUNTED AT A HEIGHT OF 1000mm TO 1500mm FROM TOP OF FINISHED GRADE TO BOTTOM EDGE OF SIGN.  
ORIENTED AT AN ANGLE NOT LESS THAN 30DEGREES AND NOT MORE 45 DEGREES TO FLOR OF TRAFFIC

TYPICAL NO PARKING SIGN S-SN2



**NOTE:**  
SIGN COLOURS MUST BE INDICATED.  
SIGN MAY BE MADE WITH REFLECTIVE MATERIAL.  
ALL PARKING STALLS IDENTIFIED AS BARRIER FREE SHALL HAVE THIS SIGNAGE CENTERED ON THE STALL  
THE SIGN SHALL BE MOUNTED AT A HEIGHT OF 1000mm TO 1500mm FROM TOP OF FINISHED GRADE TO BOTTOM EDGE OF SIGN.

TYPICAL BARRIER FREE PARKING STALLS SIGN S-SN3



**NOTE:**  
SIGN COLOURS MUST BE INDICATED.  
SIGN MAY BE MADE WITH REFLECTIVE MATERIAL. SIGN MUST BE AT LEAST 300mm (12") X 450mm (18")  
THE SIGN SHALL BE MOUNTED AT A HEIGHT OF 1000mm TO 1500mm FROM TOP OF FINISHED GRADE TO BOTTOM EDGE OF SIGN.  
SETBACK FROM FIRE ROUTE WITH CURB MINIMUM 0.3METRES TO MAXIMUM 1METRE OR WITHOUT CURB MINIMUM 3 METRES TO MAXIMUM 4 METRES  
ORIENTED AT AN ANGLE NOT LESS THAN 30DEGREES AND NOT MORE 45 DEGREES TO FLOR OF TRAFFIC

TYPICAL FIRE ROUTE SIGN S-SN4



**NOTE:**  
SIGN COLORS MUST BE INDICATED  
SIGN MAY BE MADE WITH REFLECTIVE MATERIAL  
SIGN MUST BE AT LEAST 300mm (12") BY 450mm (18")

**MOUNTING:**  
FLEXIBLE P.E. POST WITH SURFACE MOUNT BASE - EPOXY TO PAVEMENT SURFACE

TYPICAL FAMILY PARKING SIGN S-SN5



**NOTE:**  
SIGN COLORS MUST BE INDICATED  
SIGN MAY BE MADE WITH REFLECTIVE MATERIAL  
SIGN MUST BE AT LEAST 300mm (12") BY 450mm (18")

**MOUNTING:**  
FLEXIBLE P.E. POST WITH SURFACE MOUNT BASE - EPOXY TO PAVEMENT SURFACE

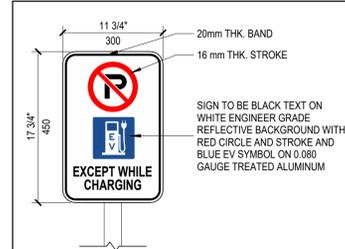
TYPICAL FAMILY PARKING SIGN S-SN6



**NOTE:**  
SIGN COLOURS MUST BE INDICATED  
SIGN MAY BE MADE WITH REFLECTIVE MATERIAL  
SIGN MUST BE AT LEAST 300mm (12") BY 450mm (18")

**MOUNTING:**  
FLEXIBLE P.E. POST WITH SURFACE MOUNT BASE - EPOXY TO PAVEMENT SURFACE

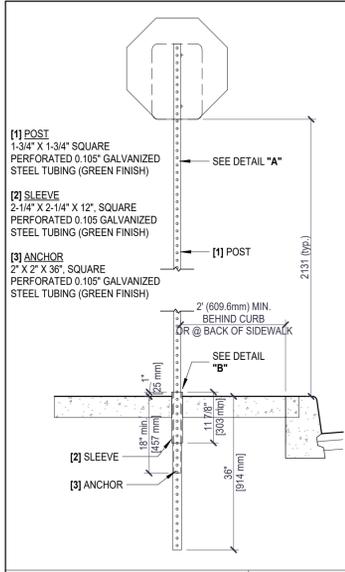
TYPICAL VIDEO MONITORING SIGN S-SN7



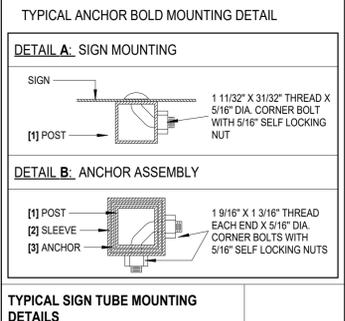
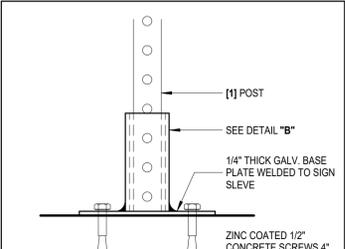
**NOTE:**  
SIGN COLORS MUST BE INDICATED  
SIGN MAY BE MADE WITH REFLECTIVE MATERIAL  
SIGN MUST BE AT LEAST 300mm (12") BY 450mm (18")

**MOUNTING:**  
FLEXIBLE P.E. POST WITH SURFACE MOUNT BASE - EPOXY TO PAVEMENT SURFACE

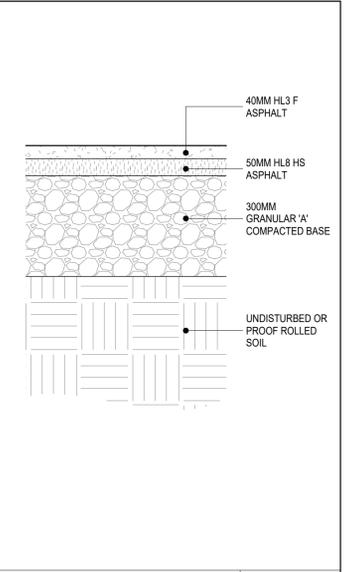
TYPICAL ELECTRIC VEHICLE PARKING SIGN S-SN8



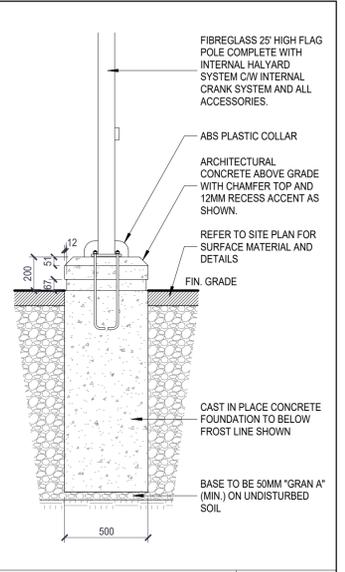
TYPICAL SIGN MOUNTING DETAIL



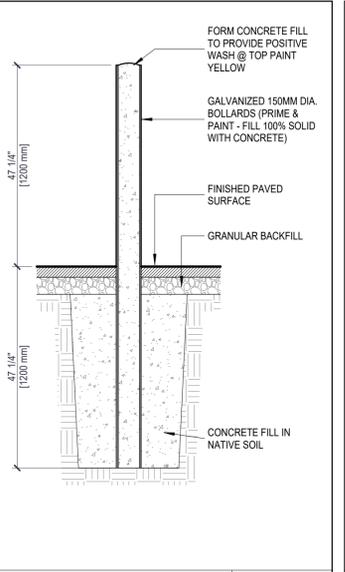
TYPICAL SIGN TUBE MOUNTING DETAILS



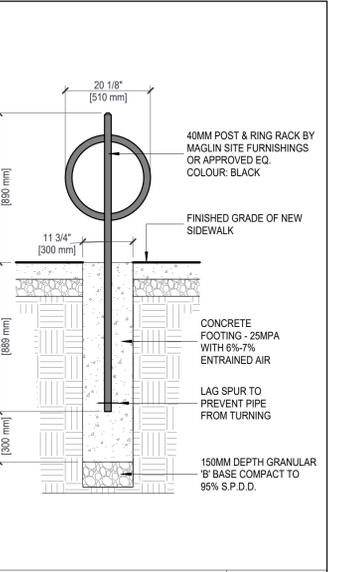
TYPICAL STANDARD DUTY ASPHALT DETAIL



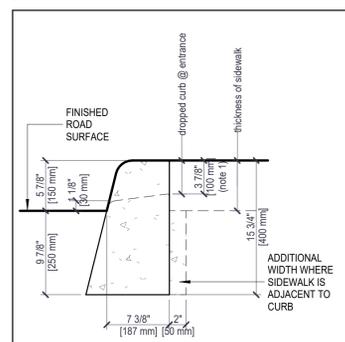
TYPICAL FLAG POLE DETAIL S-FP



TYPICAL BOLLARD DETAIL S-BL

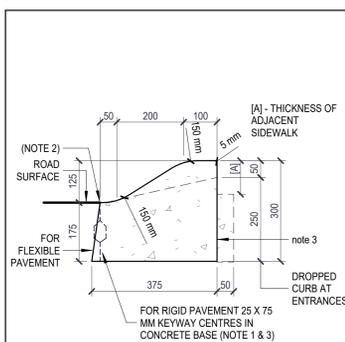


TYPICAL BIKE RACK S-BR



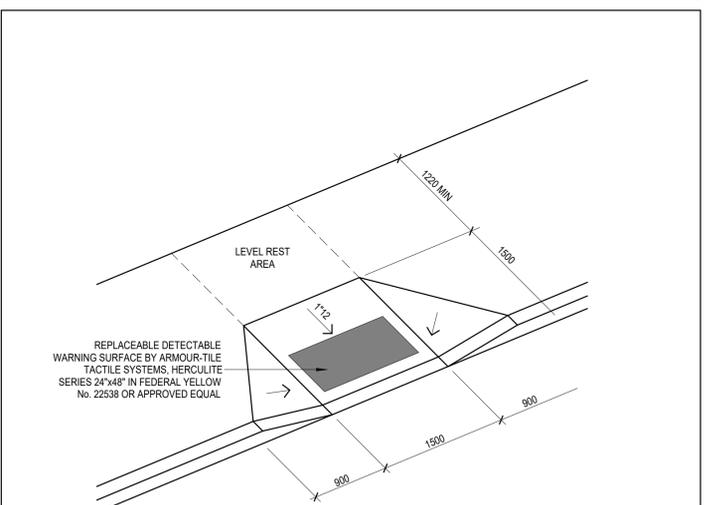
**NOTES:**  
1. WHERE SIDEWALK IS CONTINUOUSLY ADJACENT, REDUCE THE DROPPED CURB AT ENTRANCES TO 75MM  
2. FOR SLIPFORMING PROCEDURE, A 5% BATTER IS ACCEPTABLE  
3. TREATMENT AT ENTRANCE SHALL BE ACCORDING TO OPSD 351.010  
4. OUTLET TREATMENT SHALL BE ACCORDING TO THE OPSD 610 SERIES.  
5. THE TRANSITION FROM ONE CURB TYPE TO ANOTHER SHALL BE A MINIMUM LENGTH OF 3.0M, EXCEPT IN CONJUNCTION WITH THE GUIDE RAIL WHERE IT SHALL BE ACCORDING TO THE OPSD 900 SERIES.  
6. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.

TYPICAL CONCRETE CURB DETAIL

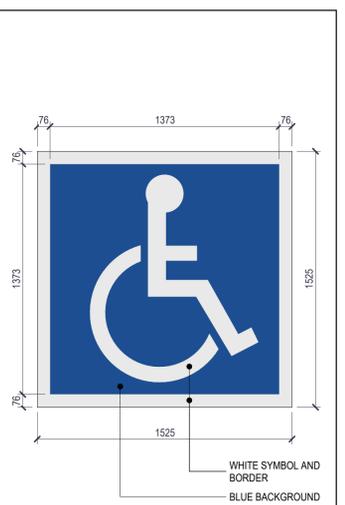


**NOTES:**  
1. WHERE CURB AND GUTTER IS ADJACENT TO CONCRETE PAVEMENT OR BASE, THIS DRAWING SHALL BE USED IN CONJUNCTION WITH OPSD 552.010 AND 552.020  
2. FLEXIBLE AND COMPOSITE PAVEMENT SHALL BE PLACED 5 MM ABOVE THE ADJACENT EDGE OF GUTTER  
3. FOR SLIPFORMING PROCEDURE A 5% BATTER IS ACCEPTABLE  
A. OUTLET TREATMENT SHALL BE ACCORDING TO THE OPSD 610 SERIES.  
B. THE TRANSITION FROM ONE CURB TYPE TO ANOTHER SHALL BE A MINIMUM LENGTH OF 3.0M, EXCEPT IN CONJUNCTION WITH THE GUIDE RAIL WHERE IT SHALL BE ACCORDING TO THE OPSD 900 SERIES.  
C. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.

TYPICAL CONCRETE SEMI-MOUNTABLE CURB DETAIL

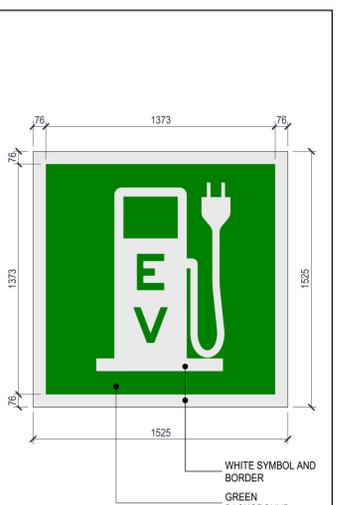


TYPICAL DROP CURB DETAIL



INTERNATIONAL SYMBOL OF ACCESS  
NOTE: ONE SYMBOL TO BE LOCATED IN CENTER OF EACH ACCESSIBLE PARKING SPACE

TYPICAL PAVEMENT BARRIER FREE PARKING SYMBOL



NOTE: ONE SYMBOL TO BE LOCATED IN CENTER OF EACH PARKING SPACE

TYPICAL PAVEMENT ELECTRIC VEHICLE PARKING SYMBOL

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**RAIMONDO**  
+ ASSOCIATES  
ARCHITECTS INC.

4607 Queen Street Suite 2,  
Niagara Falls, ON, L2E 2L9  
T | 905-357-4441  
F | 905-357-9203  
W | www.raimondosarchitects.com  
E | mail@raimondosarchitects.com

CLIENT NAME  
**Niagara Parks Commission**

PROJECT NAME  
**WEGO Garage Addition-Phase 1**

PROJECT ADDRESS  
**7805 Niagara River Pkwy, Niagara Falls, ON**

SHEET NAME  
**Site Plan Details**

DRAWN BY: **MBK**

DATE: **12/12/2024 1:21:35 PM**

SCALE: **As Indicated**

PROJECT NO.: **24-006**

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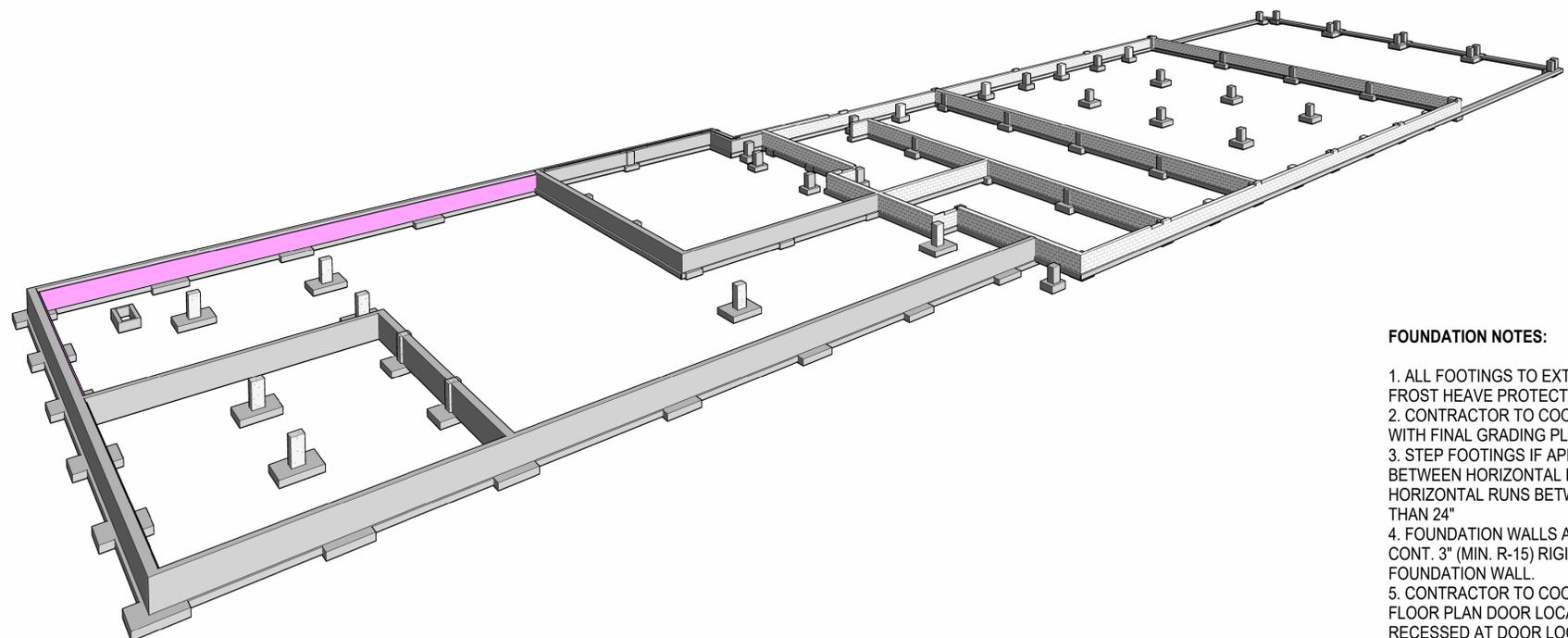
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**A1-100**

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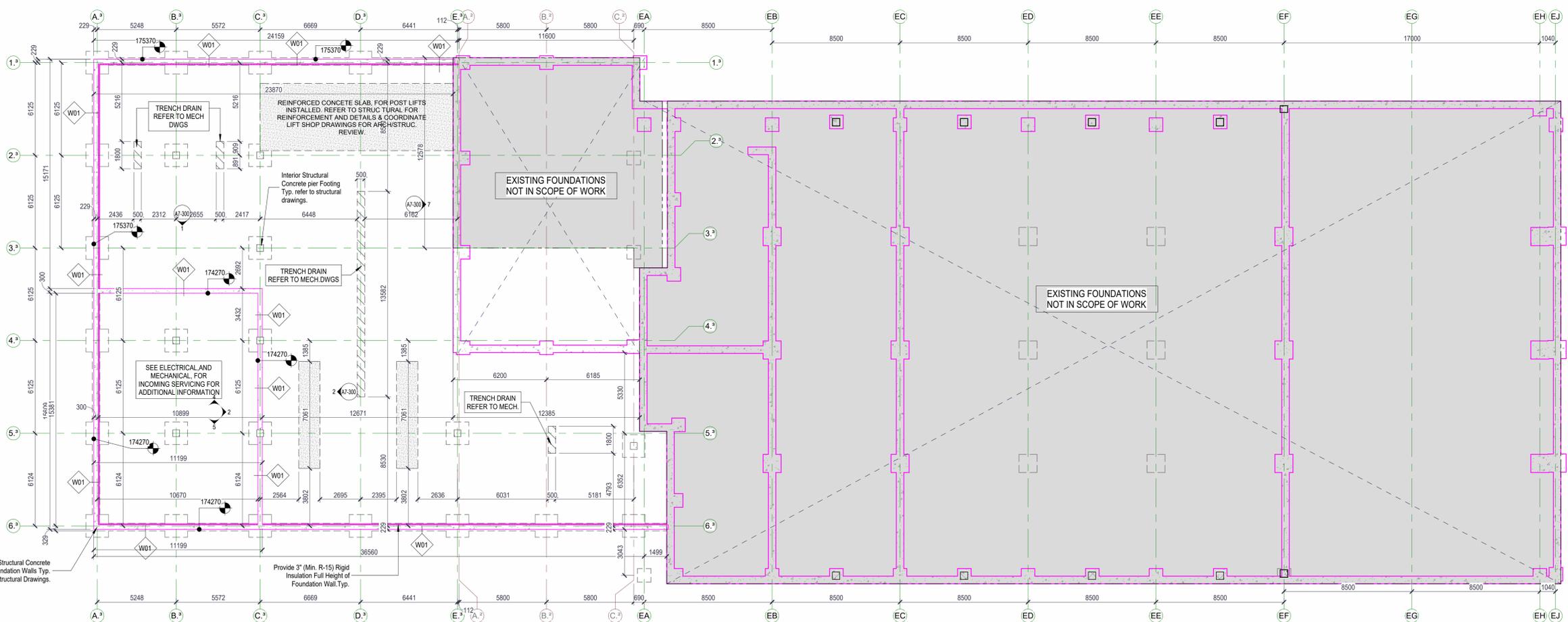
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3D Foundation View

**FOUNDATION NOTES:**

1. ALL FOOTINGS TO EXTEND MIN. 48" BELOW GRADE FOR FROST HEAVE PROTECTION
2. CONTRACTOR TO COORDINATE ALL FOOTING ELEVATIONS WITH FINAL GRADING PLAN
3. STEP FOOTINGS IF APPLIC. ARE TO HAVE VERTICAL RISES BETWEEN HORIZONTAL PORTIONS NOT EXCEEDING 24" AND HORIZONTAL RUNS BETWEEN VERTICAL PORTIONS NOT LESS THAN 24"
4. FOUNDATION WALLS AT EXTERIOR TO BE PROVIDED WITH CONT. 3" (MIN. R-15) RIGID INSULATION FULL HEIGHT OF FOUNDATION WALL.
5. CONTRACTOR TO COORDINATE ALL DOOR BUCKS WITH FIRST FLOOR PLAN DOOR LOCATIONS (FOUNDATION WALLS TO BE RECESSED AT DOOR LOCATIONS THE THICKNESS OF THE CONCRETE FLOOR SLAB TYP.)



1 Floor Plan - Foundation  
A2-000 scale: 1 : 150

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 Niagara Falls, ON, L2E 2L9  
 T | 905-357-4441  
 F | 905-357-9203  
 W | www.raidmondarchitects.com  
 E | mail@raidmondarchitects.com

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**PROJECT NAME**  
 WEGO Garage Addition-  
 Phase 1  
**PROJECT ADDRESS**  
 7805 Niagara River Pkwy, Niagara Falls, ON  
**SHEET NAME**  
 Foundation Plans

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**DATE:** 12/12/2024 1:21:55 PM  
**SCALE:** 1 : 150  
**PROJECT NO.:** 24-006  
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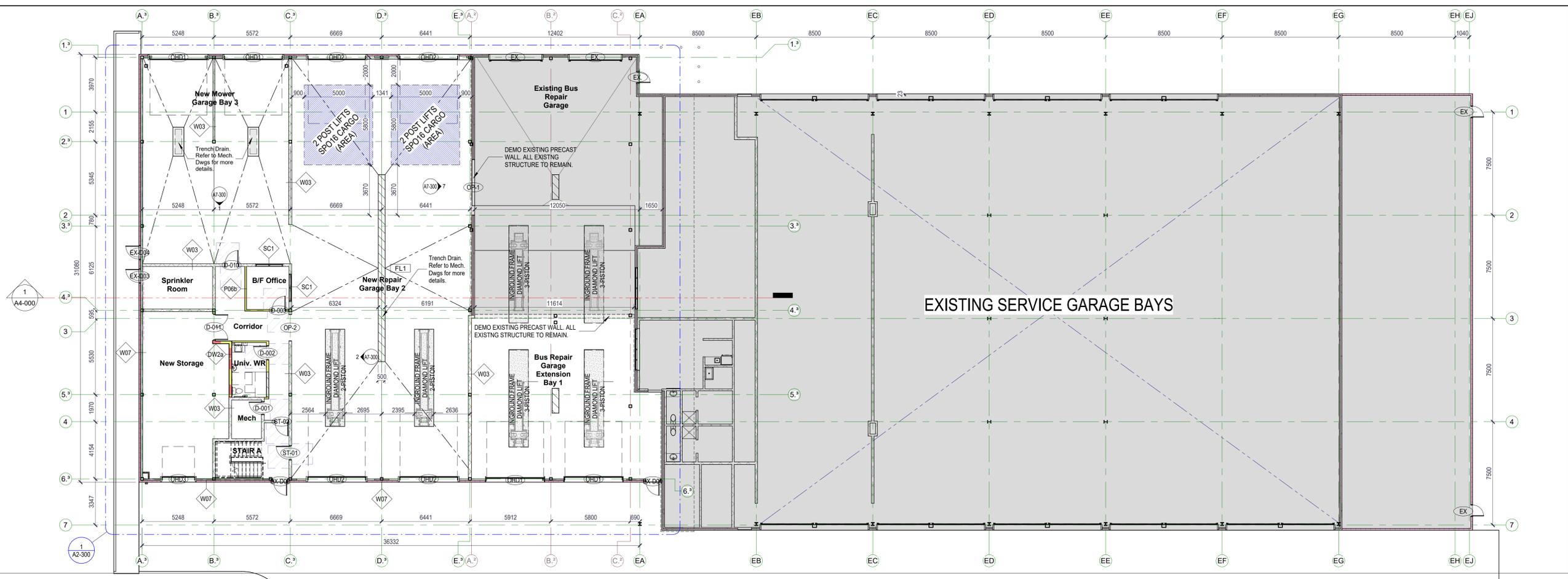
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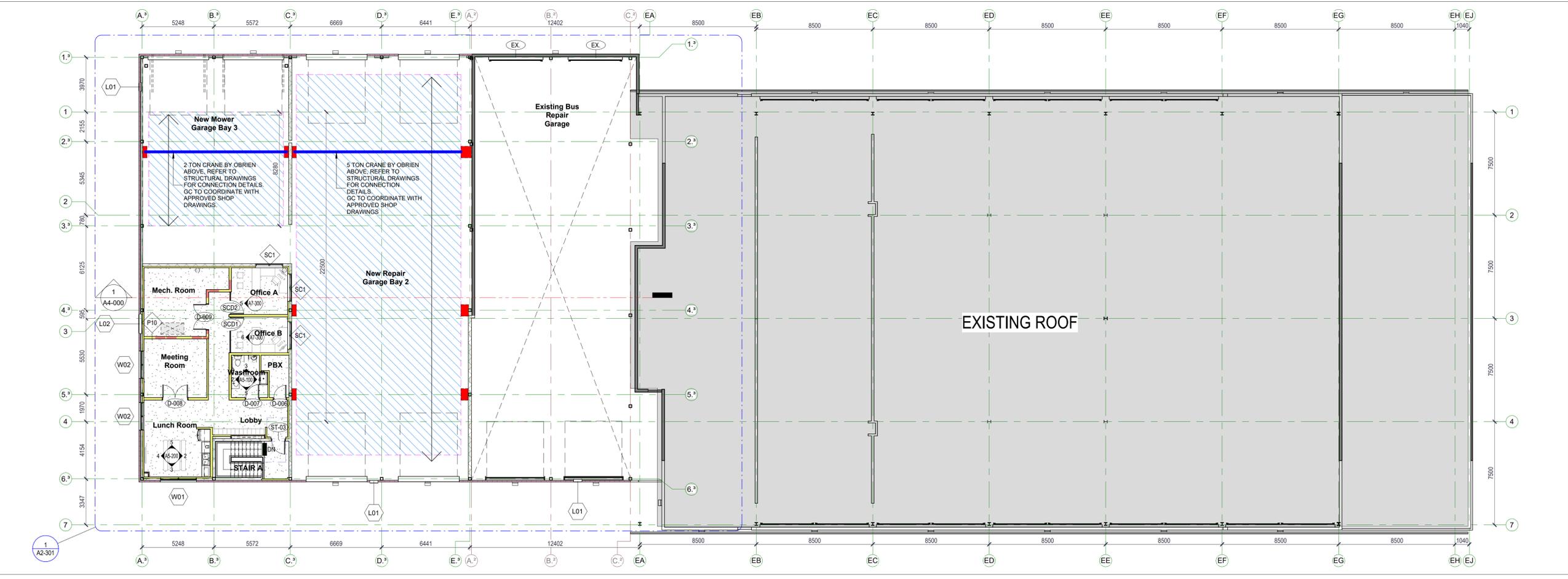
**A2-000**

**REV. #**

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1st Floor Level  
scale: 1/150



2nd Floor Level  
scale: 1/150

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 W | www.raidmondarchitects.com  
 E | mail@raidmondarchitects.com

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PROJECT NAME

WEGO Garage Addition-Phase 1

PROJECT ADDRESS

7805 Niagara River Pkwy, Niagara Falls, ON

SHEET NAME

Floor Plans

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SCALE: 1:150

PROJECT NO.: 24-006

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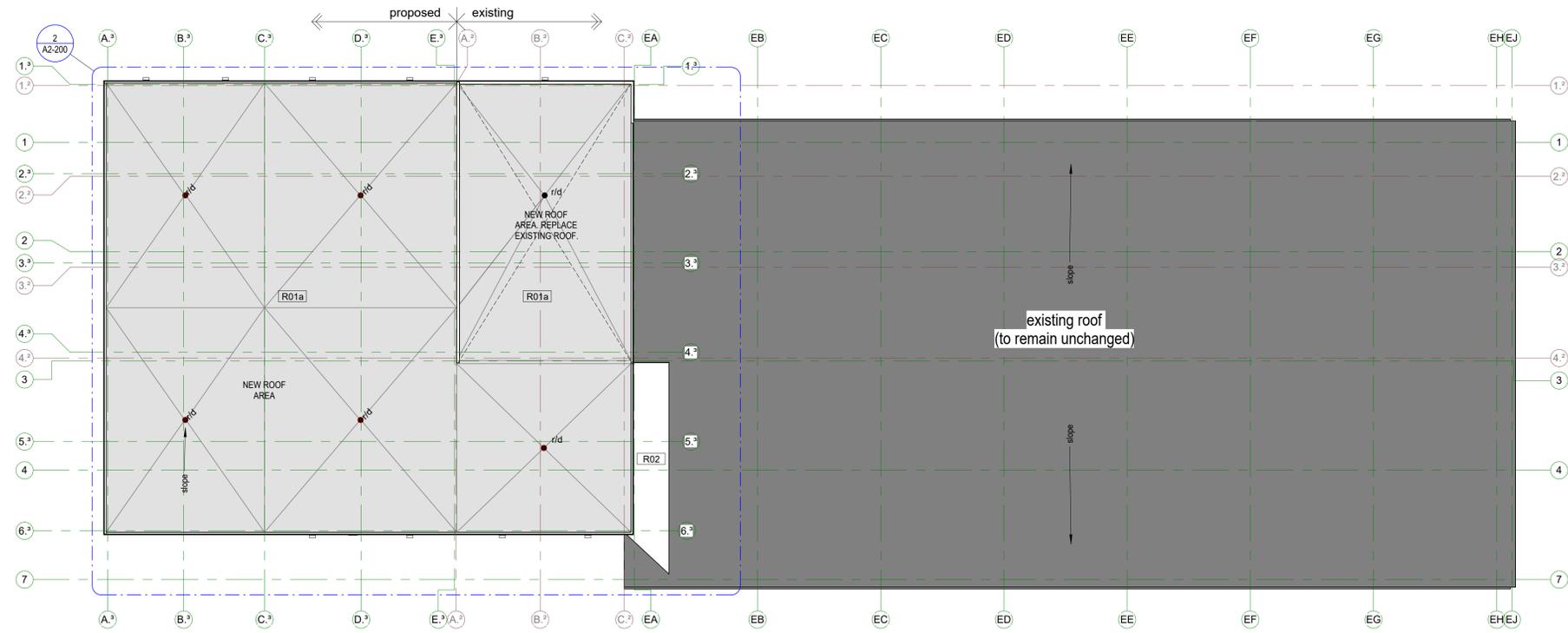
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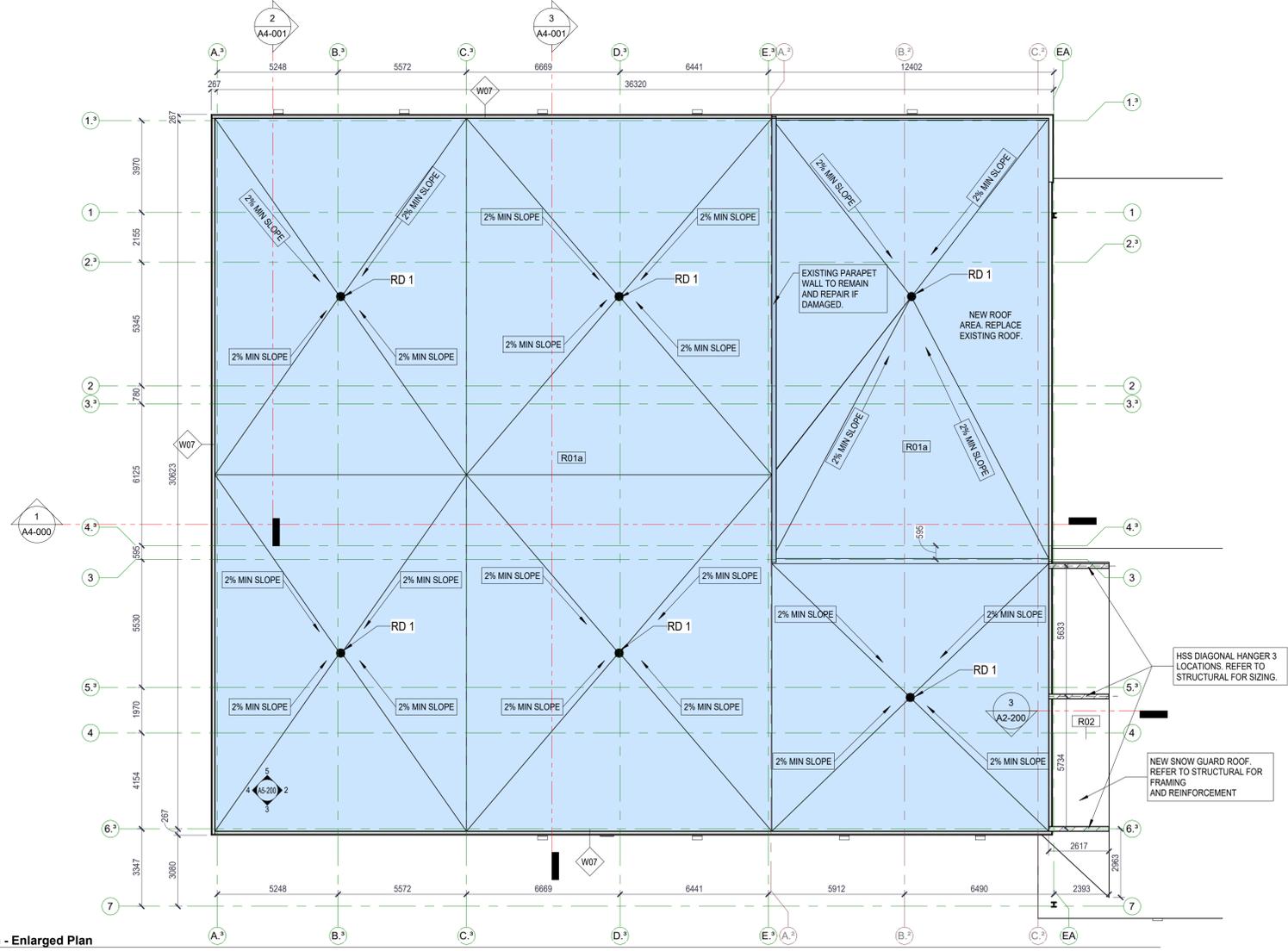
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A2-100

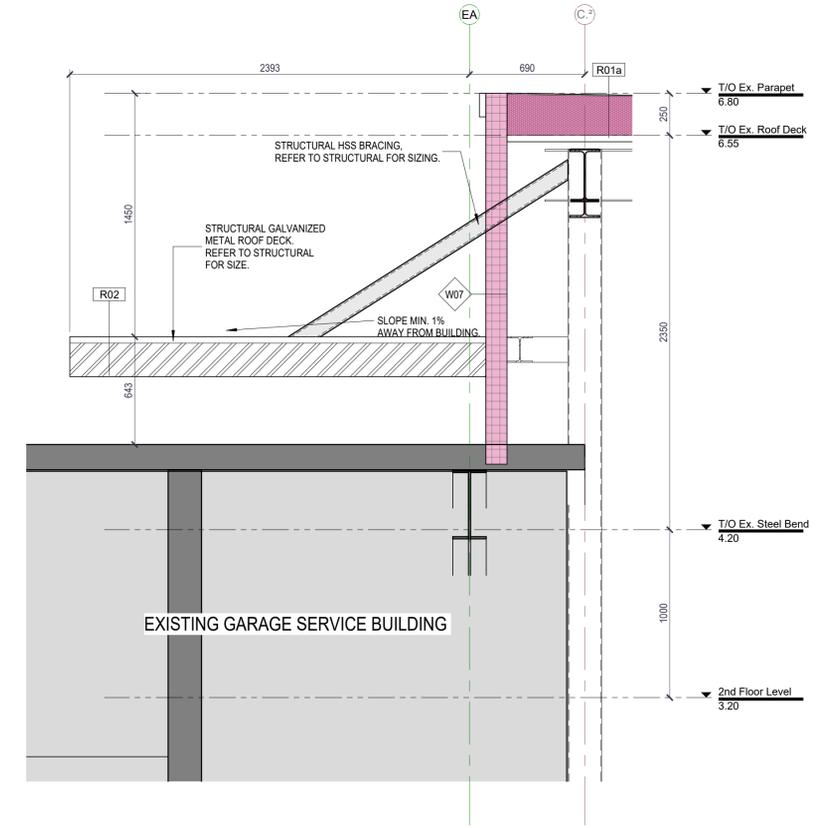
REV. #



**1 Roof Plan**  
A2-200  
scale: 1:200



**2 Roof Plan - Enlarged Plan**  
A2-200  
scale: 1:125



**3 Section - @ Snow Guard Roof**  
A2-200  
scale: 1:20

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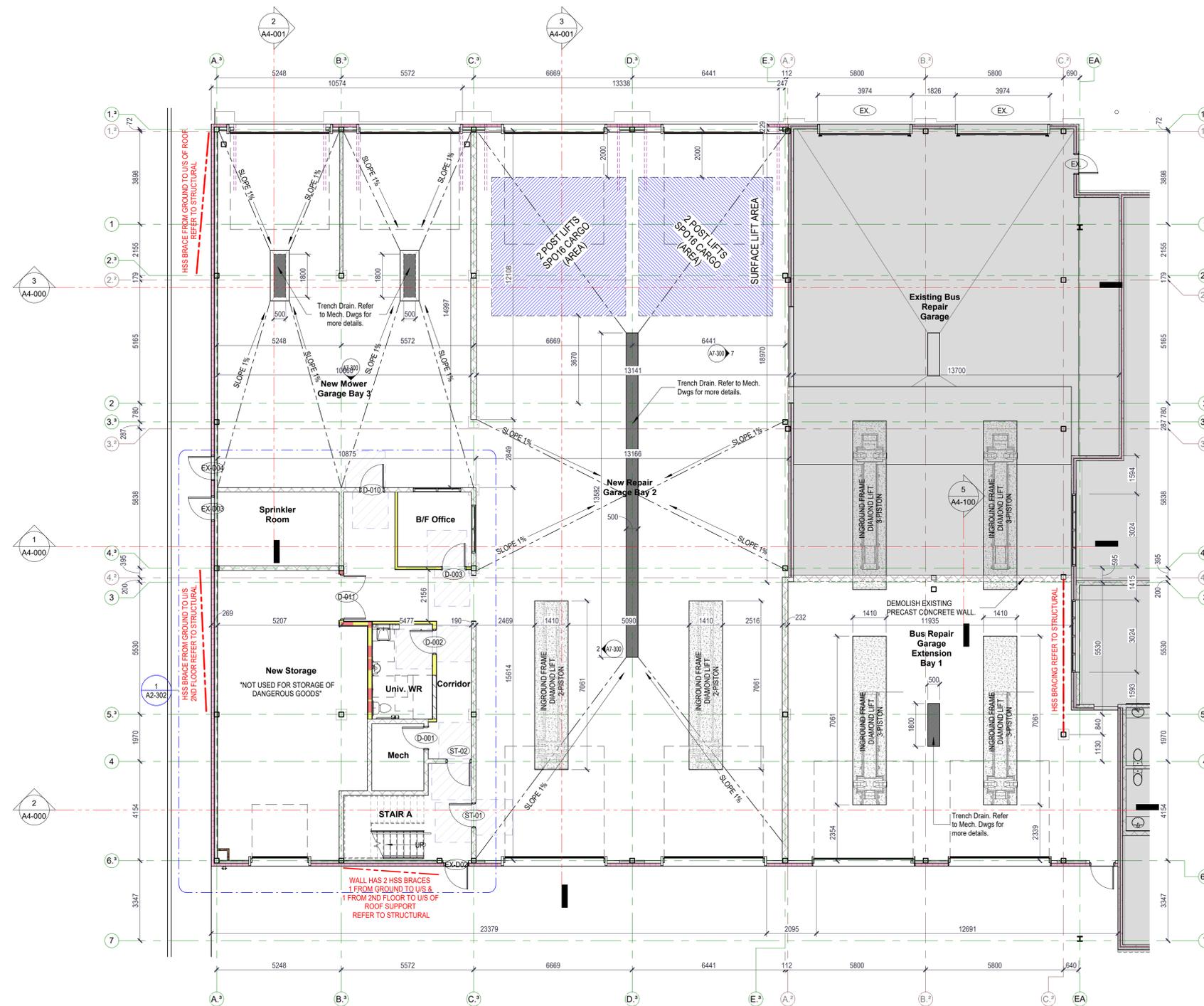


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 Niagara Parks Commission  
**PROJECT NAME**  
 WEGO Garage Addition-  
 Phase 1  
**PROJECT ADDRESS**  
 7805 Niagara River Pkwy, Niagara Falls, ON  
**SHEET NAME**  
 Roof Plans

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**SCALE:** As Indicated  
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**A2-200**  
**REV #**



1 1st Floor Addition Overall  
A2-300 scale: 1:100

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4607 Queen Street Suite 2,  
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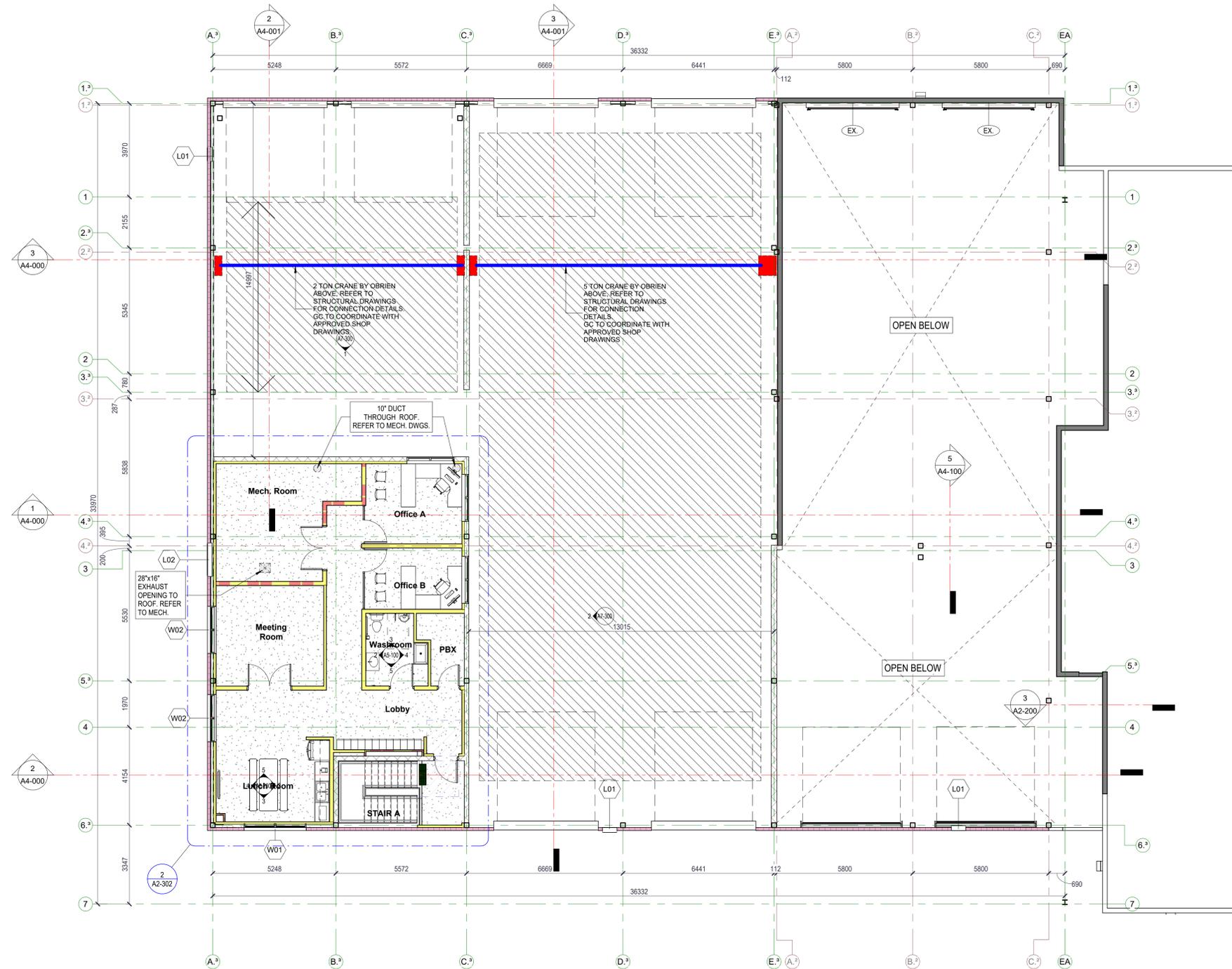
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 Enlarged 1st Floor Plan

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**SCALE:** 1:100  
**PROJECT NO.:** 24-006  
**CHECKED:** Checker

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**SHEET #**  
**A2-300**  
**REV. #**

Autodesk Docs://24-006 - NPC - WEGO Garage Niagara Falls/24-006 - NPC - WEGO Garage Niagara Falls\_12.12.2024.rvt



2nd Floor Addition Overall  
Scale: 1:100

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**CLIENT NAME**  
 Niagara Parks Commission

**PROJECT NAME**  
 WEGO Garage Addition-Phase 1

**PROJECT ADDRESS**  
 7805 Niagara River Pkwy, Niagara Falls, ON

**SHEET NAME**  
 Enlarged 2nd Floor Plan

**DRAWN BY:** Author  
**DATE:** 12/12/2024 1:22:20 PM  
**SCALE:** 1:100  
**PROJECT NO.:** 24-006  
**CHECKED:** Checker

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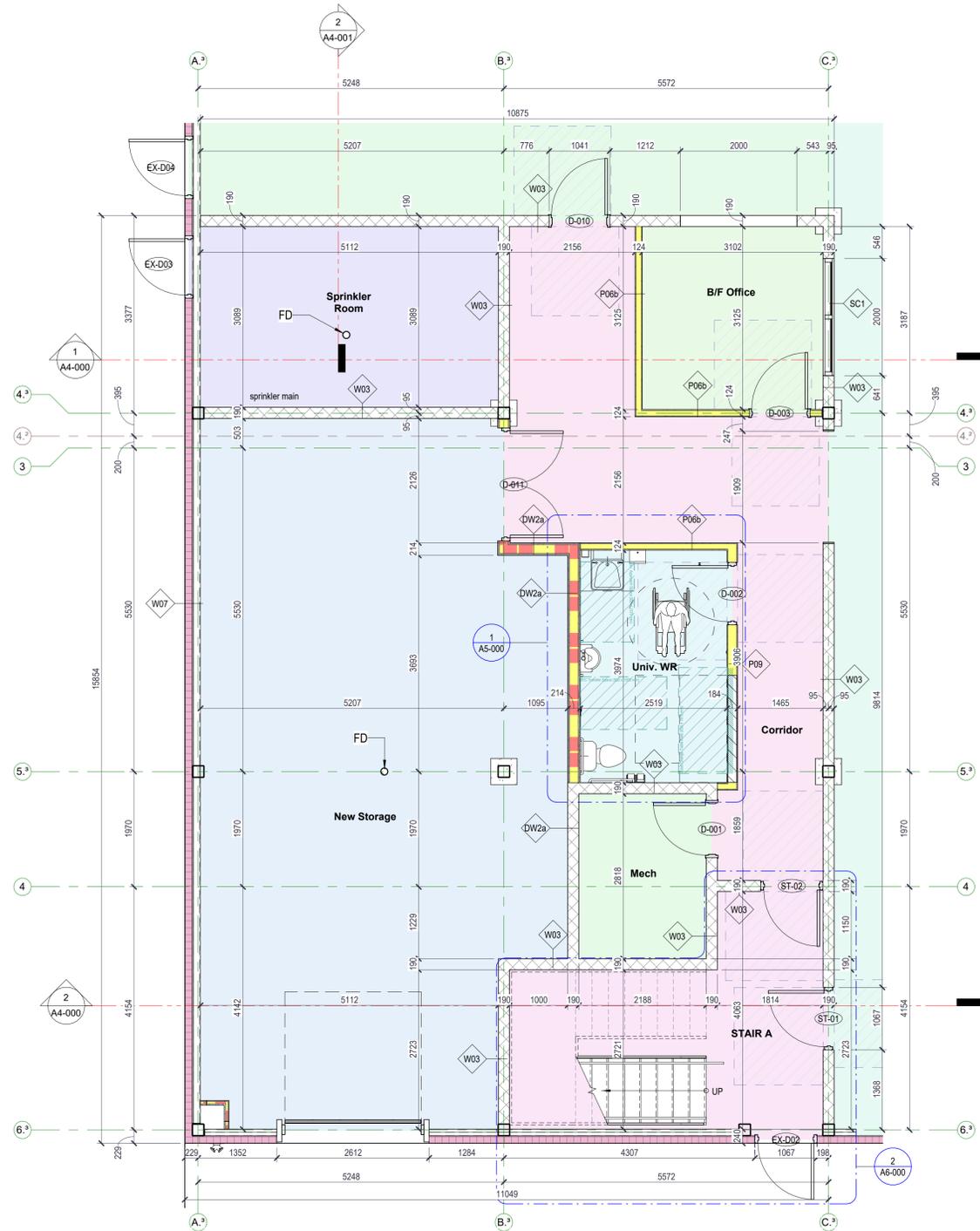
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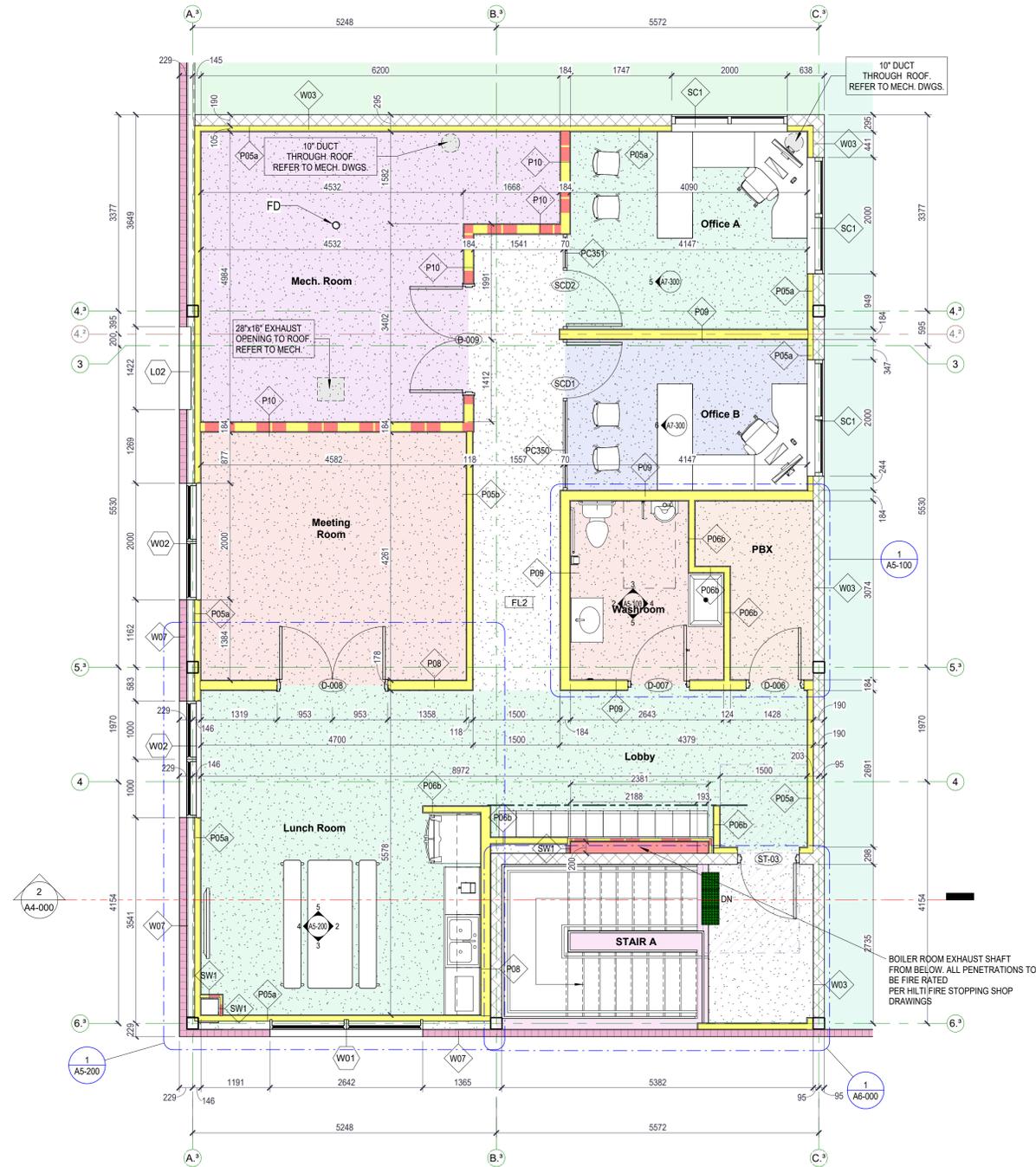
A2-301

REV #

Autodesk Docs://24-006 - NPC - WEGO Garage Niagara Falls 24-006 - NPC - WEGO Garage Niagara Falls 24-006 - NPC - WEGO Garage Niagara Falls 12-12-2024.rvt



**1 1st Floor Addition - Enlarged**  
A2-302 scale: 1:50



**2 2nd Floor Addition - Enlarged**  
A2-302 scale: 1:50

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PROJECT NAME  
 WEGO Garage Addition-  
 Phase 1

PROJECT ADDRESS  
 7805 Niagara River Pkwy, Niagara Falls, ON

SHEET NAME  
 Enlarged Interior 1st & 2nd  
 Floor Plans

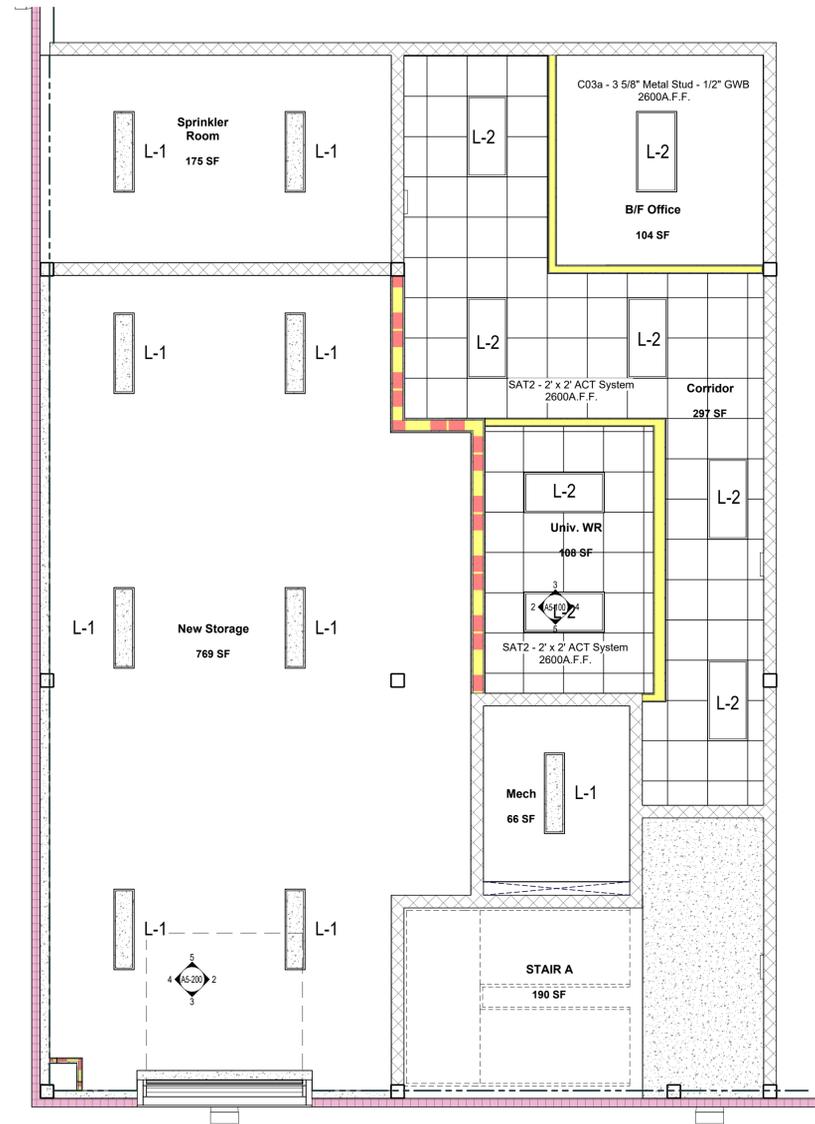
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 PROJECT NO.: 24-006  
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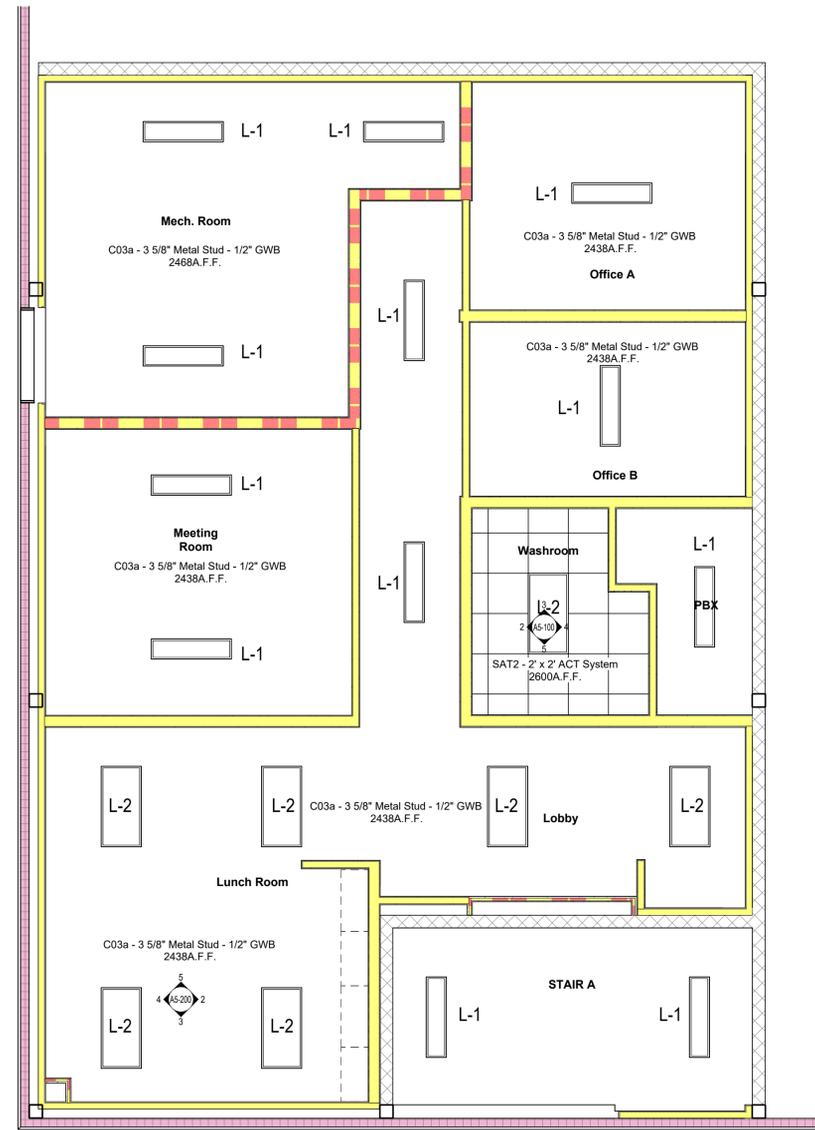
**A2-302**

REV. #



1 1st Floor Level (RCP)  
A2-400 scale: 1:50

LIGHT FIXTURES ARE FOR REFERENCE ONLY,  
REFER TO ELECTRICAL DRAWINGS FOR MORE DETAILS AND SPECIFICATION.



2 2nd Floor Level (RCP)  
A2-400 scale: 1:50

LIGHT FIXTURES ARE FOR REFERENCE ONLY,  
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SHEET NAME  
RCP- 1st & 2nd Levels

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DATE: 12/12/2024 1:22:25 PM  
SCALE: 1:50  
PROJECT NO.: 24-006  
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SHEET #

**A2-400**

REV. #

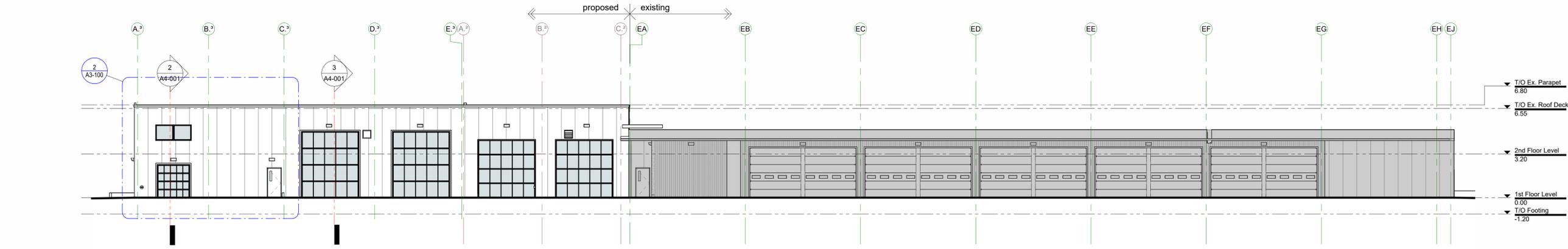


1 Elevation - East  
A3-000 scale: 1:150

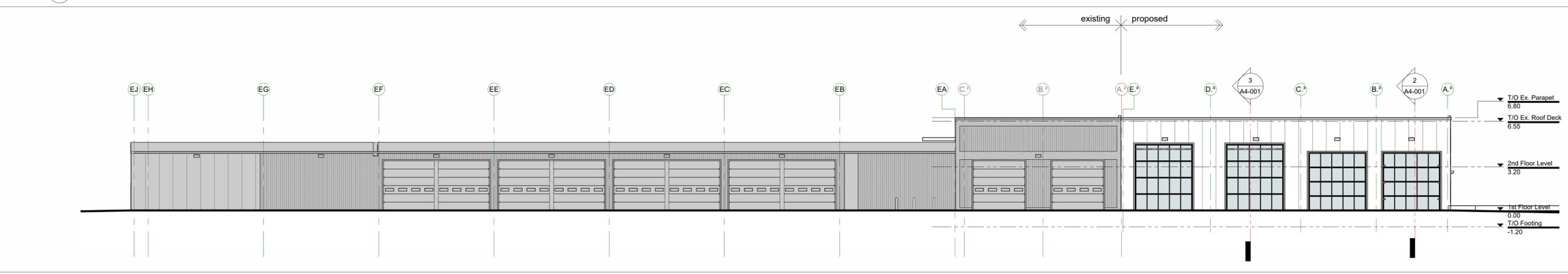


4 Elevation - West  
A3-000 scale: 1:150

- ELEVATION NOTES:**
- GRADES SHOWN ARE PRELIMINARY - CONTRACTOR TO COORDINATE GRADES BASED ON FINAL GRADING PLAN
  - SEE FOUNDATION PLAN FOR FOUNDATION REQUIREMENTS
  - ALL FOOTINGS TO EXTEND MIN. 48" BELOW GRADE FOR FROST HEAVE PROTECTION (STEP FOOTINGS IF APPLIC. ARE TO HAVE VERTICAL RISES BETWEEN HORIZONTAL PORTIONS NOT EXCEEDING 24" AND HORIZONTAL RUNS BETWEEN VERTICAL PORTIONS NOT LESS THAN 24")
  - SEE STRUCTURE DRAWINGS FOR STEEL DATUM HEIGHTS.
  - FLASHING COLOUR TO MATCH ADJACENT FINISH TYP. (UNLESS OTHERWISE NOTED) - ALL FLASHING TO BE MIN 24 GAUGE ALUMINUM
  - SEE WINDOW & DOOR SCHEDULES FOR WINDOW & DOOR REQUIREMENTS
  - WINDOW / DOOR FLASHING COLOUR TO MATCH WINDOW FRAMES- ALL WINDOW / DOOR FLASHING TO BE MIN 24 GAUGE ALUMINUM
  - COORDINATE ALL BUILDING STRUCT. REQUIREMENTS WITH STRUCTURAL DRAWINGS
  - PANEL COLOUR: MetISpan Charcoal Grey



3 Elevation - South  
A3-000 scale: 1:150



2 Elevation - North  
A3-000 scale: 1:150



3D View (South Corner)



3D View (West Corner)

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PROJECT NAME  
**WEGO Garage Addition-Phase 1**

PROJECT ADDRESS  
**7805 Niagara River Pkwy, Niagara Falls, ON**

SHEET NAME  
**Building Elevations**

DRAWN BY: **MBK**

DATE: **12/12/2024 1:24:07 PM**

SCALE: **1:150**

PROJECT NO.: **24-006**

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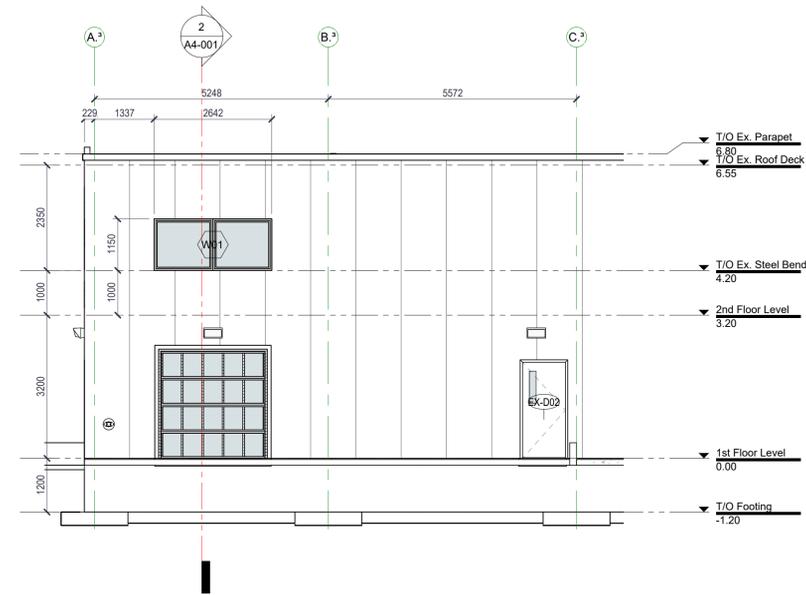
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**A3-000**

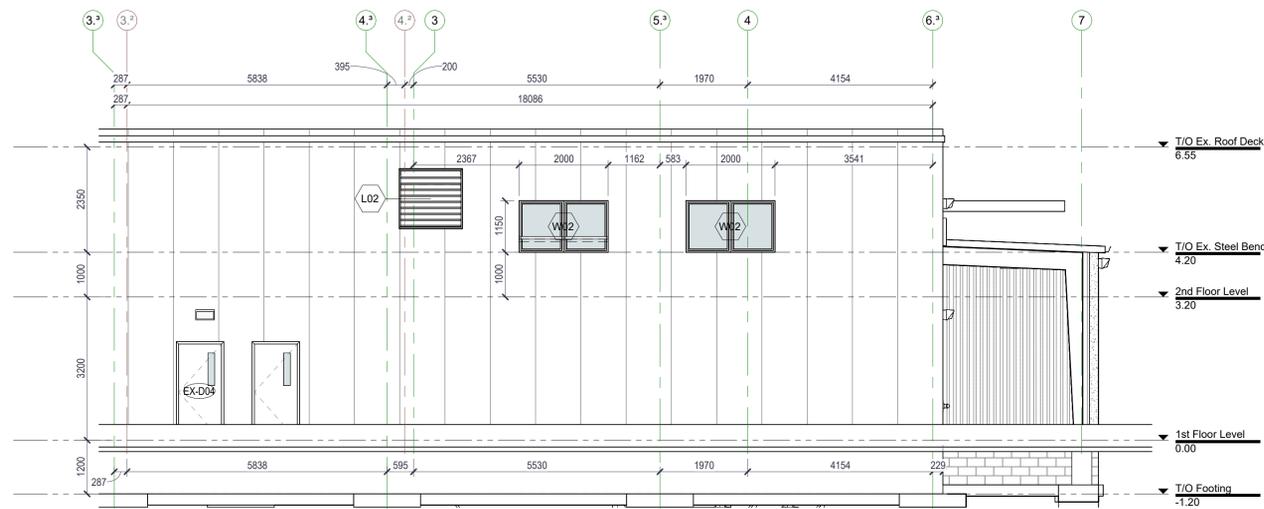
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**2 South - Enlarged Elevation**  
 A3-100 scale: 1:75



**3 West - Enlarged Elevation**  
 A3-100 scale: 1:75

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**PROJECT ADDRESS**  
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**SHEET NAME**  
 Enlarged Elevations

**DRAWN BY:** Author

**DATE:** 12/12/2024 1:24:22 PM

**SCALE:** 1:75

**PROJECT NO.:** 24-006

**CHECKED:** Checker

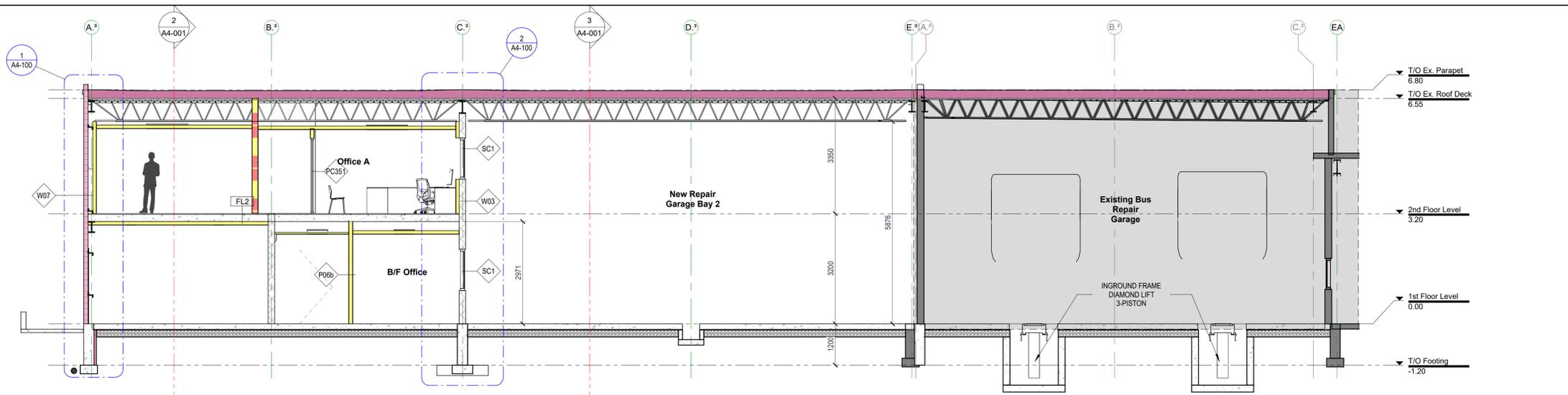
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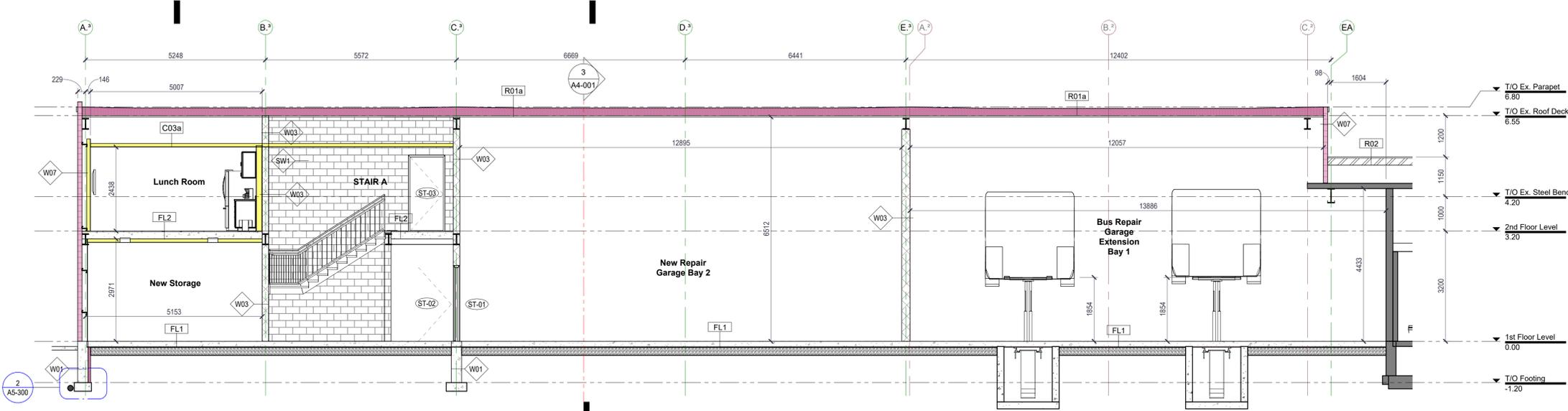
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**A3-100**

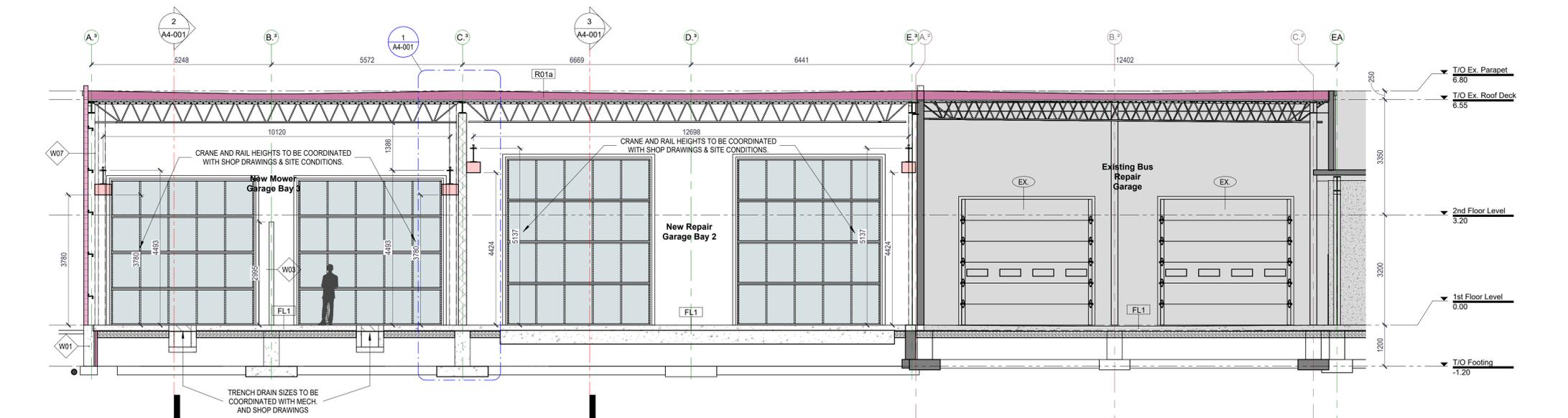
**REV #**



1 Building Section I  
A4-000 scale: 1:70



2 Building Section III  
A4-000 scale: 1:70



3 Building Section II  
A4-000 scale: 1:70

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**PROJECT ADDRESS**  
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**SHEET NAME**  
 Building Sections (Large Scale)

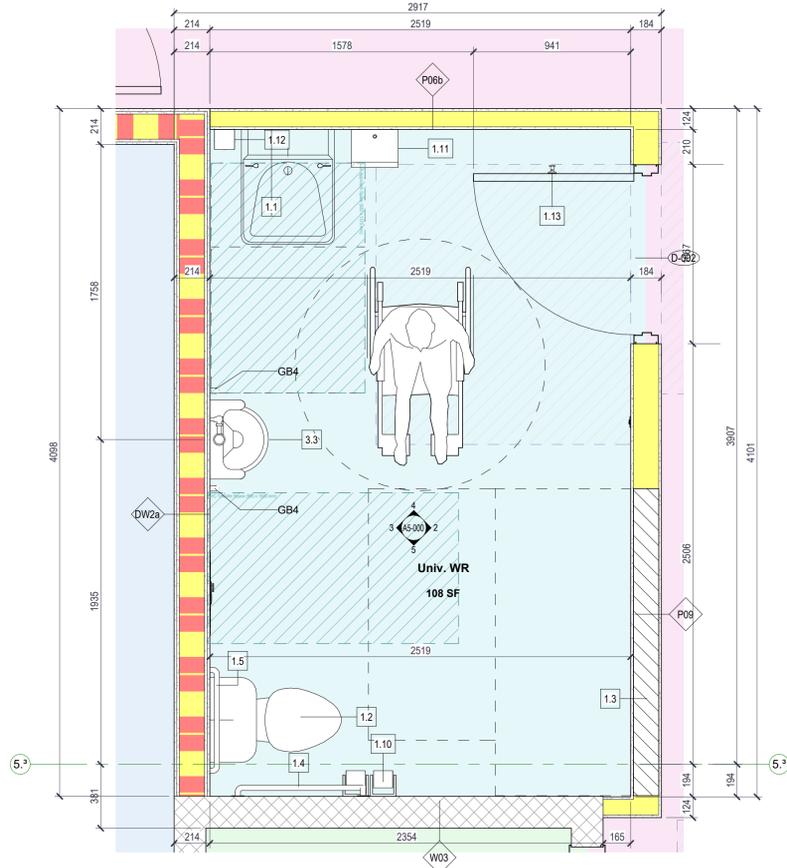
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**SHEET #**  
**A4-000**  
**REV. #**

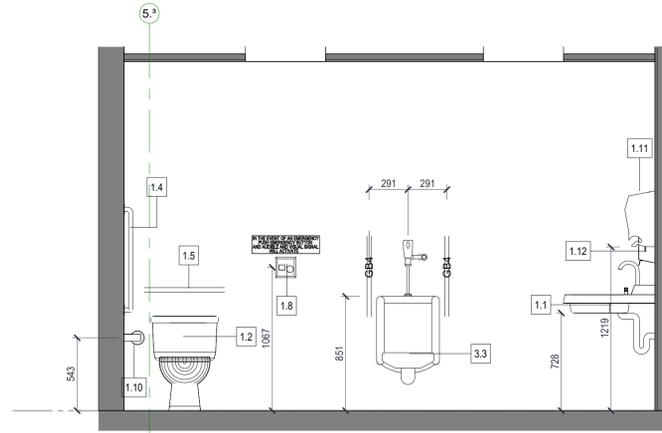




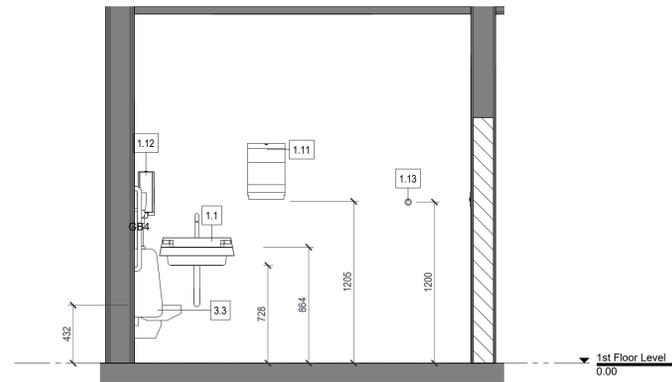


**1 1st Floor Addition - Universal Washroom Enlarged Plan**  
AS-000 scale: 1:20

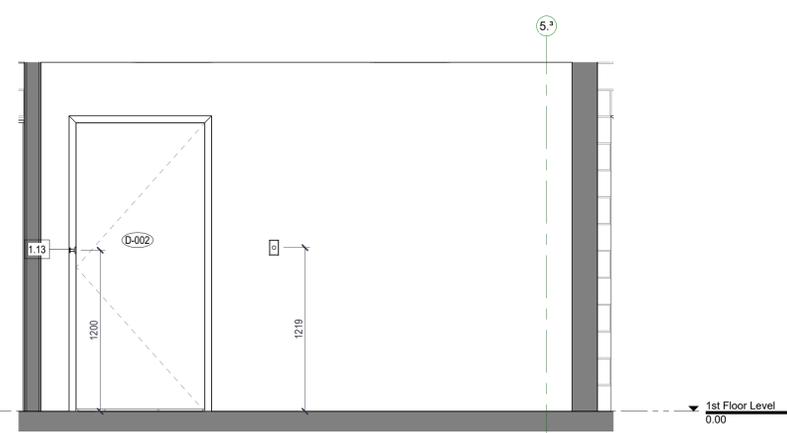
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Key Value	Keynote Text
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1.2	Universal Washroom Water Closet
1.3	Universal Washroom Adult Change Table Wall Reinforcing (See Struct. Dwg's)
1.4	Universal Washroom Water Closet L-Shape Grab Bar At Side
1.5	Universal Washroom Water Closet Horizontal Grab Bar At Rear
1.8	Universal Washroom Emergency Call System Push Button (See Elec. Dwg's)
1.10	Universal Washroom Toilet Paper Dispenser
1.11	Universal Washroom Paper towel Dispenser w/ Waste Receptacle
1.12	Universal Washroom Soap Dispenser
1.13	Universal Washroom Coat Hook
3.3	Urinal



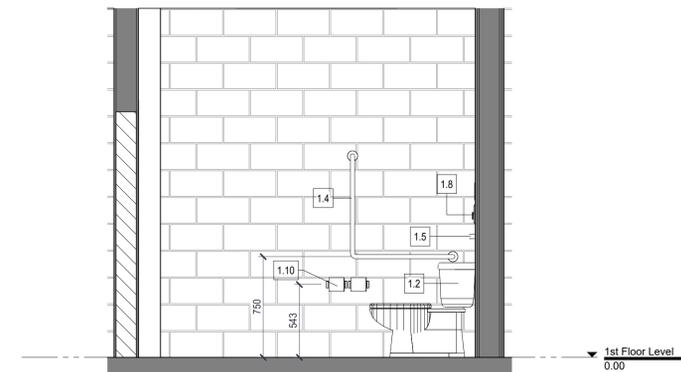
**3 Interior Universal Washroom 3**  
AS-000 scale: 1:25



**4 Interior Universal Washroom 4**  
AS-000 scale: 1:25



**2 Interior Universal Washroom 2**  
AS-000 scale: 1:25



**5 Interior Universal Washroom 5**  
AS-000 scale: 1:25



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Niagara Falls, ON, L2E 2L9  
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F | 905-357-9203  
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PROJECT NAME  
**WEGO Garage Addition-Phase 1**

PROJECT ADDRESS  
**7805 Niagara River Pkwy, Niagara Falls, ON**

SHEET NAME  
**Universal Washroom Floor Plan & Elevations**

DRAWN BY: **Author**

DATE: **12/12/2024 1:24:52 PM**

SCALE: **As Indicated**

PROJECT NO.: **24-006**

CHECKED: **Checker**

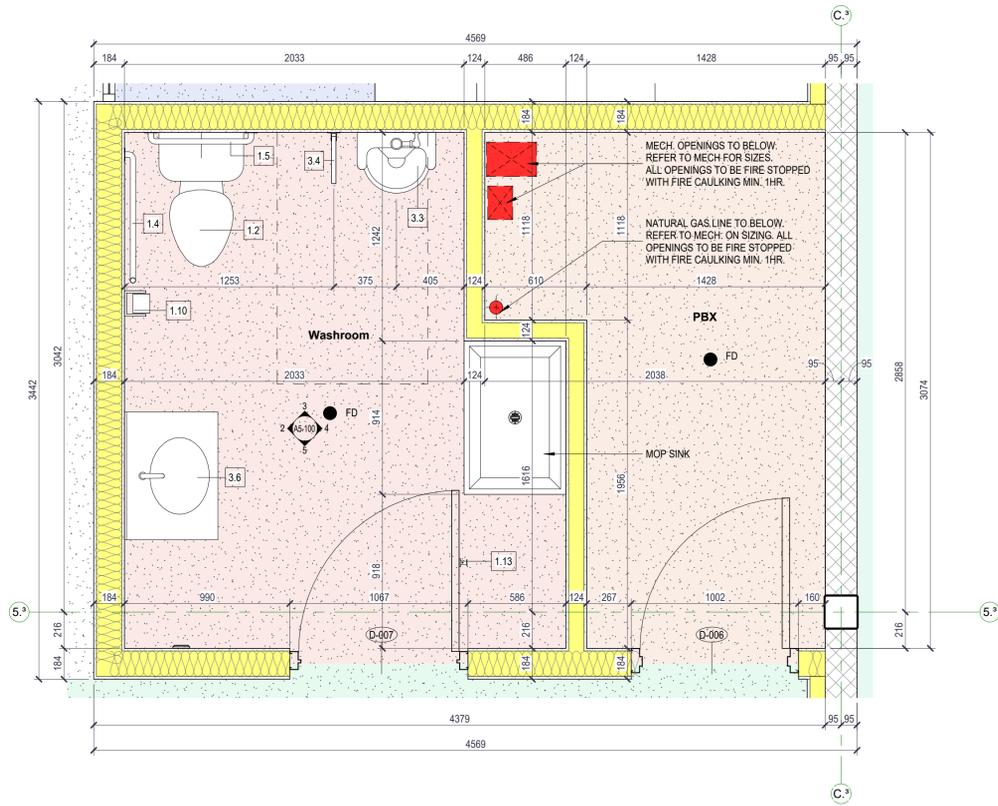
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**A5-000**

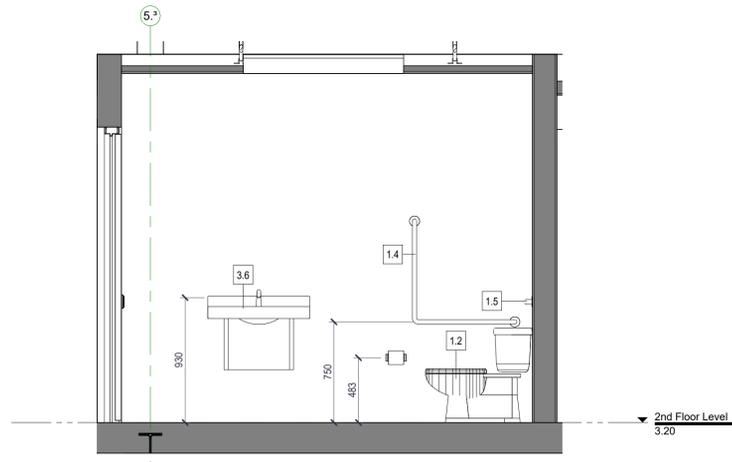
REV #

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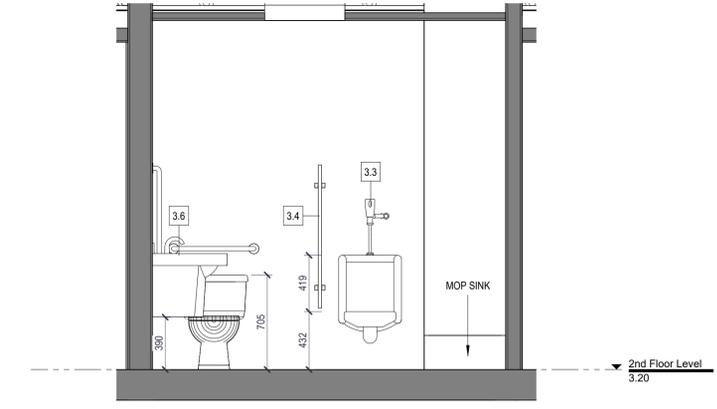


**1 2nd Floor Addition - Washroom & PBX Enlarged Plans**  
AS-100 scale: 1:20

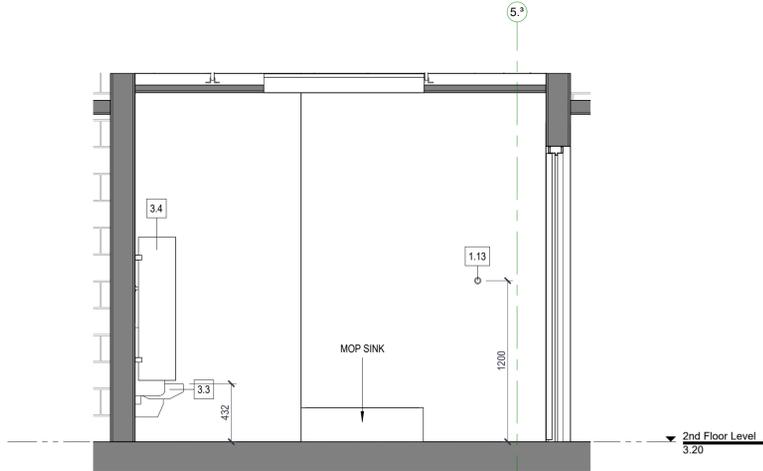
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Key Value	Keynote Text
1.2	Universal Washroom Water Closet
1.4	Universal Washroom Water Closet L-Shape Grab Bar At Side
1.5	Universal Washroom Water Closet Horizontal Grab Bar At Rear
1.10	Universal Washroom Toilet Paper Dispenser
1.13	Universal Washroom Coat Hook
3.3	Urinal
3.4	Urinal Partition
3.6	Lavatory



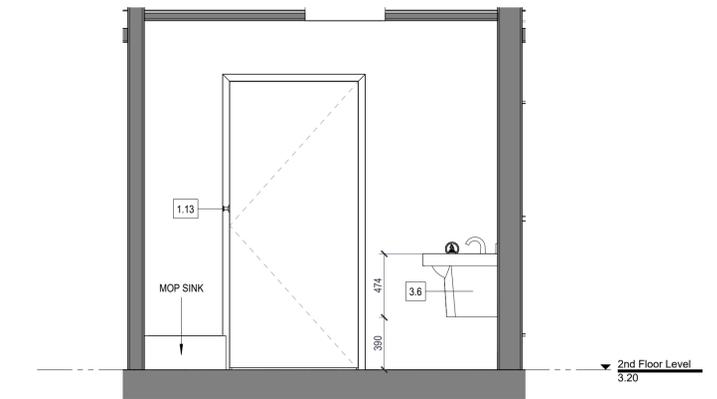
**2 Interior Washroom 2**  
AS-100 scale: 1:25



**3 Interior Washroom 3**  
AS-100 scale: 1:25



**4 Interior Washroom 4**  
AS-100 scale: 1:25



**5 Interior Washroom 5**  
AS-100 scale: 1:25

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Niagara Falls, ON, L2E 2L9  
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**Niagara Parks Commission**

PROJECT NAME  
**WEGO Garage Addition-Phase 1**

PROJECT ADDRESS  
**7805 Niagara River Pkwy, Niagara Falls, ON**

SHEET NAME  
**W/R and PBX Floor Plan & Elevations**

DRAWN BY: **Author**  
DATE: **12/12/2024 1:24:55 PM**  
SCALE: **As Indicated**  
PROJECT NO.: **24-006**  
CHECKED: **Checker**

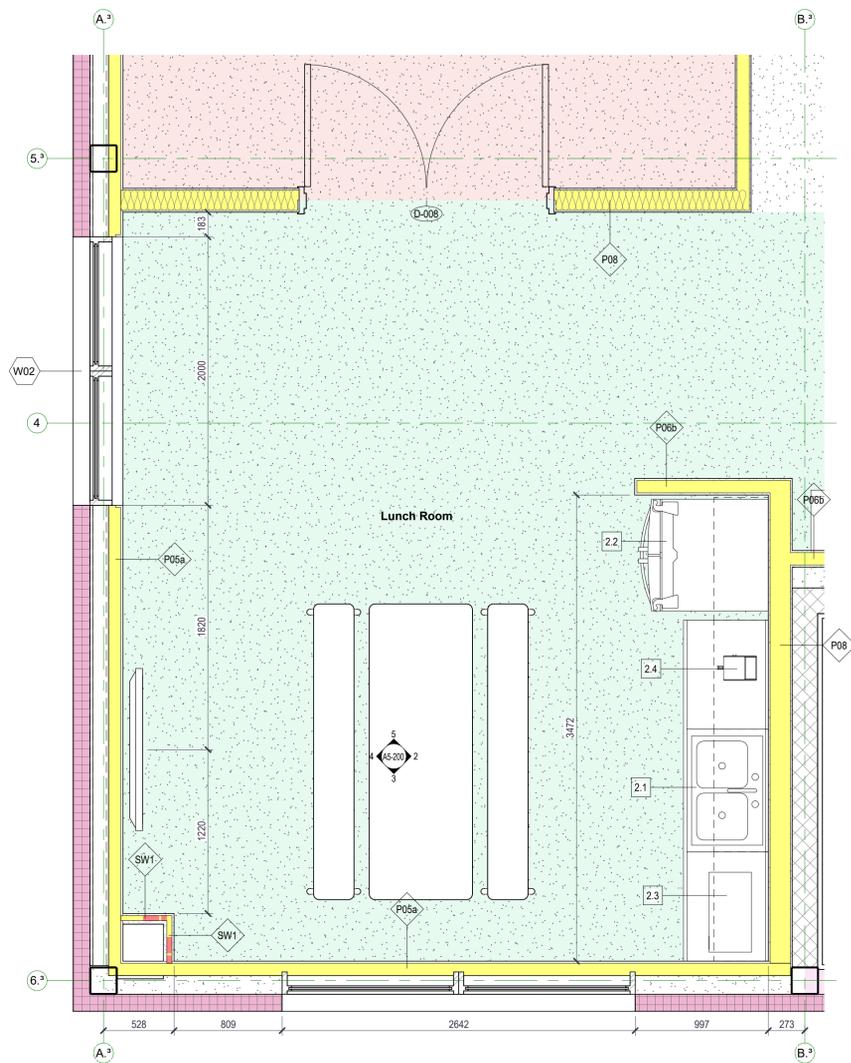
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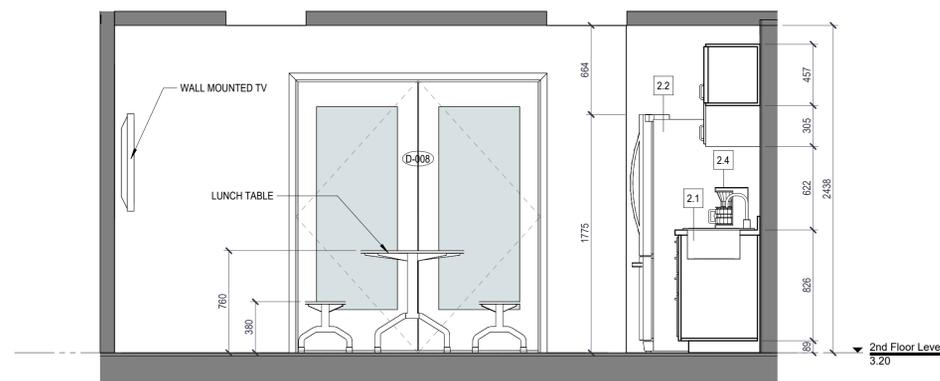
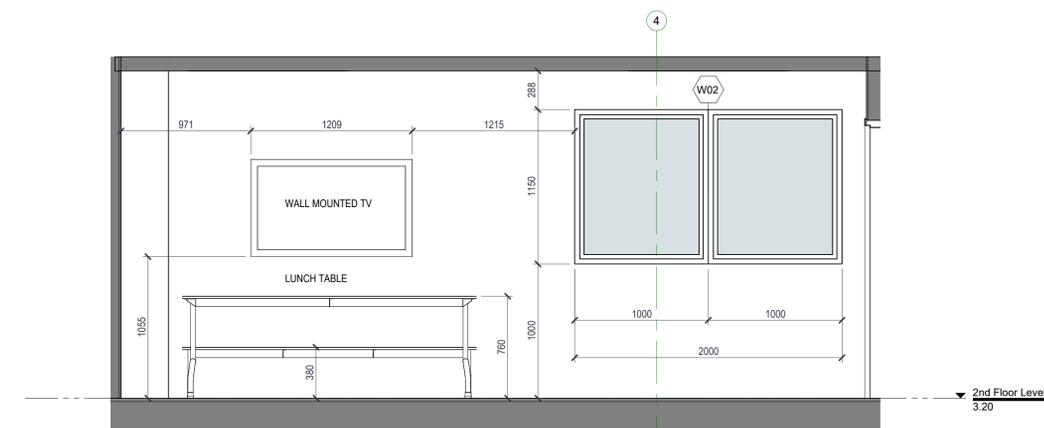
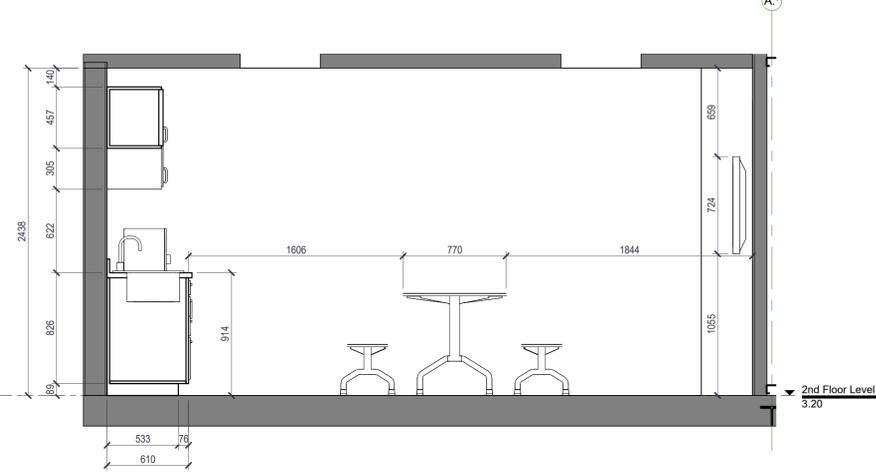
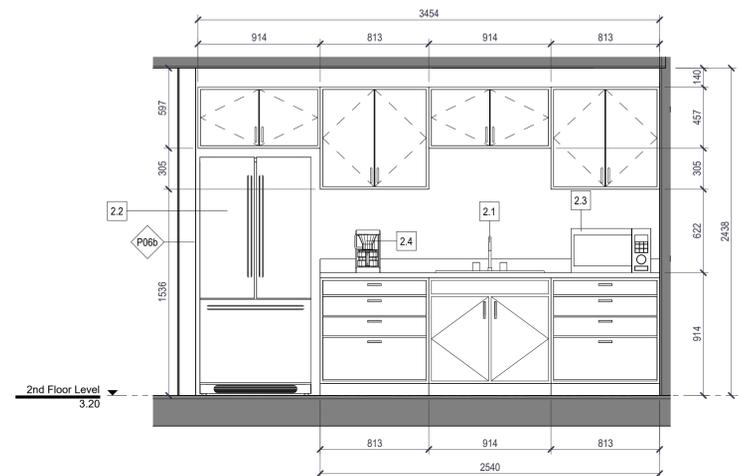
**A5-100**

REV. #

Autodesk Docs://24-006 - NPC - WEGO Garage Niagara Falls24-006 - NPC - WEGO Garage Niagara Falls\_12-12-2024.rvt



Keynote Legend		
Key Value		Keynote Text
2.1	Double Sink	
2.2	Fridge	
2.3	Microwave	
2.4	Coffee Maker	



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Niagara Falls, ON, L2E 2L9  
T | 905-357-4441  
F | 905-357-9203  
W | www.raimondosarchitects.com  
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CLIENT NAME

Niagara Parks Commission

PROJECT NAME

WEGO Garage Addition-  
Phase 1

PROJECT ADDRESS

7805 Niagara River Pkwy, Niagara Falls, ON

SHEET NAME

Lunch Room Floor Plan &  
Elevations

DRAWN BY: Author

DATE: 12/12/2024 1:24:59 PM

SCALE: 1:25

PROJECT NO.: 24-006

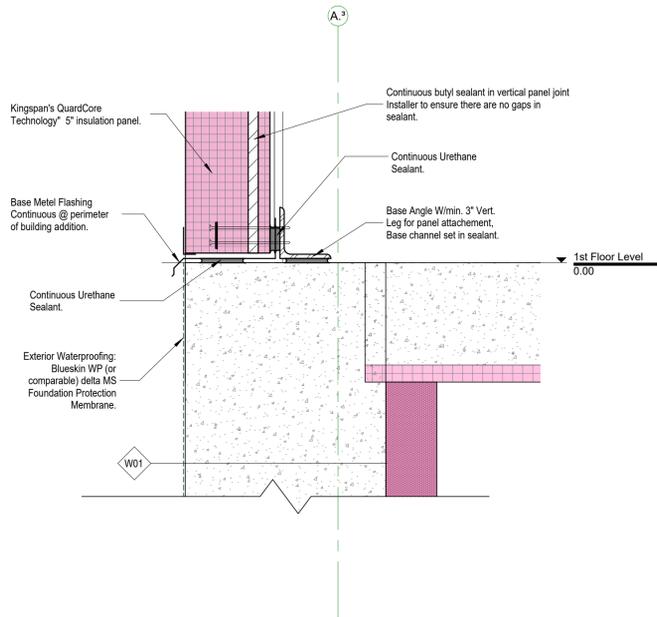
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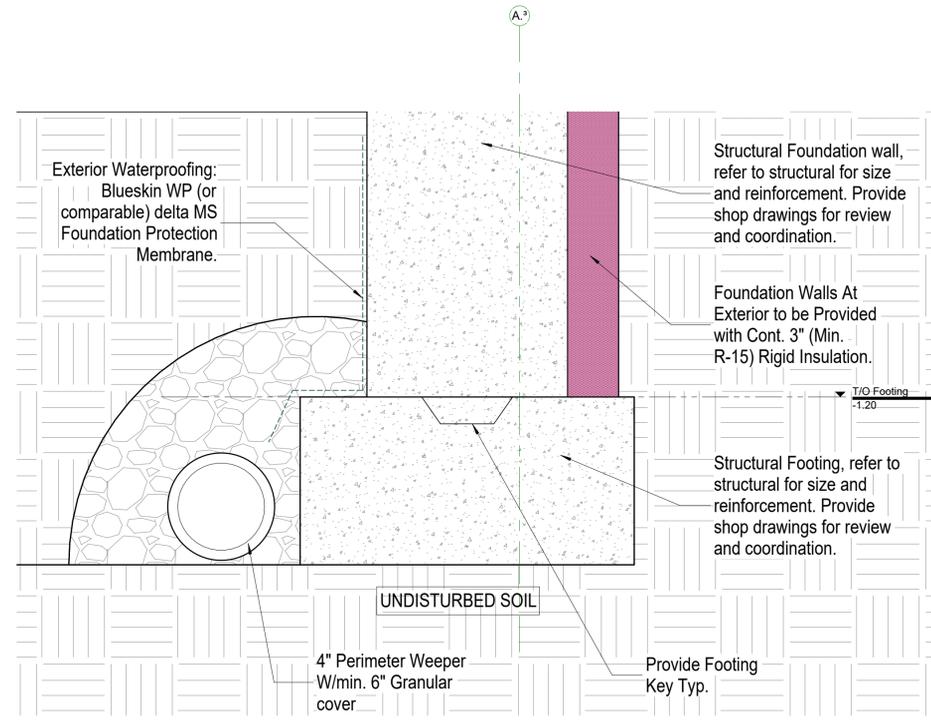
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**A5-200**

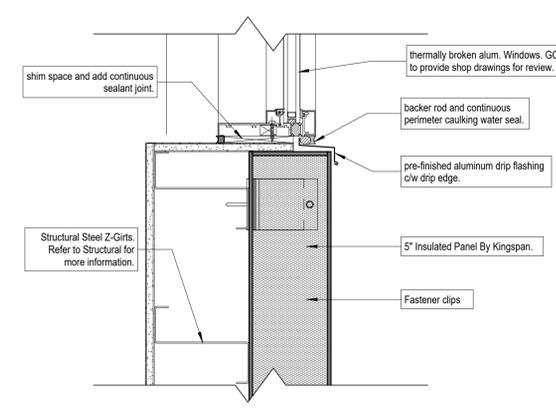
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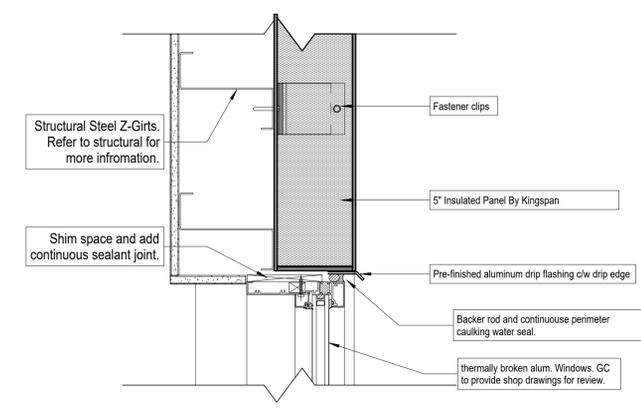
**1 Typ Exterior Detail Foundations**  
 A5-300 scale: 1:5



**2 Typ Bottom of Footing Detail**  
 A5-300 scale: 1:5



**3 ALUMINUM WINDOW Sill @ Insulated Metal Panel Wall**  
 A5-300 scale: 1:5



**5 ALUMINUM WINDOW HEAD @ Insulated Metal Panel Wall**  
 A5-300 scale: 1:5

Autodesk Docs://24-006 - NPC - WEGO Garage Niagara Falls24-006 - NPC - WEGO Garage Niagara Falls\_12-12-2024.rvt

A	May 10, 2024	Issued For Client Review
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4687 Queen Street Suite 2,  
 Niagara Falls, ON, L2E 2L9  
 T | 905-357-4441  
 F | 905-357-9203  
 W | www.raimondoarchitects.com  
 E | mail@raimondoarchitects.com

**CLIENT NAME**  
 Niagara Parks Commission

**PROJECT NAME**  
 WEGO Garage Addition-Phase 1

**PROJECT ADDRESS**  
 7805 Niagara River Pkwy, Niagara Falls, ON

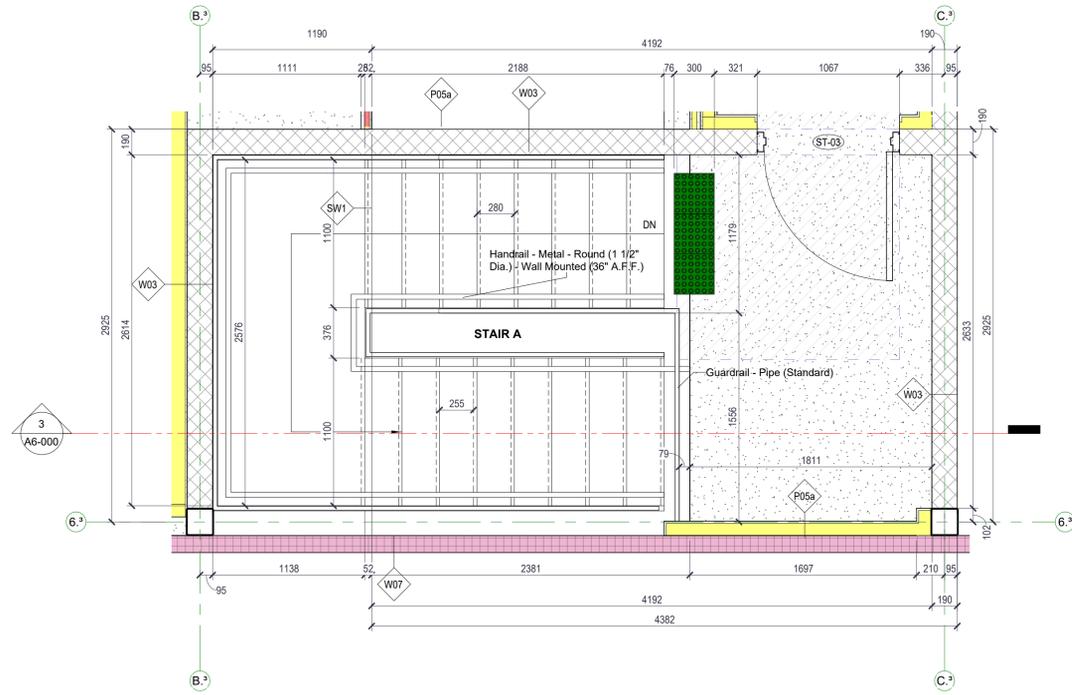
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 Enlarged Section Details

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SCALE:	1:5
PROJECT NO.:	24-006
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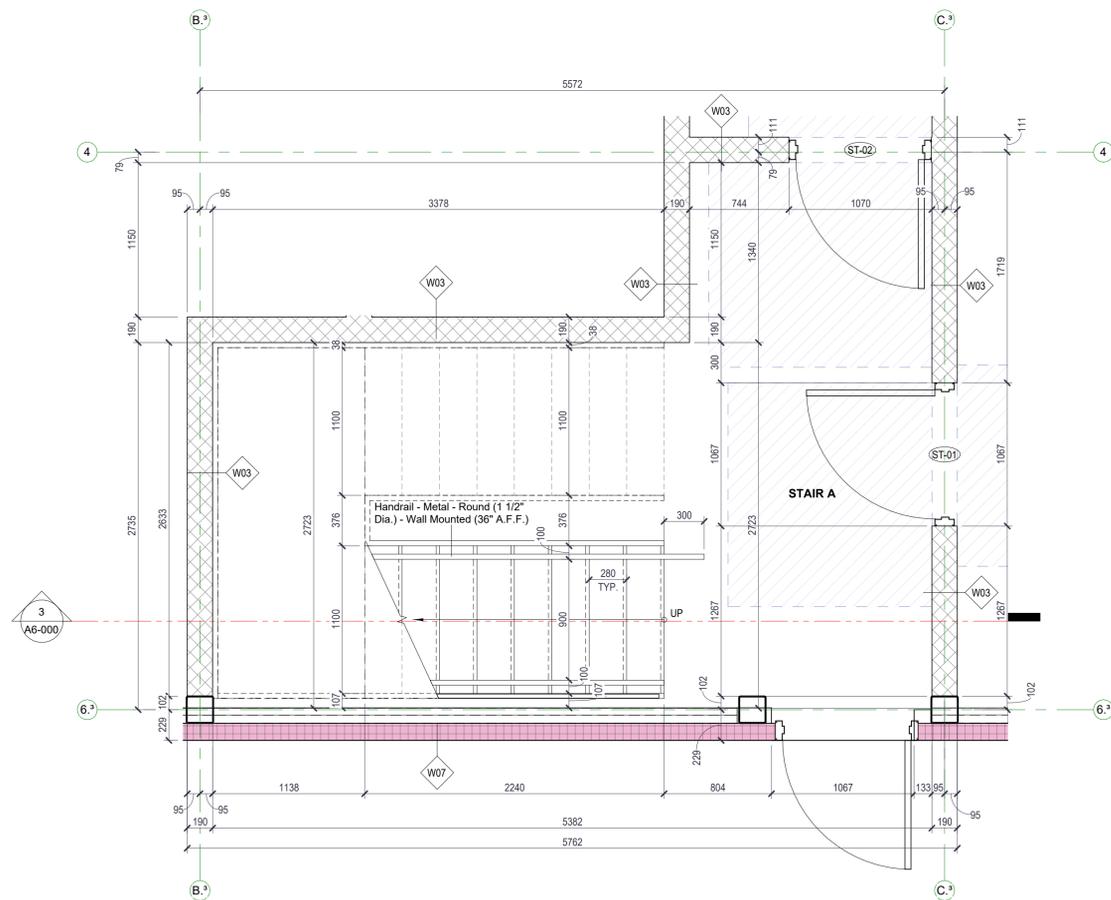
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 A5-300

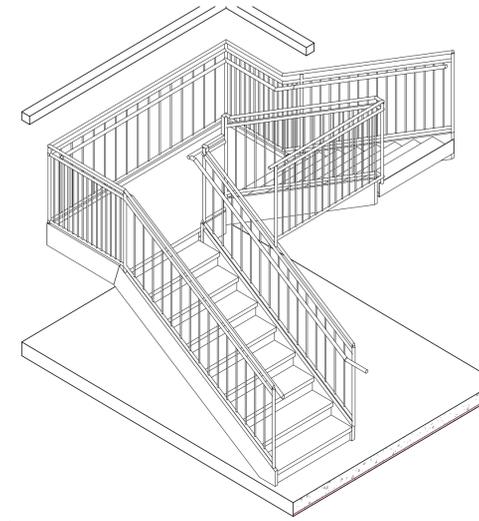
**REV #**



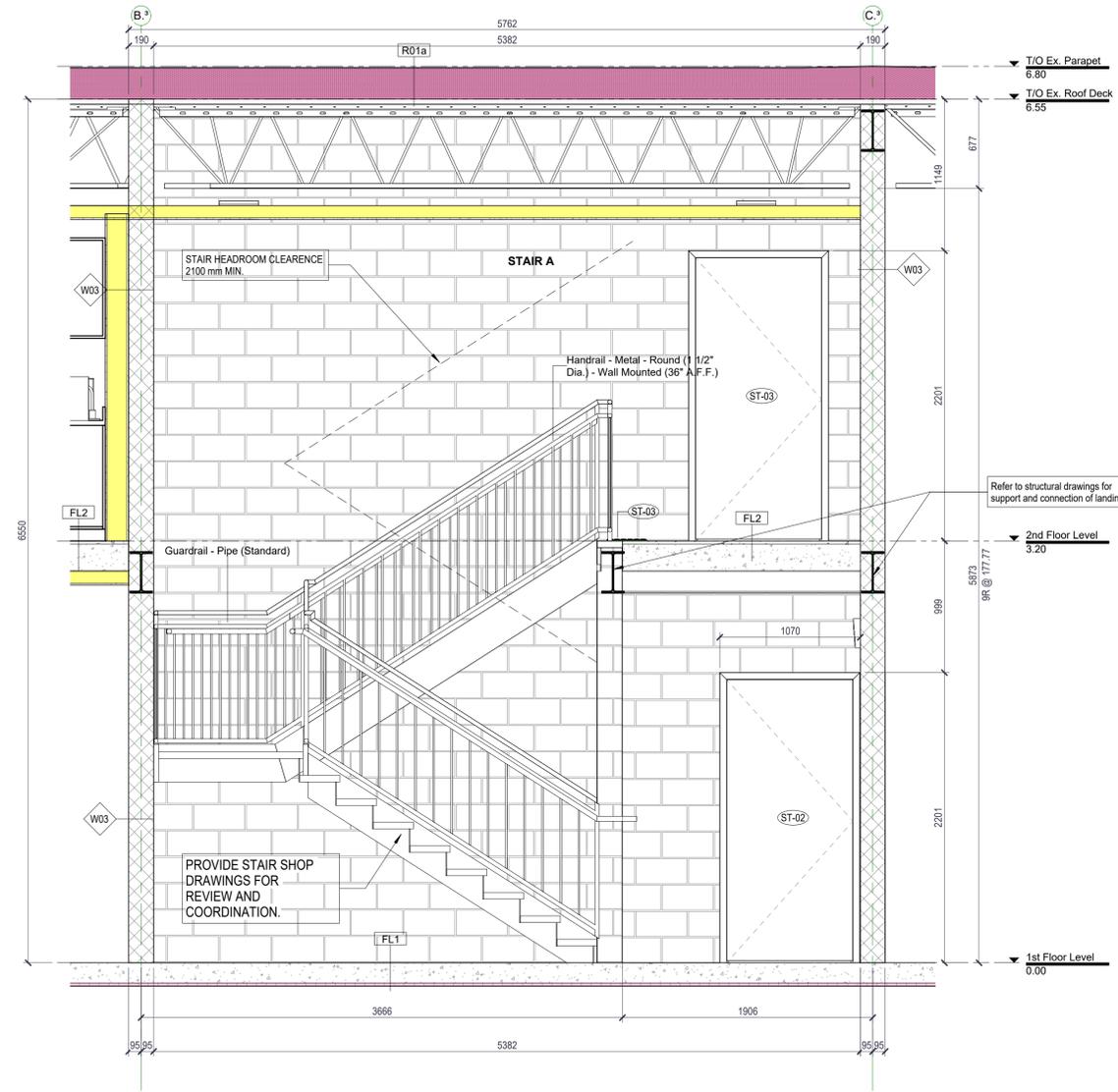
**1 Stair A - Floor Plan- 2nd Floor**  
A6-000 scale: 1:25



**2 Stair A - Floor Plan- 1st Floor**  
A6-000 scale: 1:25



**4 3D Stair A View**



**3 Stair Section A**  
A6-000 scale: 1:25

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**SHEET NAME**  
Stair Plans + Sections

**DRAWN BY:** Author

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**SCALE:** 1:25

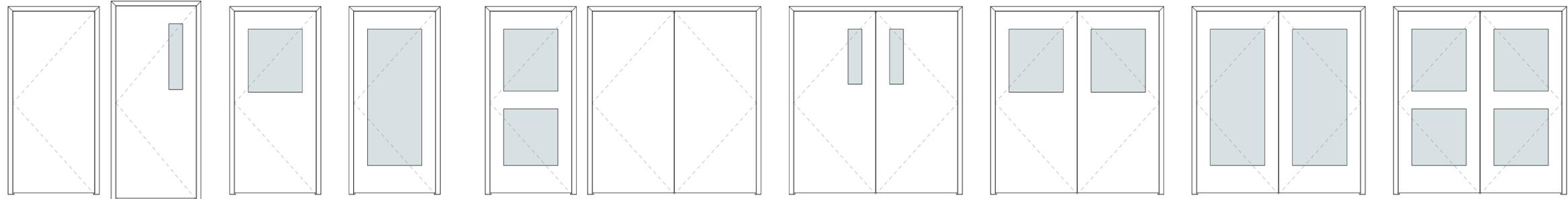
**PROJECT NO.:** 24-006

**CHECKED:** Checker

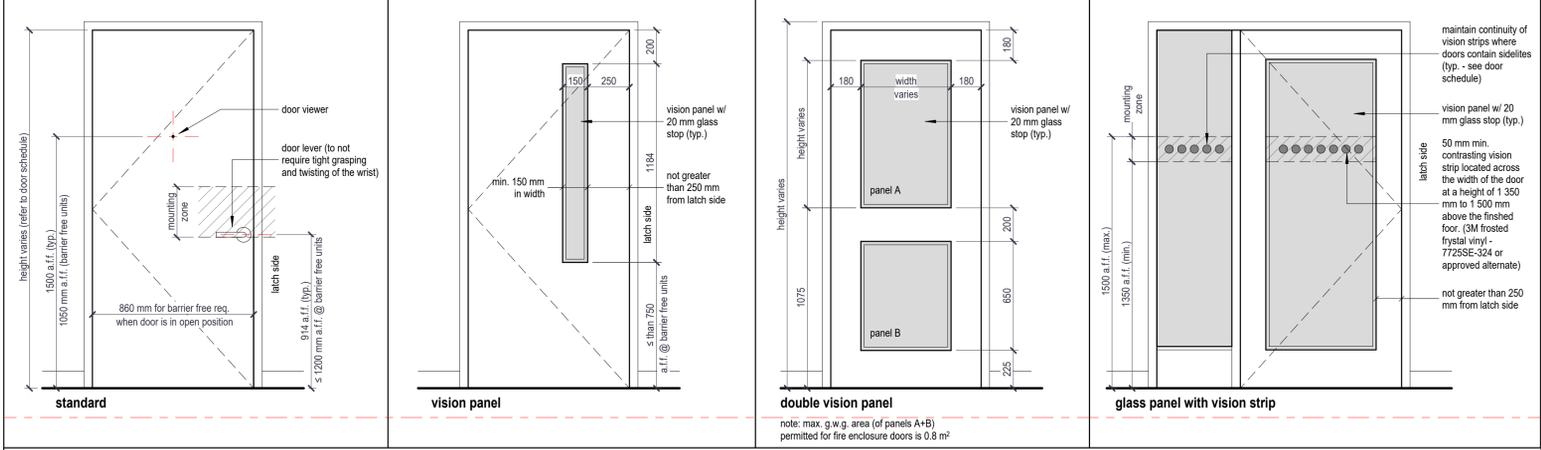
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**A6-000**

**REV #**



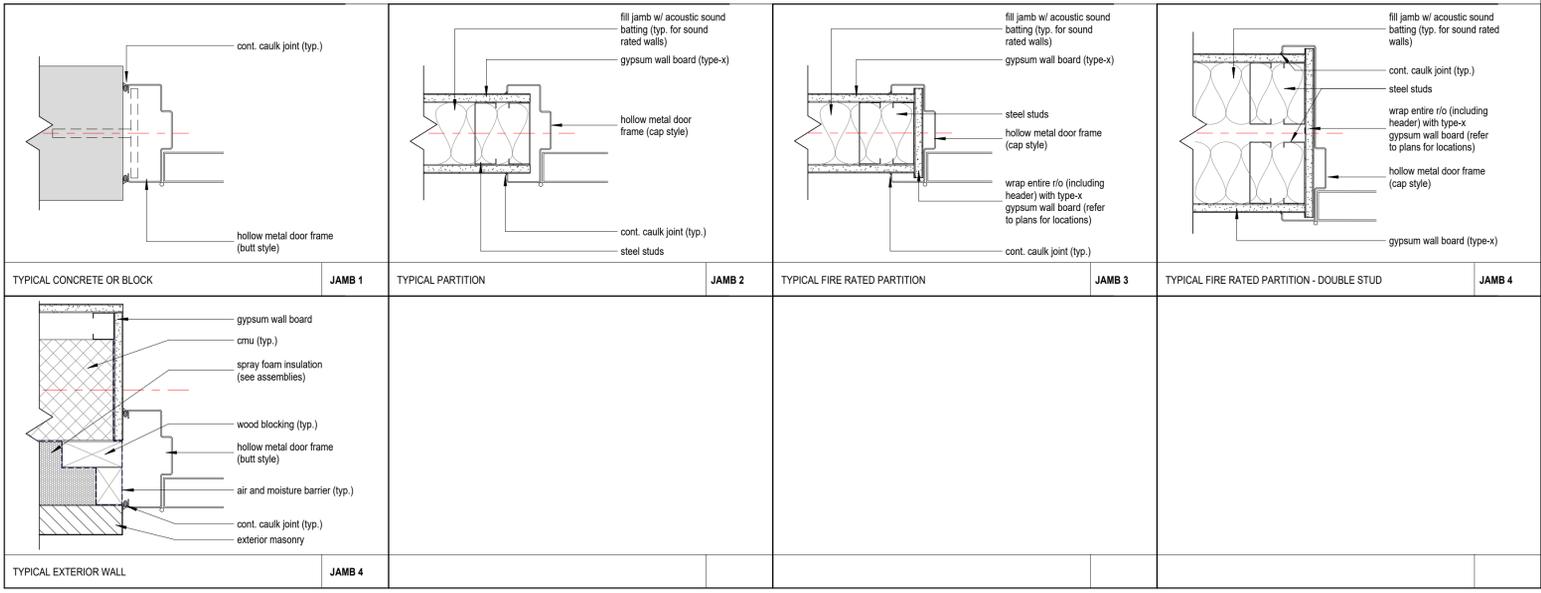
Door Type Legend



NOTE: DETAILS AS PER O.B.C. 3.3.1.12 & 3.8.3.3

Mark	Unit Sizes		Unit Information				Fire Rating	Hardware					Comments			
	Width	Height	Door Type	Material	Finish	Frame Material		Frame Finish	Glazing	Time	Closer	Lock Set		Passage Set	Privacy Set	Power Operator
D-001	900	2150	F	HM	Painted	Hollow Metal	Painted	n/a	45 Min							Sprinkler Room
D-002	965	2150	F	HM	Painted	Hollow Metal	Painted	n/a	45 Min							Universal Washroom
D-003	965	2150	FG2	HM	Painted	Hollow Metal	Painted	6mm Tempered								Barrier Free Office
D-006	900	2150	VP	HM	Painted	Hollow Metal	Painted	n/a								Storage
D-007	965	2150	F	HM	Painted	Hollow Metal	Painted	n/a								Barrier Free Washroom
D-008	1830	2032	DFG	HM	Painted	Hollow Metal	Painted	n/a								Meeting Area
D-009	1830	2032	DVP	HM	Painted	Hollow Metal	Painted	n/a	45 Min							Mech. Room
D-010	965	2150	FG2	HM	Painted	Hollow Metal	Painted	n/a								Storage
D-011	1830	2032	DVP	HM	Painted	Hollow Metal	Painted	6mm Tempered	45 Min							Corridor to Storage
EX-D01	965	2150	VP	HM	Painted	Ins. Hollow Metal	Painted	n/a								Exit Door Bay 1
EX-D02	965	2150	VP	HM	Painted	Ins. Hollow Metal	Painted	n/a								Exit Door Stair A
EX-D03	965	2150	VP	HM	Painted	Ins. Hollow Metal	Painted	n/a								Exit Door Sprinkler Room
EX-D04	965	2150	VP	HM	Painted	Ins. Hollow Metal	Painted	n/a								Exit Door Bay 3
OHD1	4270	4267	OHDG	HM		Ins. Hollow Metal	Anodized	13mm Insulated								@ Bay 1 Bus Repair Garage
OHD1	4270	4267	OHDG	HM		Ins. Hollow Metal	Anodized	13mm Insulated								@ Bay 1 Bus Repair Garage
OHD1	4270	4267	OHDG	HM		Ins. Hollow Metal	Anodized	13mm Insulated								@ Bay 3 Mower Garage
OHD1	4270	4267	OHDG	HM		Ins. Hollow Metal	Anodized	13mm Insulated								@ Bay 3 Mower Garage
OHD2	4270	4877	OHDG	HM		Ins. Hollow Metal	Anodized	13mm Insulated								@ Bay 2 Repair Garage
OHD2	4270	4877	OHDG	HM		Ins. Hollow Metal	Anodized	13mm Insulated								@ Bay 2 Repair Garage
OHD2	4270	4877	OHDG	HM		Ins. Hollow Metal	Anodized	13mm Insulated								@ Bay 2 Repair Garage
OHD2	4270	4877	OHDG	HM		Ins. Hollow Metal	Anodized	13mm Insulated								@ Bay 2 Repair Garage
OHD2	4270	4877	OHDG	HM		Ins. Hollow Metal	Anodized	13mm Insulated								@ Bay 2 Repair Garage
OHD3	2438	2438	OHDG	HM		Ins. Hollow Metal	Anodized	13mm Insulated								@ New Storage
OP-1	4017	2150	n/a	n/a												New Garage Openings
OP-2	1900	2150	n/a	n/a												New Garage Openings
SCD1	965	2140	FG	Glass	Painted	Alum.	Anodized	6mm Tempered								Interior Screens @ Offices
SCD2	965	2140	FG	Glass	Painted	Alum.	Anodized	6mm Tempered								Interior Screens @ Offices
ST-01	965	2150	F	HM	Painted	Hollow Metal	Painted	n/a	45 Min							Stair Well Doors
ST-02	965	2150	F	HM	Painted	Hollow Metal	Painted	n/a	45 Min							Stair Well Doors
ST-03	965	2150	F	HM	Painted	Hollow Metal	Painted	n/a	45 Min							Stair Well Doors

1 TYP. DOOR & BARRIER FREE DOOR ELEVATION DETAILS  
A7-100 1:20



TYP. DOOR JAMB AND HEADER DETAILS

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SHEET NAME

Door + Frame Schedules

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 DATE: 12/12/2024 1:25:03 PM  
 SCALE: As Indicated  
 PROJECT NO.: 24-006  
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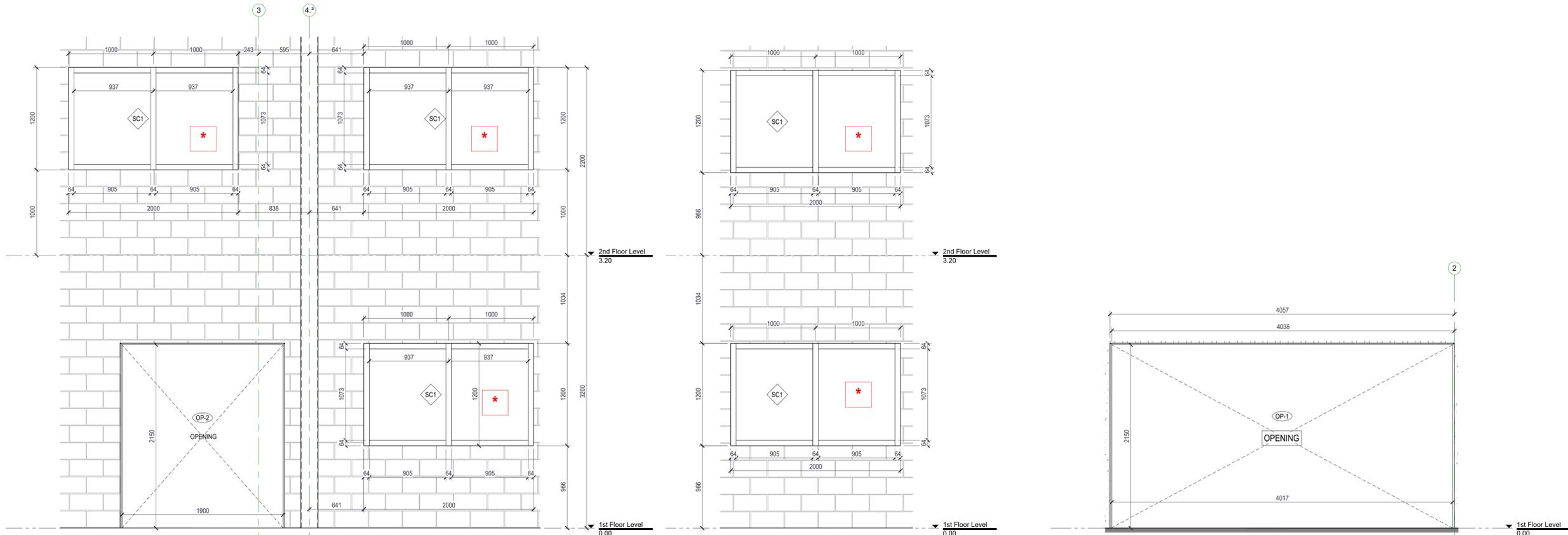
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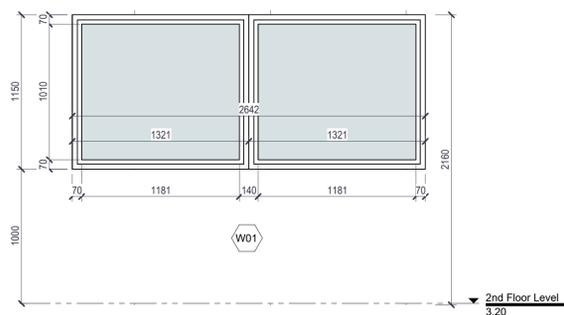
Interior Screen Elevation @ Repair Garage Bay

Interior Screen Elevation @ Mower Garage Bay

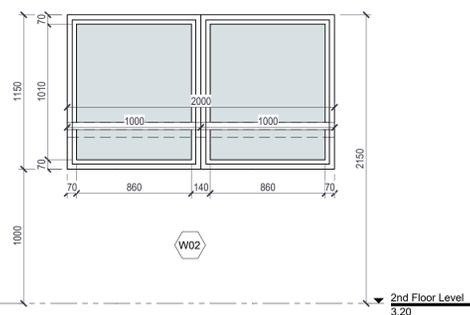
Interior Opening @ Existing Precast Wall

\* = FIRELITE FIRE RATED GLASS, MIN. 60 MINS.  
GC TO COORDINATE SHOP DRAWINGS  
FOR REVIEW AND COORDINATION.

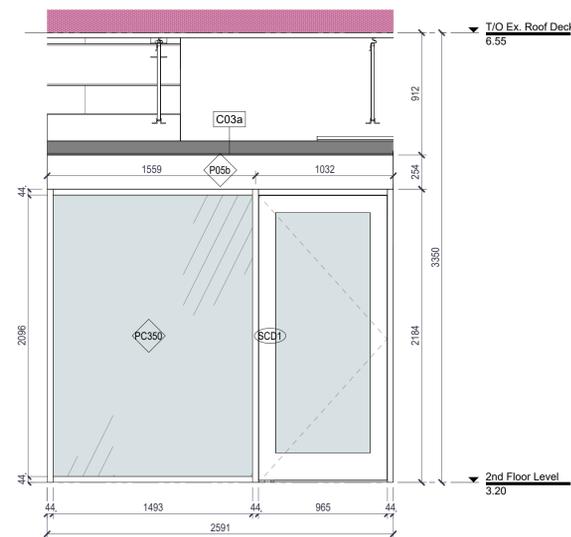
Window Schedule (By Type Mark)						
Type Mark	Count	Width	Height	Frame Material	Comments	Thermal Resistance (R)
W01	1	2642	1150	Alum.	Low-E Coding Glazing	0.5032 (m²·K)/W
W02	1	2000	1150	Alum.	Low-E Coding Glazing	0.5032 (m²·K)/W
L02	1	1422	1346		Low-E Coding Glazing	0.5032 (m²·K)/W
L01	1	610	610			
L01	1	610	610			
L01	1	610	610			



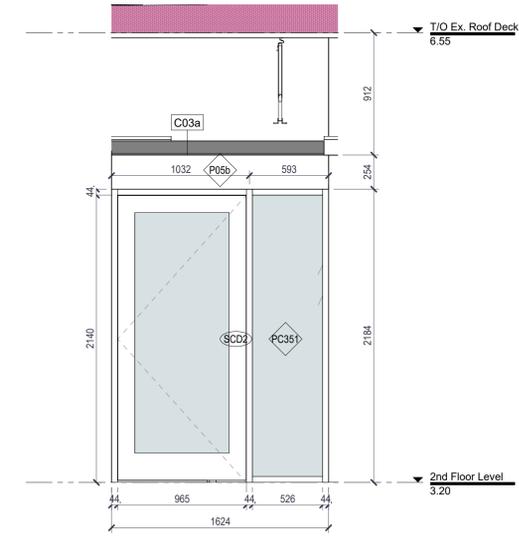
Elevation - W01 - Window



Elevation - W02 - Window



Interior Screen @ Office B



Interior Screen @ Office A

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Windows & Interior Screens Schedule

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DATE: 12/12/2024 1:25:08 PM

SCALE: 1 : 25

PROJECT NO.: 24-006

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<p>(ND* - female w/c only)</p>	<p>(ND* - female w/c only)</p>	<p>(ND* - female w/c only)</p>	<p>(ND* - female w/c only)</p>	<p>(ND* - female w/c only)</p>	<p>(ND* - female w/c only)</p>	<p>(ND* - female w/c only)</p>	<p>(ND* - female w/c only)</p>	<p>(ND* - female w/c only)</p>	<p>(ND* - female w/c only)</p>		
<b>STC</b> standard toilet compartment	<b>BFTC</b> barrier-free toilet compartment	<b>GB1</b> grab bar (760 x 760 mm sstl)	<b>GB4</b> grab bar (600 to 910 mm sstl)	<b>GB4</b> barrier-free urinal, grab bars (GB4 - 600 mm sstl) + privacy screen	<b>U+UPS</b> standard urinal + privacy screen	<b>M1+SD1</b> mirror + soap dispenser	<b>TD1</b> toilet paper dispenser	<b>TD1</b> barrier free toilet paper dispenser	<b>PW1</b> paper towel dispenser with waste receptacle		
hatched areas indicate blocking required see plans for locations	hatched areas indicate blocking required see plans for locations	hatched areas indicate blocking required provide (1) set for each (HC) barrier-free w/c	hatched areas indicate blocking required provide (1) set for each (HC) barrier-free w/c	hatched areas indicate blocking required at least (1) set at accessible urinals	hatched areas indicate blocking required see plans for locations	hatched areas indicate blocking required provide (1) over each sink in washrooms only	hatched areas indicate blocking required (1) per toilet stall	hatched areas indicate blocking required see plans for locations	provide (1) at each sink in counters in rooms other than washrooms		
<b>PW1</b> paper towel dispenser	<b>D</b> D style door pull	<b>ALD</b> accessible locking device	<b>ND</b> feminine napkin disposal	<b>NV</b> feminine napkin vendor	<b>SS+SH1+SH2</b> fold-up shower seat (SS) w/ shower head (SH1) shower control (SH2) and grab bars (GB2 - 100x750mm sstl) + GB1+GB2 (GB6 - 1000mm sstl)	<b>GB6</b> grab-bar (1000 mm sstl)	<b>SD2+SH1</b> liquid soap dispenser (surface mounted)	<b>CH</b> coat hook	<b>SC+SR</b> shower curtain & rod	<b>MH</b> mop holder	<b>SF</b> shelf
provide (1) in each washroom if specified	provide (1) per barrier-free w/c stall	provide (1) per barrier-free w/c stall	hatched areas indicate blocking required provide (1) per female stall	hatched areas indicate blocking required provide (1) per female "gang" washroom	hatched areas indicate blocking required see plans for locations	hatched areas indicate blocking required see plans for locations	provide (1) for each shower head	hatched areas indicate blocking required provide (1) for each stall or as shown (see shower rooms)	hatched areas indicate blocking required provide (1) set per shower stall	hatched areas indicate blocking required provide (1) for each janitor room	hatched areas indicate blocking required see floor plans for location(s)
<b>BCT</b> baby change table	<b>HD1</b> barrier-free surface mounted hand/hair-dryer	<b>HD2</b> surface mounted hand/hair-dryer	<b>GB3 + GB5</b> bathtub grab bars (GB3 - 900x900mm sstl) + (GB5 - 750mm sstl)	barrier free lavatories & mirrors	barrier free path of travel controls	barrier free signs	barrier free doors	barrier free doors	barrier free doors	barrier free doors	barrier free doors
hatched areas indicate blocking required see plan for locations	hatched areas indicate blocking required see plan for locations	hatched areas indicate blocking required see plan for locations	hatched areas indicate blocking required see plans for locations	hatched areas indicate blocking required see plans for locations	hatched areas indicate blocking required see plans for locations	hatched areas indicate blocking required see plans for locations	hatched areas indicate blocking required see details for clearances	hatched areas indicate blocking required see details for clearances	hatched areas indicate blocking required see details for clearances	hatched areas indicate blocking required see details for clearances	hatched areas indicate blocking required see details for clearances
<p><b>TYPICAL BARRIER FREE WASHROOM LAYOUT</b></p>											
<p><b>barrier free door clearances - swinging</b></p>											
<p><b>barrier free door clearances - sliding or folding doors</b></p>											

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**RAIMONDO + ASSOCIATES ARCHITECTS INC.**

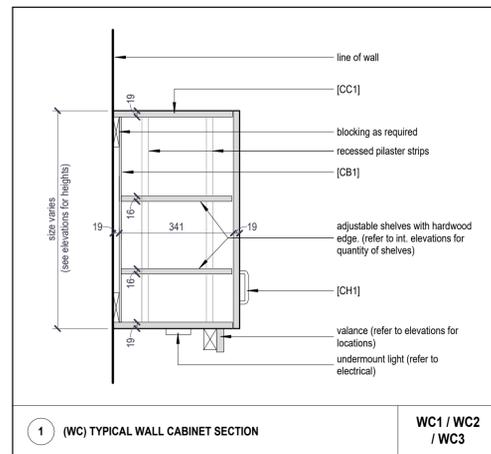
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 7805 Niagara River Pkwy, Niagara Falls, ON  
**SHEET NAME**  
 Barrier Free Details

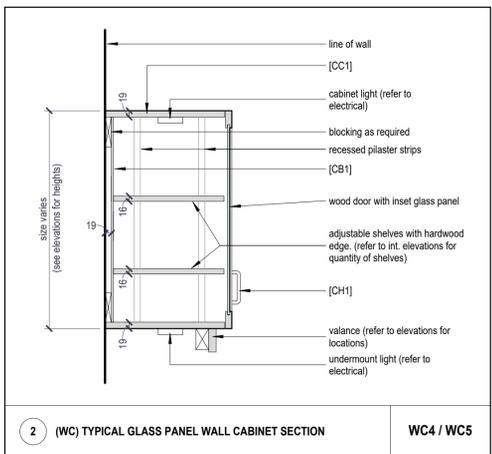
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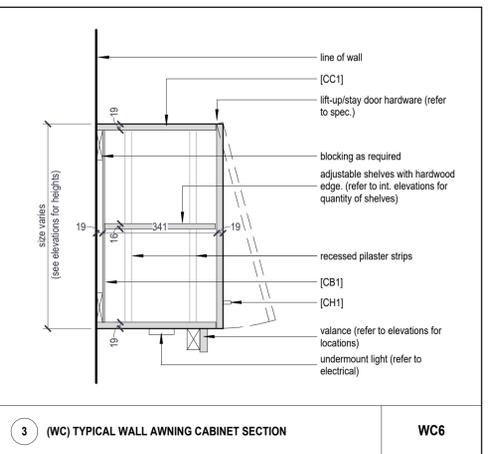
**SHEET #**  
**A9-000**  
**REV. #**



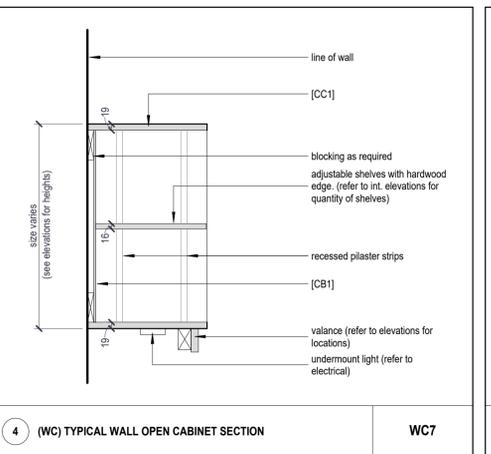
1 (WC) TYPICAL WALL CABINET SECTION WC1 / WC2 / WC3



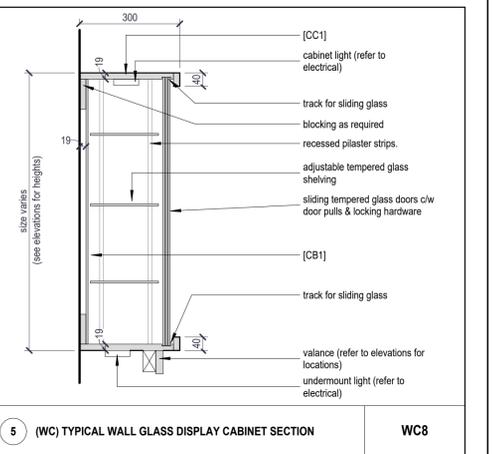
2 (WC) TYPICAL GLASS PANEL WALL CABINET SECTION WC4 / WC5



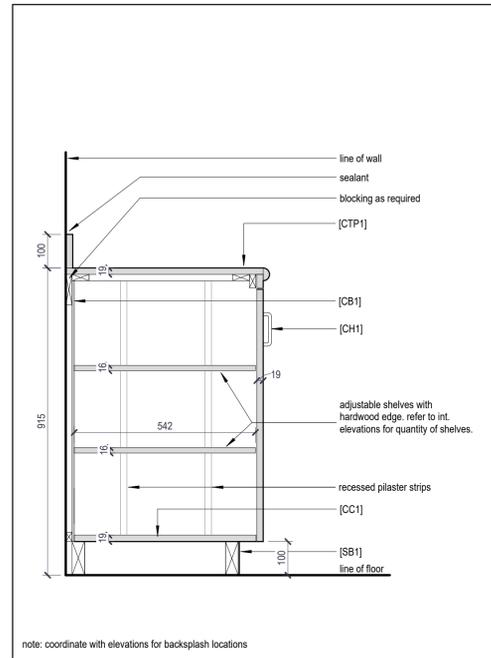
3 (WC) TYPICAL WALL AWNING CABINET SECTION WC6



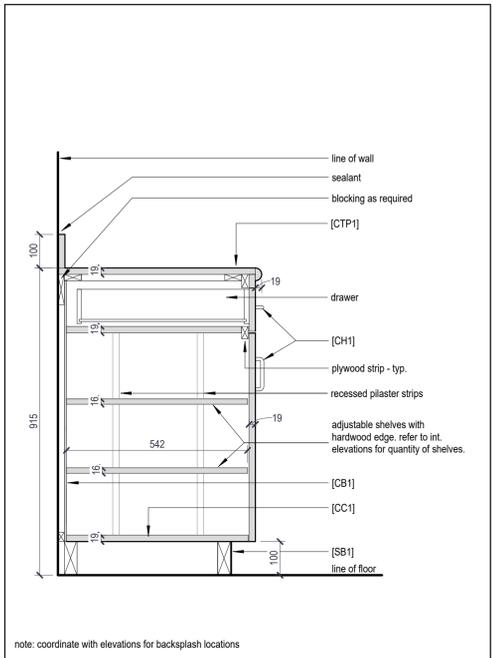
4 (WC) TYPICAL WALL OPEN CABINET SECTION WC7



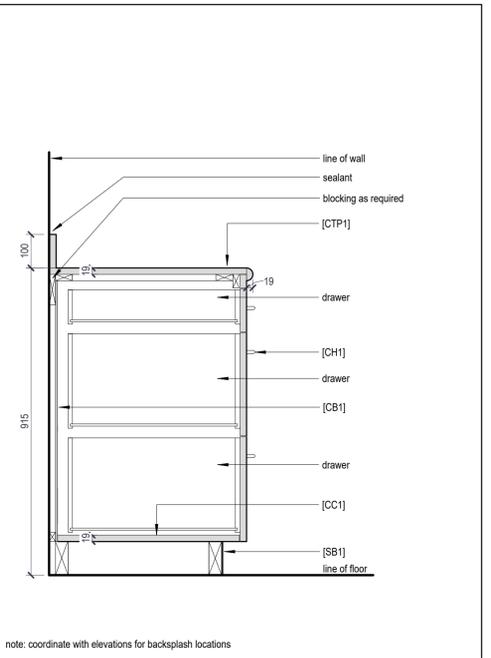
5 (WC) TYPICAL WALL GLASS DISPLAY CABINET SECTION WC8



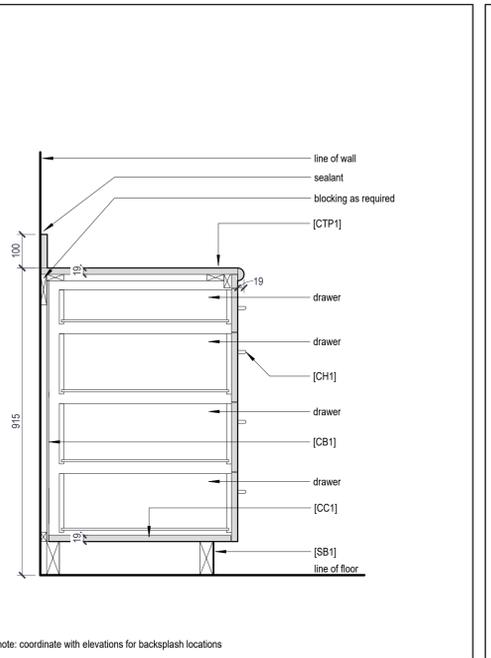
6 (BC) TYPICAL BASE CABINET SECTION - DOOR(S) BC1 / BC6 / BC10



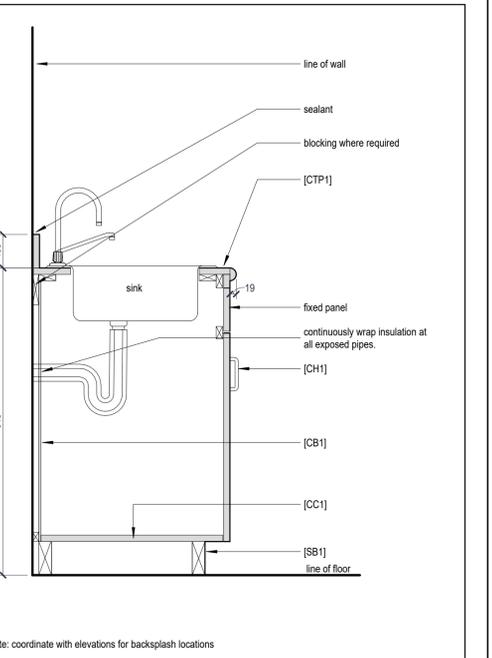
7 (BC) TYPICAL BASE CABINET SECTION - DRAWER(S) / DOOR(S) BC2 / BC8 / BC9



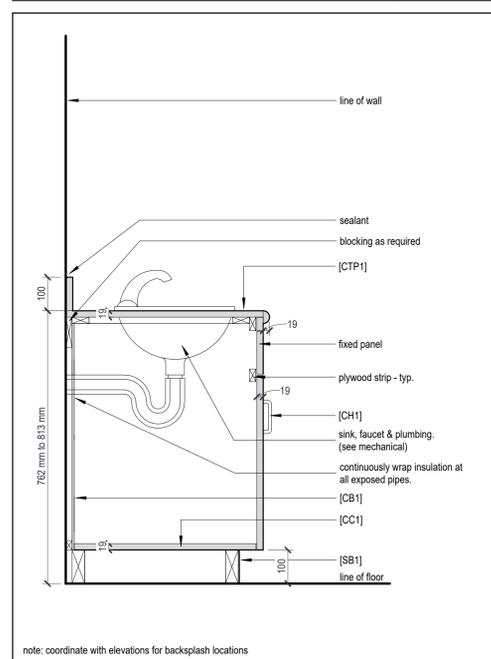
8 (BC) TYPICAL BASE CABINET SECTION - 3 DRAWERS BC4



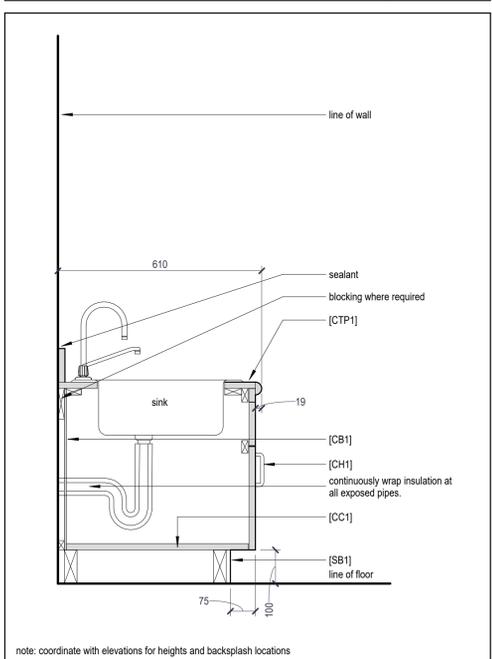
9 (BC) TYPICAL BASE CABINET SECTION - 4 DRAWERS BC5



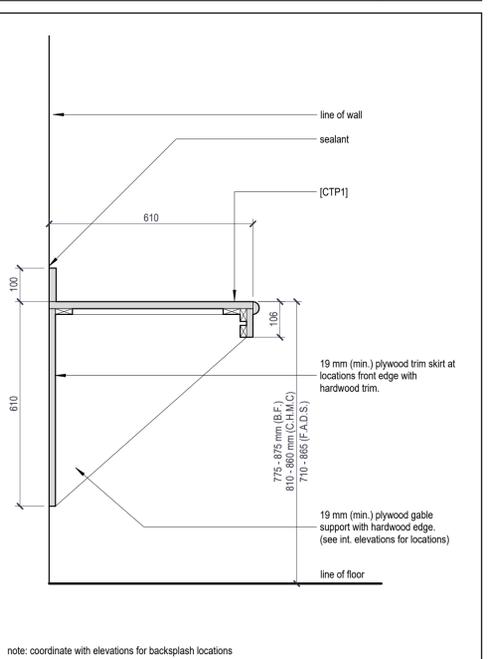
10 (BC) TYPICAL BASE SINK CABINET SECTION BC3 / BC7



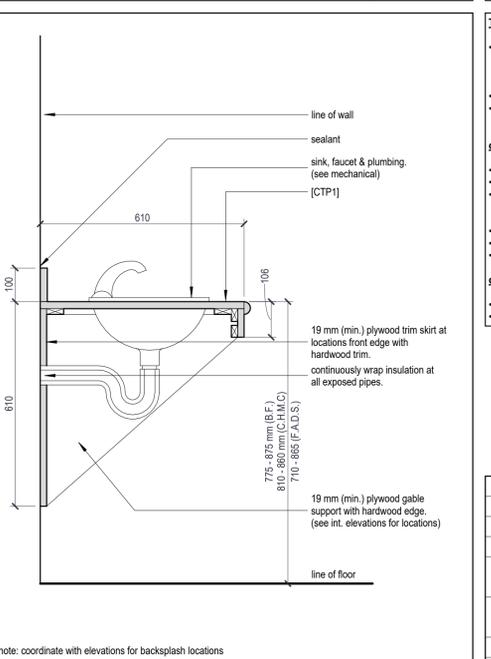
11 (VC) TYPICAL VANITY BASE CABINET VC1 / VC2



12 (VC) TYPICAL CHILD WASH STATION CABINET SECTION VC3



14 (VC) TYPICAL BARRIER FREE COUNTER VC4



13 (VC) TYPICAL BARRIER FREE VANITY VC5

**TYPICAL MILLWORK NOTES**

- contractor shall verify all rough-in & plumbing rough-in, fixture & accessory mounting heights for all kindergartens, daycare, special ed. & other similar non-typical spaces w/ owner / operator prior to constructing the above noted heights shall be confirmed to be in accordance w/ the latest o.b.c. prior to rough-in & installation
- reinforce masonry walls wherever req'd, for mounting equipment
- shop drawings to be in dimension units as illustrated on this drawing or they will be rejected (imperial & metric both shown is acceptable)

**cabinets & doors**

- all new millwork doors are to be constructed of 19mm veneer plywood both inside and out.
- shelves are to be 16mm solid or veneer plywood to match above.
- drawer sides are to be constructed of 19mm good one side veneer plywood. drawer base is to be 6mm good one side veneer plywood. veneer surface is to be visible on inside of drawer.
- 3mm solid hardwood edging to match on all exposed edges.
- internal edges may be veneer tape to match.
- all adjustable shelves are to be installed on recessed pilaster strips.

**countertops**

- edge profile and backsplash where noted.
- at wet locations particle board is to be moisture resistant.

ref.	item	description
[CH1]	cabinet hardware	series D-shape pulls in 304 stainless steel - brushed finish
[MCR1]	metal closet rod	25 mm Ø - chrome plated finish
[CTP1]	counter top	19 mm particle board - factory laminated - post-formed w/ 38mm 180° bullnosed edge
[CC1]	cabinet carcass	19 mm maple veneer plywood - cabinet grade w/ edge banding (typ.)
[CB1]	cabinet back panel	6mm maple veneer plywood - good one side
[SB1]	scheduled base	10 mm mdf core - white finish



4687 Queen Street Suite 2,  
Niagara Falls, ON, L2E 2L9  
T | 905-357-4441  
F | 905-357-9203  
W | www.raimondosarchitects.com  
E | mail@raimondosarchitects.com

CLIENT NAME  
**Niagara Parks Commission**

PROJECT NAME  
**WEGO Garage Addition-Phase 1**

PROJECT ADDRESS  
**7805 Niagara River Pkwy, Niagara Falls, ON**

SHEET NAME  
**TYPICAL MILLWORK DETAILS**

DRAWN BY: **MBK**

DATE: **12/12/2024 1:25:12 PM**

SCALE: **As Indicated**

PROJECT NO.: **24-006**

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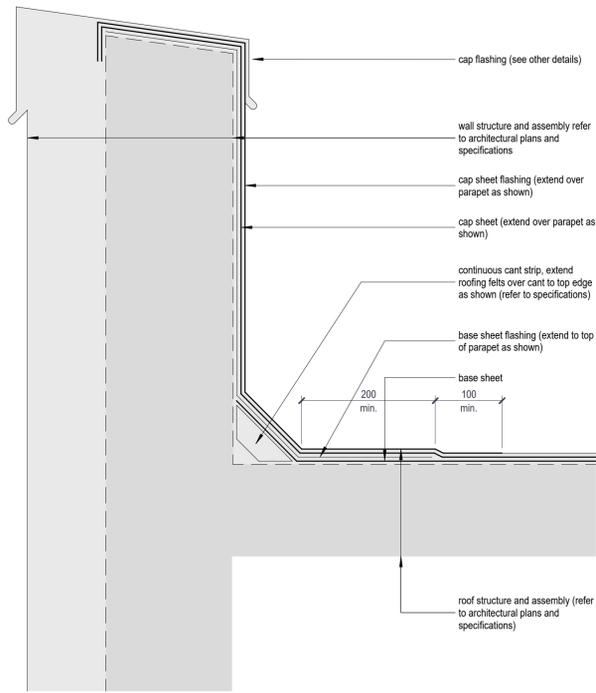
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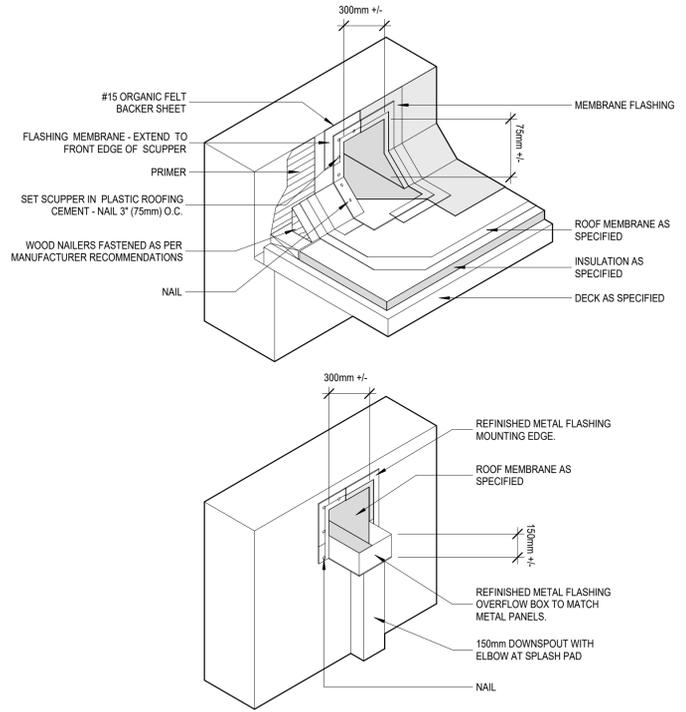
**A9-100**

REV. #





**1 TYP. ROOF PARAPET DETAIL**  
 A9-201 scale: 1 : 5



**2 TYP. ROOF SCUPPER DETAILS**  
 A9-201 scale: 1 : 25

Autodesk Docs://24-006 - NPC - WEGO Garage Niagara Falls24-006 - NPC - WEGO Garage Niagara Falls\_12-12-2024.rvt

A May 10, 2024 Issued For Client Review  
 B May 24, 2024 Issued For Client Review  
 C Dec 04, 2024 Issued for Tender




 4687 Queen Street Suite 2,  
 Niagara Falls, ON, L2E 2L9  
 T | 905-357-4441  
 F | 905-357-9203  
 W | www.raimondosarchitects.com  
 E | mail@raimondosarchitects.com

**CLIENT NAME**  
 Niagara Parks Commission

**PROJECT NAME**  
 WEGO Garage Addition-Phase 1

**PROJECT ADDRESS**  
 7805 Niagara River Pkwy, Niagara Falls, ON

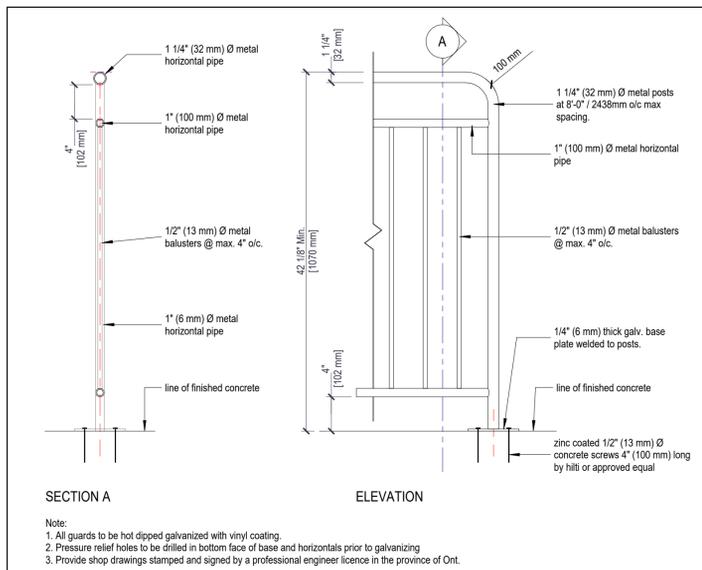
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 Typical Roof Details

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**PROJECT NO.:** 24-006  
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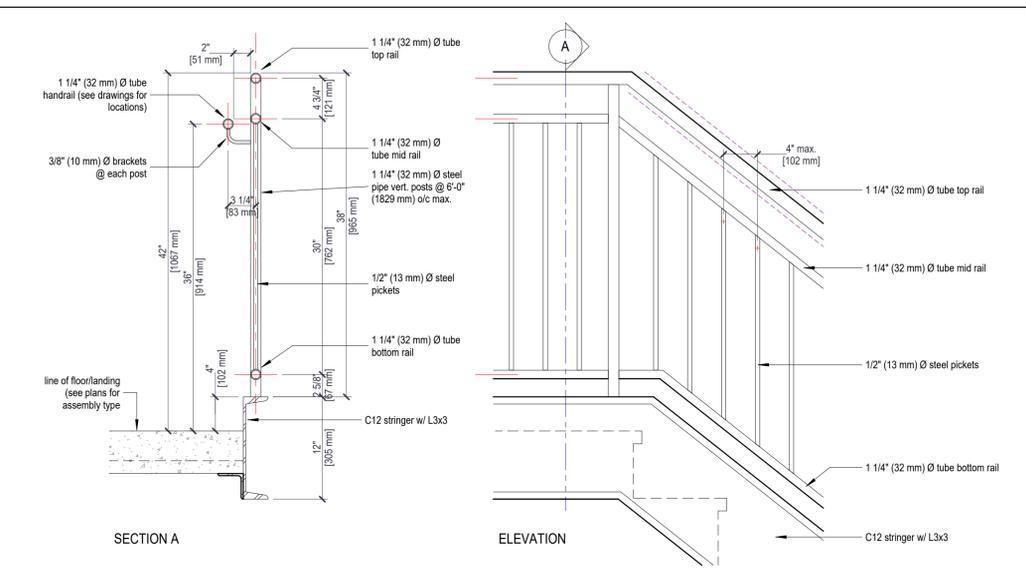
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A9-201  
**REV. #**

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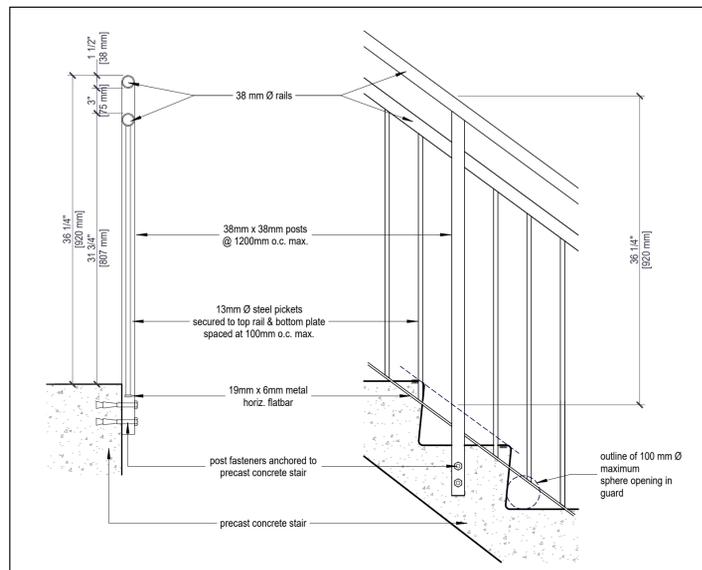


TYPICAL EXTERIOR METAL GUARD DETAIL

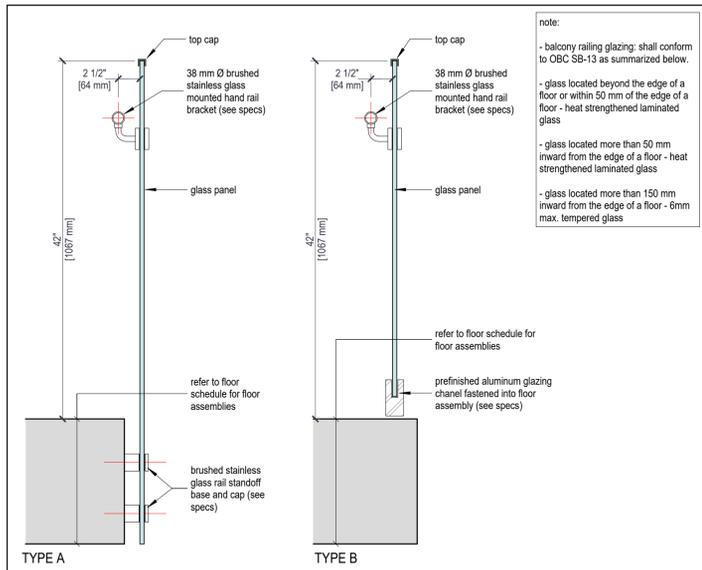
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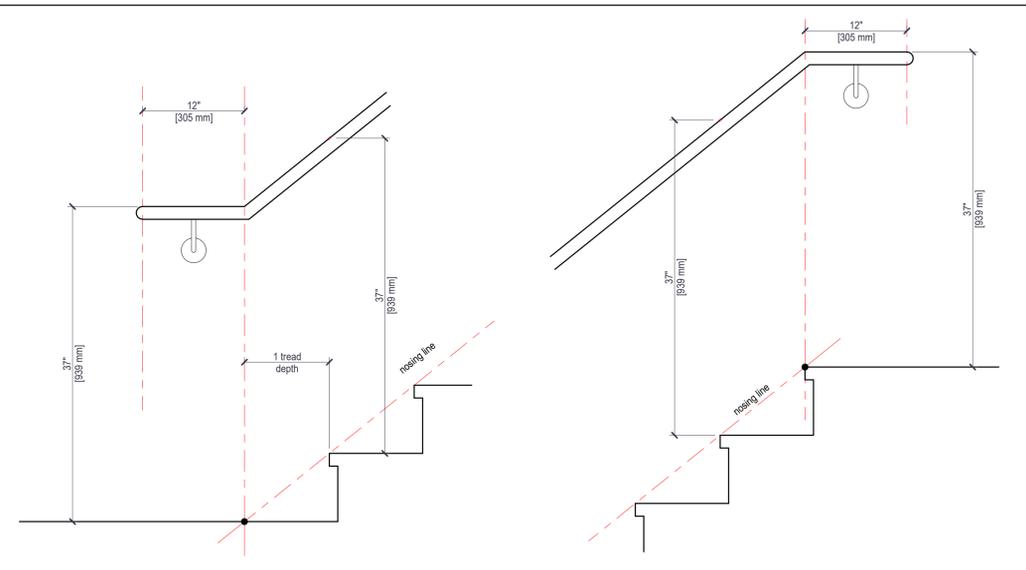
TYPICAL ROUND RAIL HANDRAIL W/ METAL PICKETS



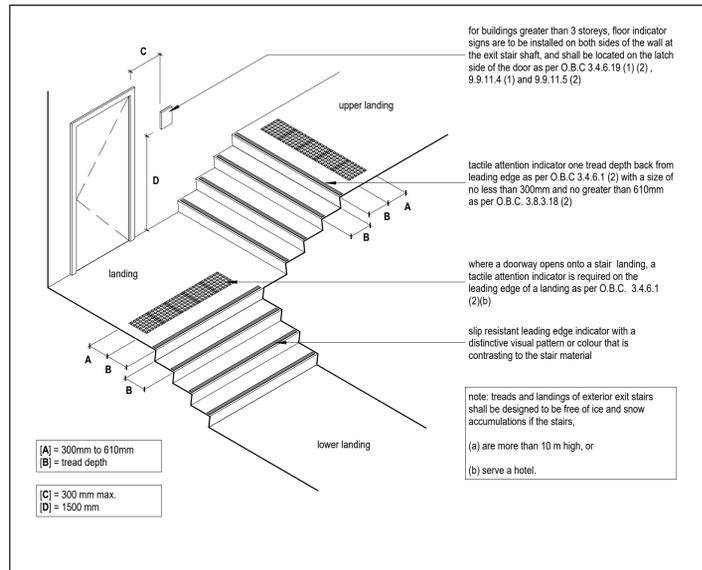
TYPICAL SIDE MOUNTED GUARDRAIL DETAIL



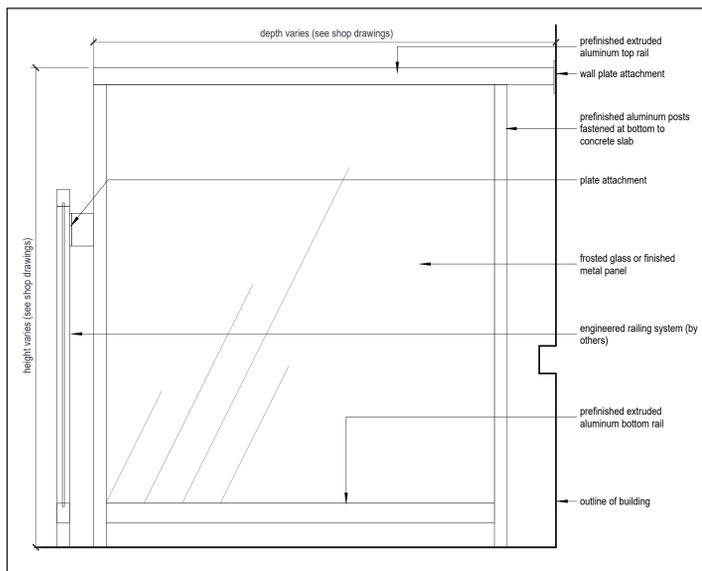
TYPICAL GLASS RAILING DETAIL



TYPICAL HANDRAIL TERMINATIONS

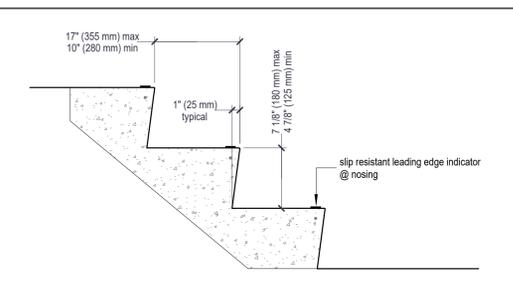


TYPICAL TACTILE STRIPS & FLOOR NUMBERING INDICATORS

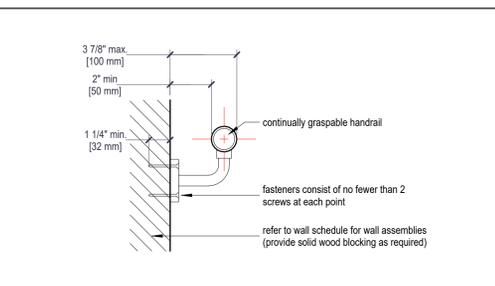


TYPICAL PRIVACY SCREEN DETAIL

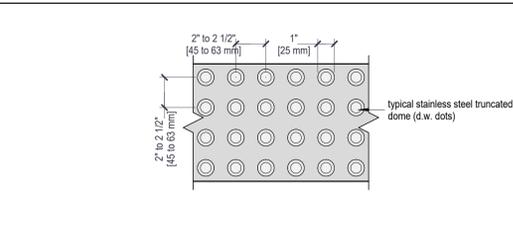
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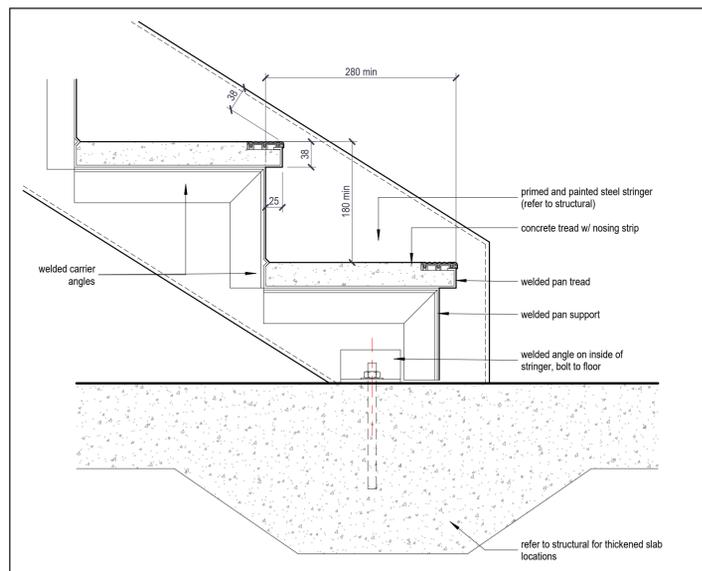
TYPICAL PRECAST CONCRETE STAIR DETAIL



TYPICAL WALL MOUNT HANDRAIL DETAIL



TYPICAL TRUNCATED DOME DETECTABLE WARNING SURFACE



TYPICAL METAL STAIR W/ CONCRETE TREAD DETAIL

A. May 10, 2024 Issued For Client Review  
B. May 24, 2024 Issued For Client Review  
C. Dec. 04, 2024 Issued For Tender



CLIENT NAME

Niagara Parks Commission

PROJECT NAME

WEGO Garage Addition-Phase 1

PROJECT ADDRESS

7805 Niagara River Pkwy, Niagara Falls, ON

SHEET NAME

Typical Stair + Railing Details

DRAWN BY: Author

DATE: 12/12/2024 1:25:16 PM

SCALE: As Indicated

PROJECT NO.: 24-006

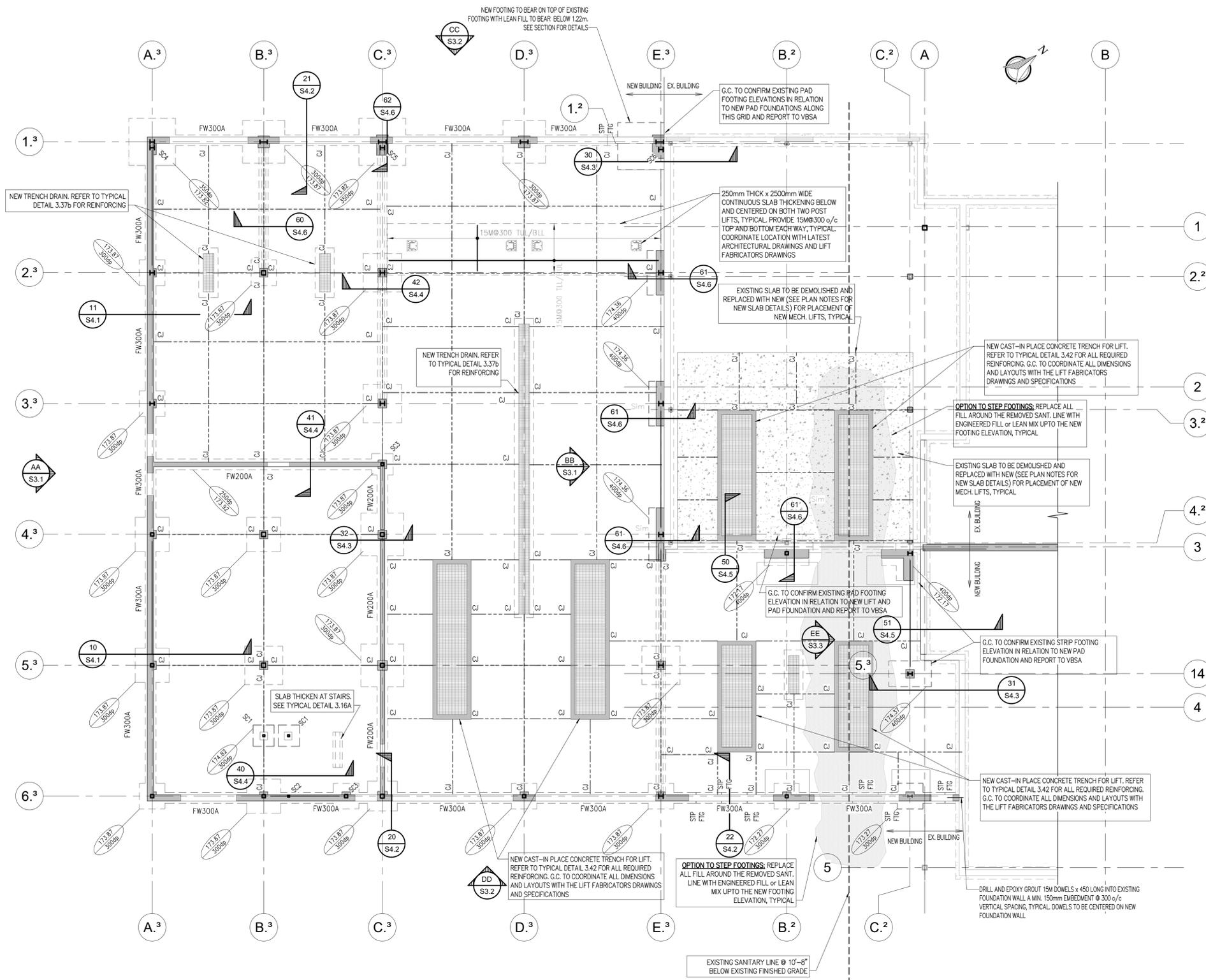
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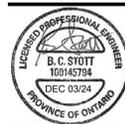
A9-300

REV. #



**FOUNDATION PLAN NOTES**

- TOP OF SLAB ELEVATION AT FINISHED FLOOR LEVEL IS AT +0.00 (175.340), CONFIRM ALL ELEVATIONS WITH ARCHITECTURAL DRAWINGS.
- THE BUILDING FOUNDATIONS HAVE BEEN DESIGNED FOR A BEARING RESISTANCE (SLS) OF 144 kPa (3000 psf) AND A FACTORED BEARING RESISTANCE (ULS) OF 190 kPa (4000 psf) ON UNDISTURBED NATIVE SOIL U.N.O. ON PLAN. ALL BEARING RESISTANCES TO BE VERIFIED BY GEOTECHNICAL INVESTIGATION AFTER EXCAVATION AND REPORTED TO VBSA.
- UNDERSIDE OF FOOTINGS ARE TO BE A MINIMUM OF 1200mm BELOW FINISHED GRADE UNLESS NOTED OTHERWISE AS THUS  $\frac{1500}{1000}$  ON PLAN. AT LOCATIONS WHERE STRIP FOOTINGS ABUT PAD FOOTINGS THICKEN STRIP FOOTING LOCALLY TO MATCH UNDERSIDE OF ADJACENT PAD FOOTING AS SHOWN ON TYPICAL DETAIL 3.03.
- TYPICAL SLAB ON GRADE CONSTRUCTION U.N.O.:** 150mm CONCRETE SLAB WITH 152x152 MW18.7xMW18.7 WELDED WIRE FABRIC ON VAPOUR BARRIER ON 200mm LAYER OF COMPACTED 19mm CLEAR CRUSHED STONE ON APPROVED NATIVE SUBGRADE OR APPROVED ENGINEERED FILL. **GARAGE AREA:** 150mm CONCRETE SLAB WITH 152x152 MW18.7xMW18.7 WELDED WIRE FABRIC ON VAPOUR BARRIER ON 200mm LAYER OF COMPACTED 19mm CLEAR CRUSHED STONE ON APPROVED NATIVE SUBGRADE OR APPROVED ENGINEERED FILL.
- TYPICAL RADIANT HEATED SLAB ON GRADE CONSTRUCTION** (REFER TO ARCHITECTURAL DWGS. FOR LOCATIONS): MINIMUM 150mm CONCRETE SLAB WITH TWO LAYERS OF 152x152 MW18.7xMW18.7 WELDED WIRE FABRIC ON VAPOUR BARRIER ON 50mm RIGID INSULATION ON 50mm SCREEDED SAND LAYER ON 300mm LAYER OF GRANULAR 'A' COMPACTED TO 100% SPMD ON GRANULAR 'B' COMPACTED TO 98% SPMD ON APPROVED NATIVE SOIL OR APPROVED STRUCTURAL FILL.
- SEE ARCHITECTURAL DRAWINGS FOR SLOPES TO DRAINS IN FLOOR AREAS. MAINTAIN ALL STRUCTURAL THICKNESS SHOWN.
- SEE ARCHITECTURAL DRAWINGS FOR TOP OF FOUNDATION WALL ELEVATIONS. DEPRESS TOP OF FOUNDATION WALL 300mm AT ALL DOOR OPENINGS.
- CENTRE ALL CONCRETE PIERS UNDER STEEL COLUMN BASE PLATES UNLESS NOTED OTHERWISE. SEE ARCHITECTURAL DRAWINGS FOR COLUMN OFFSETS FROM GRID LINES.
- AT ALL LOCATIONS ON PLAN NOTED AS THUS  $\frac{1500}{1000}$ , PROVIDE A SAWCUT OR A CONSTRUCTION JOINT (SEE TYPICAL DETAIL 3.15). PROVIDE A CONTROL JOINT AT ALL INTERIOR DOOR LOCATIONS OVER FOUNDATION WALLS. FINAL LOCATIONS OF CONTROL JOINTS MUST BE COORDINATED BETWEEN THE CONCRETE CONTRACTOR AND THE FLOOR FINISHING CONTRACTOR THROUGH THE GENERAL CONTRACTOR. **MANY SLAB ON GRADE SAWCUTS HAVE BEEN OMITTED FOR CLARITY - CONTRACTOR TO FOLLOW 3.15 AND SUBMIT SAWCUT PATTERNS FOR REVIEW BY THE ARCHITECT AND STRUCTURAL CONSULTANT.**
- CONCRETE CONTRACTOR TO COORDINATE WITH ALL TRADES THE LOCATION OF ALL PIPE SLEEVES THROUGH CONCRETE FOUNDATION WALLS. PIPE SLEEVES MAY NOT BE PLACED WITHIN FOOTINGS. FOUNDATIONS MUST BE STEPPED DOWN TO ACCOMMODATE ELEVATION OF PIPE SLEEVES. SEE TYPICAL DETAILS FOR STEPS IN FOUNDATION WALLS. REPORT ANY DISCREPANCIES TO THE STRUCTURAL CONSULTANT.
- UNDERSIDE OF ALL COLUMN BASE PLATES TO BE 200mm BELOW TOP OF FINISH FLOOR ELEVATION UNLESS NOTED OTHERWISE IN THE COLUMN SCHEDULE.
- FOR 125mm SLAB ON GRADE, THICKEN SLAB UNDER ALL CONCRETE BLOCK PARTITION WALLS AND BEARING LOCATIONS FOR STAIRS (SEE TYPICAL DETAIL 3.16A). FOR 200mm SLAB ON GRADE, PROVIDE 15M @ 300 TRANSVERSE BARS x 1500mm LONG AND x 15M CONT. COORDINATE DIMENSIONS TO CONCRETE BLOCK PARTITION WALLS AND STAIRS WITH ARCHITECTURAL PLANS. NON-LOADBEARING BLOCK PARTITION WALLS ARE SHOWN ON FOUNDATION PLAN AS THUS  $\frac{1500}{1000}$  FOR INFORMATION ONLY. LOCATION OF ALL BLOCK PARTITIONS AND CORRESPONDING SLAB THICKENINGS MUST BE COORDINATED WITH ARCHITECTURAL PLANS AND DETAILS.
- PROVIDE A STEPPED STRIP FOOTING WHERE INDICATED ON PLAN AS 'STP FTG'. SEE TYPICAL DETAIL 3.02 FOR STEP FOOTING DETAILS AND LIMITATIONS.
- SEE TYPICAL DETAIL 3.33 FOR CONSTRUCTION OF HOUSEKEEPING PADS FOR MECHANICAL & ELECTRICAL EQUIPMENT. SEE MECHANICAL & ELECTRICAL DRAWINGS FOR REQUIRED CONCRETE HOUSEKEEPING PAD LOCATION AND DIMENSIONS. HOUSEKEEPING PADS NOT SHOWN ON STRUCTURAL DRAWINGS.
- PROVIDE DOWELS FOR WALLS OR COLUMNS IN STRIP FOOTINGS TYPICAL. DOWELS TO MATCH WALL OR COLUMN VERTICAL REINFORCEMENT TYPICAL.
- PROVIDE 25mm THICK RIGID INSULATION BETWEEN ADJACENT FOOTING POURS, TYP. AT ALL LOCATIONS WHERE TWO SEPARATE FOOTINGS ARE IN CLOSE CONTACT WITH EACH OTHER.



4882 Portage Rd., Unit 1  
Niagara Falls, ON, L2E 6A3  
T 905-357-2030  
W | www.vbands.com  
E | info@vbands.com

Niagara Parks Commission

WEGO Garage Addition

7805 Niagara River Pkwy, Niagara Falls, ON

FOUNDATION PLAN

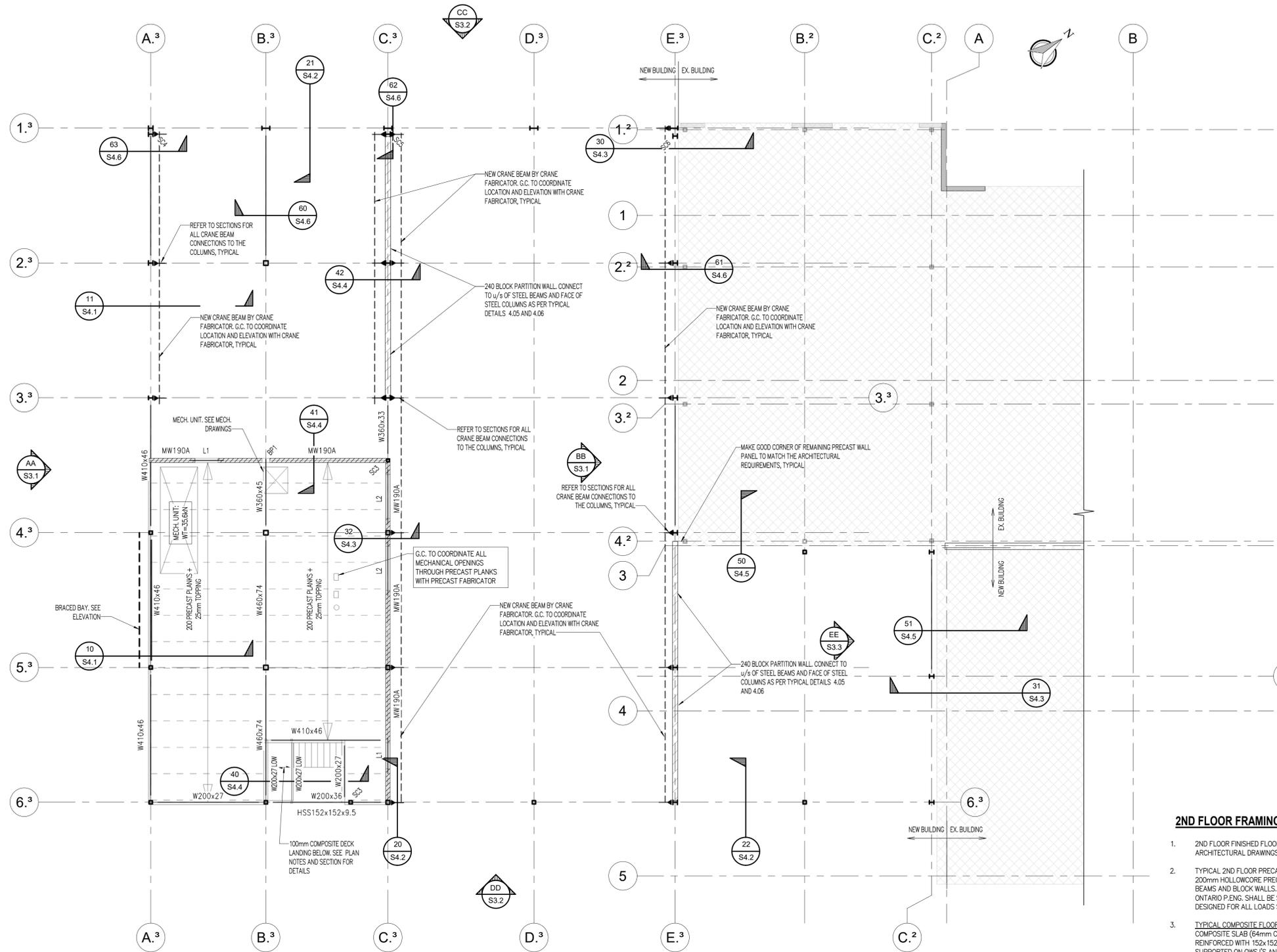
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**S1.0**

REV. #



**2ND FLOOR FRAMING PLAN NOTES**

- 2ND FLOOR FINISHED FLOOR ELEVATION IS AT +3200 (178.540m GEODETIC). CONFIRM WITH ARCHITECTURAL DRAWINGS.
- TYPICAL 2ND FLOOR PRECAST FLOOR CONSTRUCTION U.N.O. ON PLAN: 25mm TOPPING ON 200mm HOLLOWCORE PRECAST PLANKS (SEE PLAN FOR LOCATIONS) SUPPORTED ON STEEL BEAMS AND BLOCK WALLS. HOLLOW CORE PLANK SHOP DRAWINGS BEARING THE SEAL OF AN ONTARIO P.ENG. SHALL BE SUBMITTED TO THE STRUCTURAL CONSULTANT. PLANKS TO BE DESIGNED FOR ALL LOADS SHOWN ON PLAND AND IN SCHEDULES.
- TYPICAL COMPOSITE FLOOR STAIR LANDING CONSTRUCTION U.N.O. ON PLAN: 102mm COMPOSITE SLAB (64mm CONCRETE ON 38mm METAL COMPOSITE DECK, 0.76mm MIN.) REINFORCED WITH 152x152 MW18.7xMW18.7 WELDED WIRE FABRIC. COMPOSITE DECK IS SUPPORTED ON OWS/S'S AND STEEL BEAMS.
- SEE ARCHITECTURAL DRAWINGS FOR COLUMN OFFSETS FROM GRID LINES.
- STEEL DECK SPAN DIRECTION IS INDICATED WITH ARROWS AS THUS ON PLAN.
- TOP OF STEEL BEAMS ARE AT UNDERSIDE OF FLOOR DECK UNLESS NOTED ON PLANS THUS BELOW UNDERSIDE OF DECK. TOP OF STEEL ELEVATIONS FROM UNDERSIDE OF DECK ARE BASED ON AN ASSUMED JOIST SHOE DEPTH OF 102mm UNLESS NOTED OTHERWISE ON PLAN.
- BEAMS DENOTED WITH ARE TO BE CONNECTED FOR FULL MOMENT AND SHEAR CAPACITY OF BEAM UNLESS NOTED OTHERWISE.
- DESIGN THE PRECAST FLOOR PLANKS, INCLUDING THEIR CONNECTION TO SUPPORTING ELEMENTS FOR AN FACTORED DIAPHRAGM SHEAR FORCE OF 100 kN/m.
- TIE JOISTS ARE INDICATED ON PLANS AS "TJ" ON PLAN. EXTEND BOTH TOP AND BOTTOM CHORD MEMBERS AND CONNECT THEM TO COLUMN, BEAM, OR WALL.
- NOT ALL FLOOR OPENINGS HAVE BEEN SHOWN ON PLAN. STEEL FABRICATOR TO COORDINATE FINAL SIZE AND LOCATION OF FLOOR OPENINGS WITH MECHANICAL DRAWINGS AND GENERAL CONTRACTOR PRIOR TO FABRICATION. SEE TYPICAL DETAILS FOR REQUIRED FRAMING AROUND FLOOR OPENINGS. GENERAL CONTRACTOR TO COORDINATE PROVIDING LIGHT GAUGE STEEL CLOSURE SCREEDS WHERE STEEL ANGLES NOT PROVIDED - SEE TYPICAL DETAIL 5.08

ISSUED FOR TENDER  
1 Dec 3/24



**MBSA**  
VanBoxmeer Stranges Antonio  
STRUCTURAL ENGINEERS

4882 Portage Rd., Unit 1  
Niagara Falls, ON, L2E 6A3  
T | 905-357-2030  
W | www.vbands.com  
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Niagara Parks Commission  
**WEGO Garage Addition**

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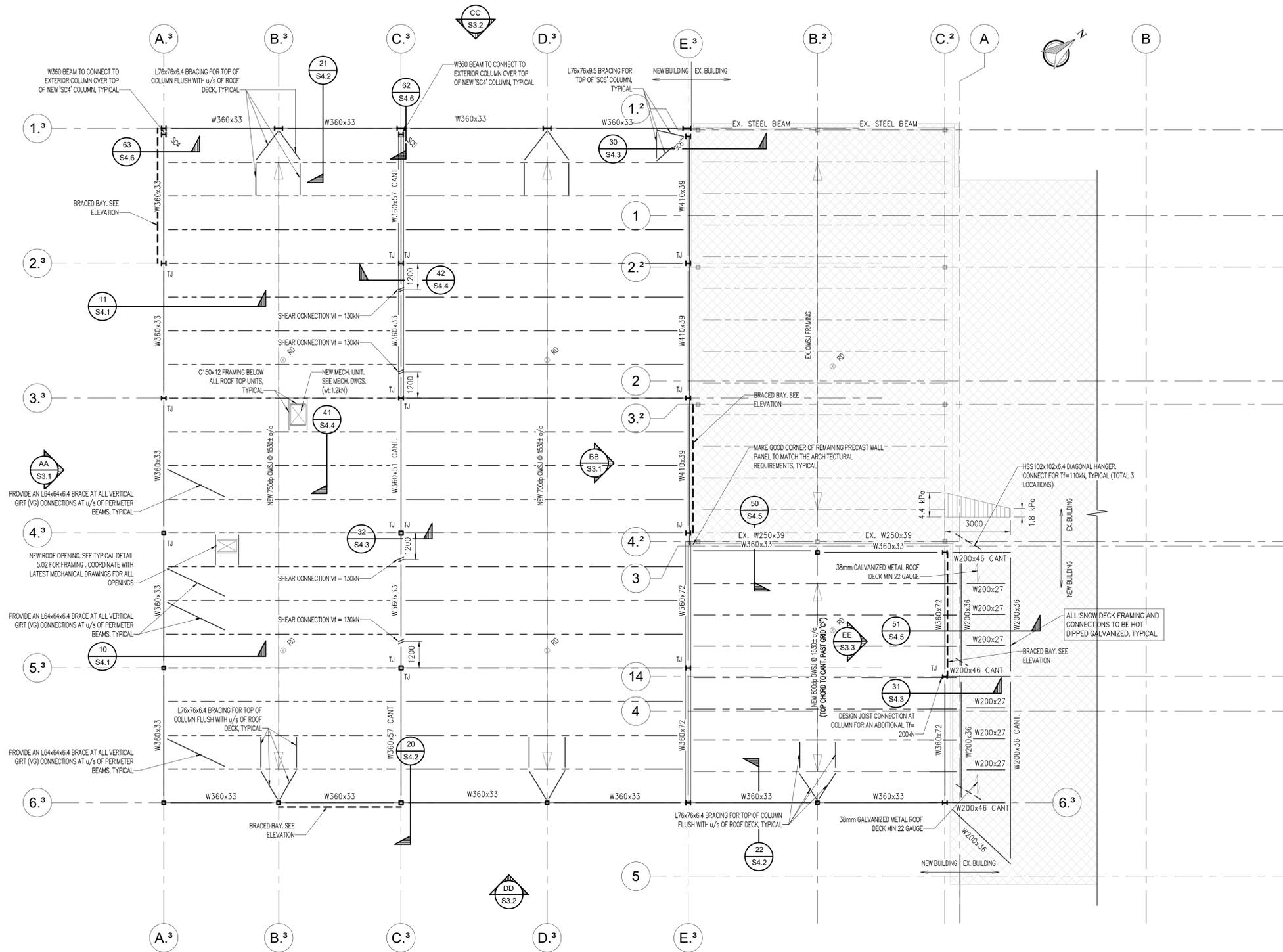
**2ND FLOOR FRAMING PLAN**

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**S1.1**

REV. #



**ROOF FRAMING PLAN NOTES**

- ROOF U/S DECK ELEVATION IS AT +6550 (181.890m GEODETIC). CONFIRM ALL ELEVATIONS WITH ARCHITECTURAL DRAWINGS.
- TOP OF STEEL BEAM IS AT UNDERSIDE OF SLOPING ROOF DECK UNLESS NOTED ON PLANS THUS "EXX" BELOW UNDERSIDE OF SLOPING ROOF DECK. TOP OF STEEL ELEVATIONS FROM UNDERSIDE OF ROOF DECK ARE BASED ON ASSUMED JOIST SHOE DEPTHS OF 100mm UNLESS NOTED OTHERWISE ON PLAN.
- ROOF SLOPES ACHIEVED WITH TAPERED INSULATION (SEE ARCHITECTURAL DRAWINGS). ROOF SLOPES ARE SHOWN ON PLAN AS UNDERSIDE OF DECK ELEVATIONS [ EXX ] AT LOW AND HIGH POINTS, BASED ON THE LATEST INFORMATION AVAILABLE TO THE CONSULTANTS. COORDINATE ROOF SLOPES WITH ARCHITECTURAL DRAWINGS.
- TYPICAL STEEL ROOF CONSTRUCTION U.N.O.: 38mm STEEL ROOF DECK SUPPORTED BY STEEL JOISTS OR STEEL BEAMS SPACED AS SHOWN ON PLAN. STEEL DECK FABRICATOR TO DESIGN DECK AND DETERMINE DECK THICKNESS (GAUGE) BASED ON LOADS SHOWN ON PLAN AND SCHEDULE (CANAM P-3615 OR EQUAL WITH MINIMUM 0.76mm THICKNESS). NOTE AREAS WITH DRIFT LOADING MAY REQUIRE HEAVIER GAUGE DECK - DESIGNER TO VERIFY ALL AREAS.
- STEEL DECK SPAN DIRECTION IS INDICATED WITH ARROWS AS THUS ON PLAN.
- ADDITIONAL SNOW LOAD ACCUMULATION IS INDICATED AS "DRIFT" AND IS SHOWN ON PLAN. THIS LOAD IS IN ADDITION TO THE BASIC SNOW LOAD LISTED ON THIS DRAWING. NOTE DRIFTS ARE CUMULATIVE - SEE DASHED PROFILE BOUNDARIES ON PLAN.
- SEE ARCHITECTURAL DRAWINGS FOR COLUMN OFFSETS FROM GRID LINES.
- OWSJ SPACING WILL VARY DEPENDING ON GRID SPACING AND TIE JOIST LOCATIONS. OWSJ AND DECK TO BE SIZED ACCORDINGLY.
- OWSJ DESIGNER TO REFER TO MECHANICAL SPRINKLER DRAWINGS AND ALLOW FOR ASSOCIATED ADDITIONAL PIPE LOADS.
- OWSJ DESIGNER TO REFER TO LATEST MECHANICAL TO COORDINATE DUCTS THROUGH THE OWSJ/S AND JOIST GRIDDERS
- DESIGN THE STEEL ROOF DECK AND STEEL JOISTS, INCLUDING THEIR CONNECTION TO SUPPORTING ELEMENTS FOR A FACTORED DIAPHRAGM SHEAR FORCE OF 5.0 kN/m.
- DESIGN THE STEEL ROOF DECK, STEEL JOISTS AND THEIR CONNECTIONS TO SUPPORTING MEMBERS FOR AN UNFACTORED UNIFORM UPLIFT PRESSURE OF 1.0kPa.
- MECHANICAL ROOFTOP UNITS ARE SHOWN ON PLAN BASED ON THE LATEST INFORMATION AVAILABLE TO THE CONSULTANTS. STEEL FABRICATOR MUST COORDINATE FINAL WEIGHT, SIZE AND LOCATION OF ALL ROOFTOP UNITS WITH GENERAL CONTRACTOR PRIOR TO FABRICATION. SEE THIS SHEET FOR TYPICAL SNOW DRIFT DIAGRAM AROUND ROOFTOP UNITS.
- NOT ALL ROOF OPENINGS HAVE BEEN SHOWN ON PLAN. STEEL FABRICATOR TO COORDINATE FINAL SIZE AND LOCATION OF ROOF OPENINGS WITH GENERAL CONTRACTOR PRIOR TO FABRICATION. SEE TYPICAL DETAIL 5.02 ON DRAWING S5.4 FOR REQUIRED FRAMING AROUND ROOF OPENINGS.
- TIE JOISTS OR TIE JOIST GRIDDERS ARE INDICATED ON PLANS AS "TJ" ON PLAN. EXTEND BOTH TOP AND BOTTOM CHORD MEMBERS AND CONNECT THEM TO COLUMN, BEAM, OR WALL.
- BEAMS DENOTED WITH ARE TO BE CONNECTED FOR FULL MOMENT AND SHEAR CAPACITY OF BEAM UNLESS NOTED OTHERWISE.
- ALL BEAMS ON PLAN ARE TO BEAR ON 'BP-1' BEARING PLATES AT CONCRETE WALLS U.N.O ON PLAN.



**MBSA**  
VanBoxmeer Stranges Antonio  
STRUCTURAL ENGINEERS

4082 Portage Rd., Unit 1  
Niagara Falls, ON, L2E 6A3  
T | 905-357-2030  
W | www.vbands.com  
E | al@vbands.com

Niagara Parks Commission

WEGO Garage Addition

7805 Niagara River Pkwy, Niagara Falls, ON

**PARTIAL ROOF FRAMING PLAN**

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**S1.2**

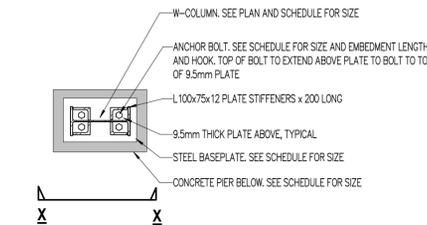
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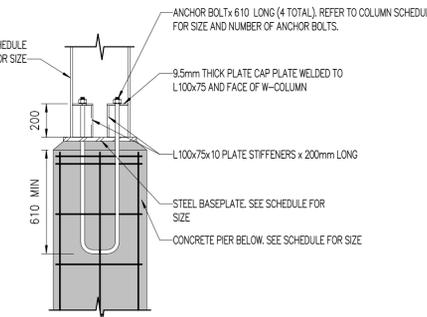
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COLUMN/FOOTING DATA																				
ROOF LEVEL ELEVATION +6550																				
LEVEL 2 FLOOR ELEVATION +3200	W200x62	W200x62 Mf = 30kNm	W200x42 Mf = 30kNm	HSS 152x152x6.4	HSS 152x152x6.4	HSS 152x152x6.4	W360x57	HSS 203x203x13	HSS 203x203x13	HSS 203x203x13	HSS 152x152x6.4	W360x57	W200x62 Mf = 30kNm	W200x62 Mf = 30kNm	HSS 178x178x6.5 Mf = 40kNm	HSS 178x178x6.5 Mf = 40kNm	HSS 178x178x6.5 Mf = 40kNm	W360x57	HSS 152x152x6.4	
GROUND FLOOR ELEVATION 0.00	FIXED BASE TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	FIXED BASE TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	FIXED BASE TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	FIXED BASE TOP OF PIER	TOP OF PIER	
u/s OF STEEL BASE PLATE ELEVATION (FROM ELEVATION +0000)	-350	-200	-200	-200	-200	-200	-350	-200	-200	-200	-200	-350	-200	-200	-200	-200	-200	-350	-200	
TOP OF PIER ELEVATION (FROM ELEVATION +0000)	-400	-250	-250	-250	-250	-250	-400	-250	-250	-250	-250	-400	-250	-250	-250	-250	-250	-400	-250	
BASE PLATE (mm) (SQUARE U.O.)	300x25x300	300x20x300	300x20x300	300x20x300	300x20x300	300x20x300	450x20x250	300x20x300	300x20x300	300x20x300	300x20x300	450x20x250	300x20x300	300x20x300	350x20x350	350x20x350	350x20x350	450x20x250	300x20x300	
ANCHOR BOLT	No. / SIZE	4-25Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-32Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-32Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-32Ø	4-20Ø	
	EMBEDMENT (mm)	600	400	400	400	400	600	400	400	400	400	600	400	400	400	400	400	600	400	
	HOOK (mm)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PIER	SIZE (mm)	400x800	400x400	400x400	400x400	400x400	550x550	400x400	400x400	400x400	400x400	550x950	400x400	400x400	450x450	450x450	450x450	550x550	400x400	
	VERTICAL REINFORCING	8-25M	8-20M	8-20M	8-20M	8-20M	8-25M	8-20M	8-20M	8-20M	8-20M	8-25M	8-20M	8-20M	8-20M	8-20M	8-20M	8-25M	8-20M	
	TIES (SEE TYP. DETAIL 3.06)	10M @ 400	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 400	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 400	10M @ 300	10M @ 400	10M @ 300					
FOOTING	SIZE (L x l x W mm)	2200x350x2200	1200x300x1200	1200x300x1200	1600x300x1600	1600x300x1600	2000x350x2000	1200x300x1200	1600x300x1600	1800x300x1800	1600x300x1600	2200x350x2200	1800x300x1800	1800x300x1800	2000x300x2000	2000x300x2000	1400x300x1400	2000x350x2000	1200x300x1200	
	HORIZONTAL REINFORCING	8-15M B.E.W. & T.E.W. HOOKED	4-15M B.E.W. & T.E.W. HOOKED	4-15M B.E.W. HOOKED	6-15M B.E.W. & T.E.W. HOOKED	6-15M B.E.W. & T.E.W. HOOKED	4-15M B.E.W. HOOKED	8-15M B.E.W. & T.E.W. HOOKED	4-15M B.E.W. HOOKED	5-15M B.E.W. HOOKED	8-15M B.E.W. HOOKED	5-15M B.E.W. & T.E.W. HOOKED	8-15M B.E.W. HOOKED	8-15M B.E.W. HOOKED	12-15M B.E.W. HOOKED	12-15M B.E.W. HOOKED	5-15M B.E.W. & T.E.W. HOOKED	8-15M B.E.W. & T.E.W. HOOKED	4-15M B.E.W. HOOKED	
COMMENTS	REFER TO TYPICAL BASEPLATE CONNECTION DETAIL THIS DRAWING REFER TO SECTION 637 FOR CRANE BEAM CONNECTION	REFER TO SECTION 637 FOR CRANE BEAM CONNECTION SEE SECTION FOR CANT. BEAM DETAILS *CRANE LOAD INCLUDED	REFER TO SECTION 637 FOR CRANE BEAM CONNECTION SEE SECTION FOR CANT. BEAM DETAILS *CRANE LOAD INCLUDED				REFER TO TYPICAL BASEPLATE CONNECTION DETAIL THIS DRAWING					REFER TO TYPICAL BASEPLATE CONNECTION DETAIL THIS DRAWING	SEE SECTION FOR CANT. BEAM DETAILS *CRANE LOAD INCLUDED	SEE SECTION FOR CANT. BEAM DETAILS *CRANE LOAD INCLUDED	SEE SECTION FOR CANT. BEAM DETAILS *CRANE LOAD INCLUDED	SEE SECTION FOR CANT. BEAM DETAILS *CRANE LOAD INCLUDED	SEE SECTION FOR CANT. BEAM DETAILS *CRANE LOAD INCLUDED	REFER TO TYPICAL BASEPLATE CONNECTION DETAIL THIS DRAWING		
UNFACTORED LOADS (kN)	DL = 12 LL = 15	DL = 50 LL = 80*	DL = 50 LL = 80*	DL = 155 LL = 140	DL = 155 LL = 140	DL = 65 LL = 55	DL = 25 LL = 30	DL = 12 LL = 15	DL = 165 LL = 120	DL = 220 LL = 160	DL = 135 LL = 110	DL = 30 LL = 35	DL = 115 LL = 205*	DL = 115 LL = 205*	DL = 200 LL = 245*	DL = 225 LL = 265*	DL = 85 LL = 120*	DL = 15 LL = 20	DL = 15 LL = 20	
COLUMN/FOOTING DATA																				
COLUMN MARK	A <sup>3</sup> -1,3	A <sup>3</sup> -2,3	A <sup>3</sup> -3,3	A <sup>3</sup> -4,3	A <sup>3</sup> -5,3	A <sup>3</sup> -6,3	B <sup>3</sup> -1,3	B <sup>3</sup> -2,3	B <sup>3</sup> -4,3	B <sup>3</sup> -5,3	B <sup>3</sup> -6,3	C <sup>3</sup> -1,3	C <sup>3</sup> -2,3	C <sup>3</sup> -3,3	C <sup>3</sup> -4,3	C <sup>3</sup> -5,3	C <sup>3</sup> -6,3	D <sup>3</sup> -1,3	D <sup>3</sup> -6,3	

**COLUMN AND PAD FOOTING SCHEDULE NOTES**

- FOR COLUMN OFFSETS FROM GRIDLINES. REFER TO ARCHITECTURAL DRAWINGS.
- COLUMN SCHEDULE IS SCHEMATIC ONLY. COORDINATE ALL TOP OF COLUMNS, COLUMN SPLICE LOCATIONS, CONNECTIONS, ETC. WITH PLANS, SECTIONS AND ARCHITECTURAL DRAWINGS.
- FOR PLACEMENT OF CONCRETE PAD FOOTINGS AND ASSOCIATED PIERS. SEE TYPICAL DETAIL 3.05 AND 3.38.
- FOR TIES IN ALL CONCRETE COLUMNS AND PIERS. SEE TYPICAL DETAIL 3.06.
- FOR STRUCTURAL STEEL BASE PLATES AND PAD FOOTINGS, FIRST PLAN DIMENSION IS TO BE ORIENTED IN THE N-S DIRECTION U.O.
- SEE STRUCTURAL SPECIFICATION FOR REQUIRED MINIMUM CONCRETE STRENGTHS, SLUMPS, AND AIR CONTENTS.
- SEE TYPICAL DETAIL 3.01 FOR CLEAR COVER TO REINFORCING BARS IN CONCRETE PIERS AND FOOTINGS.
- ALL BOTTOM REINFORCING FOR PAD FOOTINGS TO BE HOOKED, UNLESS NOTED OTHERWISE.



**PLAN DETAIL COLUMN BASEPLATE AT GRID A<sup>3</sup>-1, B<sup>3</sup>-1, C<sup>3</sup>-1, D<sup>3</sup>-1 AND E<sup>3</sup>-1**  
1:20



**SECTION X-X**  
1:20



**MBSA**  
**VanBoxmeer Stranges Antonio**  
**STRUCTURAL ENGINEERS**

4082 Portage Rd., Unit 1  
Niagara Falls, ON, L2E 6A3  
T | 905-357-2030  
W | www.vbands.com  
E | e@vbands.com

Niagara Parks Commission

**WEGO Garage Addition**

7805 Niagara River Pkwy, Niagara Falls, ON

**SCHEDULES**

DRAWN BY:	VR
DATE:	2024-12-03 9:54:43 AM
SCALE:	As indicated
PROJECT NO.:	24175
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**S2.2**

REV. #

COLUMN MARK	E.3.1.3	E.3.2.3	E.3.3.3	E.3.4.3	E.3.5.3	E.3.6.3	B.3.3	B.3.6.3	C.2.3	C.2.4A	C.2.6.3	SC1	SC2	SC3	SC4	SC5	SC6	
COLUMN/FOOTING DATA																		
ROOF LEVEL ELEVATION +6550																		
LEVEL 2 FLOOR ELEVATION +3200	W200x67	W200x62 MC MF = 40kNm	HSS 152x152x6.4	HSS 152x152x6.4	W200x36	W200x36	W200x36	U/S STAIR LANDING HSS127x127x1.3	U/S STAIR LANDING HSS96x96x3.5	HSS 152x152x6.4	W200x62 MC MF = 30kNm	W200x62 MC MF = 40kNm	W200x62 MC MF = 40kNm					
GROUND FLOOR ELEVATION 0.00	FIXED BASE																	
TOP OF PIER																		
u/s OF STEEL BASE PLATE ELEVATION (FROM ELEVATION +0000)	-350	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-350	-350	-350	
TOP OF PIER ELEVATION (FROM ELEVATION +0000)	-400	-250	-250	-250	-250	-250	-250	-250	-250	-250	-250	-250	-250	-250	-400	-400	-400	
BASE PLATE (mm) (SQUARE U.N.O.)	450x20x250	300x20x300	300x20x300	300x20x300	300x20x300	300x20x300	300x20x300	300x20x300	300x20x300	300x20x300	300x20x300	300x20x300	250x20x250	300x20x300	300x20x300	300x20x300	300x20x300	
ANCHOR BOLT	No. / SIZE	4-32Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	
	EMBEDMENT (mm)	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	
	HOOK (mm)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
PIER	SIZE (mm)	550x950	2100x400	2100x400	2500x400	400x400	400x400	2100x400	400x400	SEE COMMENTS	400x400	400x400	400x400	350x350	350x350	'A3-1"	'C3-1"	'E3-1"
	VERTICAL REINFORCING	8-25M	SEE SECTION 61	SEE SECTION 61	SEE SECTION 61	8-20M	8-20M	SEE SECTION 61	8-20M	SEE SECTION 61	8-20M	8-20M	8-20M	8-20M	8-20M	'A3-1"	'C3-1"	'E3-1"
	TIES (SEE TYP. DETAIL 3.06)	10M @ 400	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	'A3-1"	'C3-1"	'E3-1"
FOOTING	SIZE (L x t x W mm)	2200x350x2200	2100x400x800	2100x400x800	2500x400x800	1800x300x1800	1200x300x1200	2100x400x800	1200x300x1200	SEE COMMENTS	1200x300x1200	1200x300x1200	1000x300x1000	1000x300x1000	1200x300x1200	'A3-1"	'C3-1"	'E3-1"
	HORIZONTAL REINFORCING	SEE COMMENTS	SEE COMMENTS	SEE COMMENTS	SEE COMMENTS	8-15M B.E.W. HOOKED	4-15M B.E.W. HOOKED	SEE COMMENTS	4-15M B.E.W. HOOKED	SEE COMMENTS	4-15M B.E.W. & T.E.W. HOOKED	4-15M B.E.W. HOOKED	4-15M B.E.W. HOOKED	4-15M B.E.W. HOOKED	4-15M B.E.W. HOOKED	'A3-1"	'C3-1"	'E3-1"
COMMENTS																		
UNFACTORED LOADS (kN)	DL = 15 LL = 20	DL = 60 LL = 120*	DL = 60 LL = 120*	DL = 75 LL = 135*	DL = 120 LL = 190*	DL = 30 LL = 85*	DL = 15 LL = 20	DL = 15 LL = 20	DL = 15 LL = 15	DL = 50 LL = 60	DL = 15 LL = 15	DL = 15 LL = 15	DL = 15 LL = 15	DL = 20 LL = 20	DL = 50 LL = 60	DL = 50 LL = 60	DL = 50 LL = 60	
COLUMN/FOOTING DATA																		
COLUMN MARK	E.3.1.3	E.3.2.3	E.3.3.3	E.3.4.3	E.3.5.3	E.3.6.3	B.3.3	B.3.6.3	C.2.3	C.2.4A	C.2.6.3	SC1	SC2	SC3	SC4	SC5	SC6	

**COLUMN AND PAD FOOTING SCHEDULE NOTES**

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- FOR PLACEMENT OF CONCRETE PAD FOOTINGS AND ASSOCIATED PIERS. SEE TYPICAL DETAIL 3.05 AND 3.06.
- FOR TIES IN ALL CONCRETE COLUMNS AND PIERS. SEE TYPICAL DETAIL 3.06.
- FOR STRUCTURAL STEEL BASE PLATES AND PAD FOOTINGS, FIRST PLAN DIMENSION IS TO BE ORIENTED IN THE N-S DIRECTION U.N.O.
- SEE STRUCTURAL SPECIFICATION FOR REQUIRED MINIMUM CONCRETE STRENGTHS, SLUMPS, AND AIR CONTENTS.
- SEE TYPICAL DETAIL 3.01 FOR CLEAR COVER TO REINFORCING BARS IN CONCRETE PIERS AND FOOTINGS.
- ALL BOTTOM REINFORCING FOR PAD FOOTINGS TO BE HOOKED, UNLESS NOTED OTHERWISE.

ISSUED FOR TENDER  
1 Dec 3/24



**MBSA**  
VanBoxmeer Stranges Antonio  
STRUCTURAL ENGINEERS

4082 Portage Rd., Unit 1  
Niagara Falls, ON, L2E 6A3  
T | 905-357-2030  
W | www.vbands.com  
E | a@vbands.com

Niagara Parks Commission

WEGO Garage Addition

7805 Niagara River Pkwy, Niagara Falls, ON

SCHEDULES

DRAWN BY: **VR**  
DATE: **2024-12-03 9:54:44 AM**  
SCALE: **1 : 100**  
PROJECT NO.: **24175**  
CHECKED: **BCS**

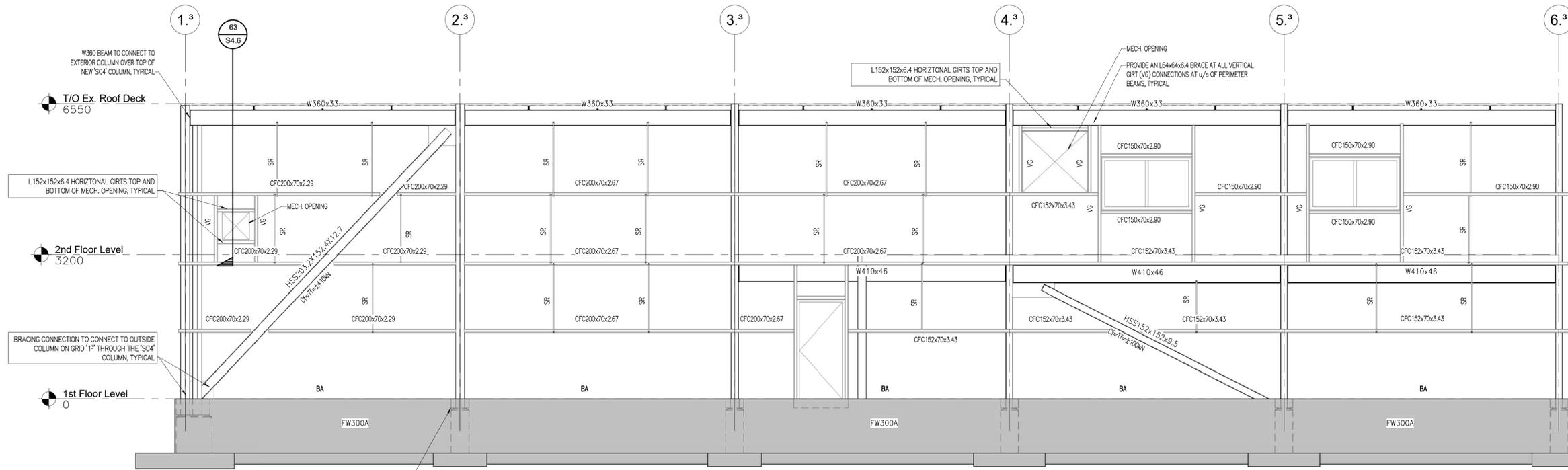
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**S2.3**

REV. #

Autodesk Docs://24-006 - NPC - WEGO Garage Niagara Falls/24175 Structural Central.rvt

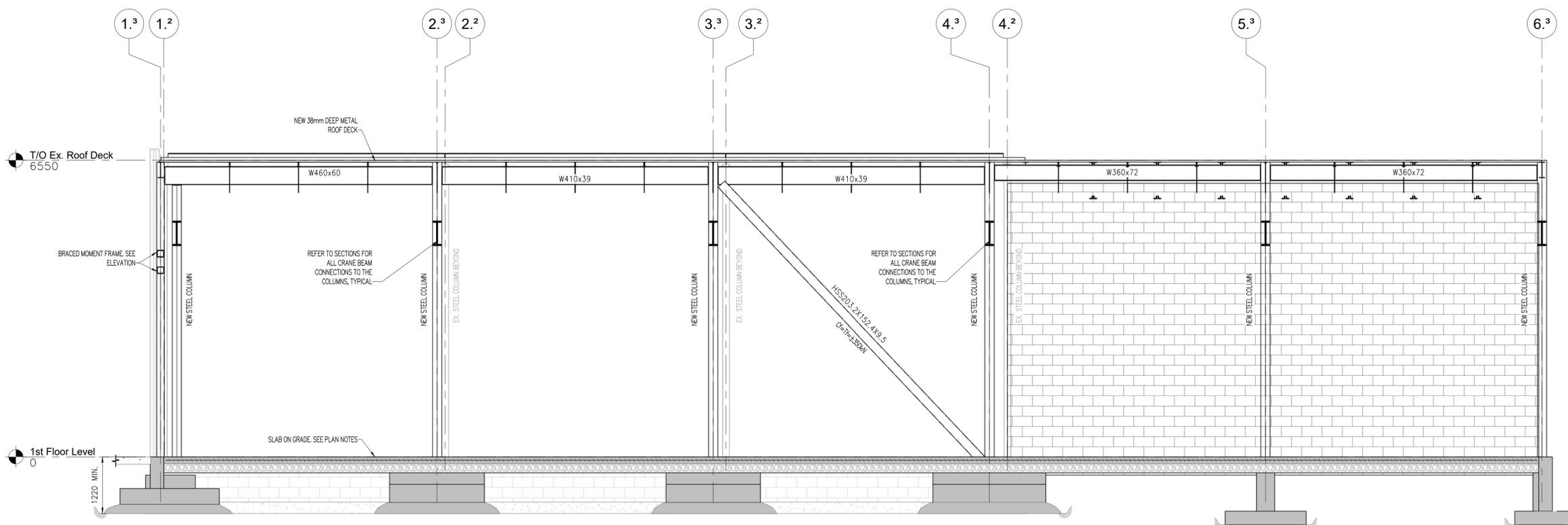


**BA** - L102x102x6.4 CONTINUOUS SUPPORT OF INSULATED SIDING. FIELD WELDED TO CAST-IN PLATES AT TOP OF FOUNDATION WALL. PLATES TO BE 102x102x8 STEEL PLATES ANCHORED TO CONCRETE WALL WITH 2-100 NELSON HEADED CONCRETE ANCHORS x 150 LONG SPACED ALONG WALL @ 900 o/c MAX. INSTALL ONE EACH SIDE OF COLUMN AND/OR DOOR OPENING, TYPICAL.

**SG** - 16mmØ SAG RODS. PROVIDE NUTS ON TOP AND BOTTOM OF GIRT. LOCATE SAG ROD IN CENTRE OF GIRT TYPICAL AT 3RD POINT IN GIRT SPAN UNLESS NOTED OTHERWISE.

ELEVATION AA  
1 : 50  
S1.0

**VG** - CFC150x70x3.43 VERTICAL GIRTS. CONNECT TO TOP OF PRECAST/FOUNDATION WALL w/ A STEEL BASEPLATE AND 2-19mmØx150 EMBEDMENT POWERS WEDGE BOLTS, TYPICAL



ELEVATION BB  
1 : 50  
S1.0

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STRUCTURAL ENGINEERS

4082 Portage Rd., Unit 1  
Niagara Falls, ON, L2E 6A3  
T | 905-357-2030  
W | www.vbands.com  
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Niagara Parks Commission  
WEGO Garage Addition

7805 Niagara River Pkwy, Niagara Falls, ON  
ELEVATIONS

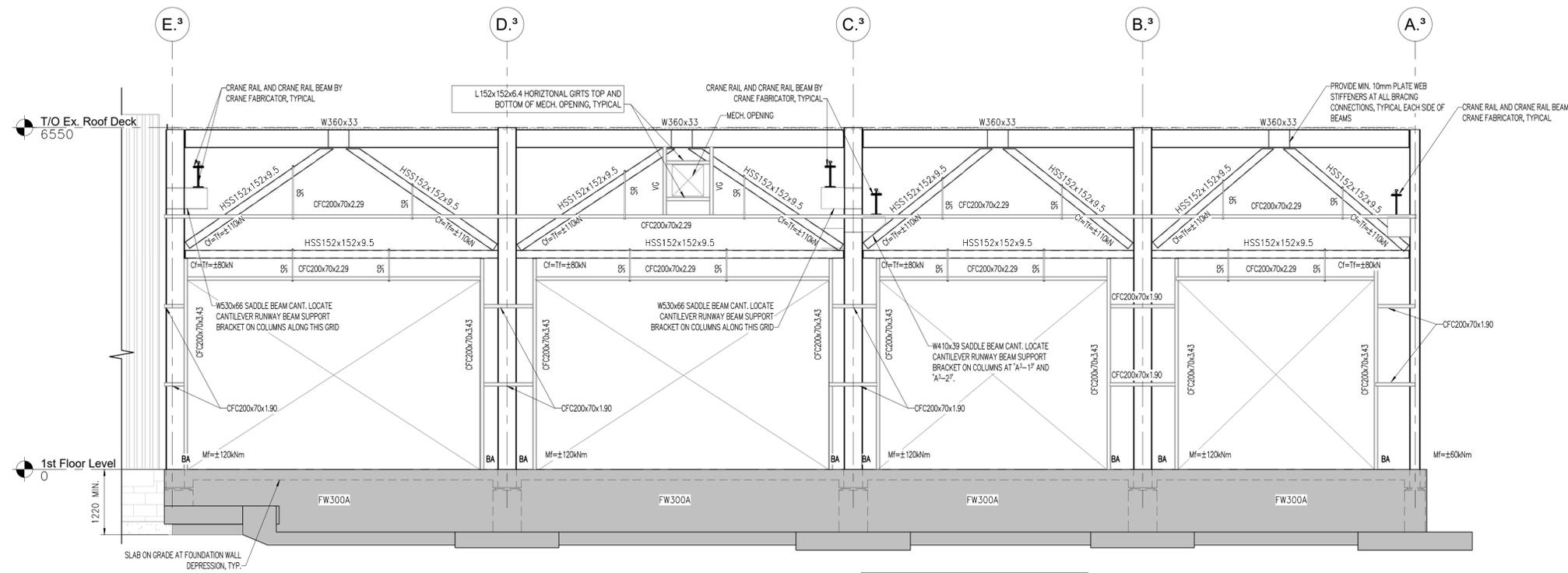
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S3.1

REV. #

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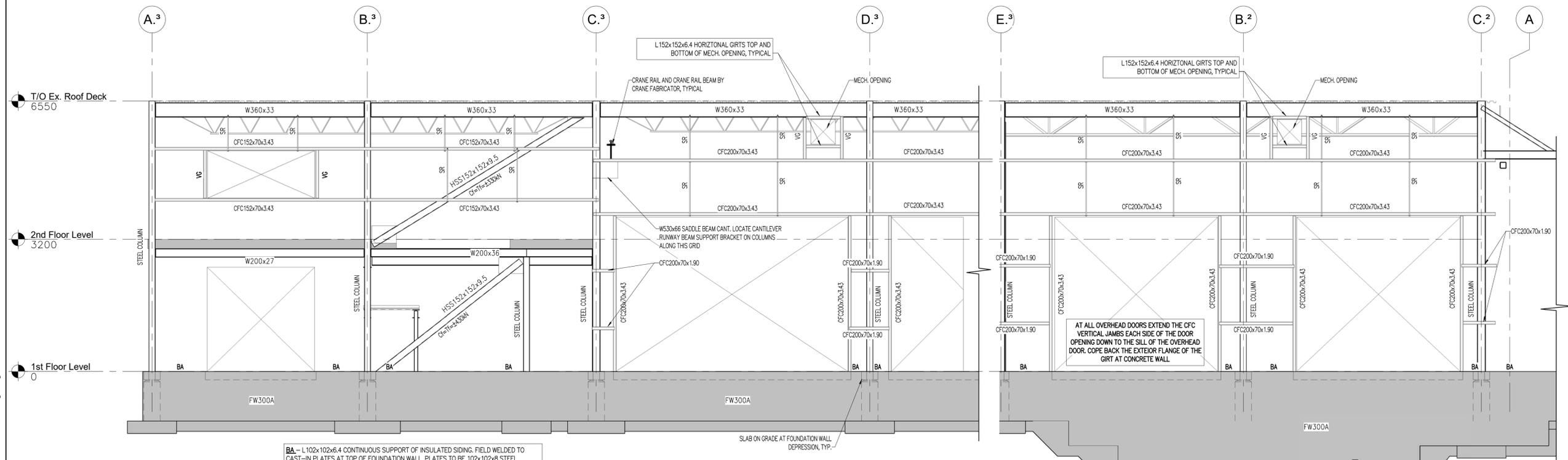


**BA** - L102x102x6.4 CONTINUOUS SUPPORT OF INSULATED SIDING. FIELD WELDED TO CAST-IN PLATES AT TOP OF FOUNDATION WALL. PLATES TO BE 102x102x8 STEEL PLATES ANCHORED TO CONCRETE WALL WITH 2-100 NELSON HEADED CONCRETE ANCHORS x 150 LONG SPACED ALONG WALL @ 900 o/c MAX. INSTALL ONE EACH SIDE OF COLUMN AND/OR DOOR OPENING, TYPICAL.

**SQ** - 16mmØ SAG RODS. PROVIDE NUTS ON TOP AND BOTTOM OF GIRT. LOCATE SAG ROD IN CENTRE OF GIRT TYPICAL AT 3RD POINT IN GIRT SPAN UNLESS NOTED OTHERWISE.

ELEVATION **CC**  
1 : 50 **S1.0**

AT ALL OVERHEAD DOORS EXTEND THE CFC VERTICAL JAMBS EACH SIDE OF THE DOOR OPENING DOWN TO THE SILL OF THE OVERHEAD DOOR. COPE BACK THE EXTERIOR FLANGE OF THE GIRT AT CONCRETE WALL.



**VC** - CFC200x70x3.43 VERTICAL GIRTS. CONNECT TO TOP OF PRECAST FOUNDATION WALL w/ A STEEL BASEPLATE AND 2-19mmØx150 EMBEDMENT POWERS WEDGE BOLTS, TYPICAL.

**BA** - L102x102x6.4 CONTINUOUS SUPPORT OF INSULATED SIDING. FIELD WELDED TO CAST-IN PLATES AT TOP OF FOUNDATION WALL. PLATES TO BE 102x102x8 STEEL PLATES ANCHORED TO CONCRETE WALL WITH 2-100 NELSON HEADED CONCRETE ANCHORS x 150 LONG SPACED ALONG WALL @ 900 o/c MAX. INSTALL ONE EACH SIDE OF COLUMN AND/OR DOOR OPENING, TYPICAL.

**SQ** - 16mmØ SAG RODS. PROVIDE NUTS ON TOP AND BOTTOM OF GIRT. LOCATE SAG ROD IN CENTRE OF GIRT TYPICAL AT 3RD POINT IN GIRT SPAN UNLESS NOTED OTHERWISE.

ELEVATION **DD**  
1 : 50 **S1.0**

STEP FOOTINGS. SEE TYPICAL DETAIL 3.02

EXISTING SANITARY LINE @ 10'-8" BELOW EXISTING FINISHED GRADE. SITE CONFIRM EXACT LOCATION PRIOR TO PLACEMENT OF FOOTINGS

ISSUED FOR TENDER  
1 Dec 3/24



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T | 905-357-2030  
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WEGO Garage Addition

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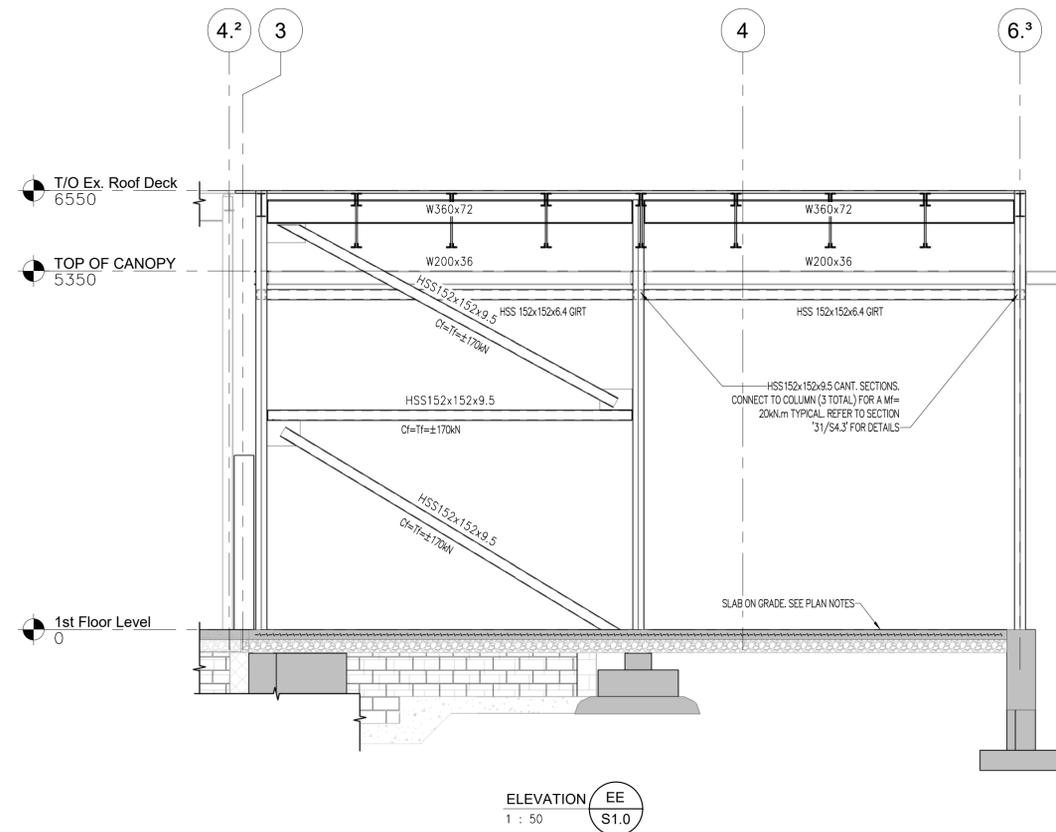
ELEVATIONS

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SCALE: **1 : 50**  
PROJECT NO.: **24175**  
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**S3.2**

REV. #



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 T | 905-357-2030  
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WEGO Garage Addition

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ELEVATIONS

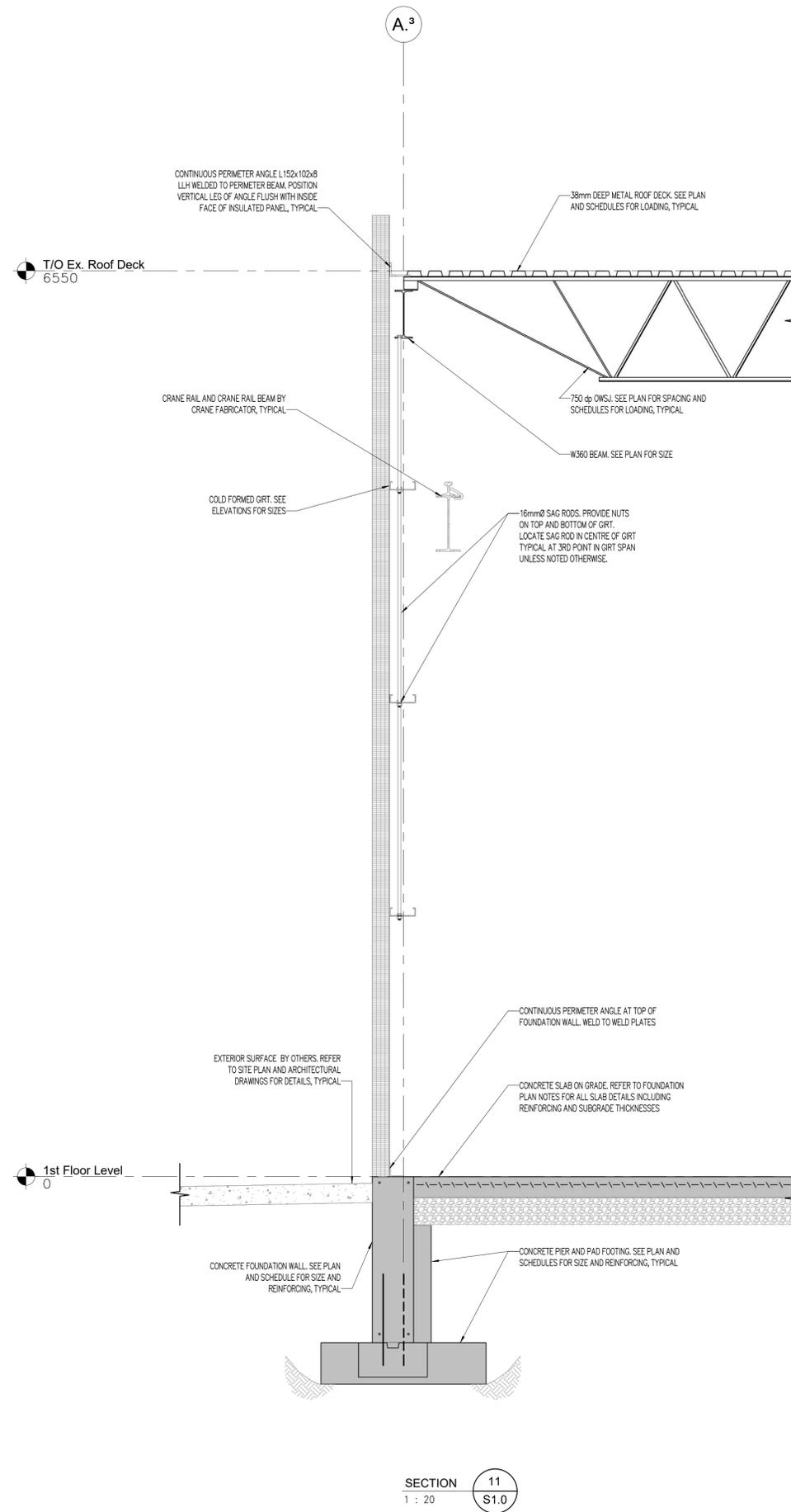
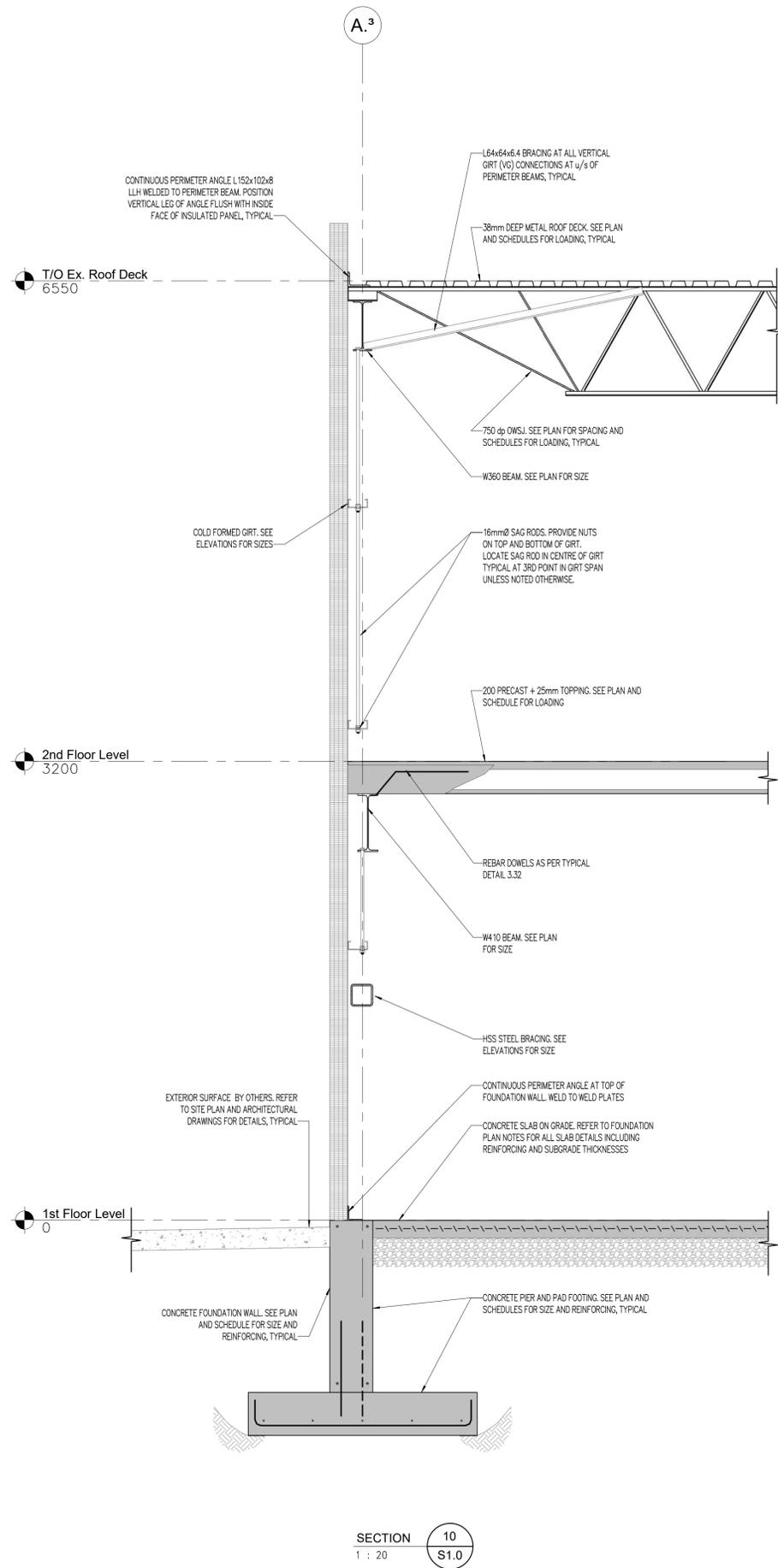
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**S3.3**

REV.#



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WEGO Garage Addition

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SECTIONS

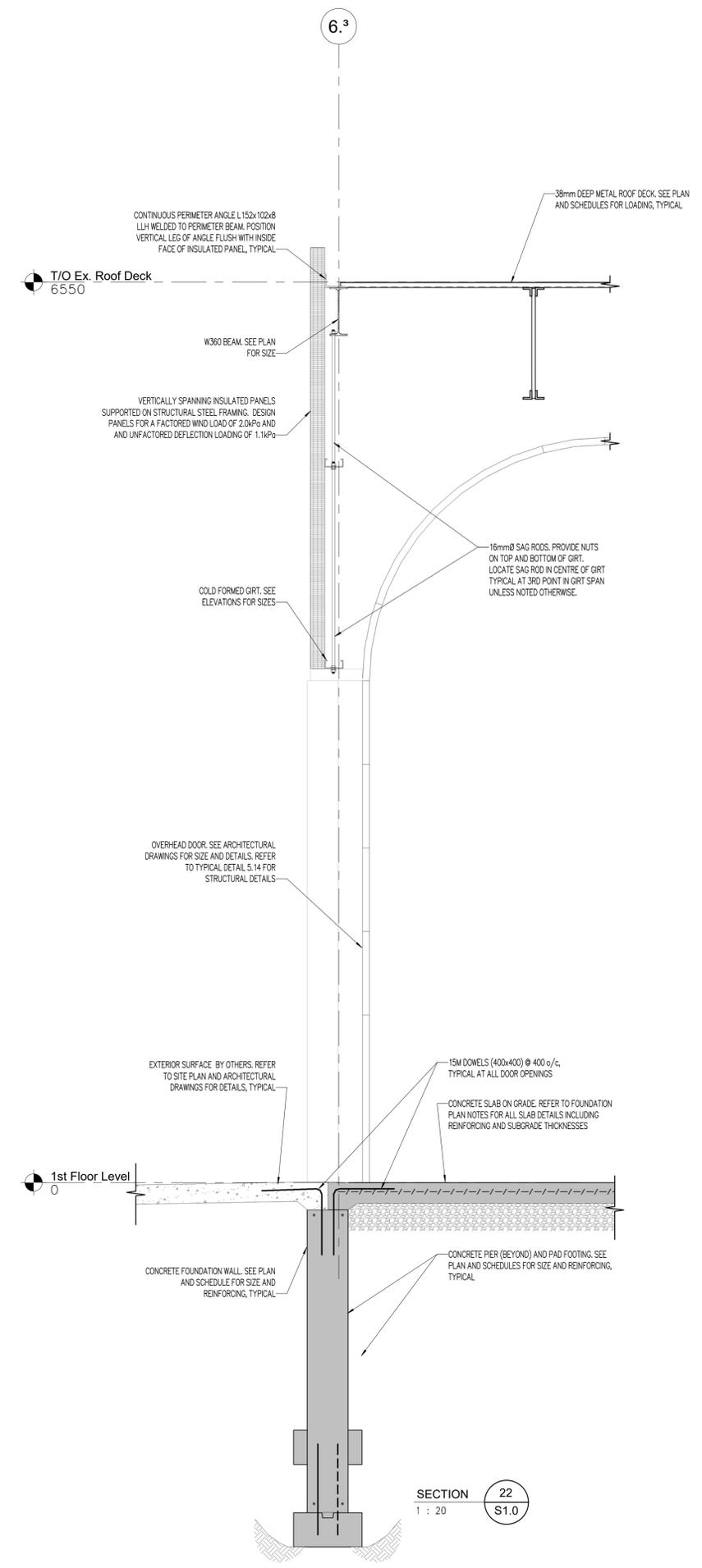
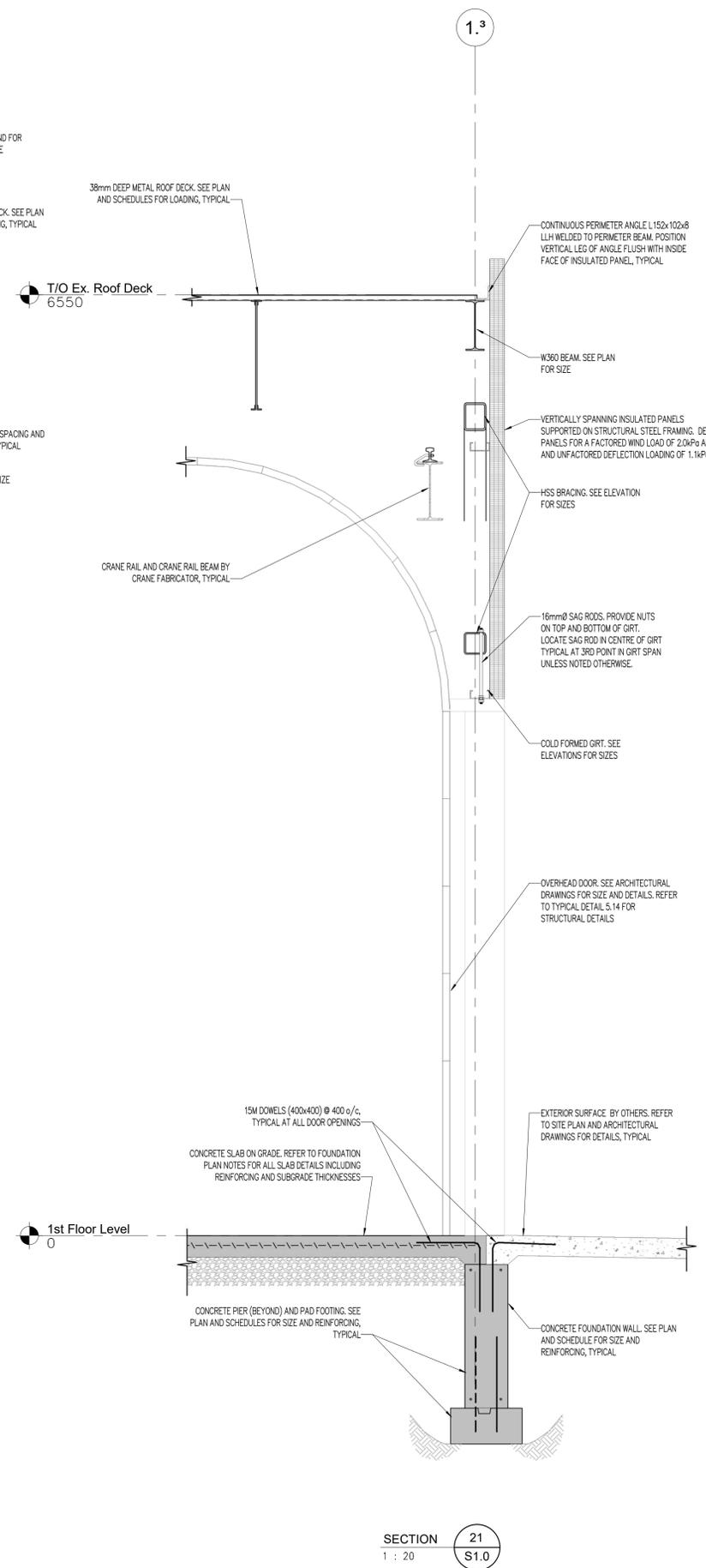
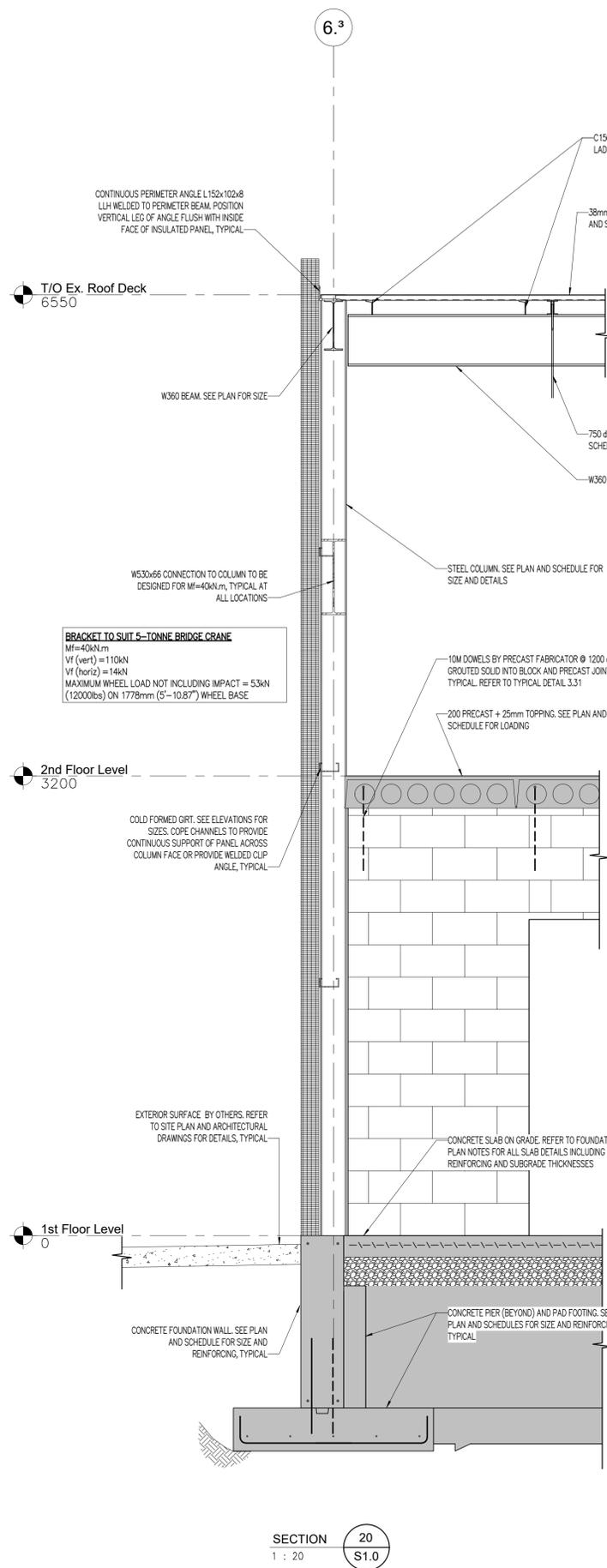
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**S4.1**

REV. #



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1 Dec 03/24



**MBSA**  
VanBoxmeer Stranges Antonio  
STRUCTURAL ENGINEERS

4082 Portage Rd., Unit 1  
Niagara Falls, ON, L2E 6A3  
T | 905-357-2030  
W | www.vbands.com  
E | e@vbands.com

Niagara Parks Commission  
**WEGO Garage Addition**

7805 Niagara River Pkwy, Niagara Falls, ON

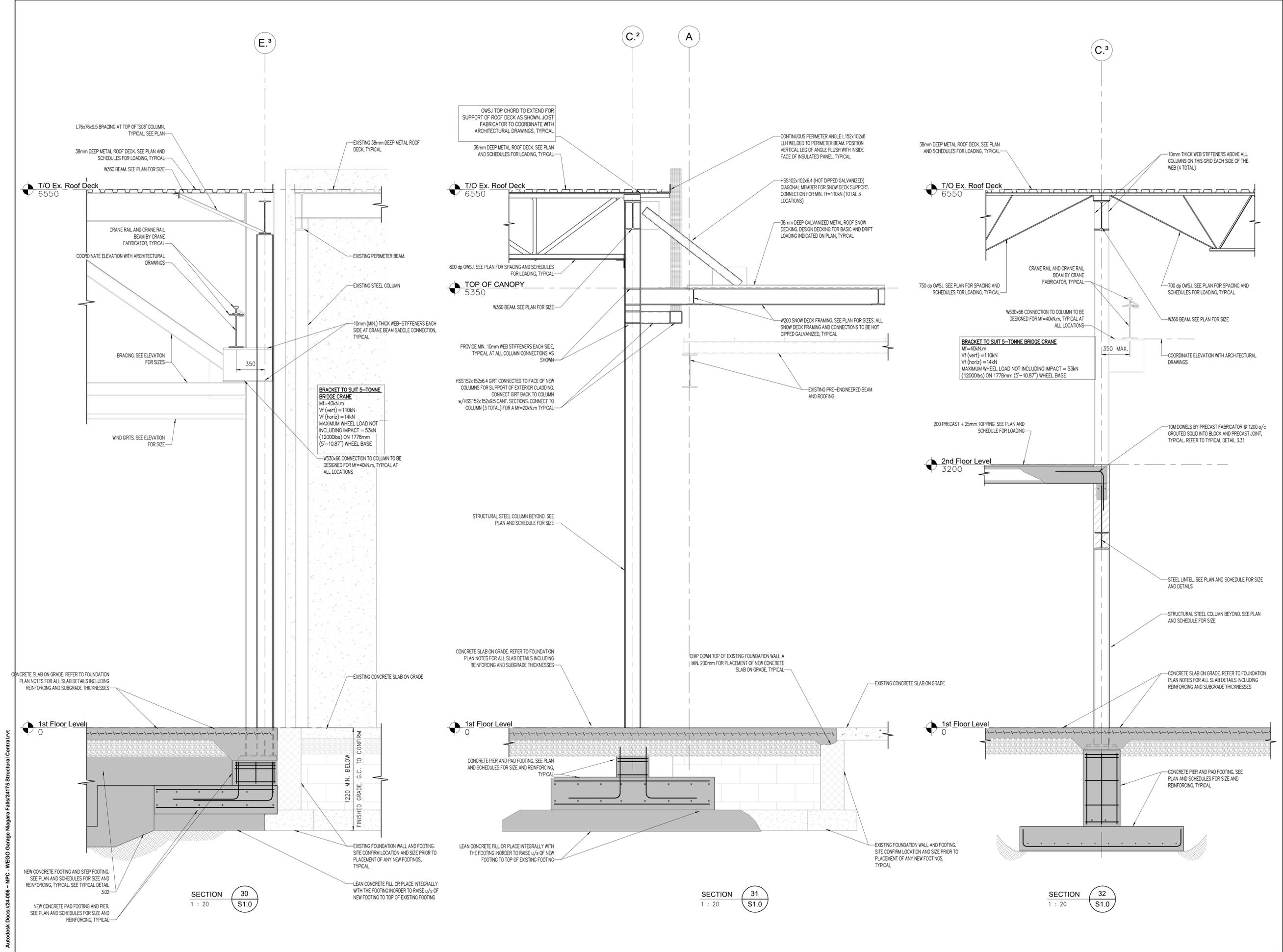
**SECTIONS**

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**S4.2**

REV. #



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T | 905-357-2030  
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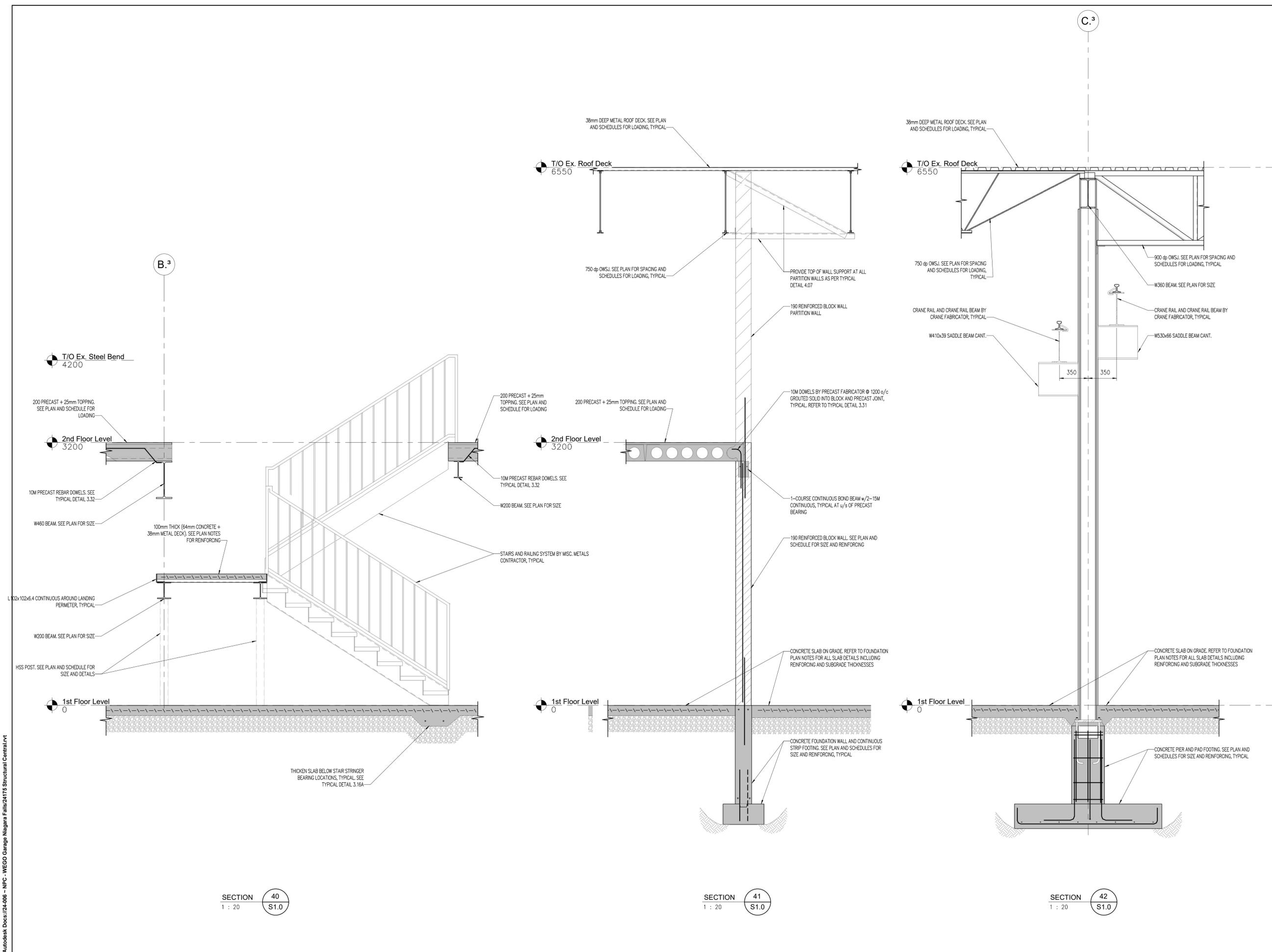
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**S4.3**

REV. #

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SECTION 40  
1 : 20  
S1.0

SECTION 41  
1 : 20  
S1.0

SECTION 42  
1 : 20  
S1.0

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T | 905-357-2030  
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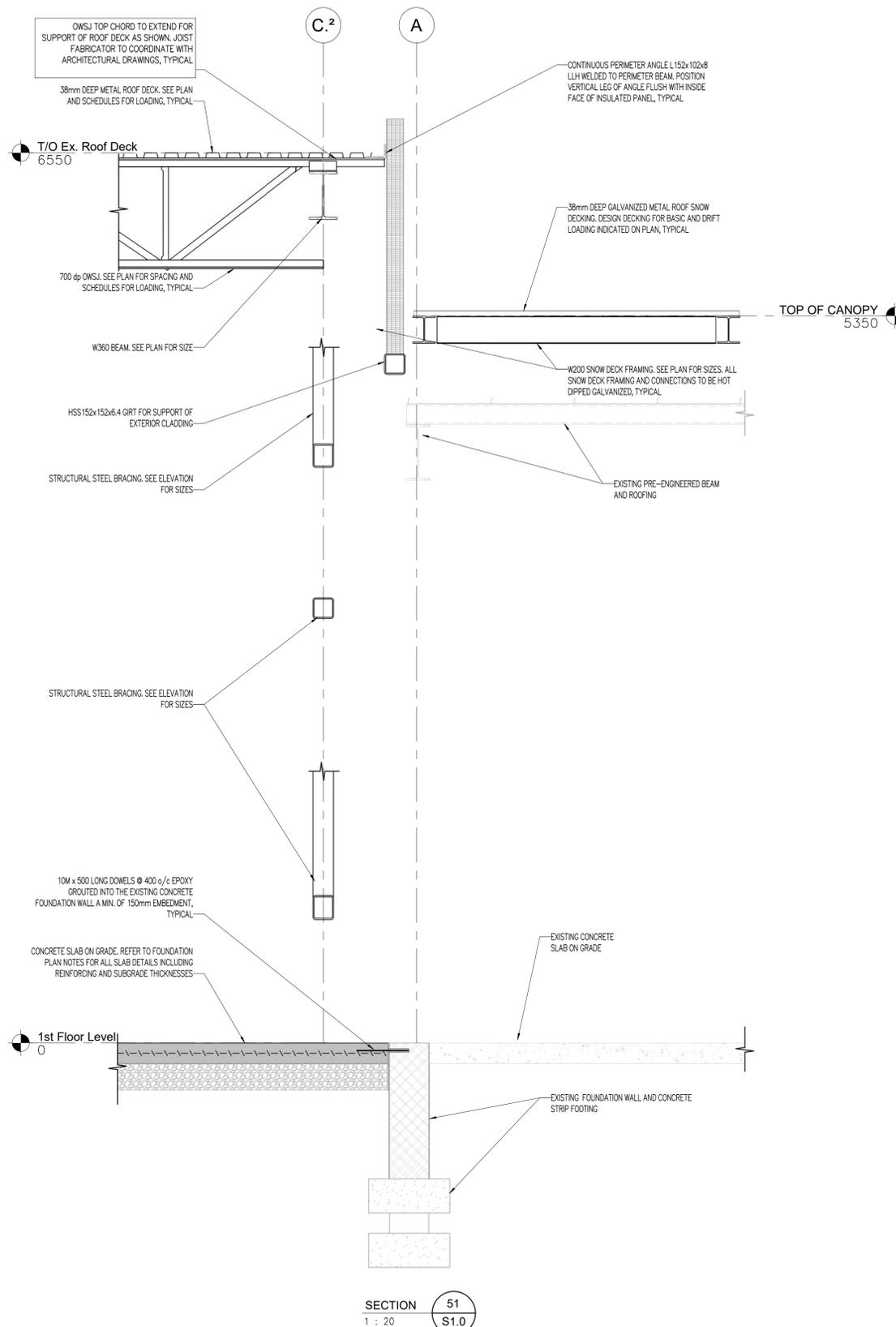
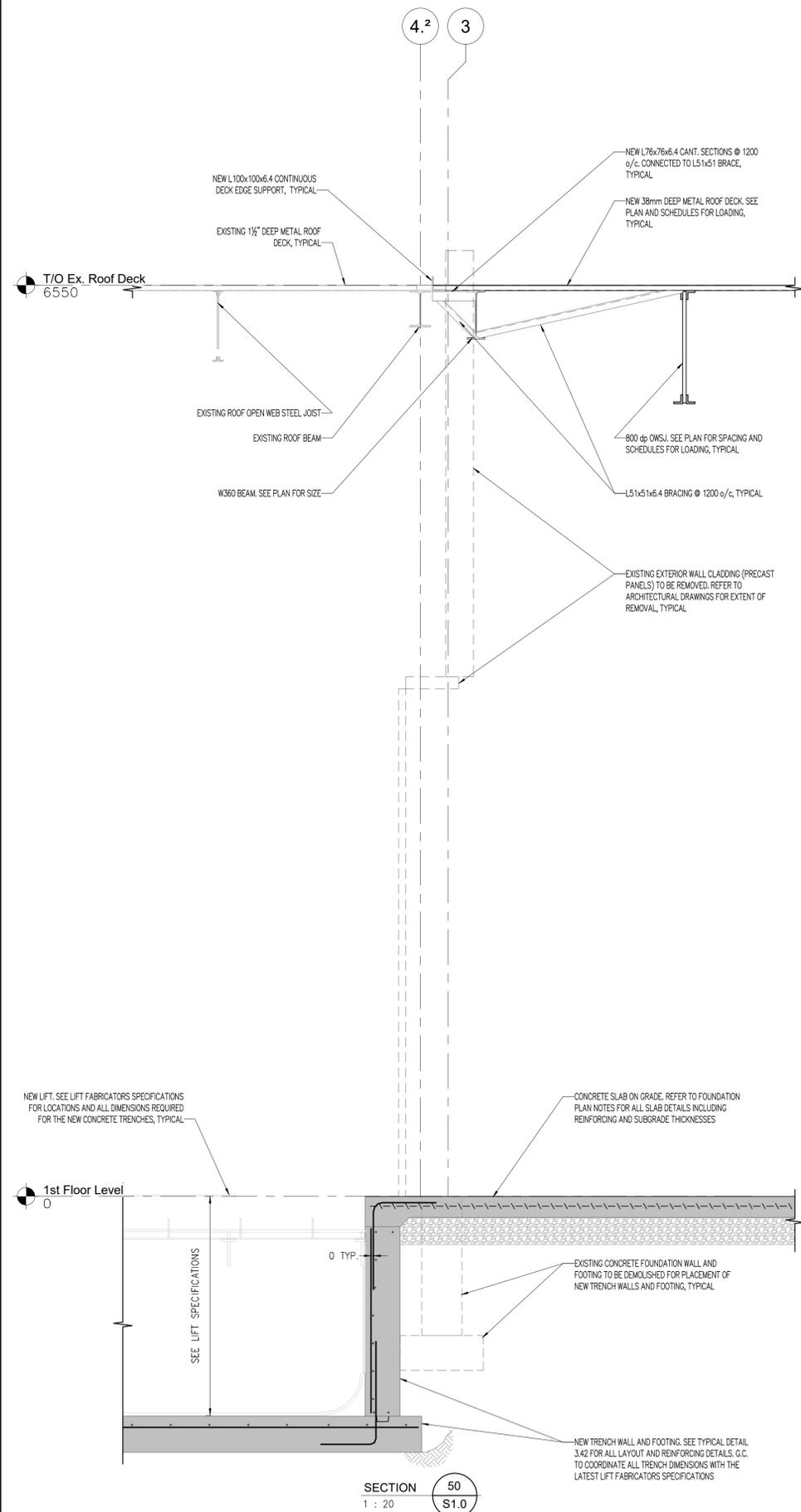
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**S4.4**

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W | www.vbands.com  
E | e@vbands.com

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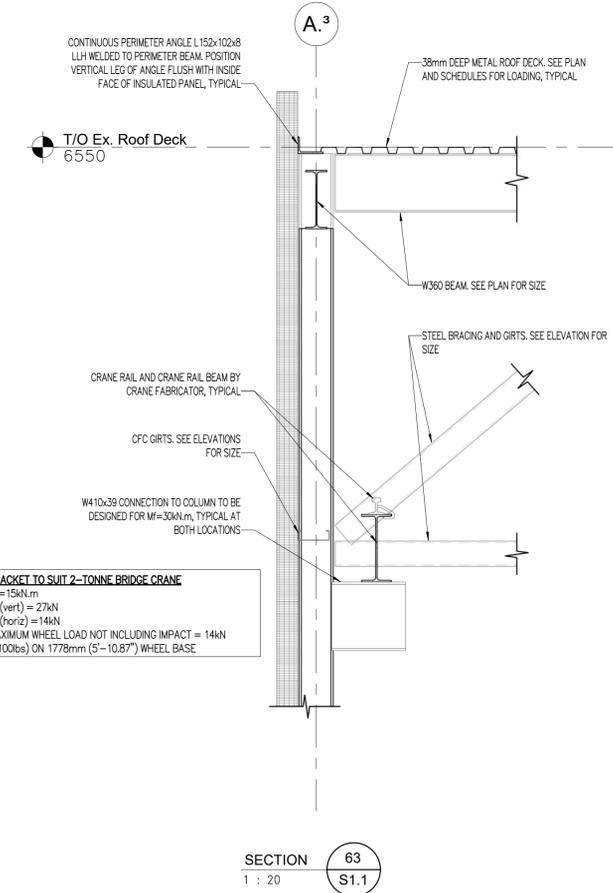
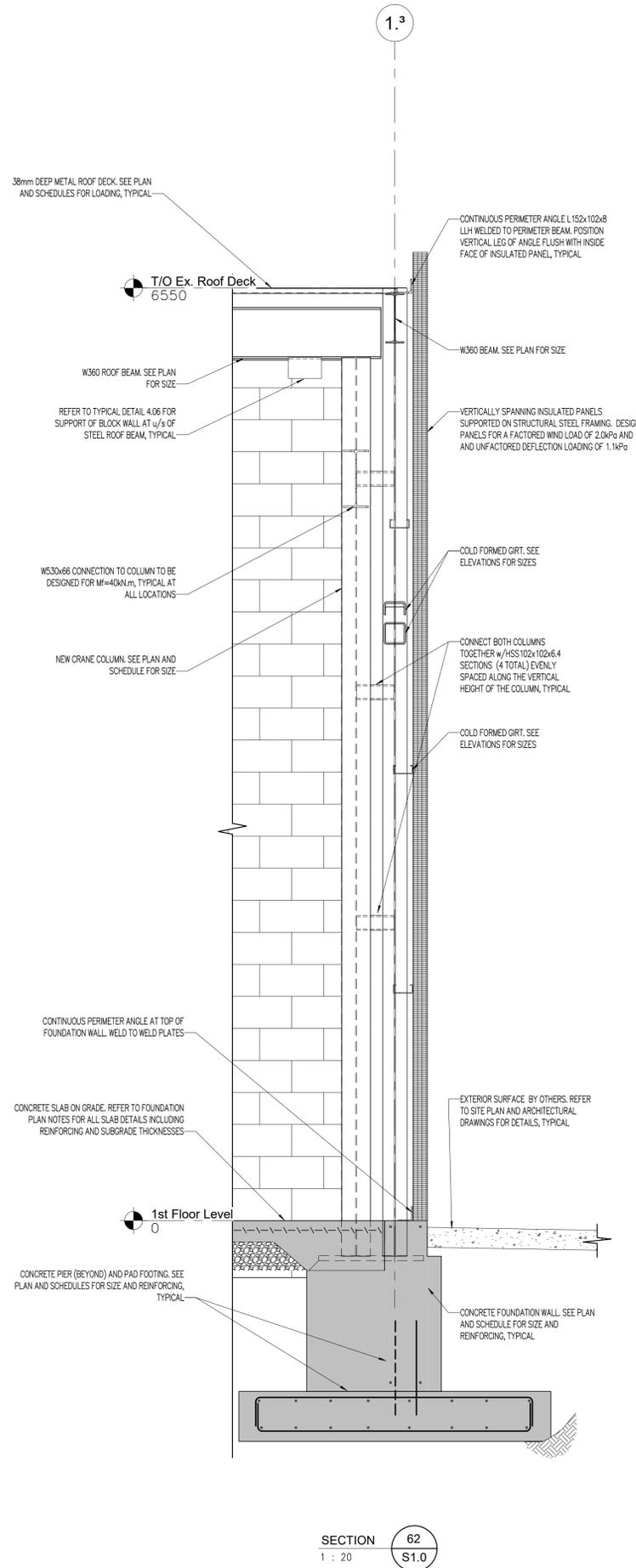
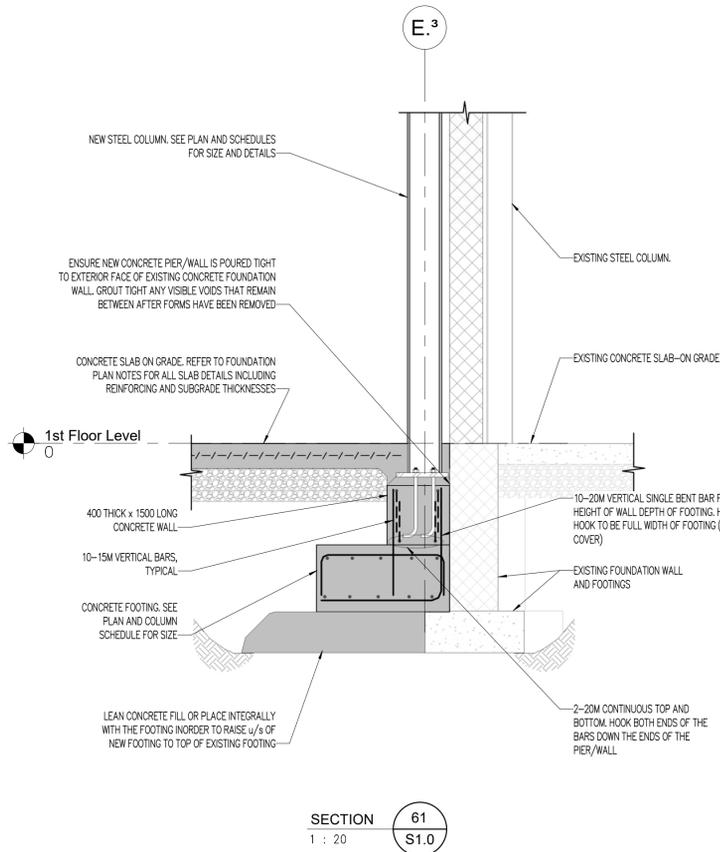
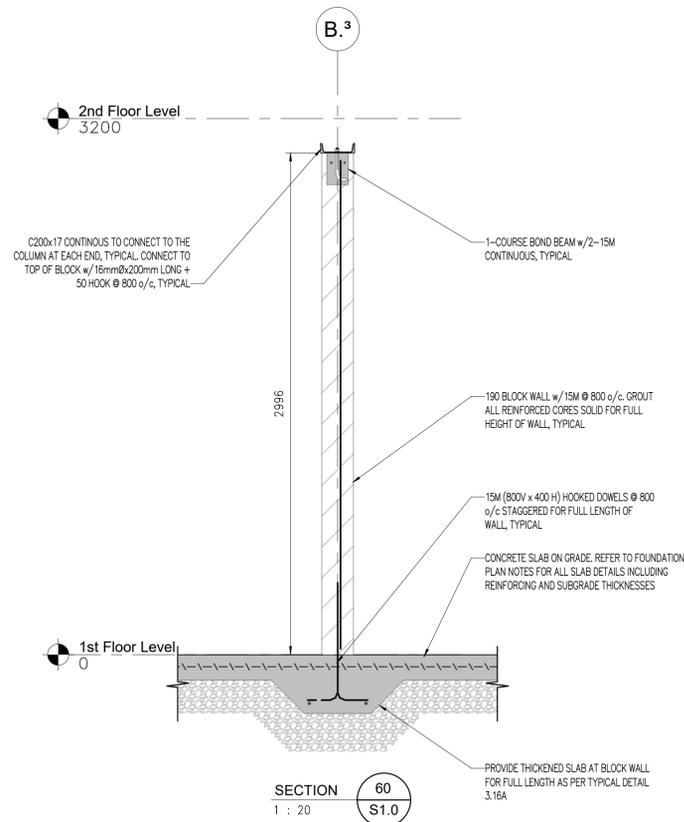
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**S4.5**

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**BRACKET TO SUIT 2-TONNE BRIDGE CRANE**  
 Mf = 15kN.m  
 Vf (vert) = 27kN  
 Vf (horiz) = 14kN  
 MAXIMUM WHEEL LOAD NOT INCLUDING IMPACT = 14kN  
 (3100lbs) ON 1778mm (5'-10.87") WHEEL BASE

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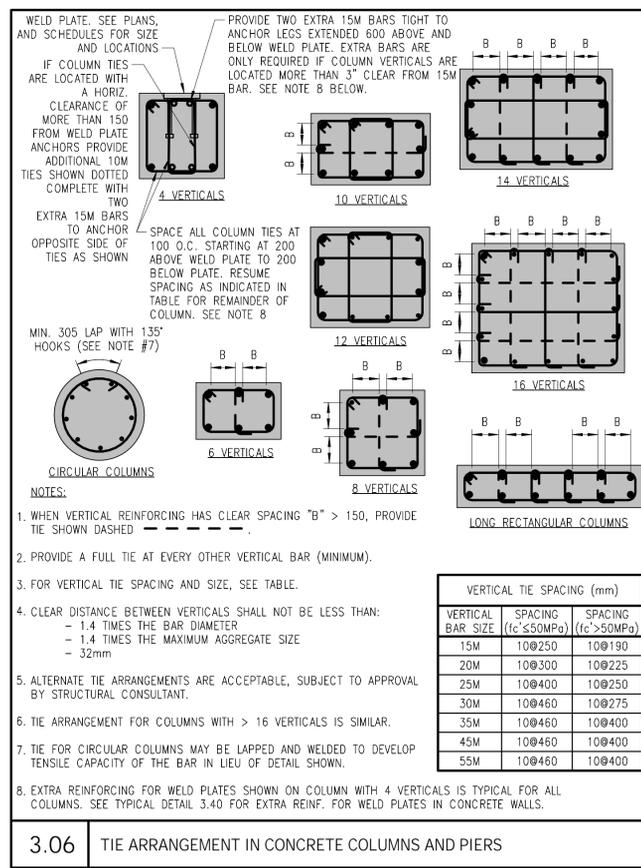
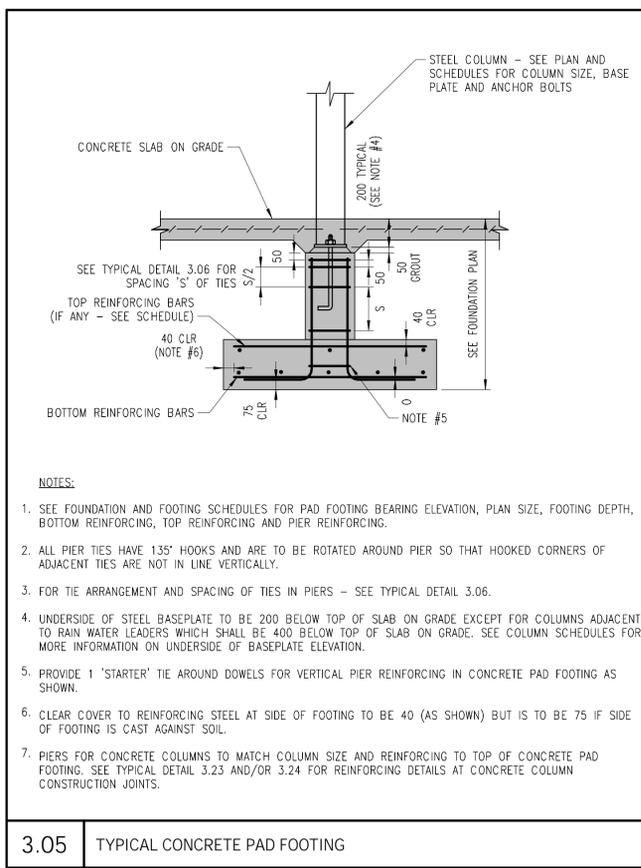
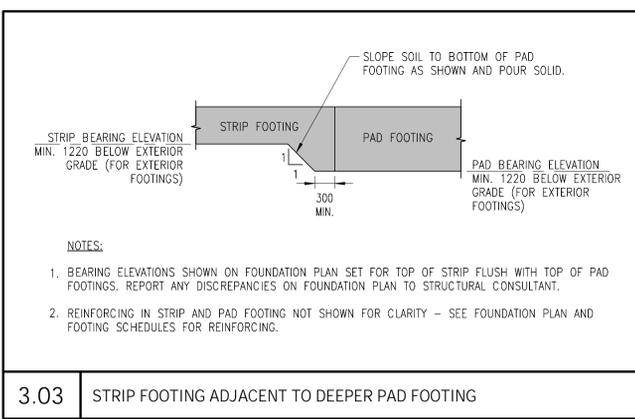
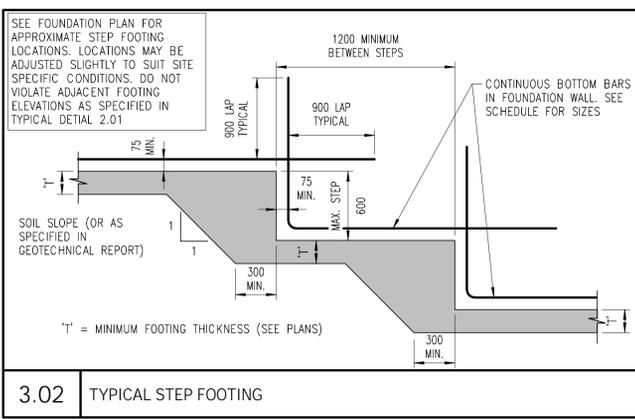
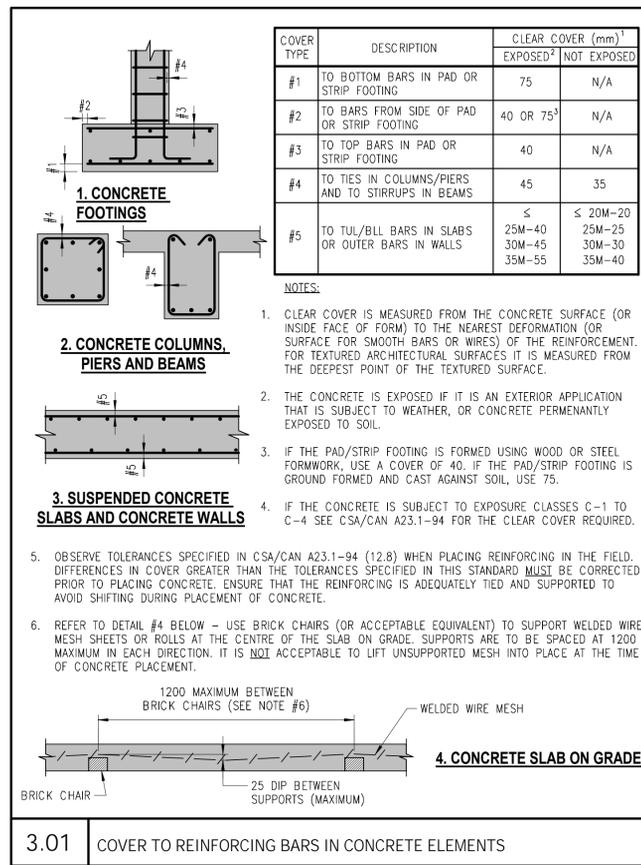
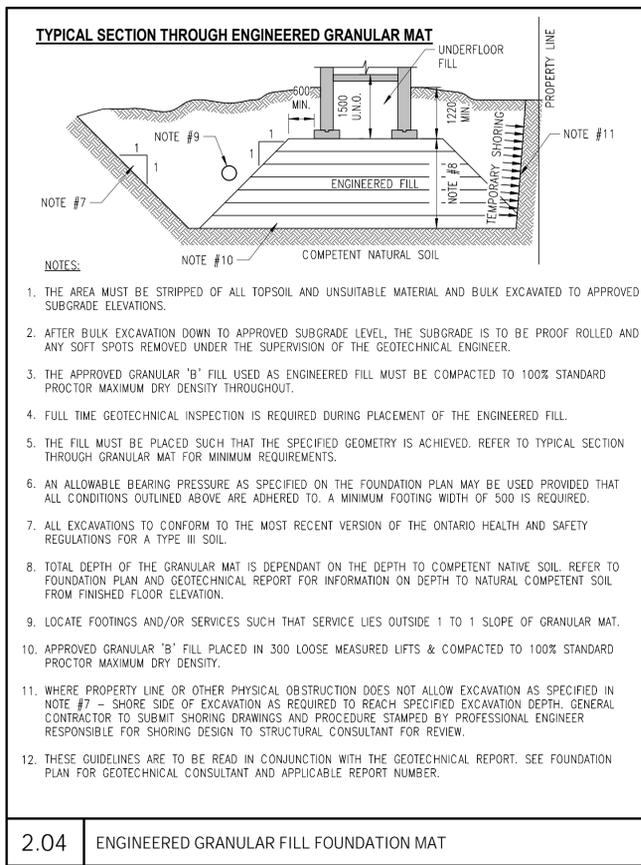
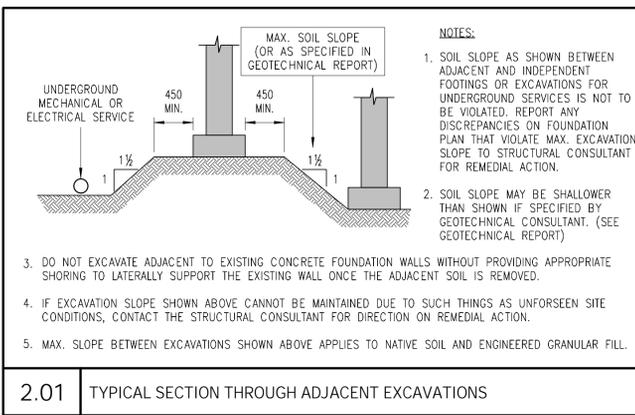
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**S4.6**

REV. #



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STRUCTURAL ENGINEERS

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Niagara Falls, ON, L2E 6A3  
T | 905-357-2030  
W | www.vbands.com  
E | sl@vbands.com

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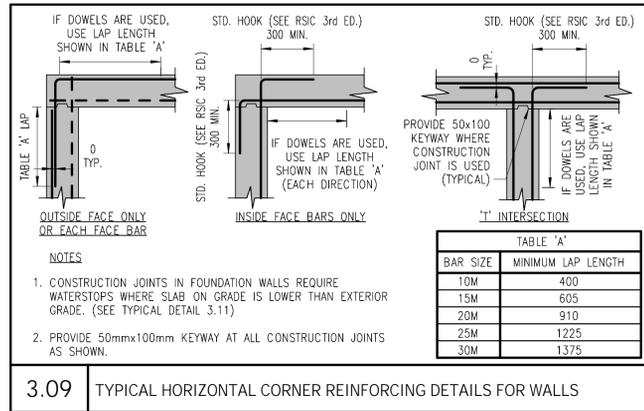
TYPICAL DETAILS

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CHECKED: xx

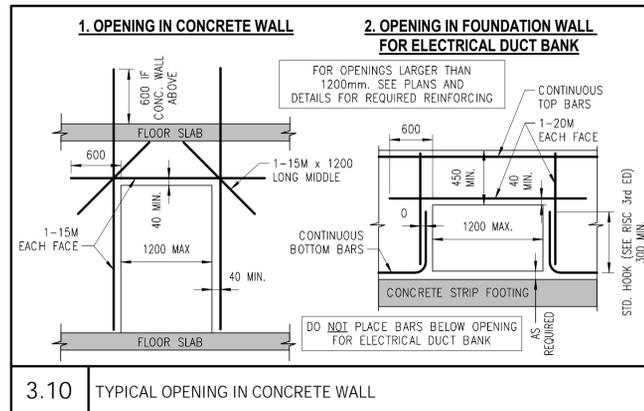
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**S5.1**

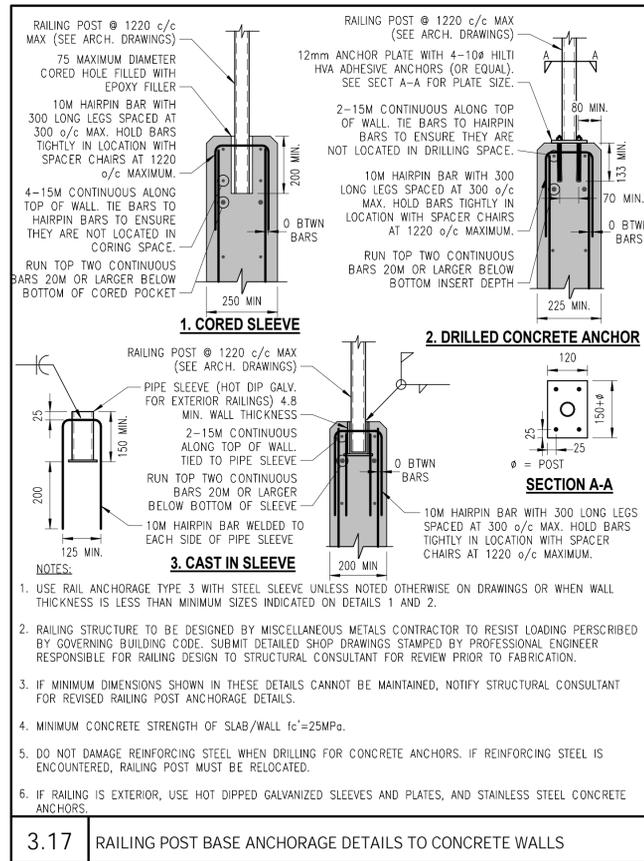
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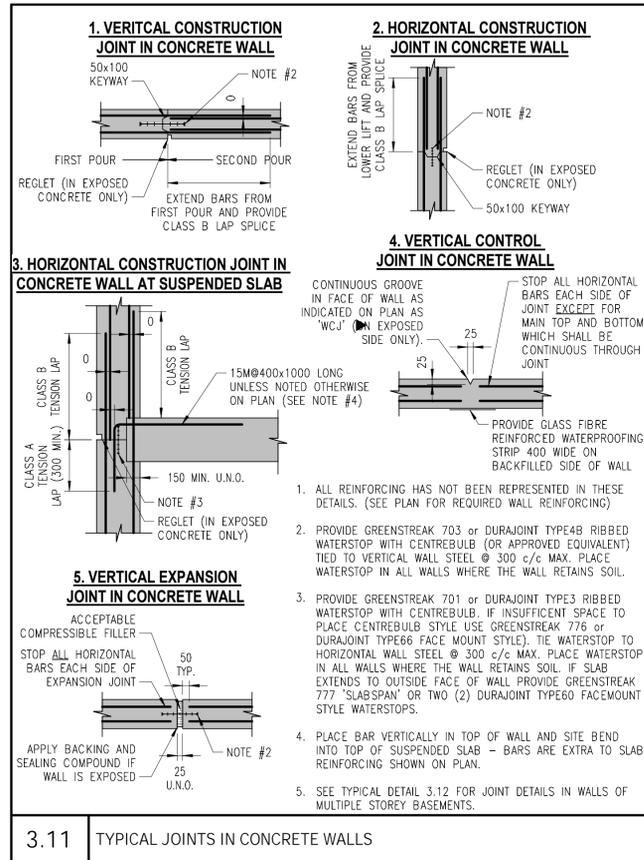
3.09 TYPICAL HORIZONTAL CORNER REINFORCING DETAILS FOR WALLS



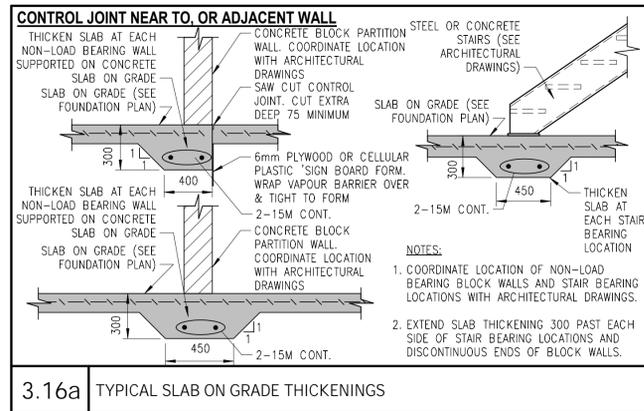
3.10 TYPICAL OPENING IN CONCRETE WALL



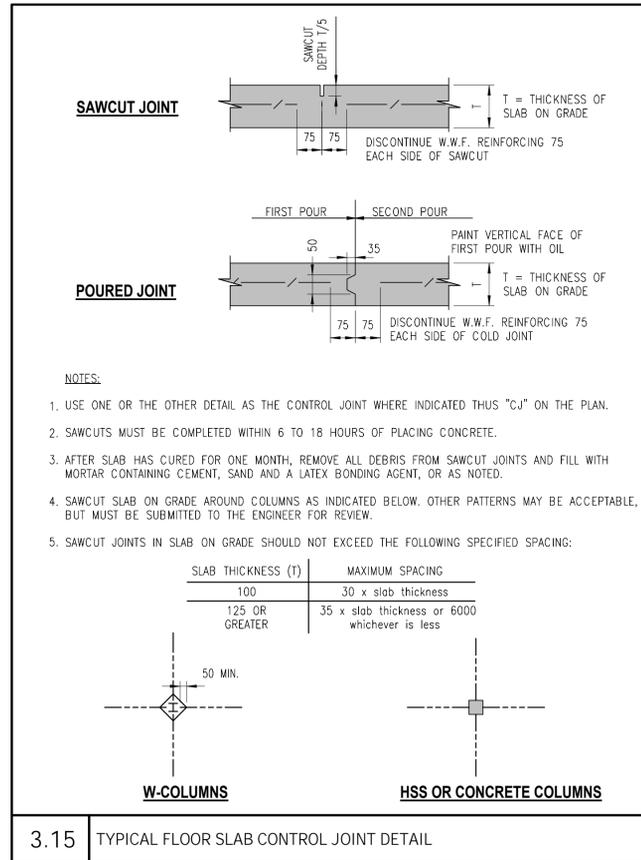
3.17 RAILING POST BASE ANCHORAGE DETAILS TO CONCRETE WALLS



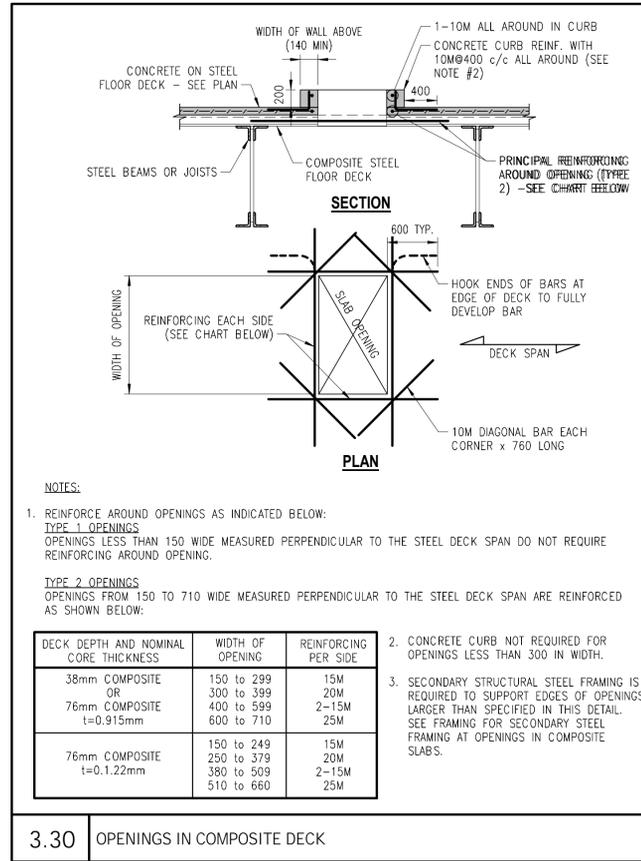
3.11 TYPICAL JOINTS IN CONCRETE WALLS



3.16a TYPICAL SLAB ON GRADE THICKENINGS



3.15 TYPICAL FLOOR SLAB CONTROL JOINT DETAIL



3.30 OPENINGS IN COMPOSITE DECK

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TYPICAL DETAILS

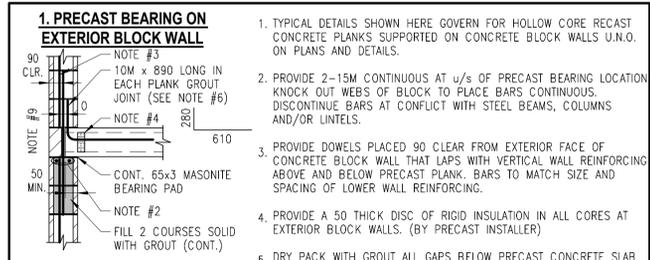
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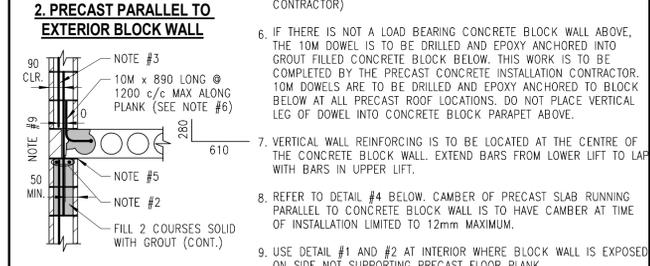
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S5.2

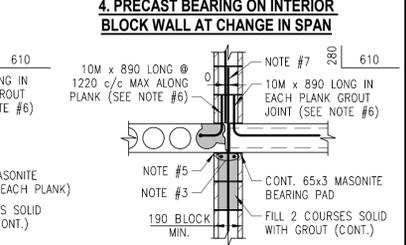
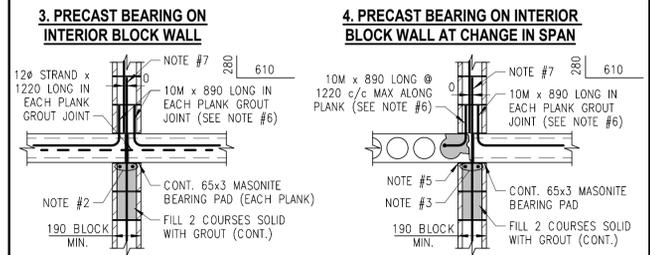
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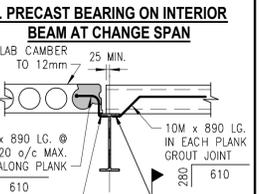
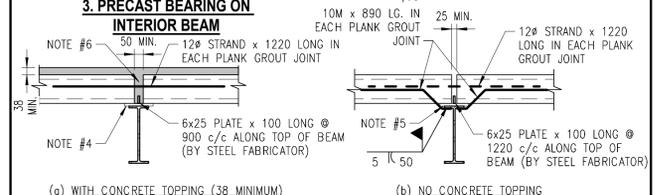
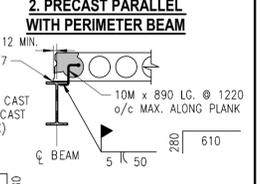
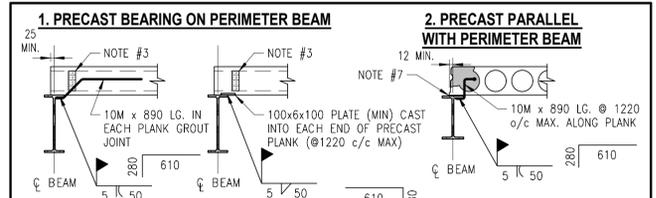
- TYPICAL DETAILS SHOWN HERE GOVERN FOR HOLLOW CORE RECAST CONCRETE PLANKS SUPPORTED ON CONCRETE BLOCK WALLS U.N.O. ON PLANS AND DETAILS.
- PROVIDE 2-15M CONTINUOUS AT u/s OF PRECAST BEARING LOCATION KNOCK OUT WEBS OF BLOCK TO PLACE BARS CONTINUOUS. DISCONTINUE BARS AT CONFLICT WITH STEEL BEAMS, COLUMNS AND/OR LINTELS.
- PROVIDE DOWELS PLACED 90 CLEAR FROM EXTERIOR FACE OF CONCRETE BLOCK WALL THAT LAPS WITH VERTICAL WALL REINFORCING ABOVE AND BELOW PRECAST PLANK. BARS TO MATCH SIZE AND SPACING OF LOWER WALL REINFORCING.
- PROVIDE A 50 THICK DISC OF RIGID INSULATION IN ALL CORES AT EXTERIOR BLOCK WALLS. (BY PRECAST INSTALLER)
- DRY PACK WITH GROUT ALL GAPS BELOW PRECAST CONCRETE SLAB PRIOR TO PLACING CONCRETE BLOCK WALL ABOVE. (BY MASONRY CONTRACTOR)



- IF THERE IS NOT A LOAD BEARING CONCRETE BLOCK WALL ABOVE, THE 10M DOWEL IS TO BE DRILLED AND EPOXY ANCHORED INTO GROUT FILLED CONCRETE BLOCK BELOW. THIS WORK IS TO BE COMPLETED BY THE PRECAST CONCRETE INSTALLATION CONTRACTOR. 10M DOWELS ARE TO BE DRILLED AND EPOXY ANCHORED TO BLOCK BELOW AT ALL PRECAST ROOF LOCATIONS. DO NOT PLACE VERTICAL LEG OF DOWEL INTO CONCRETE BLOCK PARAPET ABOVE.
- VERTICAL WALL REINFORCING IS TO BE LOCATED AT THE CENTRE OF THE CONCRETE BLOCK WALL. EXTEND BARS FROM LOWER LIFT TO LAF WITH BARS IN UPPER LIFT.
- REFER TO DETAIL #4 BELOW. CAMBER OF PRECAST SLAB RUNNING PARALLEL TO CONCRETE BLOCK WALL IS TO HAVE CAMBER AT TIME OF INSTALLATION LIMITED TO 12mm MAXIMUM.
- USE DETAIL #1 AND #2 AT INTERIOR WHERE BLOCK WALL IS EXPOSED ON SIDE NOT SUPPORTING PRECAST FLOOR PLANK.

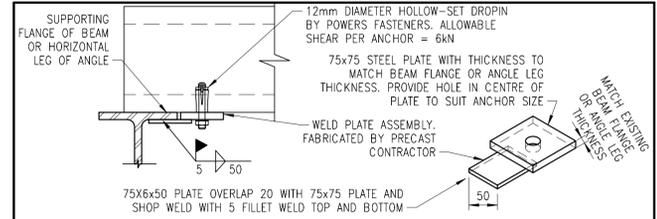


3.31 HOLLOW CORE PRECAST FLOOR PLANKS SUPPORTED ON CONCRETE BLOCK WALLS OR CAST-IN-PLACE CONCRETE (CONCRETE BLOCK WALLS SHOWN, CAST-IN-PLACE CONCRETE SIMILAR)



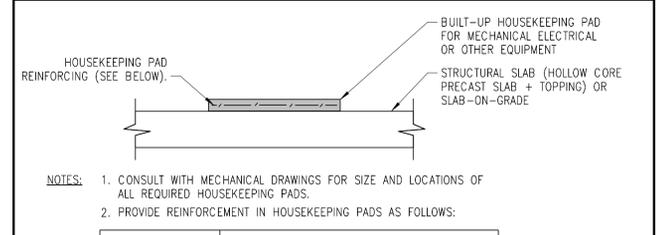
- TYPICAL DETAILS SHOWN HERE GOVERN FOR HOLLOW CORE PRECAST CONCRETE PLANKS SUPPORTED ON STRUCTURAL STEEL BEAMS U.N.O. ON PLANS AND DETAILS.
- REFER TO DETAIL #1 ABOVE AND TYP DETAIL 3.32b. ANY CONNECTION DETAIL SHOWN (WELDED REBAR IN GROUT JOINT, WELD PLATE CAST INTO u/s OF PLANK OR POST INSTALLED PLATE WITH 10M WELDED BARS) IS ACCEPTABLE. PRECAST DESIGN ENGINEER TO ENSURE THAT CONNECTION DETAIL USED IS ABLE TO SAFELY TRANSMIT DIAPHRAGM LOADS GIVEN ON EACH FRAMING PLAN.
- PROVIDE A 50 THICK DISC OF RIGID INSULATION IN CORES AT EXTERIOR WALLS. (BY PRECAST INSTALLER)
- IF BEAM FLANGE WIDTH IS 190 OR LESS, PROVIDE 205 WIDE x 6 THICK CONTINUOUS PLATE WELDED TO TOP FLANGE OF STEEL BEAM TO PROVIDE ADEQUATE BEARING SUPPORT FOR PRECAST PLANKS.
- IF BEAM FLANGE WIDTH IS 165 OR LESS, PROVIDE 180 WIDE x 6 THICK CONTINUOUS PLATE WELDED TO TOP FLANGE OF STEEL BEAM TO PROVIDE ADEQUATE BEARING SUPPORT FOR PRECAST PLANKS.
- CONCRETE FINISHER TO ENSURE THAT CONCRETE COMPLETELY FILLS GAP BETWEEN ENDS OF PRECAST FLOOR PLANKS WHEN PLACING CONCRETE TOPPING.
- DRY PACK WITH GROUT ALL GAPS BELOW PRECAST CONCRETE SLAB. (BY GENERAL CONTRACTOR)
- ALL FIELD WELDS SHOWN ABOVE TO BE COMPLETED BY PRECAST PLANK ERECTION CONTRACTOR.

3.32 HOLLOW CORE PRECAST FLOOR PLANKS SUPPORTED ON STEEL BEAMS



- ALSO REFER TO TYPICAL DETAIL 3.32. THIS DETAIL IS PROVIDED AS AN ALTERNATE TO PROVIDING CAST IN STEEL PLATES. THIS ALTERNATE IS MEANT TO BE USED IN CONJUNCTION WITH 10M REBARS WELDED TO UNDERSIDE OF BEAM FLANGE OR ANGLE LEG. (IE 10M BARS ARE TO BE PLACED AT JOINTS BETWEEN PRECAST PLANKS AT 1200 O.C. IN ADDITION TO ABOVE DETAILED PLATE ASSEMBLIES TO TRANSFER HORIZONTAL DECK SHEARS.) SUPPLY AND INSTALLATION OF THESE SHEAR PLATES COMPLETE WITH WELDING IS BY THE PRECAST PLANK SUPPLIER AND ERECTOR.
- REFER TO PLANS FOR SHEAR LOADS TO BE TRANSFERRED FROM PRECAST PLANK TO STRUCTURAL STEEL SHAPE. TO DETERMINE NUMBER OF PLATES REQUIRED DIVIDE THE TOTAL SHEAR LOAD TO BE TRANSFERRED TO LATERAL RESISTING ELEMENT BY 6 kN AND ROUND UP BY ONE PLATE. DISTRIBUTE PLATES EQUALLY ALONG LENGTH OF STRUCTURAL STEEL MEMBER.

3.32b ALTERNATE SHEAR PLATE CONNECTION BETWEEN HOLLOW CORE PRECAST PLANKS AND STRUCTURAL STEEL SUPPORTS

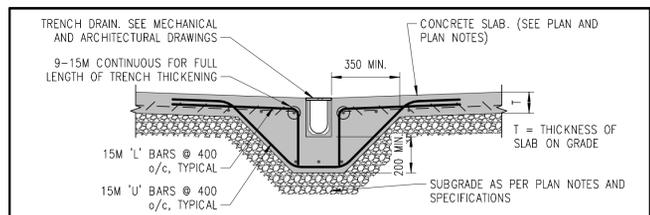


NOTES:

- CONSULT WITH MECHANICAL DRAWINGS FOR SIZE AND LOCATIONS OF ALL REQUIRED HOUSEKEEPING PADS.
- PROVIDE REINFORCEMENT IN HOUSEKEEPING PADS AS FOLLOWS:

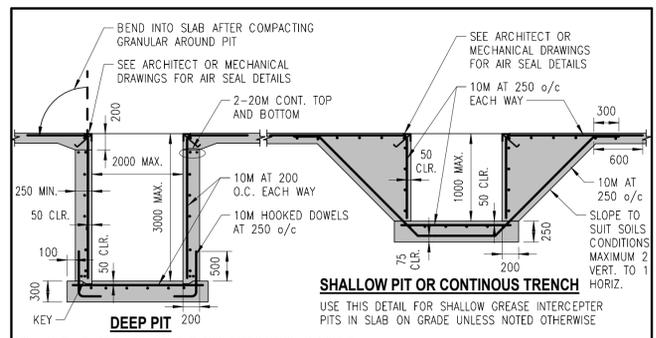
PAD THICKNESS "t" (mm)	REINFORCEMENT
100	152x152 MW18.7xMW18.7 WWF ONE LAYER
150	10M @ 300 MIDDLE EACH WAY

3.33 EQUIPMENT HOUSEKEEPING PADS

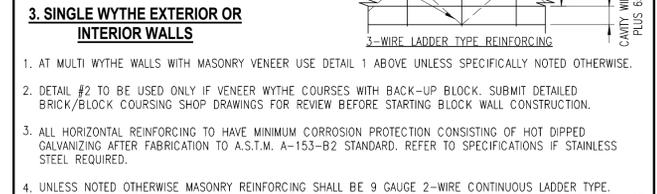
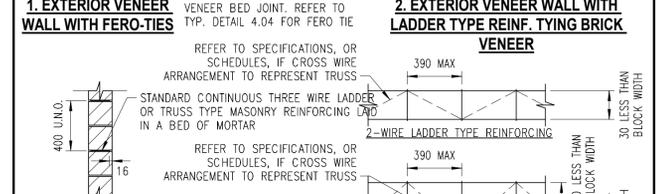
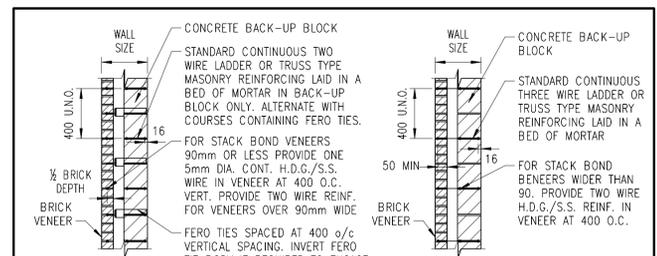


- SAW-CUT PERIMETER OF THE SLAB TO BE DEMOLISHED AND REMOVED (IF APPLICABLE).
- REMOVE CONCRETE AND FILL FOR THE INSTALLATION OF THE MECHANICAL SERVICES.
- INSTALL MECHANICAL SERVICES AND BACKFILL WITH GRANULAR 'A' COMPACTED. TO A MINIMUM OF 98% SPMD OR HIGHER AS DIRECTED BY THE SOILS REPORT.
- PLACE CONCRETE, WITH PROPERTIES SPECIFIED IN THE CONCRETE SPECIFICATIONS.
- ALLOW CONCRETE TO CURE PRIOR TO LOADING THE CONCRETE SLAB. (REFER TO CONCRETE SPECIFICATIONS)

3.37b TYPICAL SLAB ON GRADE PREFABRICATED TRENCH DRAIN REINFORCING

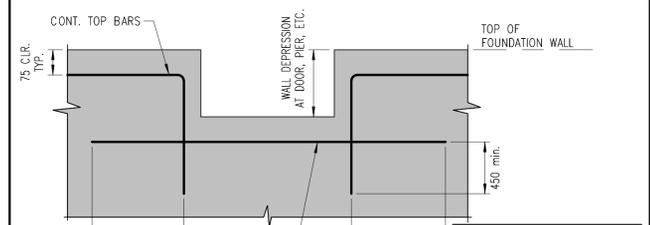


3.42 TYPICAL PIT AND TRENCH DETAILS



- AT MULTI WYTHE WALLS WITH MASONRY VENEER USE DETAIL 1 ABOVE UNLESS SPECIFICALLY NOTED OTHERWISE.
- DETAIL #2 TO BE USED ONLY IF VENEER WYTHE COURSES WITH BACK-UP BLOCK. SUBMIT DETAILED BRICK/BLOCK COURSING SHOP DRAWINGS FOR REVIEW BEFORE STARTING BLOCK WALL CONSTRUCTION.
- ALL HORIZONTAL REINFORCING TO HAVE MINIMUM CORROSION PROTECTION CONSISTING OF HOT DIPPED GALVANIZING AFTER FABRICATION TO A.S.T.M. A-153-B2 STANDARD. REFER TO SPECIFICATIONS IF STAINLESS STEEL REQUIRED.
- UNLESS NOTED OTHERWISE MASONRY REINFORCING SHALL BE 9 GAUGE 2-WIRE CONTINUOUS LADDER TYPE. (REFER TO LOAD BRG WALL SCHEDULE AND TYPICAL DETAILS FOR MINIMUM WIRE SIZES AND IF TRUSS TYPE WIRE REINFORCING IS REQUIRED IN SEISMIC ZONES.)
- THE OVERALL WIDTH OF THE MASONRY REINFORCING SHALL BE APPROX. 65 LESS THAN THE THICKNESS OF THE WALL. THE CROSS WIRES SHOULD NOT HAVE A DIP.
- LAP THE REINFORCING 200 AT SPLICES (300 FOR PLAIN WIRE).
- USE PREFABRICATED CORNERS AND TEES IN ALL MASONRY WALL CORNERS AND INTERSECTIONS.
- PROVIDE EXTRA LAYERS OF MASONRY REINF. IN FIRST COURSE ABOVE AND BELOW ALL BLOCK OPENINGS.

4.02 TYPICAL CONTINUOUS HORIZONTAL REINFORCING IN ALL MASONRY WALLS



NOTES:

- REFER TO PLANS AND SCHEDULES FOR REINFORCING STEEL REQUIREMENTS.

TABLE 'A'	
BAR SIZE	MINIMUM LAP LENGTH
10M	400
15M	605
20M	910
25M	1225
30M	1375

3.39 TYPICAL LAP DETAIL FOR CONTINUOUS TOP REBAR AT PIER AND DOOR DEPRESSIONS IN WALLS

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1 Dec 2024



**VBSA**  
VanBoxmeer Stranges Antonio  
STRUCTURAL ENGINEERS

4082 Portage Rd., Unit 1  
Niagara Falls, ON, L2E 6A3  
T | 905-357-2030  
W | www.vbands.com  
E | e@vbands.com

Niagara Parks Commission

WEGO Garage Addition

7805 Niagara River Pkwy, Niagara Falls, ON

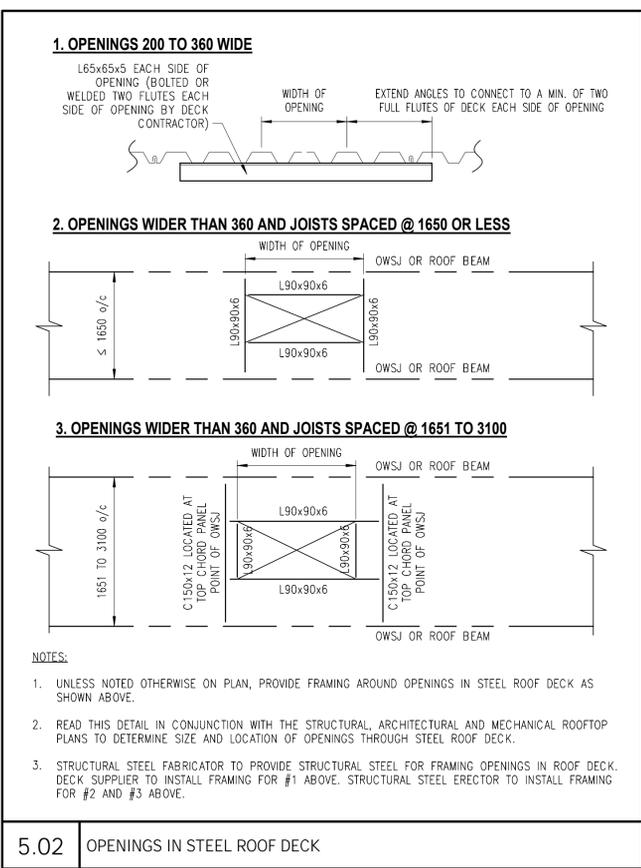
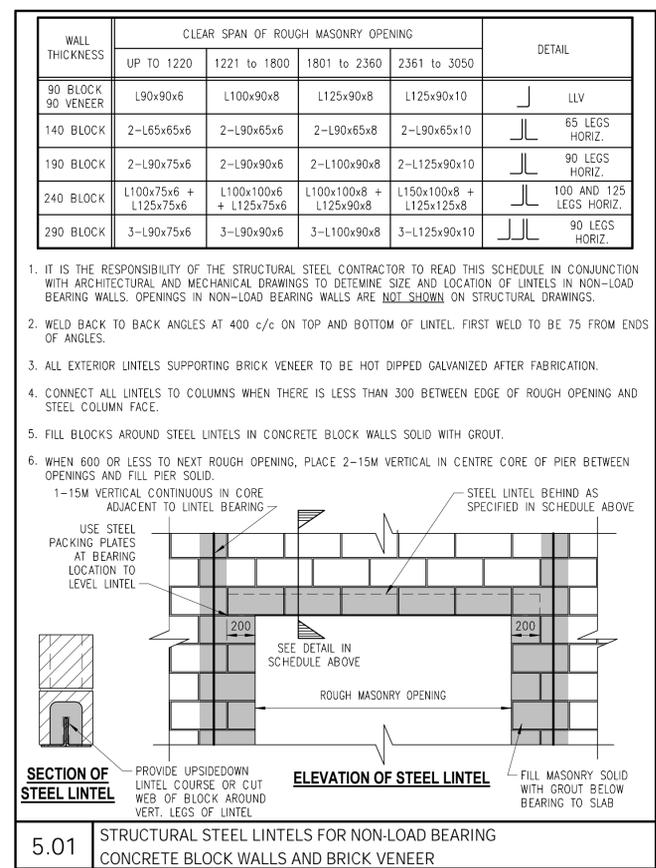
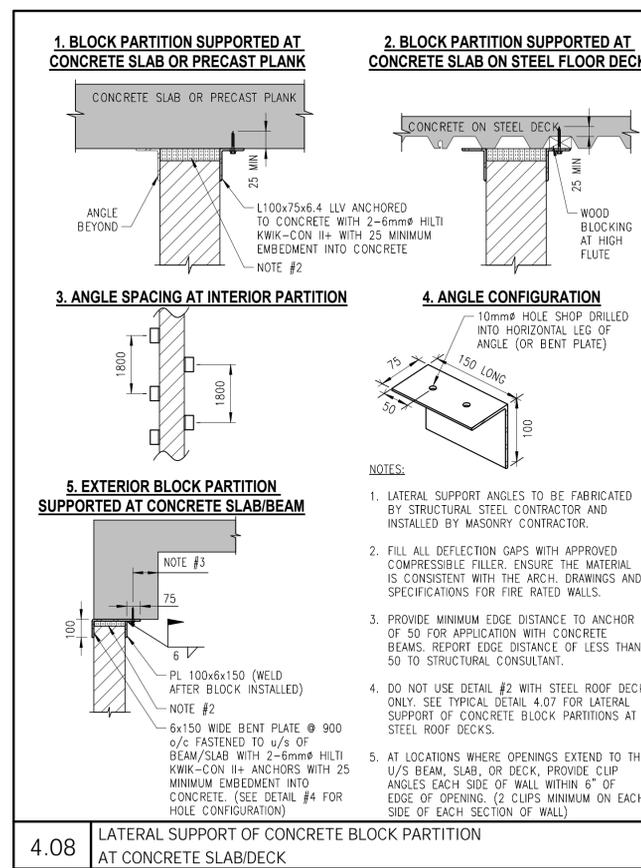
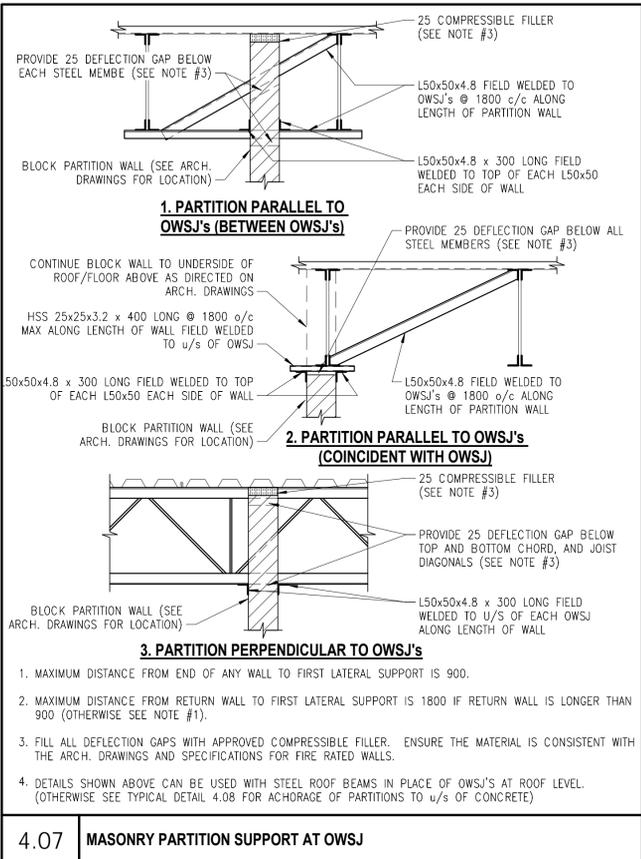
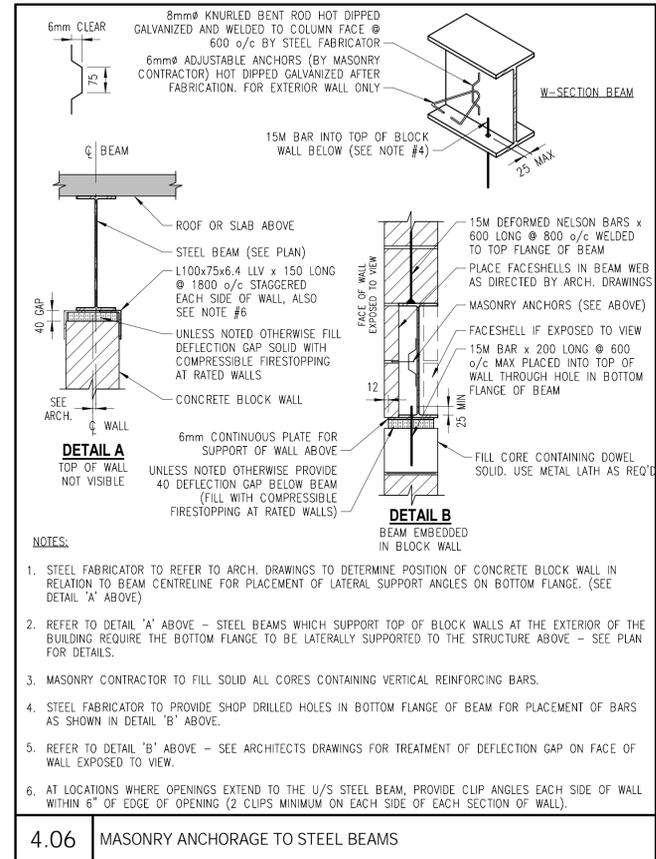
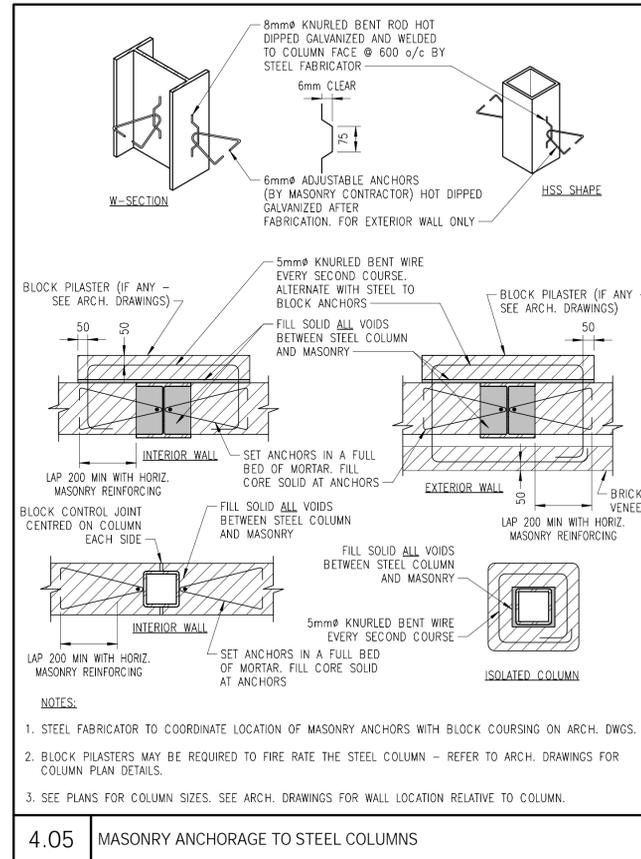
TYPICAL DETAILS

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PROJECT NO.: 24175  
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**S5.3**

REV.#



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**VBSA**  
VanBoxmeer Stranges Antonio  
STRUCTURAL ENGINEERS

4082 Portage Rd., Unit 1  
Niagara Falls, ON, L2E 6A3  
T | 905-357-2030  
W | www.vbands.com  
E | e@vbands.com

Niagara Parks Commission

WEGO Garage Addition

7805 Niagara River Pkwy, Niagara Falls, ON

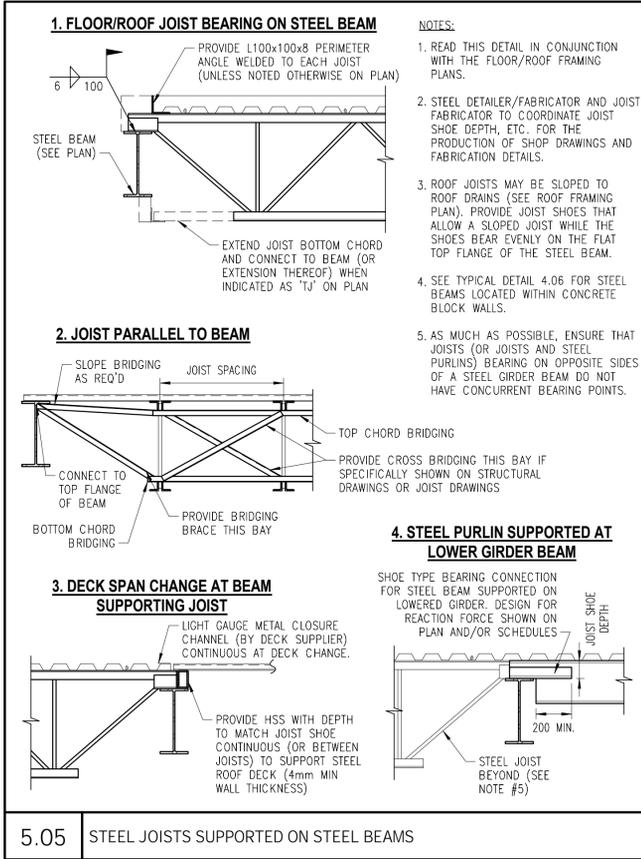
TYPICAL DETAILS

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DATE: 2024-12-02 12:02:53 PM  
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CHECKED: Checker

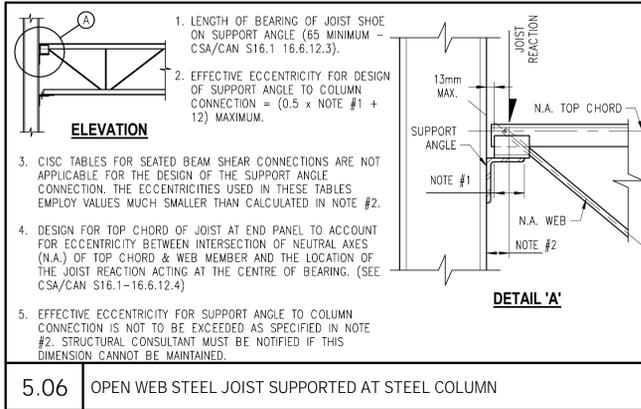
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**S5.4**

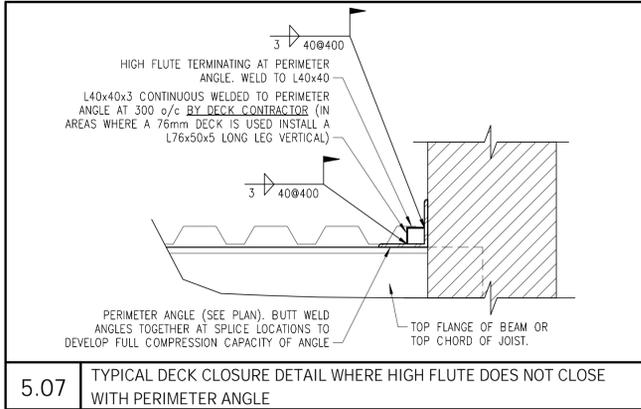
REV.#



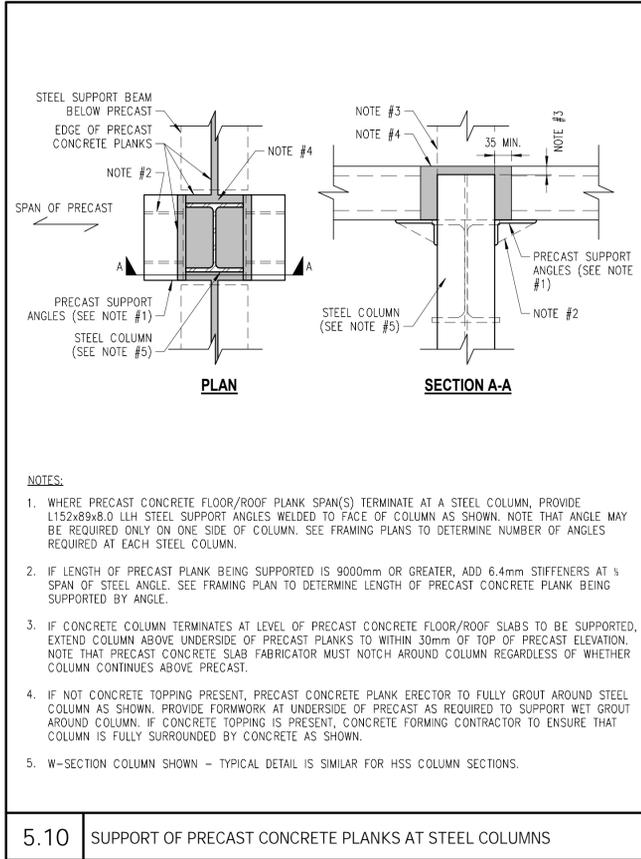
5.05 STEEL JOISTS SUPPORTED ON STEEL BEAMS



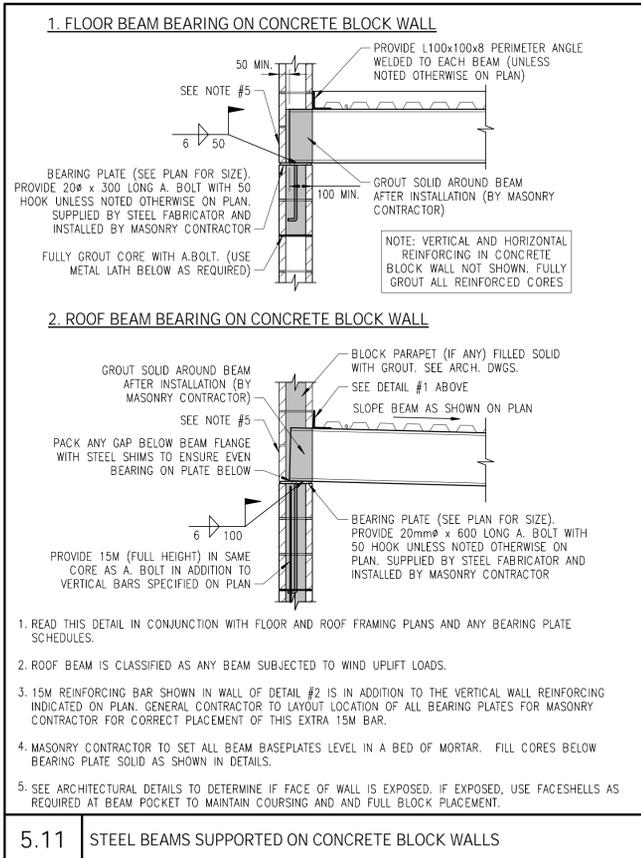
5.06 OPEN WEB STEEL JOIST SUPPORTED AT STEEL COLUMN



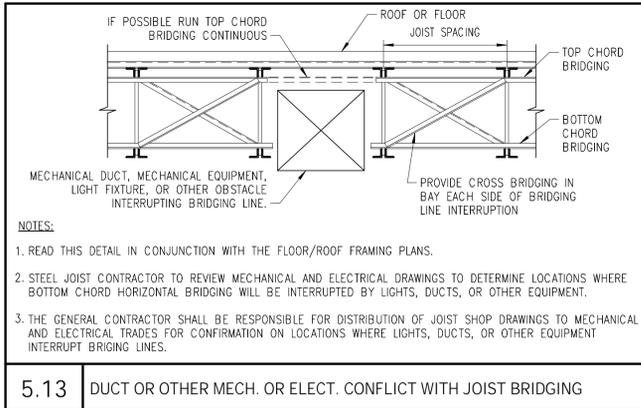
5.07 TYPICAL DECK CLOSURE DETAIL WHERE HIGH FLUTE DOES NOT CLOSE WITH PERIMETER ANGLE



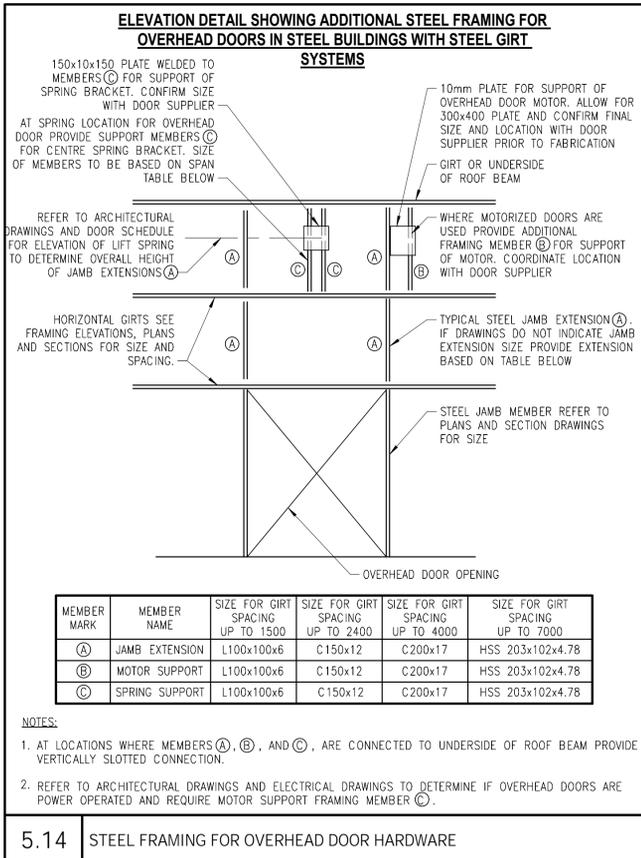
5.10 SUPPORT OF PRECAST CONCRETE PLANKS AT STEEL COLUMNS



5.11 STEEL BEAMS SUPPORTED ON CONCRETE BLOCK WALLS



5.13 DUCT OR OTHER MECH. OR ELECT. CONFLICT WITH JOIST BRIDGING



5.14 STEEL FRAMING FOR OVERHEAD DOOR HARDWARE

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4082 Portage Rd., Unit 1  
Niagara Falls, ON, L2E 6A3  
T | 905-357-2030  
W | www.vbands.com  
E | sl@vbands.com

Niagara Parks Commission

WEGO Garage Addition

7805 Niagara River Pkwy, Niagara Falls, ON

TYPICAL DETAILS

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**S5.5**

REV. #



LOUVRE SCHEDULE												
TAG	SYSTEM	LOCATION	SIZE		MODEL	AIRFLOW		REMARKS				
			mm	in		L/S	CFM					
L-1	GARAGE VENTILATION	MECHANICAL ROOM	1219x1628	48"x64"	2435	3,898	8,260	EXTRUDED ALUMINUM - 6063-T5 ALLOY, 0.081" (2.06 mm) FRAME THICKNESS, 0.081" (2.06 mm) BLADE THICKNESS, 35° BLADE ANGLE, 3.5" (89 mm) BLADE CENTRES, 19 GA. GALVANIZED BIRD SCREEN - 1/2" x 1/2" OPENINGS, MILL FINISH				

NOTES:  
1. SPECIFICATIONS BASED ON VENTEX

HEATING COIL SCHEDULE																					
TAG	AREA SERVED	AIRFLOW		EAT DB		LAT DB		A.P.D	FLUID	EWT		LWT		FLOW		W.P.D.		TOTAL CAPACITY		REMARKS	
		L/S	CFM	°C	°F	°C	°F			Pa	in. w.c.	°C	°F	°C	°F	L/S	us gpm	kPa	ft. w.c.		KW
HC-1	AHU-1 HEATING	3,728	7,900	-18.0	-0.4	3.7	38.7	15	.07	40% PROPYLENE GLYCOL	65.6	150	54.4	130	2.3	35.7	10.46	3.5	97.3	332.3	-
HRC-S	AHU-1 SUPPLY HEAT RECOVERY	3,728	7,900	-18.0	-0.4	-6.6	20.2	180	.72	50% PROPYLENE GLYCOL	-1.7	29	-5.0	23	4.1	65.0	51.41	17.2	51.4	175.6	-
HRC-E	AHU-1 EXHAUST HEAT RECOVERY	1,699	3,600	4.4	40.0	-5.2	22.7	70	.29	50% PROPYLENE GLYCOL	-5.0	23	-1.7	29	4.1	65.0	46.93	15.7	51.7	176.6	-

NOTES:  
1. SPECIFICATIONS BASED ON NORTEK AIR SOLUTIONS

PUMP SCHEDULE																			
TAG	SERVICE	LOCATION	MANUFACTURER	MODEL	FLUID	SERVICE DUTY	TYPE	CONTROL	SIZE	FLOW		HEAD		EFF %	RPM	ELECTRICAL DATA			REMARKS
										L/S	USGPM	M	ft.			VOLTAGE	KW	HP	
P-B-1	BOILER PUMP	GROUND FLOOR MECHANICAL ROOM	GRUNDFOS	UPXML	40% PROPYLENE GLYCOL	CONTINUOUS	INLINE CENTRIFUGAL	BOILER	25-124	1.4	22	3.7	12	-	-	120/1/60	0.12	0.17	SUPPLIED BY BOILER MANUFACTURER, POWERED FROM BOILER
P-B-2	BOILER PUMP	GROUND FLOOR MECHANICAL ROOM	GRUNDFOS	UPXML	40% PROPYLENE GLYCOL	CONTINUOUS	INLINE CENTRIFUGAL	BOILER	25-124	1.4	22	3.7	12	-	-	120/1/60	0.12	0.17	
P-G-1	GARAGE RADIANT HEATING	GROUND FLOOR MECHANICAL ROOM	GRUNDFOS	MAGNA3	40% PROPYLENE GLYCOL	PARALLEL	INLINE CENTRIFUGAL	-	50-150 F	0.9	14.7	11.6	38	-	-	120/1/60	0.75	1	
P-G-2	GARAGE RADIANT HEATING	GROUND FLOOR MECHANICAL ROOM	GRUNDFOS	MAGNA3	40% PROPYLENE GLYCOL	PARALLEL	INLINE CENTRIFUGAL	-	50-150 F	0.9	14.7	11.6	38	-	-	120/1/60	0.75	1	
P-G-3	HEAT RECOVERY COILS	GROUND FLOOR MECHANICAL ROOM	GRUNDFOS	MAGNA3	50% PROPYLENE GLYCOL	CONTINUOUS	INLINE CENTRIFUGAL	-	100-120 F	4.1	65	11.9	39	-	-	230/1/60	1.12	2	
P-RM3	STORAGE ROOM RADIANT HEATING	GROUND FLOOR MECHANICAL ROOM	GRUNDFOS	MAGNA3	40% PROPYLENE GLYCOL	CONTINUOUS	INLINE CENTRIFUGAL	-	32-100 F	0.2	3.7	9.8	32	-	-	120/1/60	0.19	0.25	
P-HC	HC-1 PUMP	GROUND FLOOR MECHANICAL ROOM	GRUNDFOS	MAGNA3	40% PROPYLENE GLYCOL	CONTINUOUS	INLINE CENTRIFUGAL	-	32-120 GF	2.3	35.7	4.0	13	-	-	120/1/60	0.19	0.25	

NOTES:  
1. SPECIFICATIONS BASED ON GRUNDFOS

SPLIT HEAT PUMP SCHEDULE																							
OUTDOOR UNITS								INDOOR UNITS					REMARKS										
TAG	LOCATION	MODEL #	PERFORMANCE		MIN. OPERATING TEMPERATURE		ELECTRICAL			WEIGHT		TAG		LOCATION	TYPE	MODEL #	AIRFLOW		CAPACITY		WEIGHT		
			COOLING	HEATING	°C	°F	VOLTAGE	MCA	MOC	KG	LBS						COOLING TOTAL	HEATING TOTAL	KG	LBS			
			MBH	MBH	°C	°F	°C	°F	°C	°F	°C						°F	°C	°F	°C	°F	°C	°F
HP-O-1	OUTDOOR	HVAHR072B33CW	72	81	-20.6	-5	208-230/3/60	53.5/48.5	70/60	340	747	HP-I-1	SECOND FLOOR MECHANICAL ROOM	MULTI-POSITION AIR HANDLING UNIT	TIAH060822M	849	1800	60	64	76	168	- OUTDOOR UNIT COMPLETE WITH 24" PRE-FABRICATED STAND, HAIL GUARD AND AIR GUIDE ACCESSORIES - INDOOR UNITS COMPLETE WITH CONDENSATE PUMPS. - INDOOR UNITS POWERED FROM OUTDOOR UNITS.	

NOTES:  
1. SPECIFICATIONS BASED ON HITACHI  
2. ACCEPTABLE ALTERNATIVES: LG, YORK

ENERGY RECOVERY UNIT SCHEDULE																																										
TAG	SYSTEM	LOCATION	MODEL #	AIRFLOW		HEAT RECOVERY SUMMER CONDITIONS						HEAT RECOVERY WINTER CONDITIONS						FAN MOTOR (SUPPLY)		FAN MOTOR (RETURN)		ELECTRICAL		WEIGHT	REMARKS																	
						OUTSIDE AIR		RETURN AIR		SUPPLY AIR		OUTSIDE AIR		RETURN AIR		SUPPLY AIR		POWER	ESP	POWER	ESP	VOLTAGE	MCA			KG	LBS															
				L/S	CFM	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F	°C	°F			W	HP	Pa	in.w.c.	W	HP	Pa	in.w.c.	VOLTAGE	MCA	KG	LBS					
ERY-1	OFFICE VENTILATION	SECOND FLOOR MECHANICAL ROOM	HED7N	530	365	30.0	86.0	23.0	73.4	23.9	75.0	16.9	62.5	25.4	77.8	19.6	67.3	-18.0	-0.4	-18.9	-2.1	22.2	72.0	12.3	54.2	11.9	53.4	6.0	42.8	357	-	100	0.4	357	-	100	0.4	120V/1/60	12.2	73	160	-

NOTES:  
1. SPECIFICATIONS BASED ON RENEWARE

EXHAUST FAN SCHEDULE													
TAG	SYSTEM	LOCATION	TYPE	MODEL	CAPACITY		ESP		VOLTAGE		MOTOR		REMARKS
					L/S	CFM	Pa	in.w.c.	°C	°F	KW	HP	
EF-1	GARAGE EXHAUST	NEW MOWER GARAGE	SIDEWALL DIRECT DRIVE FAN	AER-20-VG	507	1075	75	0.3	120/1/60	0.19	1/4	-	COMPLETE WITH EC MOTOR WITH DIAL FOR BALANCING, OSHA-APPROVED MOTOR SIDE GUARD, GALVANIZED WEATHERHOOD WITH BIRD SCREEN, GRAVITY BACKDRAFT DAMPER
EF-2	GARAGE EXHAUST	NEW REPAIR GARAGE	SIDEWALL DIRECT DRIVE FAN	AER-20-VG	507	1075	75	0.3	120/1/60	0.19	1/4	-	
EF-3	GARAGE EXHAUST	NEW REPAIR GARAGE	SIDEWALL DIRECT DRIVE FAN	AER-20-VG	507	1075	75	0.3	120/1/60	0.19	1/4	-	
EF-4	GARAGE EXHAUST	BUS REPAIR GARAGE EXTENSION	SIDEWALL DIRECT DRIVE FAN	AER-20-VG	507	1075	75	0.3	120/1/60	0.19	1/4	-	

NOTES:  
1. SPECIFICATIONS BASED ON GREENHECK

AIR HANDLING UNIT SCHEDULE																				
TAG	SYSTEM	LOCATION	MODEL #	AIRFLOW		MIN O.A.		FAN MOTOR (SUPPLY)				FAN MOTOR (RETURN)				VOLTAGE		WEIGHT		REMARKS
				L/S	CFM	L/S	CFM	POWER		ESP		POWER		ESP		KG	LBS			
				W	HP	Pa	in.w.c.	W	HP	Pa	in.w.c.	W	HP	Pa	in.w.c.	W	HP	Pa	in.w.c.	
AHU-1	GARAGE VENTILATION	SECOND FLOOR MECH. ROOM	CSU-BK HW	3,728	7,900	1,699	3,600	2x 1.9	2x 2.5	250	1	2x 1.5	2x 2	250	1	575/3/60	3,629	8,000	REFER TO COIL SCHEDULE FOR HYDRONIC COILS	

NOTES:  
1. SPECIFICATIONS BASED ON NORTEK SOLUTIONS

HYDRONIC HEATING BOILER SCHEDULE																				
TAG	LOCATION	SYSTEM	MODEL #	INPUT		OUTPUT		EWT		LWT		FLOW		VENT SIZE		WEIGHT		ELECTRICAL		REMARKS
				KW	MBH	KW	MBH	°C	°F	°C	°F	L/S	us gpm	mm	in.	KG	LBS	VOLTAGE	AMPS	
B-1	GROUND FLOOR MECH. ROOM	GARAGE HEATING	WHB399	116.8	399	110.4	377	48.9	120	68.3	155	1.4	21.5	100.00	4	127	280	120/1/60	4.5	LOCATION - GROUND FLOOR LEVEL
B-2	GROUND FLOOR MECH. ROOM	GARAGE HEATING	WHB399	116.8	399	110.4	377	48.9	120	68.3	155	1.4	21.5	100.00	4	127	280	120/1/60	4.5	LOCATION - GROUND FLOOR LEVEL

NOTES:  
1. SPECIFICATIONS BASED ON LOCHINAR

DOMESTIC HOT WATER HEATER SCHEDULE											
TAG	AREA SERVED	MODEL	CAPACITY		INPUT		ELECTRICAL		WEIGHT		REMARKS
			L	USGAL	WATTS	VOLTAGE	AMPS	KG	LBS		
HWH-1	OFFICE AREA	EGSP15	56.8	15	3000	120/1/60	-	90.7	200	CEILING HUNG WITH DRIP PAN. LOCATION - GROUND FLOOR MECHANICAL ROOM.	

NOTES:  
1. SPECIFICATIONS BASED ON RHEIM

GLYCOL FILL STATION											
TAG	AREA SERVED	MODEL #	CAPACITY		DIAMETER		ELECTRICAL		WEIGHT		REMARKS
			L	USGAL	MM	IN	VOLTAGE	AMPS	KG	LBS	
GFS-1	HEATING BOILERS	MF200	24.6	6.5	-	-	120/1/60	-	6.8	15	COMPLETE WITH MF200-1430 TANK MOUNTING SHELF AND RATIO-1-SAA LOW LEVEL ALARM DRY CONTACT
GFS-2	AHU-1 HEAT RECOVERY COILS	DMF150	17.4	4.6	-	-	120/1/60	-	6.8	15	COMPLETE WITH MF200-1430 TANK MOUNTING SHELF AND RATIO-1-SAA LOW LEVEL ALARM DRY CONTACT

NOTES:  
1. SPECIFICATIONS BASED ON AXIOM

BASEBOARD HEATER SCHEDULE								
TAG	LOCATION	MODEL #	STYLE	CAPACITY		ELECTRICAL		REMARKS
				W	VOLUME	VOLTAGE	AMPS	
BBH-1	MEETING ROOM	DFW2006	ELECTRIC	2,000	208V	9.6	9.6	COMPLETE WITH REMOTE THERMOSTAT
BBH-2	LUNCH ROOM	DFW2006	ELECTRIC	2,000	208V	9.6	9.6	COMPLETE WITH REMOTE THERMOSTAT
BBH-3	LUNCH ROOM	DFW2006	ELECTRIC	2,000	208V	9.6	9.6	COMPLETE WITH REMOTE THERMOSTAT

NOTES:  
1. SPECIFICATIONS BASED ON OUTLETTE

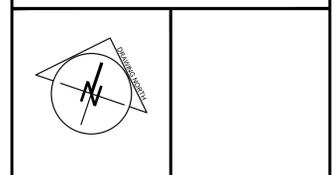
DIFFUSER/GRILLE SCHEDULE				
TAG	TYPE	MODEL	REMARKS	
S1	610x610 SQUARE CONE DIFFUSER	SCD/4C/B12	SIZE AS INDICATED ON DRAWINGS	
S2	305x305 SQUARE CONE DIFFUSER	SCD/3C/B12	SIZE AS INDICATED ON DRAWINGS	
R1	EGGCRATE RETURN GRILLE	80/B12	SIZE AS INDICATED ON DRAWINGS	
E1	LOUVRED FACE RETURN	530D/S/B12	SIZE AS INDICATED ON DRAWINGS	

NOTES:  
1. SPECIFICATIONS BASED ON E.H. PRICE

GENERAL NOTES

1	RE-ISSUED FOR TENDER	DEC. 10, 2024	J.C.
0	ISSUED FOR TENDER	DEC. 03, 2024	J.C.
No.	DESCRIPTION	DATE	BY

REVISIONS



PROJECT:  
**NPC - WEGO GARAGE ADDITION SERVICES ASSESSMENT**  
7805 NIAGARA RIVER PARKWAY, NIAGARA FALLS, ON L2G 7M8

START DATE: 2024 10 06  
DRAWN BY: M.R.  
DESIGNED BY: M.R.

DRAWING TITLE:  
**SCHEDULES**

SCALE: N/A  
DRAWING No.: **M-101**  
PROJECT: 24-109-090

PLOT DATE: December 10, 2024

ORIGINAL SHEET SIZE: ARCH D

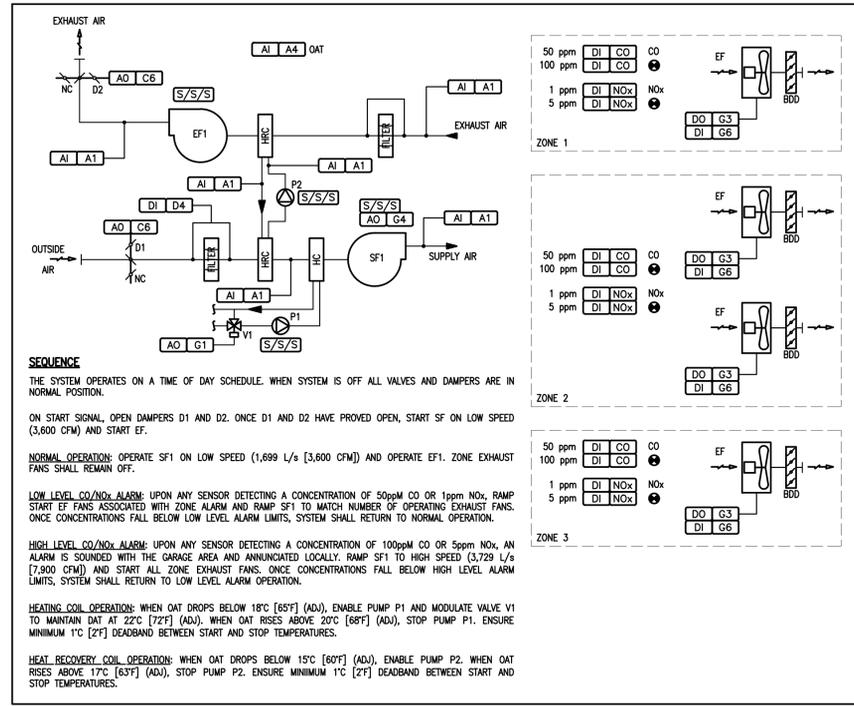
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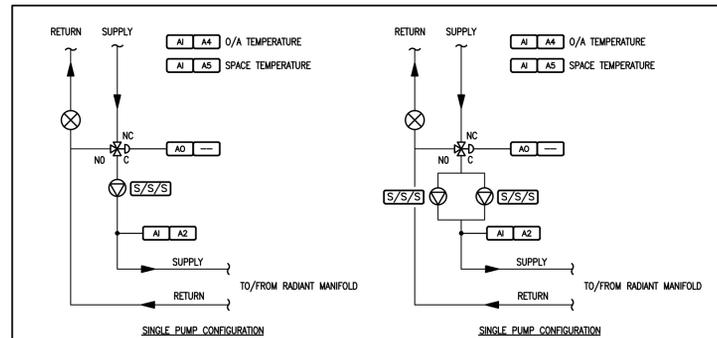


CONTROL LEGEND	
SENSOR AND INSTRUMENT CODES	ABBREVIATIONS
A1	TEMPERATURE SENSOR, DUCT MOUNTED
A2	TEMPERATURE SENSOR, PIPE MOUNTED
A3	TEMPERATURE SENSOR, AVERAGING ELEMENT
A4	TEMPERATURE SENSOR, OUTSIDE AIR TYPE
A5	TEMPERATURE SENSOR, ROOM TYPE
A6	TEMPERATURE SENSOR, LOW LIMIT
A7	TEMPERATURE SENSOR, HIGH LIMIT
B1	HUMIDITY SENSOR, DUCT MOUNTED
B2	HUMIDITY SENSOR, ROOM TYPE
B3	HUMIDITY SENSOR, OUTSIDE AIR TYPE
B5	HUMIDITY SENSOR, HIGH LIMIT TYPE
C1	DIFFERENTIAL PRESSURE
C2	PRESSURE SENSOR
C3	STATIC PRESSURE SENSOR
C4	PRESSURE SWITCH
C5	WATERFLOW SWITCH
C6	DAMPER STATUS SWITCH
C7	AIR VOLUME
C8	PULSED OUTPUT FROM POWER METER
C9	PULSED OUTPUT FROM WATER METER
C10	EMERSION HEATER ON/OFF
C11	CURRENT SENSOR
C12	CO2 SENSOR
CO2	CARBON DIOXIDE SENSOR
CO	CARBON MONOXIDE SENSOR
D1	MOTOR CONTROL RELAYS, START/STOP/STATUS TYPE
D2	CURRENT TRANSFORMERS AND RELAYS
D3	MOTOR STATUS CONTACTS
D4	DIFFERENTIAL PRESSURE SWITCH
D5	LEVEL SWITCH, TANK MOUNTED
D6	LEVEL SWITCH, FLOAT TYPE
D7	DIFFERENTIAL PRESSURE TRANSMITTER
D8	CURRENT SENSITIVE RELAY
D9	LEVEL TRANSMITTER
K1	WATERFLOW TRANSMITTER, ANNUBAR TYPE
K2	WATERFLOW TRANSMITTER, TURBINE TYPE
K3	AIRFLOW TRANSMITTER, DIGITRON TYPE
K4	AIRFLOW TRANSMITTER, ANNUBAR ARBAR
K5	ENERGY METER, DELTA T AND FLOW
K6	GAS DETECTOR
F1	INTERFACE CONTACT TO CACF
F2	VIBRATION DETECTOR
F3	INTERFACE CONTACT
F4	INTERFACE TO HOOD SUPPRESSION
G1	OUTPUT TO VALVE
G2	OUTPUT TO DAMPER
G3	START/STOP
G4	OUTPUT TO VSD
G5	FAULT INPUT
G6	STATUS
G7	VIBRATION CUT-OUT
G8	ELECTRICAL POWER CONSUMPTION
ADJ	ADJUSTABLE
AI	ANALOG INPUT
AO	ANALOG OUTPUT
BAS	BUILDING AUTOMATION SYSTEM
CACF	CENTRAL ALARM & CONTROL FACILITY
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CLS	COOLING
CWS	CONDENSER WATER SUPPLY
CWR	CONDENSER WATER RETURN
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
DP	DIFFERENTIAL PRESSURE
DS	DAMPER END SWITCH
EAT	EXHAUST AIR TEMPERATURE
EF	EXHAUST FAN
EWAV	ENTERING WATER TEMPERATURE
FPWV	FAN POWERED VAV TERMINAL
FCS	FAN COIL SUPPLY
FCR	FAN COIL RETURN
FCLU	FAN COIL UNIT
FS	FLOW SENSOR

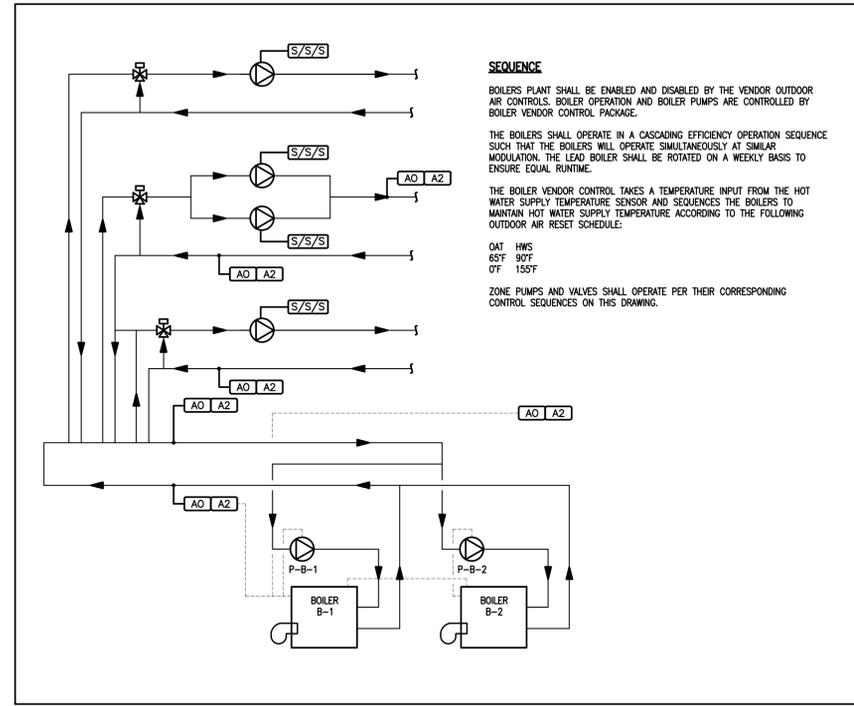
CD-1 CONTROL LEGEND  
M-104



CD-2 GARAGE VENTILATION/EXHAUST SYSTEM  
M-104 HEATING & COOLING



CD-4 IN-FLOOR RADIANT HEATING  
M-104

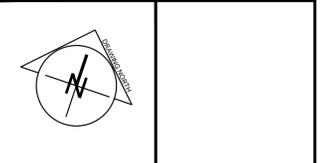


CD-3 HOT WATER PLANT CONTROL  
M-104

GENERAL NOTES

No.	DESCRIPTION	DATE	BY
1	RE-ISSUED FOR TENDER	DEC. 10, 2024	J.C.
0	ISSUED FOR TENDER	DEC. 03, 2024	J.C.

REVISIONS



1100 South Service Rd., #417  
Stoney Creek ON L8E 0C5  
T (905) 643-8530  
F (905) 643-8510  
www.arcengineering.ca  
contact@arcengineering.ca

PROJECT:  
**NPC - WEGO GARAGE ADDITION SERVICES ASSESSMENT**  
7805 NIAGARA RIVER PARKWAY, NIAGARA FALLS, ON L2G 7M8

START DATE: 2024 10 06  
DRAWN BY: M.R.  
DESIGNED BY: M.R.

DRAWING TITLE:  
**CONTROL DIAGRAMS**

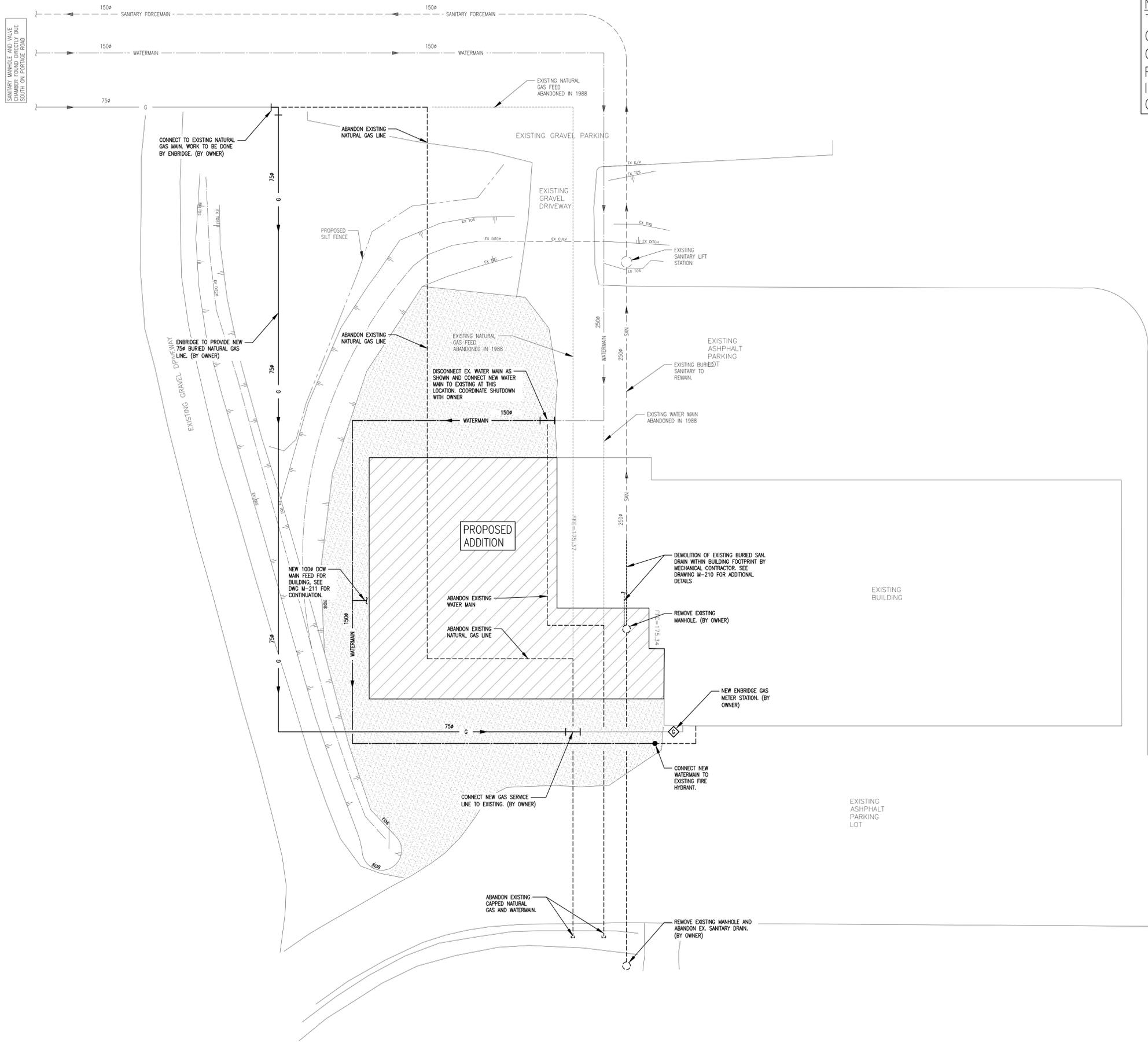
SCALE: N/A  
DRAWING No.: **M-104**  
PROJECT: 24-109-090

PLOT DATE: December 10, 2024

ORIGINAL SHEET SIZE: ARCH D

<p>1. <b>GENERAL</b></p> <p>1.1. The scope of work is to provide mechanical engineering services for the new WEGO people mover garage building located at 7805 Niagara River Parkway in Niagara Falls, Ontario.</p> <p>1.2. Perform all mechanical work detailed on these drawings to provide a complete and fully operational operating system to the satisfaction of the owner and mechanical consultant.</p> <p>1.3. Where there is discrepancy between specified, or scheduled equipment, and information indicated elsewhere on the drawings, the most stringent shall apply.</p> <p>1.4. Where there is apparent discrepancy of any kind, between any drawings, equipment tables, schedules, specifications, or other bid documents, notify the Consultant, for direction and clarification during the tender period.</p> <p>1.5. Consideration will not be granted for misunderstanding the intent of the contractual documents, the extent of work to be performed, or the intent required to provide complete and fully operational and controlled systems upon completion installation.</p> <p>1.6. Specified work described or indicated on drawings does not delegate function to any specified subcontractor or identify absolute contractual limits between mechanical or subcontractors.</p> <p>1.7. Arrange for milestone inspections. Contact ARC Engineering Tel: (905) 643-8530 E-mail: contact@arcengineering.ca.</p> <p>1.8. As a minimum, base building standards shall form the basis for this construction. Comply with Landlord's requirements for systems shutdown and connection.</p> <p>1.9. Coordinate all work with base building work. Refer to base building drawings and specifications.</p> <p>1.10. Codes and bylaws shall be strictly adhered to. Obtain necessary permits, approvals and inspections from the authorities having jurisdiction.</p> <p>1.11. Permits and fees required by the authorities having jurisdiction shall be obtained and paid for by this contractor. Include all applicable taxes.</p> <p>1.12. Existing site conditions affecting the work of this trade shall be reviewed prior to tender submission. Contractor shall conduct ongoing reviews during demolition and construction and immediately notify the consultants of any deviations from drawing dimensions/details/schematics. Failure to do so shall not relieve contractor of full contract responsibility.</p> <p>1.13. Cutting, patching and core drilling required by this trade shall be paid for by this contractor. Provide details of new opening through structural components for engineer's approval. Incur all costs related for structural approval.</p> <p>1.14. Fire stop shall be ULC listed for the required separation and provided at all pipe and duct penetrations through rated assemblies.</p> <p>1.15. Premium time costs shall be included for work outside of normal working hours. Comply with construction schedule prepared by Management.</p> <p>1.16. Flashing and counter flashing for exterior penetrations or water-proofed floors shall be provided under this contract.</p> <p>1.17. Shop drawings shall be complete with contractors reviewed stamp. Submit four (4) copies and/or one (1) electronic copy of all shop drawings. Allow one (1) week for consultant's review.</p> <p>1.18. Base bid equipment and suppliers in Base Building Mechanical Specifications shall apply to this contract.</p> <p>1.19. If the Contractor chooses to submit alternates:</p> <p>1.19.1. Contractor to submit alternates in addition to base bid products, and show savings by utilizing alternates. Where modifications to the work of Other Trades are required as a result of part of the alternate offered, include the cost of said modifications in the alternative price offered.</p> <p>1.19.2. Contractor responsible for ensuring alternate equipment meets physical requirements of existing site conditions to remain and proposed design with respect to but not limited to: size, weight, service access clearances, duct connection arrangement, &amp; air intake clearances.</p> <p>1.19.3. Contractor responsible for ensuring alternate equipment meets functions and performance specifications specified in schedule and/or shown on Drawings.</p> <p>1.20. Equipment substitutions offered award of contract will not be considered without written explanation and consultant's written authorization. The quality and performance characteristics of substituted product shall be equivalent to the specified product. All substitute products shall be approved by consultants. Any additional costs incurred by all trades for substituted equipment installation must be incurred by this contractor.</p> <p>1.21. Control wiring and devices shall be provided under this contract.</p> <p>1.22. Electrical devices shall be provided for all Division 15 equipment, including load side wiring, starters, disconnect, etc. Verify and coordinate voltage, phase, and short circuit interrupting capacity with the electrical contractor prior to ordering equipment. Provide conduit and wiring materials and methods in strict accordance with Division 16 requirements.</p> <p>1.23. Access doors shall be provided for all inaccessible mechanical equipment and services requiring inspection or service. Finish shall suit architect/designer requirements. Access doors shall be recessed as required to suit wall finish (e.g., tile).</p> <p>1.24. Architect/Designer/Owner approval or air terminal, thermostat, and access door locations must be obtained prior to installation.</p> <p>1.25. One (1) year written warranty shall be provided for the complete mechanical installation from date of acceptance.</p> <p>1.26. CAD as-built drawings shall be completed utilizing AutoCAD. Record accurately installed work on white prints transferring to AutoCAD. Submit both copies.</p> <p>1.27. Operating and maintenance manuals containing approved shop drawings, air and water balancing reports, equipment data sheets, written warranty, operating instructions and maintenance procedures shall be submitted to consultant for review. Manuals shall be separated with dividers in appropriate sections. Make all corrections required by consultant and resubmit for review.</p> <p>1.28. Provide, at minimum, one (1) hard copy and one (1) electronic copy of the operating and maintenance manuals referenced in section 1.27 to the building owner.</p> <p>1.29. Change Notice Quotations shall be submitted complete with cost breakdown of labour and materials. Failure to submit will result in rejection. All Mechanical Change Notices shall be priced in accordance with "MECHANICAL CONTRACTORS ASSOCIATION (MCA) Labour units strictly for labour."</p> <p>2. <b>DEMOLITION</b></p> <p>2.1. A pre-demolition audit shall be conducted by the Division 15 contractor, in the presence of the Owner to determine exactly which materials in the existing building are to be included in the demolition work and which materials can be either reused by the Owner or resold by the Contractor. Submit, in writing, to the Owner, finding from the audit.</p> <p>2.2. Provide labour, materials, products, equipment and services required to complete the demolition work specified herein.</p> <p>2.3. Dispose, off site, of all debris in accordance with the jurisdictional authorities.</p> <p>2.4. Removal and storage of salvageable items as directed by this specification section and the Owner or their representative.</p> <p>2.5. Mechanical demolition work associated with this building is indicated on the demolition drawings and generally consists of the following:</p> <ul style="list-style-type: none"> <li>- Plumbing and Drainage</li> </ul> <p>2.6. Disposed materials which have not been designated for salvage from the demolition shall become the property of the Contractor. Remove materials and debris from the site as quickly as possible and dispose of legally. Barring of debris or selling of materials on the site will not be permitted.</p> <p>2.7. Present to the Owner existing equipment removed but not identified for salvage on site. Acceptance of removed equipment is at the discretion of the Owner. Remove such items from site when deemed unsuitable.</p> <p>2.8. Conform to requirements of municipality's Works Department regarding disposal of waste materials.</p> <p>2.9. Materials prohibited from municipality waste management facilities shall be removed from site and disposed to recycling companies specializing in recyclable materials.</p> <p>2.10. Contractor shall be responsible for all fees required for the disposal of demolished materials, equipment, etc.</p> <p>2.11. Store materials only in areas designated by the Owner and as permitted by the local jurisdictional authorities.</p> <p>3. <b>HVAC PIPING SYSTEMS</b></p> <p>3.1. Piping material for hydronic hot water heating and chilled water and glycol radiant systems to 2068 kPa [300 psig] operating pressure use ASTM A-53 or A-106 schedule 40 black carbon steel, seamless or ERW with the following fittings:</p> <p>3.1.1. For small bore, 50 mm [2 in.] and under to [1034 kPa]150 psi use 1034 kPa [150 psi] screwed black malleable iron or 1034 cast iron fittings.</p> <p>3.1.2. For large bore 65 mm [2-1/2 in.] and over to 1034 kPa [150 psi] use schedule 40 black carbon steel welded fittings.</p> <p>3.1.3. For small bore 50 mm [2 in.] and under to 2068 kPa [300 psi] use 300# screwed black malleable iron or 250# fittings cast iron fittings.</p> <p>3.1.4. For large bore 65 mm [2-1/2 in.] and over to 2068 kPa [300 psi] schedule 40 black carbon steel welded fittings.</p> <p>3.2. Use of grooved systems (Victaulic or equal) installed in accordance with the manufacturer instructions, may be acceptable subject to approval by the owner and the engineer. Upon request provide savings.</p> <p>3.3. Use of copper piping for small branches and run-outs is acceptable for 20mm [3/4 in.] and below, with type L pipe, wrought copper fittings, and soldered joints for pressures up to 100 psig and silver soldering for higher pressures.</p> <p>3.4. Valves: (part numbers listed):</p> <p>3.4.1. To 1379 kPa [200 psi] working pressure, up to 50mm [2 in.] - soldered or threaded</p> <p>3.4.1.1. Gate Valves - 125S/200 W.O.G. rated, bronze body to ASTM-862, solid wedge disc, bronze trim, rising stem. (Soldered - Kitz 44, Threaded - Kitz 24)</p> <p>3.4.1.2. Globe Valves - 125S/200 W.O.G. rated, bronze body to ASTM-862, bronze trim, rising stem. (Soldered - Kitz 12, Threaded - Kitz 11)</p> <p>3.4.1.3. Ball Valves - 150/600 W.O.G. rated, two piece full port brass body (C37700), solid chrome plated brass ball, PTFE seats, double o-ring stem seals, lever operated. (Soldered - Kitz 59, Threaded - Kitz 58)</p> <p>3.4.1.4. Check Valves - 125S/200 W.O.G. rated, bronze body to ASTM 862 - bronze trim, Y pattern. (Soldered - Kitz 23, Threaded - Kitz 22)</p> <p>3.4.2. To 1379 kPa [200 psi], 65mm [2-1/2 in.] and larger - flanged</p> <p>3.4.2.1. Gate Valves - 125S/200 W.O.G. rated, cast iron body to ASTM A126 class B, bronze trim, OS&amp;Y (Kitz 72)</p> <p>3.4.2.2. Globe Valves - 125S/200 W.O.G. rated, cast iron body to ASTM A126 class B, bronze trim, OS&amp;Y (Kitz 76)</p> <p>3.4.2.3. Ball Valves - 125S/200 W.O.G. rated, two piece full port, cast iron ASTM 126 class B body, epoxy coated to NSF 61, teflon fused ball, RPTFE seats, seals, and packing, lever and gear operated.</p> <p>3.4.2.4. Butterfly Valves - 200 psi rated, ductile iron body, aluminum bronze disc, stainless steel stem, moulded or cartridge style seats (EPDM). Valve to be rated for full dead end service with the downstream flanged removed. Lever operated to 6"; gear operated 8" and over. ULC pattern. (Lever operated - Kitz 6122EL, Gear operated - Kitz 6122EG)</p> <p>3.4.2.5. Check Valves - 125S/200 W.O.G. rated, cast iron body to ASTM A126, bronze trim, bolted bonnet. (Flanged - Kitz 78)</p> <p>3.5. Butterfly valves are to be molded or cartridge style only.</p> <p>3.6. Ball valves are to be solid ball style only.</p> <p>3.7. Butterfly valves for shut-off requirements. Gate valves will not be approved.</p> <p>3.8. Provide 20 mm [3/4" in.] hose end drain valves with cap and chain at all system low points.</p> <p>3.9. Provide di-electric couplings for connection of dissimilar piping materials.</p> <p>3.10. Provide circuit balancing valves as required to balance water flow. Circuit balancing valves shall be Armstrong Model CBW - Y pattern style, all metal, with soldered or screwed connections, built-in drain connection with shut off valve and protective caps and integral valve insulation. Provide for each valve:</p> <ul style="list-style-type: none"> <li>- Vernier type handwheel settings for precision flow balancing.</li> <li>- Positive shut off valve with no drip seat and plug type stem with teflon disc.</li> <li>- Tamper proof hidden memory.</li> </ul> <p>3.11. Positive shut off metering valves with connections for portable meter. Provide one (1) portable meter and turn over at end of project.</p> <p>3.12. Select circuit balancing valve size to give a pressure drop at 100% open between 3.0 kPa [1 ft.] and 21 kPa [7 ft.]. Select valves location remote from the pumps in the circuit near minimum pressure drop and those located near the pumps of higher pressure drops.</p> <p>3.13. Provide safety and relief valves for all closed water systems. Pipe relief to nearest floor drain. Provide Watts 174A valves rated at 1033 kPa [150 psig] at 90°C [210°F] ASTM rated, cast iron body bronze disc and seat, steel spindle assembly, carbon steel spring.</p> <p>3.14. Provide strainers upstream of each pump and where indicated on drawings. Strainers shall be bronze body type with screwed connections, stainless steel screens with 1.6 mm [1/16 in.-&lt;] perforations and capable of system pressure of 860 kPa [125 PSi].</p> <p>3.15. Automatic air vents and collecting chambers Spirax 13W shall be provided at all high points of piping system. Ensure ratings are compatible with system pressure.</p> <p>3.16. Insulation shall be provided to match base building standards or refer to insulation section.</p> <p>3.17. Provide 40% glycol solution for radiant heating systems.</p> <p>3.18. Flush clean all HVAC piping systems. Bypass and isolate any equipment that may be damaged during the flushing process. After flushing process, clean all strainers and check all low points to ensure removal of all loose dirt. Chemically clean all piping systems utilizing low foaming chemical detergents which shall not adversely affect system components. After flushing and cleaning, pressure test all HVAC piping systems.</p> <p>3.19. Provide ULC classified firestopping systems by 3M or Hilti which have been tested in accordance with CAN4-S115, install firestopping systems in accordance with the appropriate ULC system number for the products and type of penetration.</p> <p>3.20. Ensure that fire ratings of floors and walls are maintained, fill spaces between openings and pipes passing through fire separations.</p> <p>4. <b>GAS PIPING SYSTEMS</b></p> <p>4.1. Provide all labour, materials, products, equipment and services to supply and install the natural gas piping system indicated on the Drawings and specified in this Section of the Specifications.</p> <p>4.2. Install natural gas system only with filters certified to Natural Gas and Propane Installation Code requirements.</p> <p>4.3. If necessary, arrange and pay for a gas service to the building, including regulating station gas meter, and associated accessories.</p> <p>4.4. Provide all equipment and materials required for the building natural gas distribution systems in accordance with the requirements of the current version of Natural Gas and Propane Installation Code.</p> <p>4.5. Provide complete natural gas system, to CSA and CGA requirements</p> <p>4.6. Steel gas piping:</p> <p>4.6.1. Piping: ASTM A-53 schedule 40 seamless</p> <p>4.6.2. Joining Material: screwed fittings with pulverised lead paste for [12mm] [1/2"] to [50mm] [2"]; welded to CSA W47.1 for [65mm] [2-1/2"] and over</p> <p>4.6.3. Fittings:</p> <p>4.6.3.1. Malleable iron: screwed to ANSI B16.3, Class 150 for service pressures up to and including 861 kPa.</p> <p>4.6.3.2. Unions: malleable iron, brass to iron, ground seat, to ASTM A47M.</p> <p>4.6.3.3. Nipples: schedule 40, to ASTM A53.</p> <p>4.6.3.4. Copper gas piping:</p> <p>4.6.3.5. Piping: Type "L" to ASTM B 75 / B 75M</p> <p>4.6.3.6. Joining Material: Brazing to ASTM B 75M</p> <p>4.6.3.7. Fittings: Wrought copper and copper alloy, solder type 1 to ANS/ASME B16.22</p> <p>4.6.3.8. Flange gaskets shall be non-metallic flat type;</p> <p>4.6.3.9. Manual shut-off valves shall be Full port, forged brass ball valve for two piece body construction complete with the following blow-out-proof stem, adjustable packing gland, chrome-plated ball, class 150 WSP, 600 WOG, CSA 3.16 approved. Provide complete with GSW, lever handle and ANSI B1.20.1 NPT end connections.</p> <p>4.10. Provide pressure reducing, regulating and relief valving required for compatibility between equipment and building natural gas distribution system.</p> <p>4.11. Provide gas pressure reducing station(s) where noted on Drawings and where required to reduce building Distribution system pressures to appliance operating pressure ranges.</p> <p>4.12. Pressure regulators shall be spring-loaded self-operated design and shall be tight closing with replaceable orifices and discs and concealed accessible manual adjustment. Valve bodies shall be cast iron rated for [1034 kPa] [150 psig] gas pressure and all valve materials shall be epoxy painted to resist corrosive ambient conditions.</p> <p>4.13. Provide gas pressure relief stations downstream of all pressure, ductwork and terminal devices where required.</p> <p>4.14. Provide relief valves of spring-loaded design with throttling characteristics to reduce system pressure surges. Valve bodies shall be cast iron rated for [1034 kPa] [150 psig] gas pressure with replaceable orifices and discs and concealed accessible manual adjustment. All valve materials shall be epoxy painted to resist corrosive ambient conditions.</p> <p>4.15. Install natural gas service to meet Natural Gas and Propane Installation Code and all authorities having jurisdiction.</p> <p>4.16. Provide 25mm [1"] opening at the top and bottom of any chase containing a gas pipe.</p> <p>4.17. Distribute gas within the building at 14 inches water column.</p> <p>4.18. Select pressure reducing valves to maintain downstream pressures within +5% range of setting. Submit sizing data for each valve with Shop Drawings.</p> <p>4.19. Select pressure relief valves for the maximum capacity of the pressure reducing station served plus not less than 25%. Submit sizing data for each valve with Shop Drawings.</p> <p>4.20. Pipe all relief vents independently to outdoors. Size piping for a maximum pressure drop of 10% of the pressure reducing valve setpoint gauge pressure with a 25% capacity safety factor.</p> <p>4.21. Provide upstream and downstream isolating valves and pressure gauges complete with gauge cocks at all pressure reducing stations. Connect relief valves so that they cannot be isolated from the appliances which they serve.</p> <p>4.22. Provide supports (roof supports Dura Block or pressure treated wood blocks complete with rigid insulation of bottom of block) at maximum spacing as follows:</p> <ul style="list-style-type: none"> <li>20mm [3/4 in.] - 25mm [1 in.]; 2.4m [8 ft.]</li> <li>30mm [1-1/4 in.] - 65mm [2-1/2 in.]; 3m [10 ft.]</li> </ul> <p>4.23. Anchor gas piping supports as per CBC, CSA, and seismic requirements.</p> <p>4.24. Connect gas piping to all gas fired equipment.</p> <p>4.25. Paint gas piping to meet code requirements.</p> <p>4.26. BASE BUILDING Gas components and equipment removed shall be turned over to the landlord/owner provide savings.</p> <p>5. <b>REFRIGERANT PIPING</b></p> <p>5.1. Refrigerant piping design and installation shall conform to the recommendations and requirements of the following:</p> <p>5.1.1. CSA Standard B52 - Mechanical Refrigeration Code</p> <p>5.1.2. Ontario Building Code</p> <p>5.1.3. Air Conditioning and Refrigeration Institute</p> <p>5.1.4. Air Conditioning equipment manufacturer.</p> <p>5.2. Select pipes, fittings and components to suit systems test and operating pressure.</p> <p>5.3. Refrigerant piping shall be factory cleaned and sealed, type ACR seamless copper piping. Use only silver brazed joints.</p> <p>5.4. Where elbows are required, use only long radius elbows.</p> <p>5.5. Select refrigerant piping to attain air conditioning equipment manufacturer's listed cooling capacities.</p> <p>5.6. Keeping piping runs and number of elbows and fittings to a minimum.</p> <p>5.7. Reduce the effect of piping vibration with the use of flexible metal hose.</p> <p>5.8. After installation of piping, a minimum test pressure of [2100 kPa] [300 psi] on the high pressure side and [1050 kPa] [150 psi] on the low pressure side shall be placed on the piping system with nitrogen. Pressures shall be maintained without loss for not less than four (4) hours. Repair or replace defective joints.</p> <p>5.9. After joints have been proven tight under test pressures, achieve a vacuum of not less than [95 kPa] [28" Hg] using a separate vacuum pump. Maintain vacuum without change in pressure for at least twelve (12) hours.</p> <p>5.10. After charging, recheck all joints with a hold leak detector. Replace any joints found to leak, and repeat the above dehydration testing and charging procedures.</p> <p>5.11. Replace any refrigerant and oil lost during the warranty period.</p> <p>6. <b>PLUMBING SYSTEM</b></p> <p>6.1. EXISTING SANITARY DRAIN locations and invert elevations shall be verified on site prior to commencement of work.</p> <p>6.2. PIPING MATERIALS:</p> <p>6.2.1. Domestic hot and cold water piping - type "L" copper with copper fittings use 95/5 tin/antimony solder. Provide type "K" soft copper piping without joints below ground.</p> <p>6.2.2. Drainage and Vent Piping (60mm [2-1/2"] and smaller):</p> <p>6.2.2.1. Sanitary piping, above ground - DWV copper pipe with drainage fittings and 50/50 solder joints.</p> <p>6.2.2.2. Sanitary piping, below ground - Type L copper with 50/50 solder joints.</p> <p>6.2.2.3. Vent piping, above ground - DWV copper pipe with drainage fittings, 50/50 solder joints.</p> <p>6.2.2.4. Vent piping, below ground - Type L copper pipe with wrought copper fittings and 50/50 solder joints.</p> <p>6.2.3. Drainage and Vent Piping (75mm [3"] and larger):</p> <p>6.2.3.1. Sanitary piping, above ground - CSA class 4000 cast iron soil pipe and fittings, with mechanical joints.</p> <p>6.2.3.2. Sanitary piping, below ground - CSA class 4000 cast iron soil pipe and fittings, with mechanical joints.</p> <p>6.2.3.3. Vent piping, above ground - CSA class 4000 cast iron soil pipe and fittings, with mechanical joints.</p> <p>6.2.3.4. Vent piping, below ground - CSA class 4000 cast iron soil pipe and fittings, with mechanical joints.</p> <p>6.2.4. Plastic piping conforming to ABS CAN/CSA B181.1 or PVC CAN/CSA B181.2 with drainage fittings and solvent welded joints may be used in lieu of copper or cast iron soil except in return air plenums or where prohibited by code.</p> <p>6.3. Lead-free Valves: (part numbers listed):</p> <p>6.3.1. To 1379 kPa [200psi] working pressure, up to 50mm [2 in.] - soldered or threaded</p> <p>6.3.1.1. Ball Valves - 150S/600 W.O.G. rated brass body to ASTM C48300 (Lead Free Brass), full port, PTFE seats, double "O" ring or teflon packing, forged brass C49300 solid ball, blowout proof stem, lever handle (Soldered - Kitz 850, Threaded - Kitz 858)</p> <p>6.3.1.2. Check Valves - 125S/200 W.O.G. rated, bronze body to ASTM C89530 (lead free bronze), screwed cap C49300 (lead free brass), integral seat, PTFE disk (Swing "Y" pattern, soldered - Kitz 823T, swing "Y" pattern, threaded - Kitz 822T)</p> <p>6.4. Butterfly valves are to be molded or cartridge style only.</p> <p>6.5. Ball valves are to be solid ball style only.</p> <p>6.6. Provide ball or butterfly valves for shut-off requirements. Gate valves will not be approved.</p> <p>6.7. Provide all bronze ball type shut off valves on main and branch lines and isolating valves for each individual plumbing fixture served.</p> <p>6.8. Plumbing fixtures shall be new, of first quality, in perfect condition and installed in best workmanlike manner. Verify plumbing fixture quantities and locations with Architect's/Designer's drawings. Reuse of domestic water heater is not permitted.</p> <p>6.9. Hot water heaters shall be as indicated on drawings and in schedule.</p> <p>6.10. Provide di-electric couplings for connection of dissimilar piping materials.</p> <p>6.11. Top seal primer must be provided on all new Floor Drains, Furnel Floor Drains and Hub Drains.</p> <p>6.12. Exposed piping and fittings within washrooms shall be chrome plated. Provide chrome plated escutcheons on all piping passing through finished surfaces and millwork.</p> <p>6.13. Stainless steel water hammer arrestors equal to Zurn Shockrol shall be provided on all lines serving groups of fixtures, quick closing valves and flush valves.</p> <p>6.14. Provide ULC classified firestopping products by 3M or Hilti which have been tested in accordance with CAN4-S115, install firestopping systems in accordance with the appropriate ULC system number for the products and type of penetration.</p> <p>6.15. Ensure that fire ratings of floors and walls are maintained, fill spaces between openings and pipes passing through fire separations.</p> <p>7. <b>INSULATION</b></p> <p>7.1. Provide all labour, materials, products, equipment and services to supply and install thermal insulation, vapour barriers and finishes for mechanical work as indicated on the drawings and specified in this section of these specifications.</p> <p>7.2. PIPING INSULATION:</p> <p>7.2.1. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics and insulating cements.</p> <p>7.2.2. Insulation materials must be manufactured at facilities certified and registered with an approved Registrar to conform to ISO 9000 quality standard.</p> <p>7.2.3. All insulation pertaining to Division 15 shall be carried out by one firm specializing in insulation work. Do not mix similar products of multiple manufacturers.</p> <p>7.2.4. Acceptable insulation manufacturers are Owens Corning Canada, Johns Manville, Manson Insulation Inc. Knuf Fiber Glass and CertainTeed.</p> <p>7.2.5. Provide insulation and covers in strict accordance with authorities governing combustibility and fireproofing of materials and in accordance with manufacturer's recommendations.</p> <p>7.2.6. Provide non-combustible insulation, jackets and finishes having a Flame Spread/Smoke Developed rating of 25/50 or less.</p> <p>7.2.7. Provide insulation materials with a minimum thermal conductivity of 0.24BTU.in/(hr. sq.ft) at 100F mean temperature.</p> <p>7.2.8. On hot piping applications, hold insulation in place with flare type staples (outward clinch).</p> <p>7.2.9. Apply pipe insulation over 1-1/2" thickness in two layers with joints staggered.</p> <p>7.2.10. Insulate fittings with fabricated mitered or preformed sections of specified insulation.</p> <p>7.2.11. Insulate over flanges and mechanical couplings with specified insulation and thickness, sized to suit flange diameter. Fill spaces between insulation and adjoining pipe insulation with similar material.</p> <p>7.2.12. Insulate valves and inline components with flexible insulation density 1/4 (lb./cu.ft.) compressed not more than 50% of original thickness. Build up to specified thickness with approved asbestos free finishing cement.</p> <p>7.2.13. Do not insulate terminal unit automatic control valves installed in hot piping.</p> <p>7.2.14. Under all domestic cold water, provide an insert between support shield and piping for piping 1-1/2" or larger.</p> <p>7.2.15. Provide the following pipe insulation type as indicated in the pipe insulation table below.</p> <p>Type P1 - Owens Corning Fiberglas Pipe Insulation, Johns Manville Micro-Lok Pipe Insulation, Manson Alaya-K Pipe Insulation or Knuf Earthwool 1000' Pipe Insulation with factory applied all purpose vapour barrier jacket where scheduled.</p> <p>Type P2 - Armacell AC Accoflex fiber-free piping insulation, painted with WB Finish where installed outdoors.</p>	<p>HEAT TRACED PIPE FOR FREEZE PROTECTION</p> <p>3" and less P-1 1" No</p> <p>4" and above P-1 1-1/2" No</p> <p>7.2.16. Provide Johns Manville Zeston PVC jacketing or Knuf Proto PVC jacketing for all exposed ceiling areas, mechanical rooms, and any locations where piping passes through regularly occupied areas.</p> <p>7.3. DUCTWORK INSULATION</p> <p>7.3.1. Provide insulation with a minimum thermal resistance of 0.25 BTU.in/hr. sq.ft °F at 75F mean temperatures.</p> <p>7.3.2. Apply vapour barrier over insulation on cold temperature ductwork.</p> <p>7.3.3. Circular silencers and acoustic plenums need not be externally insulated.</p> <p>7.3.4. Ductwork and casings lined with acoustic insulation 1" or more in thickness need not be externally insulated.</p> <p>7.3.5. Provide the following ductwork insulation type as indicated in the ductwork insulation table below.</p> <p>Type D1: Owens Corning 703 Fiberglas Insulation with FRK facing, Johns Manville 814 Spin-Glas with FRK Facing, Manson AK Board with FRK facing, or Knuf Earthwool Board with FRK facing. Density shall be not less than 3lbs./cu.ft. Impute on mechanically fastened pins located at not greater than 12" centers. Secure with speed washers. Butt joints tightly together and seal washers, breaks and joints with self-adhering 4" wide plain aluminum tape, or adhere foil with Childers CP82 or Bakor 230-38 adhesive.</p> <p>Type D2: Owens Corning SOFTR Duct Wrap FRK, Johns Manville Microelite EQ FSK Duct Wrap, Manson Alaya-K Wrap with FRK facing or Knuf Atmosphere Duct Wrap with FRK facing, 12kg/cubic metre [3/4lb./cu.ft.] density with factory applied reinforced foil facing. Adhere insulation to duct surface with Childers CP82 or Bakelite 230-39 adhesive, which shall be applied in strips 150mm [6"] wide at not greater than 300mm [12"] centres. Butt edges of insulation tightly together, and seal breaks and joints of facing with self-adhering 100mm [4"] wide aluminum tape or adhere foil with Childers CP82 or Bakor 230-38 adhesive.</p> <p>Type D3: Thermal Ceramics FireMaster FastWrap XL is a flexible high temperature insulation rated to 1292CF (1200C) that is fully encapsulated in FSP facing. The duct enclosure system shall be listed by UL and /or ULC per ASTM E 2336, CAN/ULC S144 and ISO 6944 for zero clearance to combustibles, and tested per ASTM E84 for a flame/smoke rating less than 25/50. Insulation shall have a nominal thickness of 1-1/2 inches (38 mm) and density of 6 lbs/ft3 (96 kg/m3). Insulation shall have a R-value of 7.3 at 75F. Installation shall be in strict accordance to manufacturers published installation instructions, UL or ULC Listings, and shop drawings. Twolayers of 1/2" FASTWRAP XL shall be used for duct access where specified or as required by code.</p>	<table border="1"> <thead> <tr> <th>DUTY</th> <th>INSULATION TYPE</th> <th>THICKNESS</th> <th>VAPOUR BARRIER</th> </tr> </thead> <tbody> <tr> <td>Outside air plenums and ducts</td> <td>D1</td> <td>2"</td> <td>Yes</td> </tr> <tr> <td>Relief and exhaust air plenums</td> <td>D1</td> <td>1-1/2"</td> <td>Yes</td> </tr> <tr> <td>Final 3m (10') of exhaust duct before exiting building or up to motorized damper if distance exceeds 3m (10')</td> <td>D1</td> <td>1"</td> <td>Yes</td> </tr> <tr> <td>Exposed ductwork</td> <td>D1</td> <td>1"</td> <td>Yes</td> </tr> <tr> <td>Ductwork outside of Building or in garage area</td> <td>D1</td> <td>2"</td> <td>Yes</td> </tr> <tr> <td>Concealed supply air, (including ducts in shafts) to air terminal control units, excluding flexible ducts</td> <td>D2</td> <td>1"</td> <td>Yes</td> </tr> <tr> <td>Concealed supply air ducts from air terminal control unit discharge to air terminals excluding flexible ducts</td> <td>D2</td> <td>1"</td> <td>Yes</td> </tr> </tbody> </table> <p>7.3.6. Recover insulation and insulation finishes outside the building or exposed to the weather with one [1.5mm] [1/16"] thick layer of Childers Encozel X or Bakor 110-26 fire retardant black mastic vapour barrier coating. Embed a layer of woven glass reinforcing fabric into the wet coating, taping ends and edges at least [75mm] [3"] Apply a top coating of [1.5mm] [1/16"] thick Encozel X or Bakor 110-26 over the entire surface of the fabric. Seal the entire covering to achieve a watertight assembly.</p> <p>7.3.7. In lieu of above recovering of insulation and insulation finishes outside the building, aluminum jacket with aluminum fittings may be substituted (VentureClad Plus or similar product). Band all transverse seams with waterproof mastic tape and caulk all longitudinal seams with silicone caulking. Seal the entire covering to achieve a watertight assembly.</p> <p>7.3.8. Protect the work of this trade from being defaced by other trades. Make good any damage and leave in perfect condition, ready for final painting.</p> <p>7.3.9. Apply insulation over clean dry surfaces, firmly butting all sections together.</p> <p>7.3.10. Recover all exposed insulation and insulation finishes with minimum [0.20kg/squaremetre] [6oz.-&lt;] per square foot and specifications of Childers CP50-1W2 or Bakor 120-18 while fire resistant coating. An acceptable alternative recovering will be PVC fitting covers and jacketing, installed as per manufacturer's instructions, and conforming to the specified Flame Spread/Smoke Developed Rating.</p> <p>8. <b>DUCTWORK</b></p> <p>8.1. Provide all labour, materials, products, equipment and services to supply and install the sheet metal and ductwork systems as indicated on the Drawings and specified in this Section of the Specifications.</p> <p>8.2. Meet Standards described in the latest Edition of HVAC Duct Construction Standards handbook from Sheet Metal and Air Conditioning Contractors National Association (SMACNA).</p> <p>8.3. Duct dimensions shown on Drawings are net, inside insulation and acoustic duct lining.</p> <p>8.4. RIGID DUCTWORK</p> <p>8.4.1. Fabricate ductwork from galvanized sheet metal with a minimum coating of 1.83 grams/m<sup>2</sup> (G60 coating) unless other materials are specifically named.</p> <p>8.4.2. Ductwork shall be smooth on the inside and free of obstructions, vibration and rattle.</p> <p>8.4.3. Fabricate ductwork, except as described in the next item, according to the following classifications:</p> <p>Class 1: All ducting subject to positive or negative static pressure of 250 Pa or less with maximum velocities of 13m/s shall be constructed in accordance with SMACNA construction standards for 500 Pa duct.</p> <p>Class 2: All ducting subject to positive or negative static pressure of more than 250 Pa up to 500 Pa with maximum velocity of 13 m/s shall be constructed in accordance with SMACNA construction standards for 500 Pa duct.</p> <p>8.4.4. Provide Class 2 pressure duct construction for:</p> <ul style="list-style-type: none"> <li>- Ductwork between variable volume air handling units and air terminal control units.</li> <li>- Ductwork between air flow Venturi's and fans.</li> </ul> <p>8.4.5. Provide duct transformation with expansion fittings having slopes not exceeding 1 to 7 and contraction fittings having slopes not exceeding 1 to 4.</p> <p>8.4.6. Provide full radius tees, bends, and elbows for changes in direction except where square elbows are required due to space restrictions. Provide DuroDyne double thickness 0.8 mm turning vanes assembled in top and bottom rails in square elbows.</p> <p>8.4.7. Provide balancing dampers free to move in either direction without binding and rattling. Construct dampers in ductwork from 1.2 mm galvanized sheet metal. Use manual quadrants on small ducts. On dampers longer than 375mm use push rods with DuroDyne Model SRP ball joints. Use two push rods on ducts wider than 600 mm. Provide OBO balancing dampers where shown on the drawings.</p> <p>8.4.8. Isolate equipment with DuroDyne neoprene 0.8 mm thick flexible connectors with finished fabric width not less than 150mm.</p> <p>8.4.9. Provide 50mm insulated sheet metal blank off panels behind unused portions of exterior louvers.</p> <p>8.4.10. Seal all joints in low, medium and high pressure ductwork with Transcontinental MP for low and medium pressure or DuroDyne S2 duct sealer for high pressure. Joints shall be sealed to conform to the following SMACNA standards:</p>	DUTY	INSULATION TYPE	THICKNESS	VAPOUR BARRIER	Outside air plenums and ducts	D1	2"	Yes	Relief and exhaust air plenums	D1	1-1/2"	Yes	Final 3m (10') of exhaust duct before exiting building or up to motorized damper if distance exceeds 3m (10')	D1	1"	Yes	Exposed ductwork	D1	1"	Yes	Ductwork outside of Building or in garage area	D1	2"	Yes	Concealed supply air, (including ducts in shafts) to air terminal control units, excluding flexible ducts	D2	1"	Yes	Concealed supply air ducts from air terminal control unit discharge to air terminals excluding flexible ducts	D2	1"	Yes	<table border="1"> <thead> <tr> <th>DUTY</th> <th>INSULATION TYPE</th> <th>THICKNESS</th> <th>VAPOUR BARRIER</th> </tr> </thead> <tbody> <tr> <td>DOMESTIC COLD WATER</td> <td>P-1</td> <td>1/2"</td> <td>Yes</td> </tr> <tr> <td>Less than 1"</td> <td>P-1</td> <td>1"</td> <td>Yes</td> </tr> <tr> <td>DOMESTIC HOT WATER</td> <td>P-1</td> <td>1"</td> <td>No</td> </tr> <tr> <td>Less than 1-1/2"</td> <td>P-1</td> <td>1-1/2"</td> <td>No</td> </tr> <tr> <td>1-1/2" and larger</td> <td>P-1</td> <td>1-1/2"</td> <td>No</td> </tr> <tr> <td>BUILDING HOT WATER</td> <td>P-1</td> <td>1-1/2"</td> <td>No</td> </tr> <tr> <td>Less than 1-1/2"</td> <td>P-1</td> <td>1-1/2"</td> <td>No</td> </tr> <tr> <td>1-1/2" and larger</td> <td>P-1</td> <td>2"</td> <td>No</td> </tr> <tr> <td>HORIZONTAL STORM AND SANITARY DRAINAGE</td> <td>P-1</td> <td>1"</td> <td>Yes</td> </tr> <tr> <td>all pipe sizes</td> <td>P-1</td> <td>1"</td> <td>Yes</td> </tr> <tr> <td>HORIZONTAL CONDENSATE DRAINS</td> <td>P-1</td> <td>1/2"</td> <td>Yes</td> </tr> <tr> <td>all pipe sizes</td> <td>P-1</td> <td>1/2"</td> <td>Yes</td> </tr> <tr> <td>REFRIGERANT LIQUID PIPE</td> <td>P-2</td> <td>1"</td> <td>Yes</td> </tr> <tr> <td>Less than 1"</td> <td>P-1</td> <td>1"</td> <td>Yes</td> </tr> <tr> <td>1" and above</td> <td>P-1</td> <td>1"</td> <td>Yes</td> </tr> </tbody> </table> <p>Seal Class Sealing Required Static Pressure Construction Class</p> <p>A All transverse joints, longitudinal seams and duct wall penetrations. [1000 Pa] [4" w.g. and up]</p> <p>B All transverse joints and longitudinal [500-750 Pa] [2" - 3" w.g.-&lt;] seams.</p> <p>C Transverse joints Up to [500 Pa] [2" w.g.-&lt;]</p>	DUTY	INSULATION TYPE	THICKNESS	VAPOUR BARRIER	DOMESTIC COLD WATER	P-1	1/2"	Yes	Less than 1"	P-1	1"	Yes	DOMESTIC HOT WATER	P-1	1"	No	Less than 1-1/2"	P-1	1-1/2"	No	1-1/2" and larger	P-1	1-1/2"	No	BUILDING HOT WATER	P-1	1-1/2"	No	Less than 1-1/2"	P-1	1-1/2"	No	1-1/2" and larger	P-1	2"	No	HORIZONTAL STORM AND SANITARY DRAINAGE	P-1	1"	Yes	all pipe sizes	P-1	1"	Yes	HORIZONTAL CONDENSATE DRAINS	P-1	1/2"	Yes	all pipe sizes	P-1	1/2"	Yes	REFRIGERANT LIQUID PIPE	P-2	1"	Yes	Less than 1"	P-1	1"	Yes	1" and above	P-1	1"	Yes	<p>8.4.11. Seal joints in exhaust ducting where fan intake is further than 25 m from furthest intake in accordance with seal Class A</p> <p>8.5. FLEXIBLE DUCTWORK:</p> <p>8.5.1. Provide Flexmaster T/L-A, flexible ductwork upstream and downstream of air terminal control units and/or other locations indicated on the Drawings.</p> <p>8.5.2. Construct ductwork from a tape of soft annealed aluminum sheet, spiral wound into a tube and spiral constructed to provide strength and flexibility. Provide a triple mechanical lock to form a continuous secure air joint without the use of adhesives for pressures up to 3000 Pa.</p> <p>8.5.3. Conform to the requirements of NFPA 90 and Underwriters Laboratories classification for round duct to specification UL 181.</p> <p>8.5.4. Provide flexible ductwork in minimum lengths of 1500 mm and maximum lengths of 3600 mm Class 1 pressure systems. For Class 2 and higher pressure systems restrict minimum and maximum lengths to 1200 mm.</p> <p>8.6. ACOUSTIC DUCT LINING</p> <p>8.6.1. Provide 25 mm thick acoustic duct liner where shown on drawings and as follows:</p> <p>8.6.1.1. Rectangular Duct Liner: Permacore Linoacoustic meeting ASTM C 1071 with air surface coated with acrylic coating treated with EPA registered anti-microbial agent proven to resist microbial growth as determined by ASTM G 21 and G 22.</p> <p>8.6.1.2. Noise Reduction Coefficient: .70 or higher based on "Type A mounting" and tested in accordance to ASTM C 423.</p> <p>8.6.1.3. Adhesive: meeting ASTM C 916.</p> <p>8.6.1.4. Fasteners: duct liner galvanized steel pins, welded or mechanically fastened.</p> <p>8.6.2. Round Duct Liner: Permacore Spiroacoustic, rigid preformed round liner, or Spiroacoustic Plus with air surface coated with acrylic coating treated with EPA registered anti-microbial agent proven to resist microbial growth as determined by ASTM G 21 and G 22.</p> <p>8.6.2.1. Noise Reduction Coefficient of .70 as per ASTM C 423. (Type A mounting)</p> <p>8.7. FIRE RATED DUCTING AND ENCLOSURES</p> <p>8.7.1. Provide all fire ductwork according to the manufacturers written instructions and in accordance with the UL listing. Use hangers, support rods and firestopping in accordance with the UL listing.</p> <p>8.7.2. All fire dampers shall be Type-B or Type-C, unless otherwise noted. Type-A fire dampers are not acceptable.</p> <p>8.8. SHEET METAL INSTALLATION</p> <p>8.8.1. Provide acoustic insulation on supply air ductwork from discharge side of mechanical air volume control boxes and attenuators as follows:</p> <ul style="list-style-type: none"> <li>- 300mm [10ft. - 0in.] for straight duct run box or</li> <li>- 1500mm [5ft. - 0in.] downstream of 1st elbow or</li> <li>- 1500mm [5ft. - 0in.] for each branch downstream of 1st tee.</li> </ul> <p>- From fan powered VAV box to last flexible duct connection</p> <p>8.8.2. Frame and install motorized dampers. Unless shown otherwise, attached each motorized damper module to the channel framing.</p> <p>8.8.3. Provide frames in ductwork airflow stations.</p> <p>8.8.4. Make provisions in ductwork and plenums for installation of duct type smoke detectors and other control devices.</p> <p>8.8.5. Provide neoprene isolation gaskets and nylon bolts at connections required for dissimilar metals.</p> <p>8.8.6. Seal watertight the bottom and sides of intake and exhaust ducts connected to exterior louvers as follows:</p> <ul style="list-style-type: none"> <li>- Intake: from louvre to air handling unit</li> <li>- Exhaust: from louvre to [2 metres] [6'-6"] upstream of louvre</li> </ul> <p>8.9. ACOUSTIC DUCT LINING INSTALLATION</p> <p>8.9.1. Seal all leading and trailing edges and repair all gaps or tears of acoustic duct liner with a suitable sealing compound similar to Johns-Manville Superseal.</p> <p>8.9.2. Provide a tapered sheet metal nose piece to hold the leading edge of acoustic duct liner and direct the air over the edge.</p> <p>8.10. TESTING</p> <p>8.10.1. Pressure test ductwork in accordance with the outlines and classification described in the SMACNA, HVAC Duct Leakage Test manual.</p> <p>8.10.2. All supply air ductwork shall be pressure tested.</p> <p>8.10.3. Random testing of approximately 15% of other ductwork shall be conducted when requested by Consultant.</p> <p>8.10.4. Failed joints shall be repaired and retested.</p> <p>8.10.5. Additional testing will be required if random testing reveals failures.</p> <p>8.10.6. The leakage amount shall not exceed the allotted amount for the pressure class. The test pressures shall be based on the static pressure for each fan.</p> <p>8.10.7. Repair duct and reset where air leakage</p>
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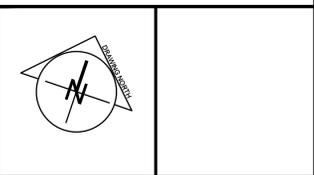


**NOTE:**  
 THIS DRAWING REPRESENTS GENERAL INTENT ONLY. CONTRACTOR TO CARRY NIAGARA PARKS COMMISSION CIVIL/SITE SERVICES ENGINEER AND FINALIZE ENGINEERED CIVIL/SITE SERVICING PLAN IMMEDIATELY FOLLOWING THE AWARD OF THE CONTRACT.

**GENERAL NOTES**

No.	DESCRIPTION	DATE	BY
1	RE-ISSUED FOR TENDER	DEC. 10, 2024	J.C.
0	ISSUED FOR TENDER	DEC. 03, 2024	J.C.

**REVISIONS**



**ARC ENGINEERING INC.**  
 solutions | excellence

1100 South Service Rd., #417  
 Stoney Creek ON L8E 0C5  
 T (905) 643-8530  
 F (905) 643-8510  
 www.arcengineering.ca  
 contact@arcengineering.ca

**PROJECT:**  
 NPC - WEGO GARAGE  
 ADDITION SERVICES  
 ASSESSMENT

7805 NIAGARA RIVER PARKWAY, NIAGARA FALLS,  
 ON L2G 7M8

**START DATE:** 2024 10 06  
**DRAWN BY:** M.R.  
**DESIGNED BY:** M.R.

**DRAWING TITLE:**  
 MECHANICAL SITE PLAN

**SCALE:** 1:150  
**PROJECT:** 24-109-090  
**DRAWING No.:** M-150

PLOT DATE: December 10, 2024

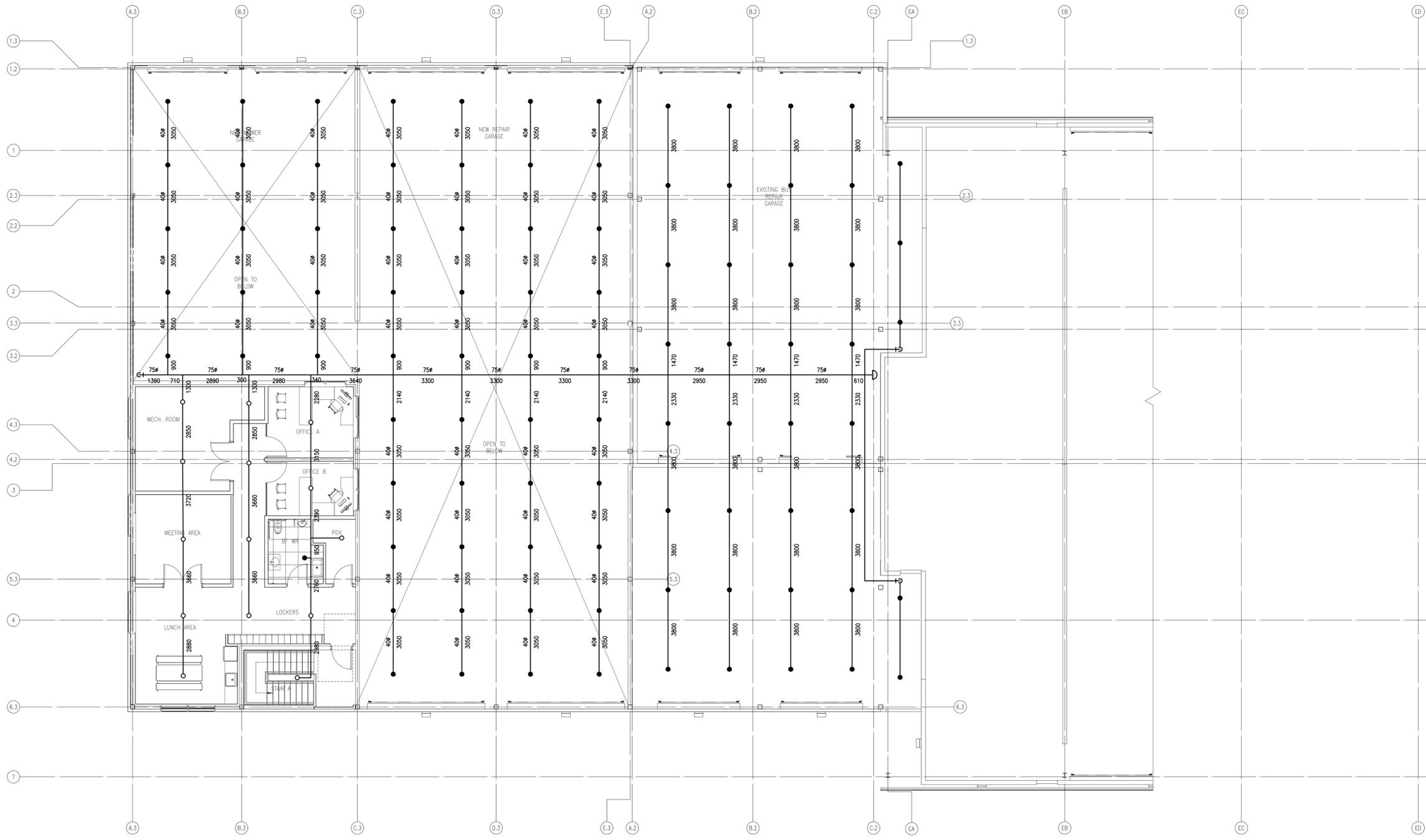








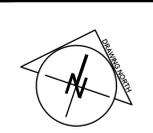




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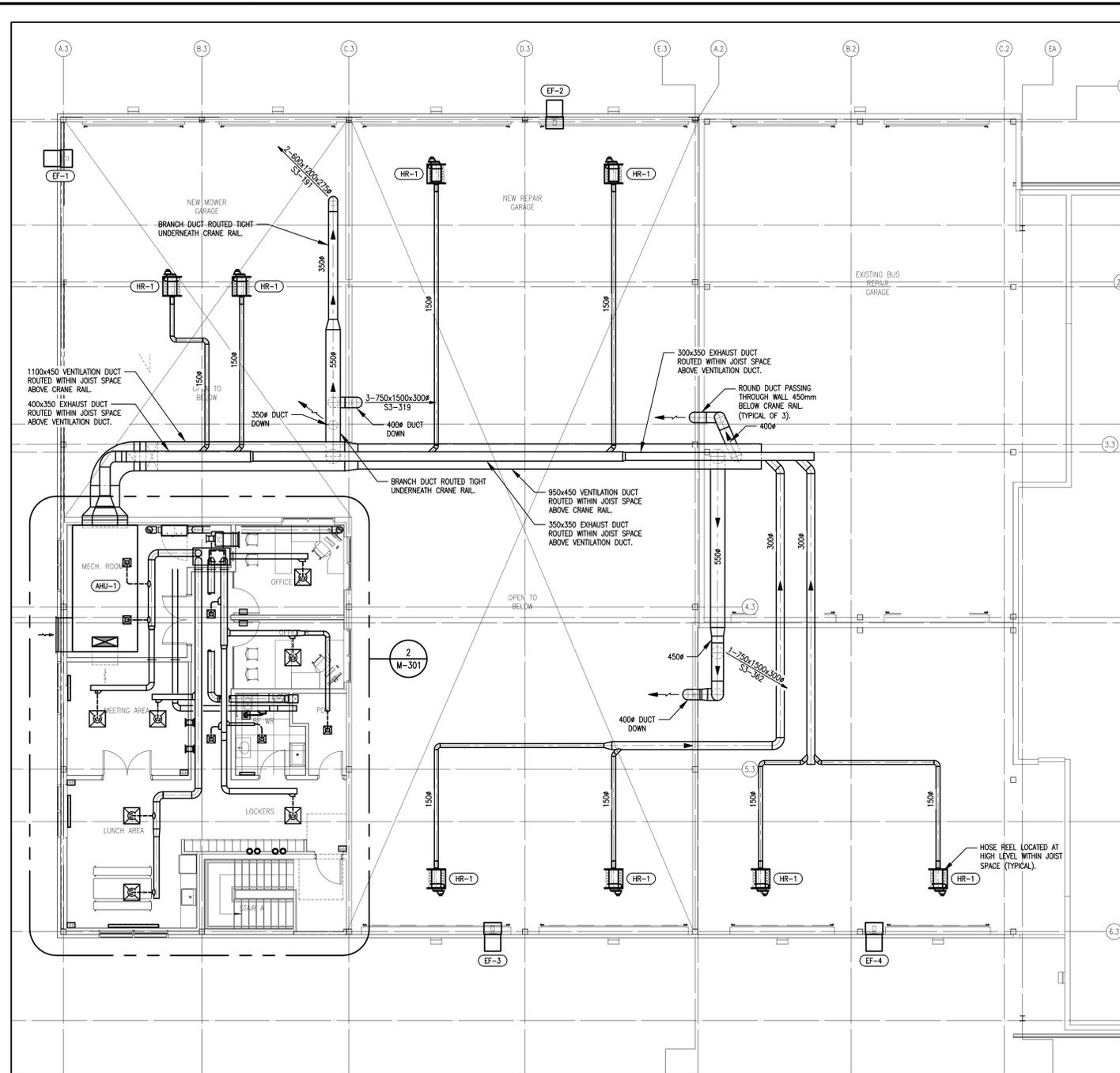
START DATE: 2024 10 06	DRAWN BY: M.R.	DESIGNED BY: M.R.
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DRAWING TITLE:  
**SECOND FLOOR FIRE  
 PROTECTION PLAN**

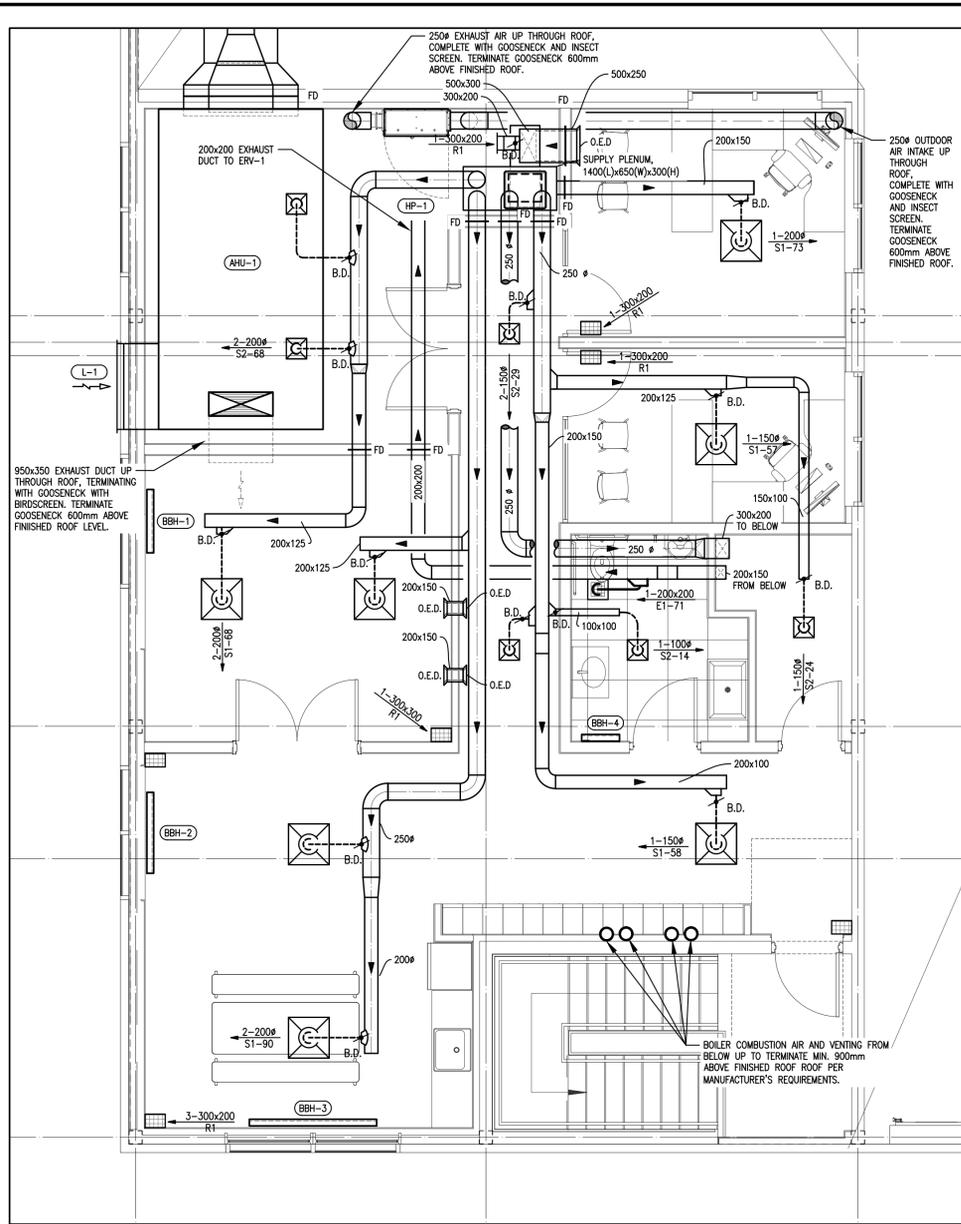
SCALE: 1:100	DRAWING No.:
PROJECT: 24-109-090	<b>M-251</b>

PLOT DATE: December 10, 2024





1 SECOND FLOOR HVAC PLAN  
M-301 SCALE: 1:100

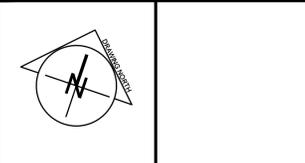


2 SECOND FLOOR OFFICE PART PLAN  
M-301 SCALE: 1:50

GENERAL NOTES

No.	DESCRIPTION	DATE	BY
1	RE-ISSUED FOR TENDER	DEC. 10, 2024	J.C.
0	ISSUED FOR TENDER	DEC. 03, 2024	J.C.

REVISIONS



1100 South Service Rd., #417  
Stoney Creek ON L8E 0C5  
T (905) 643-8530  
F (905) 643-8510  
www.arcengineering.ca  
contact@arcengineering.ca

PROJECT:  
**NPC - WEGO GARAGE  
ADDITION SERVICES  
ASSESSMENT**  
7805 NIAGARA RIVER PARKWAY, NIAGARA FALLS,  
ON L2G 7M8

START DATE: 2024 10 06  
DRAWN BY: M.R.  
DESIGNED BY: M.R.

DRAWING TITLE:  
**SECOND FLOOR HVAC PLAN**

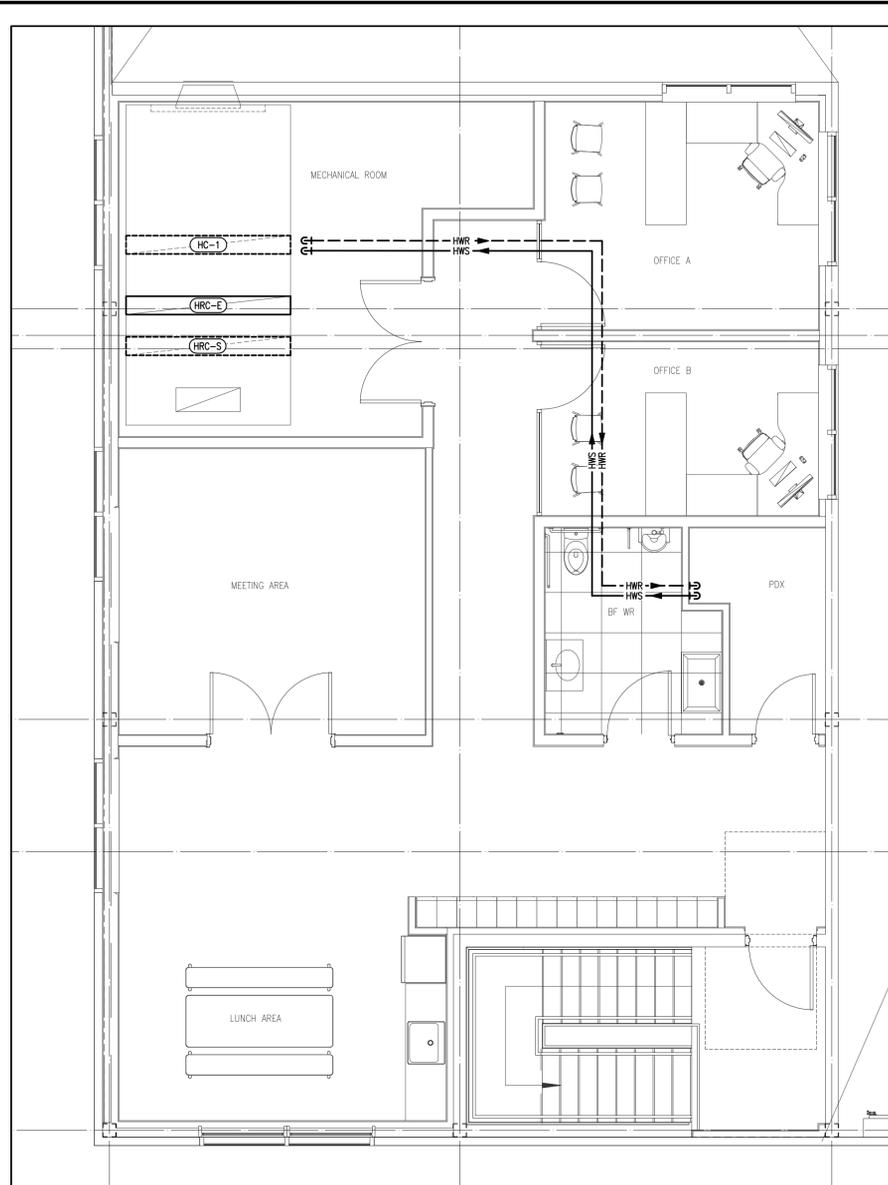
SCALE: 1:100  
PROJECT: 24-109-090  
DRAWING No.: **M-301**

PLOT DATE: December 10, 2024

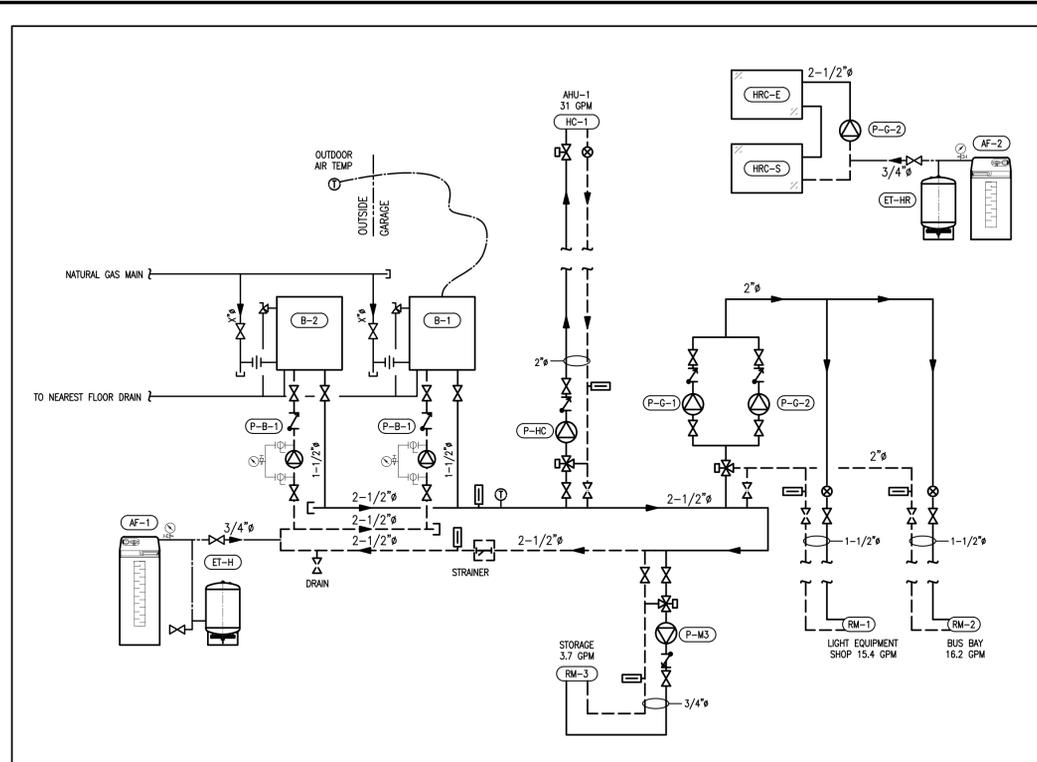
ORIGINAL SHEET SIZE: ARCH D

30cm 20cm 10cm 0





1 SECOND FLOOR OFFICE HYDRONIC PLAN  
M-401 SCALE: 1:50

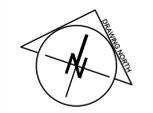


2 HYDRONIC SCHEMATIC  
M-401 SCALE: NTS

GENERAL NOTES

No.	DESCRIPTION	DATE	BY
1	RE-ISSUED FOR TENDER	DEC. 10, 2024	J.C.
0	ISSUED FOR TENDER	DEC. 03, 2024	J.C.

REVISIONS



MANIFOLD	CIRCUIT	RADIANT LOOPS																REMARKS		
		TUBE DIAMETER		SPACING		AREA		TOTAL CAPACITY		LOOP LENGTH		FLOW		EWT		LWT			CIRCUIT PRESSURE DROP	
		mm	IN	mm	IN	M <sup>2</sup>	SQ FT	W	BTU	M	FT	L/S	USGPM	°C	°F	°C	°F		kPa	FT
RM1	C1	16	5/8	305	12	29.9	323	3,921	13384	98.3	323	0.08	1.34	54.4	130	43.3	110	3.2	1.06	
	C2	16	5/8	305	12	27.7	298	3,626	12376	90.9	298	0.08	1.24	54.4	130	43.3	110			
	C3	16	5/8	305	12	29.8	321	3,906	13330	97.9	321	0.08	1.33	54.4	130	43.3	110			
	C4	16	5/8	305	12	31.6	341	4,145	14146	103.9	341	0.09	1.41	54.4	130	43.3	110			
	C5	16	5/8	229	9	20.7	223	3,328	11357	90.5	297	0.07	1.14	54.4	130	43.3	110			
	C6	16	5/8	229	9	18.7	202	3,011	10278	81.9	269	0.06	1.03	54.4	130	43.3	110			
	C7	16	5/8	305	12	31.1	336	4,081	13929	102.3	336	0.09	1.39	54.4	130	43.3	110			
	C8	16	5/8	305	12	32.1	346	4,213	14378	105.6	346	0.09	1.44	54.4	130	43.3	110			
	C9	16	5/8	305	12	31.2	337	4,093	13969	102.6	337	0.09	1.40	54.4	130	43.3	110			
	C10	16	5/8	305	12	33.1	356	4,332	14786	108.6	356	0.09	1.48	54.4	130	43.3	110			
	C11	16	5/8	305	12	32.5	350	4,261	14541	106.8	350	0.09	1.45	54.4	130	43.3	110			
	C12	16	5/8	229	9	21.1	227	3,394	11583	92.3	303	0.07	1.16	54.4	130	43.3	110	3.0	1.00	
RM2	C1	16	5/8	229	9	19.9	214	3,203	10930	87.1	286	0.07	1.09	54.4	130	43.3	110			
	C2	16	5/8	305	12	32.9	354	4,308	14705	108	354	0.09	1.47	54.4	130	43.3	110			
	C3	16	5/8	305	12	35.6	384	4,667	15930	117	384	0.10	1.59	54.4	130	43.3	110			
	C4	16	5/8	305	12	34.1	367	4,468	15249	112	367	0.10	1.52	54.4	130	43.3	110			
	C5	16	5/8	305	12	32.3	348	4,229	14432	106	348	0.09	1.44	54.4	130	43.3	110			
	C6	16	5/8	305	12	28.3	305	3,710	12662	93	305	0.08	1.27	54.4	130	43.3	110			
	C7	16	5/8	229	9	21.7	234	3,493	11922	95	312	0.08	1.19	54.4	130	43.3	110			
	C8	16	5/8	305	12	30.1	325	3,949	13479	99	325	0.09	1.35	54.4	130	43.3	110			
	C9	16	5/8	305	12	27.1	292	3,550	12118	89	292	0.08	1.21	54.4	130	43.3	110			
	C10	16	5/8	305	12	32.9	354	4,308	14705	108	354	0.09	1.47	54.4	130	43.3	110			
RM3	C1	16	5/8	229	9	19.8	213	1,875	6400	86.7	284	0.04	0.64	43.3	110	32.2	90			
	C2	16	5/8	305	12	32.1	346	2,152	7345	105.6	346	0.05	0.73	43.3	110	32.2	90			
	C3	16	5/8	305	12	34.1	368	2,287	7804	112.2	368	0.05	0.78	43.3	110	32.2	90			
	C4	16	5/8	305	12	29.5	318	1,975	6740	96.9	318	0.04	0.67	43.3	110	32.2	90			

NOTES:  
1. MANIFOLDS ARE RAHUE, LOOP LENGTHS DO NOT INCLUDE LENGTH BETWEEN FLOOR AND WALL MOUNTED MANIFOLD, LOOP PRESSURE LOSS DOES NOT INCLUDE MANIFOLD HARDWARE.

**ARC ENGINEERING INC.**  
solutions | excellence

1100 South Service Rd., #417  
Stoney Creek ON L8E 0G5  
T (905) 643-8530  
F (905) 643-8510

www.arcengineering.ca  
contact@arcengineering.ca

PROJECT:  
**NPC - WEGO GARAGE  
ADDITION SERVICES  
ASSESSMENT**

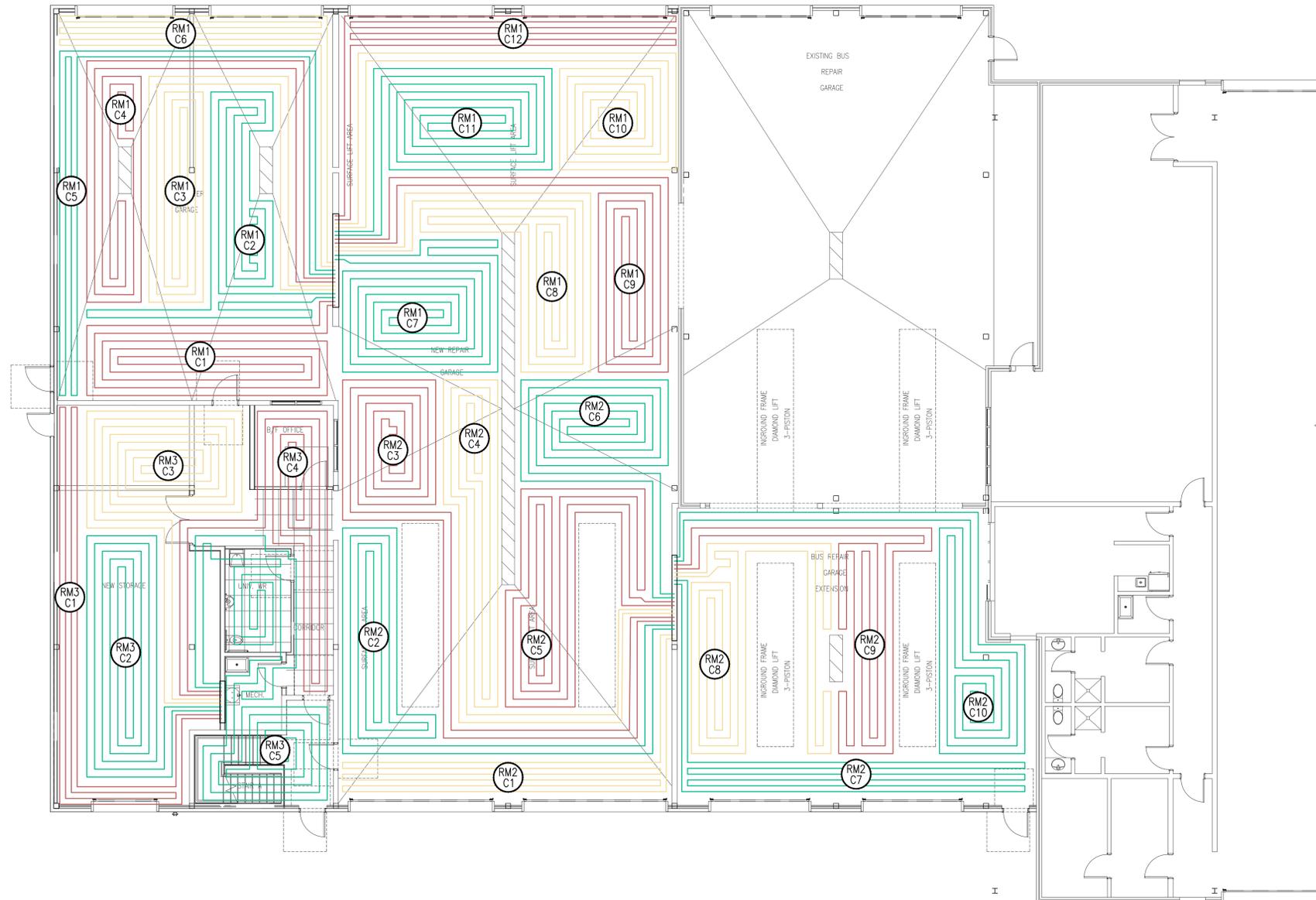
7805 NIAGARA RIVER PARKWAY, NIAGARA FALLS,  
ON L2G 7M8

START DATE: 2024 10 06  
DRAWN BY: M.R.  
DESIGNED BY: M.R.

DRAWING TITLE:  
**SECOND FLOOR HYDRONIC  
DISTRIBUTION PLAN &  
SCHEMATIC**

SCALE: 1:150  
DRAWING No.: **M-401**  
PROJECT: 24-109-090

PLOT DATE: December 10, 2024



GENERAL NOTES

No.	DESCRIPTION	DATE	BY
1	RE-ISSUED FOR TENDER	DEC. 10, 2024	J.C.
0	ISSUED FOR TENDER	DEC. 03, 2024	J.C.

REVISIONS

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1100 South Service Rd., #417  
 Stoney Creek ON L8E 0C5  
 T (905) 643-8530  
 F (905) 643-8510  
[www.arcengineering.ca](http://www.arcengineering.ca)  
[contact@arcengineering.ca](mailto:contact@arcengineering.ca)

PROJECT:  
**NPC - WEGO GARAGE  
 ADDITION SERVICES  
 ASSESSMENT**  
 7805 NIAGARA RIVER PARKWAY, NIAGARA FALLS,  
 ON L2G 7M8

START DATE: 2024 10 06	DRAWN BY: M.R.	DESIGNED BY: M.R.
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DRAWING TITLE:  
**RADIANT HEAT PIPING PLAN**

SCALE: 1:100	DRAWING No.: <b>M-410</b>
PROJECT: 24-109-090	

PLOT DATE: December 10, 2024

ORIGINAL SHEET SIZE: ARCH D

30cm 20cm 10cm 0





<p>1. GENERAL</p> <p>1.1. THIS SPECIFICATION SHALL APPLY TO AND COVER ALL WORK OF DIVISION 16. THE ELECTRICAL CONTRACTOR SHALL BE A SUBCONTRACTOR TO THE GENERAL CONTRACTOR AND HIS BID SHALL BE TENDERED DIRECT TO THE GENERAL CONTRACTOR. THE CONTRACTOR SHALL SUPPLY, INSTALL, WIRE AND CONNECT ALL EQUIPMENT, ACCESSORIES, DEVICES ETC SHOWN UNLESS SPECIFICALLY NOTED OTHERWISE. SHOULD THE CONTRACTOR BE UNSURE, THEY ARE TO SUBMIT A QUESTION 3 WORKING DAYS PRIOR TO TENDER CLOSE TO HAVE AN ADDENDUM ISSUED TO CLARIFY THE DEVICE, EQUIPMENT OR WORK SCOPE IN QUESTION.</p> <p>1.2. IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN ALL DRAWINGS AND SPECIFICATIONS PRIOR TO TENDER. SUBMITTAL ELECTRICAL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ARCHITECTURAL, STRUCTURAL AND MECHANICAL DRAWINGS. ANY DISCREPANCIES BETWEEN THESE SPECIFICATIONS AND THE DRAWINGS THAT CAUSES DOUBT AS TO THE TRUE MEANING OF INTENT OF THE DRAWINGS AND SPECIFICATIONS, A RULING SHALL BE OBTAINED FROM THE ENGINEER PRIOR TO TENDER SUBMITTAL. NO ALLOWANCE WILL BE MADE FOR FAILURE TO DO SO. IF CLARIFICATION CAN NOT BE OBTAINED IN TIME, THE CONTRACTOR SHALL INCLUDE FOR THE MORE COSTLY INSTALLATION IN THEIR BID.</p> <p>1.3. LIABILITY INSURANCE: OBTAIN AND CARRY PROPER INSURANCE TO FULLY PROTECT BOTH THE OWNER AND HIMSELF FROM ANY AND ALL CLAIMS DUE TO ACCIDENTS, MISFORTUNES, ACTS OF GOD, ETC.</p> <p>1.4. CODES, PERMITS AND INSPECTION</p> <p>1.4.1. BE RESPONSIBLE FOR AND OBTAIN ALL PERMITS, INSPECTION, ETC., AS REQUIRED BY ALL AUTHORITIES HAVING JURISDICTION OVER THIS WORK AND PAY FOR ALL FEES RELATED TO SAME.</p> <p>1.4.2. DELIVER ALL PERMITS TO THE ENGINEER AS SOON AS THEY BECOME AVAILABLE.</p> <p>1.5. CLOSE OUT DOCUMENTS AND AS-BUILT DRAWINGS:</p> <p>1.5.1. THE CONTRACTOR SHALL SUBMIT AN ENQUIRY TO THE ARCHITECT/OWNER TO OBTAIN THE FINAL ROOM NAMES AND NUMBERS TO BE USED IN ALL THE CLOSE OUT DOCUMENTS, REPORTS, FIRE ALARM/NOTICE CALL PROGRAMMING, PANEL SCHEDULES, ETC. FAILURE TO USE THE FINAL NAMES AND NUMBERS WILL REQUIRE THE CONTRACTOR TO REPLACE DOCUMENTATION/PROGRAM AS REQUIRED AT THEIR EXPENSE. THEY SHALL KEEP A SEPARATE SET OF WHITE PRINTS ON THE SITE AND NOTE ALL CHANGES AND DEVIATIONS FROM THE ORIGINAL DESIGN. DEVICES ETC NOTED AS "EX" (EXISTING) AND "REL" (RELOCATED) ARE TO HAVE THE CIRCUIT TRACED AND DESIGNATED ON THE DRAWINGS. DEVICES ETC DESIGNATED AS CONNECT TO EXISTING CIRCUIT IN AREA ARE TO HAVE THE CIRCUIT INDICATED ON THE PLANS. PROVIDE AS-BUILT DRAWINGS IN AUTOCAD FORMAT (MIN. RELEASE 2010), PDF FORMAT AND (2) TWO SETS OF THESE PLANS SHOWING ALL AS-BUILT CONDITIONS TO THE OWNER AT THE COMPLETION OF THIS CONTRACT AND BEFORE APPLYING FOR FINAL PAYMENT. (INCLUDE IN-SLAB CONDUIT RUNS). SHOULD NO MARKUPS BE REQUIRED TENDER AND/OR SEALED PLANS BY THE ENGINEER WILL NOT BE ACCEPTED.</p> <p>1.5.2. CLOSE OUT BINDERS SHALL BE PROVIDED WITH ALL TEST RESULTS, WARRANTY LETTERS AND SHOP DRAWINGS. A PDF COPY SHALL BE PROVIDED ALONG WITH THE HARD COPY VERSIONS. PDF VERSION SHALL BE ASSEMBLED VERSIONS WHERE POSSIBLE. SHOULD A DOCUMENT REQUIRE SCANNING, IT SHALL BE PROVIDED IN HIGH RESOLUTION AND BE CLEARLY LEGIBLE. ILLEGIBLE DOCUMENTS WILL NOT BE ACCEPTED.</p> <p>1.6. CODES AND STANDARDS (CURRENT EDITIONS)</p> <p>1.6.1. DO COMPLETE INSTALLATION IN ACCORDANCE WITH C.S.A. C22.1 EXCEPT WHERE SPECIFIED OTHERWISE.</p> <p>1.6.2. COMPLY WITH C.S.A. ELECTRICAL BULLETINS IN FORCE AT TIME OF TENDER SUBMISSION, WHILE NOT IDENTIFIED AND SPECIFIED BY NUMBER IN THIS DIVISION, ARE TO BE CONSIDERED AS FORMING PART OF RELATED C.S.A. PART II STANDARD.</p> <p>1.6.3. DO OVERHEAD AND UNDERGROUND SYSTEMS IN ACCORDANCE WITH C.S.A. C22.3 NO. 1 EXCEPT WHERE SPECIFIED OTHERWISE.</p> <p>1.6.4. ABBREVIATIONS FOR ELECTRICAL TERMS: TO C.S.A. Z85.</p> <p>1.6.5. COMPLY ALSO WITH THE FOLLOWING CODES:</p> <p>1.6.5.1. ONTARIO ELECTRICAL SAFETY CODE</p> <p>1.6.5.2. NATIONAL BUILDING CODE</p> <p>1.6.5.3. ONTARIO BUILDING CODE</p> <p>1.6.5.4. LOCAL HYDRO UTILITY REQUIREMENTS</p> <p>1.6.5.5. CAN/ULC 5524, 5537 AND 51001</p> <p>1.7. VISITING THE SITE: VISIT THE SITE OF THE PROJECT AND BECOME FAMILIAR WITH THE SITE CONDITIONS. REPORT ANY DEVIATION AND/OR CONFLICTS BETWEEN TENDER DOCUMENTS AND SITE CONDITIONS PRIOR TO SUBMITTING TENDER.</p> <p>1.8. LOCATION OF OUTLETS: CHANGE LOCATION OF OUTLETS, EQUIPMENT AT NO EXTRA COST OR CREDIT. PROVIDING DISTANCE DOES NOT EXCEED 10' 0" (3m) AND INFORMATION IS GIVEN BEFORE INSTALLATION.</p> <p>1.9. CUTTING AND PATCHING: PROVIDE ALL CUTTING, PATCHING AND PAINTING FOR ELECTRICAL WORK, UNLESS NOTED OTHERWISE.</p> <p>1.10. EQUIPMENT AND MATERIAL: ALL EQUIPMENT AND MATERIAL, UNLESS SPECIFICALLY NOTED OTHERWISE, SHALL BE NEW AND WITHOUT BLEMISH OR DEFECT. ALL MATERIAL AND EQUIPMENT SHALL BEAR U.L.C. OR C.S.A. LABELS.</p> <p>1.11. WARRANTY: WARRANTY ALL WORK AND APPARATUS INSTALLED UNDER THIS CONTRACT FOR A PERIOD OF ONE YEAR AFTER ACCEPTANCE OF SAME BY THE OWNER.</p> <p>1.12. MAINTENANCE OF SERVICE: PROVIDE ALL LABOUR AND MATERIALS NECESSARY TO ENSURE THAT POWER, LIGHTING AND ALL OTHER MISCELLANEOUS ELECTRICAL SERVICES ARE MAINTAINED IN FULL OPERATING CONDITION, IN ALL AREAS OF THE EXISTING BUILDING, DURING THE CONSTRUCTION PERIOD. DISCONNECT, MOVE, RELOCATE AND RECONNECT CONDUIT AND WIRING AS NECESSARY TO ACCOMMODATE THE NEW WORK AND MECHANICAL INSTALLATION.</p> <p>1.13. CLEANING</p> <p>1.13.1. DO FINAL CLEANING.</p> <p>1.13.2. AT TIME OF FINAL CLEANING, CLEAN EQUIPMENT SURFACES THAT HAVE BEEN EXPOSED TO CONSTRUCTION DUST AND DIRT.</p> <p>1.13.3. VACUUM INSIDE OF ALL PANEL BOARDS, ETC., ON COMPLETION OF THE PROJECT.</p> <p>1.14. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES</p> <p>1.14.1. SUBMIT SHOP DRAWINGS, PRODUCT DATA AND/OR SAMPLES FOR ALL EQUIPMENT, POWER DISTRIBUTION, POWER DEVICES, COMMUNICATIONS DEVICES, BACKWAY, LIGHT FIXTURES, EMERGENCY LIGHTING, ETC. THE DRAWINGS ARE TO BE REVIEWED AND STAMPED BY BOTH THE GENERAL AND ELECTRICAL CONTRACTOR PRIOR TO SUBMITTAL.</p> <p>1.14.2. SHOP DRAWINGS SHALL INCLUDE ALL RELEVANT ACCESSORIES AND LAYOUTS WHERE REQUESTED.</p> <p>1.14.3. SHOP DRAWINGS THAT ARE ILLEGIBLE AND OF POOR QUALITY WILL BE REJECTED.</p> <p>1.14.4. SHOP DRAWINGS WILL BE REVIEWED AND RETURN MARKER "REVIEWED", "REVIEWED AS MODIFIED" OR "REVISE AND RESUBMIT". THE DRAWING REVIEW DOES NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR ITS ACCURACY OR FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS.</p> <p>1.14.5. INSTALLATION OF ANY EQUIPMENT SHALL NOT START UNTIL AFTER FINAL REVIEW OF SHOP DRAWINGS BY THE CONSULTANT HAS BEEN OBTAINED.</p> <p>1.14.6. INCOMPLETE OR INCORRECT SHOP DRAWINGS THAT ARE REJECTED, WHICH ADVERSELY AFFECTS OR RESULTS IN ANY DELAY OF THE DELIVER SCHEDULE OF ANY EQUIPMENT SHALL BE THE CONTRACTORS RESPONSIBILITY.</p> <p>1.14.7. IF INCORRECT SHOP DRAWINGS ARE SUBMITTED AND REJECTED ANY SUBSEQUENT DELIVERY DELAY WILL RESULT IN THE CONTRACTOR PROVIDING TEMPORARY FACILITIES UNTIL SAID EQUIPMENT IS DELIVERED AND INSTALLED AT NO EXTRA COST TO THE OWNER.</p> <p>1.14.8. PROVIDE SPACE FOR SHOP DRAWING REVIEW STAMPS FOR THE CONTRACTOR AND CONSULTANT. THIS SPACE SHALL BE CLEAR OF ALL TECHNICAL INFORMATION AND SHALL NOT BE ON THE BACK OF ANY SHEETS.</p> <p>1.14.9. SUBMIT SHOP DRAWINGS IN DIGITAL (PDF) FORMAT.</p> <p>1.14.10. ONE (1) ORIGINAL COPY IN DIGITAL FORMAT (PDF) WILL BE RETURNED. ALL COPIES REQUIRED BY TRADES, SUPPLIERS OR OTHER CONSULTANTS WILL BE PROVIDED AND/OR PRINTED BY THE CONTRACTOR.</p> <p>1.14.11. FAILURE TO SUBMIT SHOP DRAWINGS WILL NOT RELIEVE THIS CONTRACTOR FROM ENSURING THAT ALL INSTALLED EQUIPMENT MEETS THE INTEND OF DESIGN DOCUMENTS. ALL COSTS ASSOCIATED WITH ANY ISSUES ASSOCIATED WITH ALTERNATE OR NOT SUBMITTED EQUIPMENT WILL THE RESPONSIBILITY OF THE INSTALLING CONTRACTOR.</p> <p>1.14.12. SHOP DRAWING SUBMITTAL SHALL BE (BUT NOT LIMITED TO) FOR ANY EQUIPMENT AS LISTED:</p> <p>1.14.12.1. HIGH VOLTAGE EQUIPMENT</p> <p>1.14.12.2. SWITCHBOARD, METER CENTERS, PANEL BOARDS</p> <p>1.14.12.3. FIRE ALARM SYSTEMS</p> <p>1.14.12.4. LUMINAIRES INCLUDING LAMPS AND BALLASTS</p> <p>1.14.12.5. LIGHTING CONTROLS</p> <p>1.14.12.6. EMERGENCY BATTERY UNITS AND FIXTURES</p> <p>1.14.12.7. ELECTRICAL HEATERS</p> <p>1.14.12.8. SECURITY SYSTEM</p> <p>1.14.12.9. MASTER CLOCK AND PROGRAM</p> <p>1.14.12.10. INTERCOM SYSTEM</p> <p>1.14.12.11. PUBLIC ADDRESS SYSTEM</p> <p>1.14.12.12. MILLWORK</p> <p>1.14.12.13. DEVICES</p> <p>1.15. DRAW BREAKDOWNS:</p> <p>1.15.1. THIS CONTRACTOR MUST SUBMIT A BREAKDOWN OF THE TENDER PRICE INTO SEPARATE CLASSIFICATION TO THE SATISFACTION OF THE CONSULTANT AND TOTALING THE TOTAL CONTRACT AMOUNT. EACH ITEM IS TO BE BROKEN INTO MATERIAL AND LABOUR COSTS.</p> <p>1.15.2. PROGRESS DRAWS, WHEN SUBMITTED, ARE TO BE IDENTIFIED AGAINST EACH OF THE DRAW BREAKDOWNS AND SHALL BE IN TABLE FORM SPECIFYING CONTRACT AMOUNT, AMOUNT OF THIS DRAW, TOTAL TO DATE, PERCENTAGE COMPLETE AND BALANCE.</p>	<p>1.15.3. BREAKDOWN SHALL FOLLOW, BUT NOT BE LIMITED TO:</p> <p>1.15.3.1. PERMITS AND FEE</p> <p>1.15.3.2. MOBILIZATION</p> <p>1.15.3.3. DEMOLITION</p> <p>1.15.3.4. DISTRIBUTION EQUIPMENT (IE. SWITCHBOARDS, PANELBOARDS, ETC.)</p> <p>1.15.3.5. INCOMING FEEDERS AND CONDUITS</p> <p>1.15.3.6. BRANCH WIRING CONDUITS</p> <p>1.15.3.7. BRANCH WIRING</p> <p>1.15.3.8. MECHANICAL EQUIPMENT WIRING</p> <p>1.15.3.9. FIRE ALARM DEVICES</p> <p>1.15.3.10. FIRE ALARM WIRING</p> <p>1.15.3.11. FIRE ALARM VERIFICATION AND CERTIFICATION</p> <p>1.15.3.12. EXIT AND EMERGENCY LIGHTING</p> <p>1.15.3.13. LIGHTING</p> <p>1.15.3.14. LIGHTING CONTROLS</p> <p>1.15.3.15. VOICE AND COMMUNICATION WIRING</p> <p>1.15.3.16. VOICE AND COMMUNICATION CABLES AND TERMINATIONS</p> <p>1.15.3.17. ACCESS CONTROL AND SECURITY</p> <p>1.15.3.18. MISCELLANEOUS AND SPECIALTY EQUIPMENT (IE. PUBLIC ADDRESS, SOUND, ETC.)</p> <p>1.15.4. ABOVE BREAKDOWN MUST BE APPROVED BY THE CONSULTANT PRIOR TO SUBMISSION OF THE FIRST DRAW. MOBILIZATION AMOUNT MAY ONLY BE DRAWN WHEN ALL REQUIRE SHOP DRAWINGS HAVE BEEN REVIEWED BY THE CONSULTANT</p> <p>1.16. REVISIONS TO CONTRACT:</p> <p>1.16.1. PROVIDE ITEMIZED LISTS OF MATERIALS/ASSOCIATED COSTS, LABOUR RATE/LABOUR FOR EACH ITEM, COPY OF MANUFACTURERS INVOICE, IF REQUESTED, FOR EACH ITEM GIVEN CHANGE NOTICE.</p> <p>1.17. ROOF AND WALL OPENINGS:</p> <p>1.17.1. LOCATION OF CONDUITS PASSING THROUGH ROOF AND WALLS TO BE COORDINATED WITH DIVISION 15. ALL OPENINGS TO BE MADE WATERTIGHT.</p> <p>1.18. SCHEDULE OF CONSTRUCTION:</p> <p>1.18.1. CONSULT GENERAL DIVISION FOR SCHEDULE OF CONSTRUCTION BEFORE COMMENCING WORK AND COORDINATE DETAILS WITH ENGINEER, OWNER AND ALL TRADES DURING CONSTRUCTION.</p> <p>1.19. DIRECTORIES AND LABELLING:</p> <p>1.19.1. IDENTIFY ALL ELECTRICAL EQUIPMENT. IDENTIFICATION SHALL CONSIST OF ENGRAVED LAMINATED NAMEPLATES HAVING BLACK BACKGROUND WITH WHITE LETTERS. FASTEN NAMEPLATES TO DEVICE USING SELF-TAPPING, COUNTERSUNK SCREWS. TAPE-TYPE NAMEPLATES WILL NOT BE ACCEPTED.</p> <p>1.19.2. ALL RECEPTACLE COVER PLATES SHALL BE LABELED WITH TAPE-TYPE NAMEPLATES. THE LABEL SHALL INDICATE THE PANEL DESIGNATION AND CIRCUIT NUMBER. (E A19). TAPE SHALL BE NEATLY TRIMMED ON EACH END AND PLACED PLUMB AND LEVEL ON THE FACE PLATE. LABELS SHALL HAVE A NEAT, CLEAN AND PROFESSIONAL APPEARANCE. LABELS NOT TRIMMED OR POORLY POSITIONED WILL NOT BE ACCEPTED.</p> <p>1.19.3. ALL PANELS WITH CIRCUITS ADDED OR REMOVED SHALL HAVE NEW COMPUTER GENERATED PANEL SCHEDULES PLACED IN THEM. SCHEDULE SHALL INDICATE PANEL DESIGNATION, PANEL TYPE, WIRE SIZE, VOLTAGE, PHASE, BRANCH CIRCUIT NUMBERS, BREAKER AMPERAGE AND CIRCUIT DESCRIPTION.</p> <p>1.20. GROUNDING:</p> <p>1.20.1. GROUND ALL EQUIPMENT IN ACCORDANCE WITH CODE REQUIREMENTS AND AS INDICATED.</p> <p>1.20.2. GROUNDING CONDUCTORS: COPPER, INSULATED (GREEN); SIZE PER CODE.</p> <p>1.20.3. GROUNDING LUGS, CONNECTORS: APPROVED GRINDLING TYPE.</p> <p>1.20.4. ALL GROUND CONDUCTORS #8AWG OR SMALLER SHALL BE RUN IN EMT.</p> <p>1.21. FIREPROOFING:</p> <p>1.21.1. WHERE CABLES PASS THROUGH FLOORS OR FIRE RATED WALLS, PACK SPACE BETWEEN WIRING AND SLEEVE FULL WITH APPROVED RATED FIRE STOPS AND SEAL WITH CAULKING COMPOUND CONFORMING TO C788 19-GP-986.</p> <p>1.22. MOUNTING HEIGHTS:</p> <p>1.22.1. MOUNTING HEIGHT OF EQUIPMENT IS FROM FINISHED FLOOR TO CENTRELNE OF EQUIPMENT UNLESS SPECIFIED OR INDICATED OTHERWISE.</p> <p>1.22.2. IF MOUNTING HEIGHT OF EQUIPMENT IS NOT SPECIFIED OR INDICATED, VERIFY BEFORE PROCEEDING WITH INSTALLATION.</p> <p>1.22.3. INSTALL ELECTRICAL EQUIPMENT AS SPECIFIED IN THE OBC FOR BARRIER FREE DESIGN. IF NOT NOTED, INSTALL AT FOLLOWING CENTERLINE HEIGHTS:</p> <p>1.22.3.1. LOCAL SWITCHES: 3'-5" (1050mm).</p> <p>1.22.3.2. WALL RECEPTACLES:</p> <p>1.22.3.2.1. GENERAL: 1'-6" (450mm).</p> <p>1.22.3.2.2. ABOVE TOP OF CONTINUOUS BASEBOARD HEATER: 10" (250mm).</p> <p>1.22.3.2.3. ABOVE TOP OF COUNTERTOP OR COUNTERTOP SLASH BACKS: 6" (150mm).</p> <p>1.22.3.2.4. MECHANICAL ROOMS: 3'-5" (1050mm).</p> <p>1.22.3.3. PANELBOARDS: AS REQUIRED BY CODE OR AS INDICATED.</p> <p>1.22.3.4. TELEPHONE AND INTERPHONE OUTLETS: 1'-6" (450mm).</p> <p>1.22.3.5. TELEVISION OUTLETS: 1'-6" (450mm).</p> <p>1.22.3.6. FIRE ALARM PULL STATIONS: 3'-9" (1150mm).</p> <p>1.23. LOAD BALANCE:</p> <p>1.23.1. MEASURE PHASE CURRENT TO PANELBOARDS WITH NORMAL LOADS (LIGHTING) OPERATING AT TIME OF ACCEPTANCE. ADJUST BRANCH CIRCUIT CONNECTIONS AS REQUIRED TO OBTAIN BEST BALANCE OF CURRENT BETWEEN PHASES AND RECORD CHANGES.</p> <p>1.23.2. MEASURE PHASE VOLTAGES AT LOADS AND ADJUST TRANSFORMER TAPS TO WITHIN 2% OF RATED VOLTAGE OF EQUIPMENT.</p> <p>1.23.3. SUBMIT, AT COMPLETION OF WORK, REPORT LISTING PHASE AND NEUTRAL CURRENTS ON PANELBOARDS, DRY-CORE TRANSFORMERS AND MOTOR CONTROL CENTRES, OPERATING UNDER NORMAL LOAD. STATE HOUR AND DATE ON WHICH EACH LOAD WAS MEASURED, AND VOLTAGE AT TIME OF TEST.</p> <p>1.24. SECURITY DOOR</p> <p>1.24.1. THE CONTRACTOR SHALL INCLUDE FOR ALL WORK (CUTTING, PATCHING, CONDUIT, PULLING CABLE, EQUIPMENT, LICENCES, INSTALLATION, ETC) FOR SECURITY DOORS, MAGNETIC LOCK DOORS SHALL INCLUDE POWER FOR THE CONTROLLER AND CONDUIT/CABLING TO CONNECT TO THE KEY RESET SWITCH, CONFORM LOCATION AND ROUTING PRIOR TO BID. ALL DOORS SHALL BE FULLY FUNCTIONAL AT COMPLETION OF PROJECT. WHERE SPECIFIED VENDORS ARE INDICATED, THE CONTRACTOR SHALL COORDINATE WITH THE VENDOR AND INCLUDE FOR ALL WORK NOT IN THE SCOPE OF THE SPECIFIED VENDOR. CONTRACTOR SHALL MAKE ANY ADJUSTMENTS AFTER INSTALLATION AS REQUIRED BY THE OWNER.</p> <p>1.24.2. REFER TO THE FIRE ALARM SECTION FOR VERIFICATION AND TESTING. DOORS SHALL BE TESTED AS A SYSTEM WITH THE FIRE ALARM AND OPERATION SHALL BE CONFIRMED PRIOR TO BRINGING CITY OFFICIALS, BUILDING OWNERS AND THE ENGINEER TO SITE TO WITNESS DOORS.</p> <p>1.25. CONDUIT AND CABLE INSTALLATION:</p> <p>1.25.1. INSTALL CONDUIT AND SLEEVES PRIOR TO POURING OF CONCRETE. SLEEVES THROUGH CONCRETE: SCHEDULE 40 STEEL PIPE, SIZED FOR FREE PASSAGE OF CONDUIT, AND PROTRUDING 2" (50mm).</p> <p>1.25.2. IF PLASTIC SLEEVES ARE USED IN FIRE RATED WALLS OR FLOORS, REMOVE BEFORE CONDUIT INSTALLATION.</p> <p>1.25.3. INSTALL CABLES, CONDUITS AND FITTINGS TO BE EMBEDDED OR PLASTERED OVER, NEATLY AND CLOSE TO BUILDING STRUCTURE SO FURRING CAN BE KEPT TO MINIMUM.</p> <p>1.26. DEFINITIONS:</p> <p>1.26.1. THE FOLLOWING ARE DEFINITIONS OF WORDS FOUND IN THE SPECIFICATION AND ON ASSOCIATED DRAWINGS:</p> <p>1.26.1.1. "CONCEALED": HIDDEN FROM NORMAL SIGHT IN FURRED IN SPACES, SHAFTS, CEILING SPACES, WALLS, UNDER FLOOR AND PARTITIONS.</p> <p>1.26.1.2. "EXPOSED": ALL ELECTRICAL WORK EXPOSED TO BUILDING OCCUPANTS, WIRE AND CABLEING SHALL BE IN CONDUIT UNLESS SPECIFICALLY NOTED OTHERWISE.</p> <p>1.26.1.3. "PROVIDE" (AND ALL TENSES OF "PROVIDE") SUPPLY, INSTALL, WIRE AND CONNECT COMPLETELY.</p> <p>1.26.1.4. "INSTALL" (AND ALL TENSES OF "INSTALL") INSTALL WIRE AND CONNECT COMPLETE, PRODUCTS AND SERVICES SPECIFIED.</p> <p>1.26.1.5. "SUPPLY" SUPPLY ONLY</p> <p>1.26.1.6. "OR APPROVED EQUAL": MATERIAL OR EQUIPMENT PROPOSED BY THE CONTRACTOR IN LIEU OF THAT SPECIFIED AS APPROVED BY THE CONSULTANT. MATERIAL OR EQUIPMENT SHALL MEET OR EXCEED THE SAME QUALITY, MATERIAL, EFFICIENCY, ETC AS THE SPECIFIED PRODUCTS.</p> <p>1.26.1.7. "AS INDICATED" AS SHOWN ON DRAWINGS AND/OR NOTED IN SPECIFICATIONS.</p> <p>1.27. NOT USED</p> <p>1.28. PHASING:</p> <p>1.28.1. THE CONTRACTOR SHALL REVIEW THE PHASING AS INDICATED ON ALL PLANS. THIS INCLUDES ARCHITECTURAL, MECHANICAL PLANS ETC IN THE ENTIRE DRAWING PACKAGE.</p> <p>1.28.2. THE CONTRACTOR SHALL INCLUDE FOR MECHANICAL CONNECTIONS AS REQUIRED TO FACILITATE THE WORK.</p>	<p>1.28.3. THE CONTRACTOR SHALL INCLUDE FOR ALL WEEKEND AND PREMIUM TIME REQUIRED TO FACILITATE THE PHASING AS INDICATED IN THE PLANS PACKAGE.</p> <p>2. PRODUCTS</p> <p>2.1. ELECTRICAL EQUIPMENT</p> <p>2.1.1. EQUIPMENT SHALL HAVE 1.0m (39") CLEARANCE IN FRONT OF SAID EQUIPMENT</p> <p>2.1.2. ELECTRICAL EQUIPMENT RATED AT 1200A AND OVER SHALL HAVE 1.5m (59") CLEARANCE IN FRONT OF SAID EQUIPMENT.</p> <p>2.1.3. ALL EQUIPMENT INSTALLED IN SPRINKLERED AREAS ARE TO BE COMPLETE WITH DRIP SHIELDS.</p> <p>2.2. PANEL BOARDS</p> <p>2.2.1. PANEL BOARDS: TO C.S.A. C22.2, NO. 29. LOADCENTRES ARE NOT ACCEPTABLE.</p> <p>2.2.2. PANEL BOARDS ARE TO BE THE PRODUCT OF ONE (1) MANUFACTURER</p> <p>2.2.3. 120/208V-3 PHASE-A WIRE PANEL BOARDS, BUS AND BREAKERS RATED FOR MINIMUM 10,000 (SYMMETRICAL) INTERRUPTING CAPACITY OR AS INDICATED ON THE DRAWINGS.</p> <p>2.2.4. MAIN BREAKER SHALL OCCUPY A SEPARATE COMPARTMENT FROM BRANCH BREAKERS. PANELS WITH MAIN BREAKERS IN BRANCH BREAKER COMPARTMENT WILL NOT BE ACCEPTED.</p> <p>2.2.5. SEQUENCE PHASE BUSSING WITH ODD NUMBERED BREAKERS ON LEFT AND EVEN ON RIGHT, WITH EACH BREAKER IDENTIFIED BY PERMANENT NUMBER IDENTIFICATION AS TO CIRCUIT NUMBER.</p> <p>2.2.6. PANEL BOARDS: MARKS, NUMBER OF CIRCUITS, AND NUMBER AND SIZE OF BRANCH CIRCUIT BREAKERS AS INDICATED</p> <p>2.2.7. TWO (2) KEYS FOR EACH PANEL BOARD AND KEY PANEL BOARDS ALIKE.</p> <p>2.2.8. COPPER BUS WITH FULL SIZE COPPER MAINS AND NEUTRAL.</p> <p>2.2.9. MAINS FOR BOLT-ON BREAKERS.</p> <p>2.2.10. FINISH TRIM AND DOOR BAKED GRAY ENAMEL, PAINT THE SAME AS DOOR.</p> <p>2.2.11. COMPLETE CIRCUIT DRAWING WITH TYPEWRITTEN LEGEND SHOWING CIRCUIT LABEL, AMPERAGE AND PANEL LOCATION UNDER PLASTIC COVER.</p> <p>2.2.12. EATON CUTLER HAMMER, SQUARE D, SIEMENS CANADA MANUFACTURE.</p> <p>2.3. BREAKERS GENERAL</p> <p>2.3.1. BOLT-ON MOLDED CASE CIRCUIT BREAKER, FULL MODULE (I.E., 1" MINIMUM WIDTH), QUICK-MAKE, QUICK-BREAK TYPE, FOR MANUAL AND AUTOMATIC OPERATION WITH TEMPERATURE COMPENSATION FOR 400C AMBIENT. (MNI-BREAKERS NOT ACCEPTABLE)</p> <p>2.3.2. MAGNETIC INSTANTANEOUS TRIP ELEMENTS IN CIRCUIT BREAKERS, TO OPERATE ONLY WHEN THE VALUE OF CURRENT REACHES SETTING.</p> <p>2.4. DISCONNECT SWITCHES FUSED AND UNFUSED</p> <p>2.4.1. ENCLOSED MANUAL AIR BREAK SWITCHES IN NON-HAZARDOUS LOCATIONS: TO C.S.A. C22.0 NO. 4.</p> <p>2.4.2. FUSE HOLDER ASSEMBLIES TO C.S.A. C22.2 NO. 39.</p> <p>2.4.3. FUSIBLE AND NON-FUSIBLE DISCONNECT SWITCHES AS INDICATED.</p> <p>2.4.4. PROVISION FOR PADLOCKING IN ON/OFF SWITCH POSITION BY THREE LOCKS</p> <p>2.4.5. MECHANICALLY INTERLOCKED DOOR TO PREVENT OPENING WHEN HANDLE IN "ON" POSITION</p> <p>2.4.6. QUICK-MAKE, QUICK-BREAK ACTION.</p> <p>2.4.7. ON/OFF SWITCH POSITION INDICATION ON SWITCH ENCLOSURE COVER.</p> <p>2.4.8. C.S.A. ENCLOSURE 1 UNLESS NOTED OTHERWISE.</p> <p>2.4.9. EATON CUTLER HAMMER, SQUARE D, SIEMENS CANADA MANUFACTURE.</p> <p>2.5. CONDUCTORS:</p> <p>2.5.1. ALL CONDUCTORS SHALL BE COPPER UNLESS INDICATED OTHERWISE.</p> <p>2.5.2. CONDUCTORS #10 AWG AND SMALLER SHALL BE SOLID. CONDUCTORS #8 AND LARGER SHALL BE STRANDED.</p> <p>2.5.3. CONDUCTORS SHALL BE SIZED #12 AWG MINIMUM, EXCEPT FOR CONTROL CIRCUITS WHERE #14 AWG MINIMUM SIZE IS PERMITTED. FEEDER SIZES AS INDICATED.</p> <p>2.5.4. PANEL FEEDER LENGTHS SHALL BE CONTRACTOR VERIFIED FOR LENGTH OF PROPOSED INSTALLATION PATH SO AS NOT TO EXCEED 3% VOLTAGE DROP ON INSTALLATION. FEEDERS EXCEEDING THE LENGTH OF THE ALLOWABLE AMPACITY SHALL BE BROUGHT TO THE ENGINEERS ATTENTION PRIOR TO BEGINNING ANY ROUGH INS.</p> <p>2.5.5. SIZE CONDUCTORS FOR A 2% MAXIMUM VOLTAGE DROP FROM OVERCURRENT DEVICE TO FARTHEST OUTLET.</p> <p>2.5.6. CONDUCTOR INSULATION RATED FOR 900V MINIMUM UNLESS STATED OTHERWISE.</p> <p>2.5.7. CONDUCTOR TYPES:</p> <p>2.5.7.1. TW75, TWU TO C.S.A. #C22.2 NO. 75</p> <p>2.5.7.2. RW90, RWU90 (XLP) TO C.S.A. #C22.2 NO. 38</p> <p>2.5.7.3. TW75, RW90 (XLP) - INSIDE BUILDING.</p> <p>2.5.7.4. TWU, RWU90 (XLP) - CONDUCTORS DIRECT BURIED OR IN CONDUIT OUTSIDE BUILDING.</p> <p>2.5.7.5. BX (ARMORED CABLE IS ONLY PERMITTED FOR LIGHT FIXTURE DROPS IN ARCHITECTURAL CEILING OR ABOVE CEILING) AND MAY BE USED IN HOLLOW PARTITIONS FOR SWITCH (AND/OR RECEPTACLE DROPS) OR SUSPENDED CEILING FOR FIXTURE DROPS ONLY. ANY DROPS SHALL NOT EXCEED 3.0m (10'-0") ACROSS THE SPAN OF THE CABLE. CABLE IS NOT TO BE INSTALLED IN OPEN CEILING OR ANY OTHER EXPOSED APPLICATION. ALL CABLES ARE TO BE PERMITTED FASTENED TO BUILDING STRUCTURE IN A NEAT AND PROFESSIONAL MANNER. USE OF AC-90 IN METAL STUD CONSTRUCTION HOLLOW PARTITION IS TO BE LIMITED TO A MAXIMUM OF 3.0m (10'-0"). EXCESSIVE USE OF AC-90, IN THE OPINION OF THE ENGINEER, WILL REQUIRE ELECTRICAL CONTRACTOR TO REPLACE ALL NEW WIRING WITH PROPER CONDUIT AND WIRE AT CONTRACTORS EXPENSE.</p> <p>2.6. FASTENINGS AND SUPPORTS</p> <p>2.6.1. SUPPORT EQUIPMENT, CONDUIT OR CABLES USING CLIPS, SPRING-LOADED BOLTS, CABLE CLAMPS DESIGNED AS ACCESSORIES TO BASIC CHANNEL MEMBERS.</p> <p>2.6.2. INSTALL FASTENINGS AND SUPPORTS AS REQUIRED FOR EACH TYPE OF EQUIPMENT CABLES AND CONDUIT AND IN ACCORDANCE WITH MANUFACTURERS INSTALLATION.</p> <p>2.7. CONDUITS</p> <p>2.7.1. RIGID, GALVANIZED STEEL, THREADED CONDUIT TO C.S.A. C22.2, NO. 45, SIZE AS INDICATED.</p> <p>2.7.2. ELECTRICAL METALLIC TUBING (EMT) WITH COUPLINGS AND EXPANDED ENDS AS REQUIRED, TO C.S.A. C22.2, NO. 83, SIZE AS INDICATED.</p> <p>2.7.3. RIGID PVC (UNPLASTICIZED) CONDUIT FOR EXPOSED, ABOVE GROUND WORK. TO C.S.A. C22.2, NO. 211.2, SIZE AS INDICATED. FLEXIBLE PVC IS NOT PERMITTED.</p> <p>2.7.4. FLEXIBLE METAL CONDUIT AND LIQUID-TIGHT FLEXIBLE METAL CONDUIT TO C.S.A. C22.2, NO. 36.</p> <p>2.7.5. EMT CONDUIT FITTINGS, IE. CONNECTORS, COUPLINGS, TO C.S.A. C22.2, NO. 18, ZINC-PLATED STEEL MALLEABLE IRON CONSTRUCTION. ALL CONNECTIONS AND COUPLINGS TO BE SET SCREW TYPE, IE. CONCRETE TIGHT.</p> <p>2.7.6. CONDUIT SIZES SHALL BE A MINIMUM OF 3/4" AND CONFORM TO ELECTRICAL SAFETY CODE. WHERE SIZES ARE INDICATED AND THEY EXCEED CODE, THEY SHALL NOT BE REDUCED.</p> <p>2.7.7. USE RIGID, GALVANIZED STEEL, THREADED CONDUIT WHERE CONDUIT IS SUBJECT TO MECHANICAL INJURY.</p> <p>2.7.8. RUN PARALLEL OR PERPENDICULAR TO BUILDING LINES.</p> <p>2.7.9. USE EMT FOR ALL WIRING FROM OUTLET BOX TO SOURCE.</p> <p>2.7.10. INSTALL NYLON FISH WIRE IN EMTY CONDUITS AND TERMINATE UNDER SCREW LEAVING 12" SLACK. TAG FISH WIRE IDENTIFYING SYSTEM.</p> <p>2.7.11. DO NOT LOCATE CONDUITS LESS THAN 3" (75 MM) PARALLEL TO STEAM OR HOT WATER LINES WITH A MINIMUM OF 1" (25 MM) AT CROSS-OVERS.</p> <p>2.7.12. IN-SLAB CONDUIT: LOCATE TO SUIT REINFORCING STEEL. INSTALL IN CENTRE 1/2 OF SLAB.</p> <p>2.7.13. PROVIDE AND INSTALL 4.38mm (4 1/16") SPARE CONDUITS UP TO CEILING SPACE FROM EACH PULL MOUNTED ELECTRICAL PANEL. TERMINATE IN 300mm X 300mm (12"x12") JUNCTION BOXES IN ACCESSIBLE CEILING SPACE.</p> <p>2.8. JUNCTION AND PULL BOXES</p> <p>4. GENERAL</p> <p>4.1.1. COMPONENTS COMPRISING GROUND FAULT PROTECTIVE SYSTEM TO BE OF SAME MANUFACTURER.</p> <p>4.2. BREAKER TYPE GROUND FAULT INTERRUPTER</p> <p>4.2.1. SINGLE POLE GROUND FAULT CIRCUIT INTERRUPTER FOR 15A, 120V, 1 PHASE CIRCUIT C/W TEST AND RESET FACILITIES.</p> <p>4.2.2. SINGLE POLE GROUND FAULT CIRCUIT INTERRUPTER FOR 30A, 120V, 1 PHASE CIRCUIT C/W TEST AND RESET FACILITIES.</p> <p>4.3. INSTALLATION</p> <p>4.3.1. DO NOT GROUND NEUTRAL ON LOAD SIDE OF GROUND FAULT RELAY.</p> <p>4.3.2. PASS PHASE CONDUCTORS INCLUDING NEUTRAL THROUGH ZERO SEQUENCE TRANSFORMERS.</p> <p>4.3.3. CONNECT SUPPLY AND LOAD WIRING TO EQUIPMENT IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.</p> <p>4.4. FIELD QUALITY CONTROL</p> <p>4.4.1. PERFORM TESTS IN ACCORDANCE WITH SECTION 16010 - ELECTRICAL GENERAL</p> <p>4.4.2. ABANDON AND PAY FOR FIELD TESTING OF GROUND FAULT EQUIPMENT BY INDEPENDENT TESTING LABORATORY GROUND FAULT EQUIPMENT MANUFACTURER CONTRACTOR BEFORE COMMISSIONING SERVICE.</p> <p>2.10. TRANSFORMERS</p> <p>2.10.1. TRANSFORMERS SHALL BE COMPLETE WITH COPPER WINDINGS AND MEET THE</p>	<p>REQUIREMENTS OF CSA 802.2-CURRENT EDITION FOR ENERGY EFFICIENCY.</p> <p>2.10.2. TRANSFORMERS SHALL BE GENERAL PURPOSE, SUITABLE FOR SPRINKLER LOCATION WITH DELTA/V/VE CONFIGURATION 600/120/208V, 3PH, 4W SECONDARY C/W THREE (3) COILS WINDINGS.</p> <p>2.10.3. MOUNT DRY TYPE TRANSFORMER UP TO 75VA ON WALL WITH ANGLE IRON FRAME SECURELY SUPPORTED FROM STRUCTURE AND VIBRO-ACOUSTIC ISOLATORS, UNO.</p> <p>2.10.4. MOUNT DRY TYPE TRANSFORMER 75VA AND ABOVE ON 4" CONCRETE PAD C/W VIBRO-ACOUSTIC ISOLATORS, UNO.</p> <p>2.10.5. ACCEPTABLE MANUFACTURERS: HAMMOND POWER SOLUTIONS (HPS), MARCUS AND BEX POWER MAGNETICS.</p> <p>2.11. WIRING DEVICES:</p> <p>2.11.1. SUPPLY AND INSTALL WIRING DEVICES AS INDICATED COMPLETE WITH COVERPLATES.</p> <p>2.11.2. SWITCHES: MANUALLY OPERATED, GENERAL PURPOSE, AC, SPECIFICATION GRADE, TOTALLY ENCLOSED BODY, RATED 120V, 20 AMPERES MINIMUM OR AS REQUIRED BY CIRCUIT COMPLETE WITH WHITE DECORATIVE DESIGNER SERIES TOGGLE. (ROCKER)</p> <p>2.11.3. RECEPTACLES: 3 WIRE, U-GROUND TYPE, PREMIUM SPECIFICATION GRADE COMPLETE WITH SCREW-TYPE TERMINALS, DOUBLE WIRE CONTACTS, RIVETED GROUND CONTACTS, BREAK-OUT LINKS FOR SPLIT RECEPTACLES AND WHITE MOLDED HOUSING. RECEPTACLES WITHIN 1.5m OF A SNK ARE TO BE PROTECTED BY GFH EXTERIOR RECEPTACLES ARE TO BE GFH AND INCLUDE "EXTRA DUTY IN USE" WEATHERPROOF COVER. HUBBELL CAT NO. AM4020.</p> <p>2.11.4. OTHER RECEPTACLES WITH AMPACITY AND VOLTAGE AS INDICATED.</p> <p>2.11.5. PRODUCTS: DEVICES TO BE HUBBELL MANUFACTURE, STYLE LINE SERIES:</p> <p>2.11.5.1.1. LIGHT SWITCH (STYLE LINE DECORATOR SERIES):</p> <p>2.11.5.1.1.1. 20A-120V SINGLE POLE WHITE - P6120W</p> <p>2.11.5.1.1.2. 20A-120V 3-WAY WHITE - D5200W</p> <p>2.11.5.1.1.3. 20A-120V 4-WAY WHITE - D5420W</p> <p>2.11.5.1.1.4. 20A-347V SINGLE POLE WHITE - COOPER AH18221W</p> <p>2.11.5.1.1.5. 20A-347V 3-WAY WHITE - COOPER AH18232W</p> <p>2.11.5.2. RECEPTACLES (STYLE LINE DECORATOR SERIES):</p> <p>2.11.5.2.1. 15A-125V DUPLEX WHITE - DR15WHI</p> <p>2.11.5.2.2. 20A-125V DUPLEX WHITE - DR20WHI</p> <p>2.11.5.2.3. 15A-125V GFCI DUPLEX - GF15WLA</p> <p>2.11.5.2.4. 20A-125V GFCI DUPLEX - GF20WLA</p> <p>2.11.5.3. TAMPER RESISTANT RECEPTACLES (STYLE LINE DECORATOR SERIES):</p> <p>2.11.5.3.1. 15A-125V DUPLEX WHITE - DR15WHITR</p> <p>2.11.5.3.2. 20A-125V DUPLEX WHITE - DR20WHITR</p> <p>2.11.5.3.3. 15A-125V GFCI DUPLEX - GFR15W</p> <p>2.11.5.3.4. 20A-125V GFCI DUPLEX - GFR20W</p> <p>2.11.5.4. USB RECEPTACLE (STYLE LINE DECORATOR SERIES)</p> <p>2.11.5.4.1. 15A-125V USB DUPLEX WHITE, 5A USB A/B C - USB15A45W</p> <p>2.11.5.5. WALL PLATES (STYLE LINE): STANDARD SIZE WHITE NYLON:</p> <p>2.11.5.5.1. 1-GANG - NP26W</p> <p>2.11.5.5.2. 2-GANG - NP262W</p> <p>2.11.5.5.3. 3-GANG - NP263W</p> <p>2.11.5.5.4. 4-GANG - NP264W, ETC.</p> <p>2.11.5.6. WALL PLATES (STYLE LINE): STANDARD SIZE STAINLESS:</p> <p>2.11.5.6.1. 1-GANG - SS26</p> <p>2.11.5.6.2. 2-GANG - SS262</p> <p>2.11.5.6.3. 3-GANG - SS263</p> <p>2.11.5.6.4. 4-GANG - SS264, ETC.</p> <p>2.11.6. ACCEPTABLE MANUFACTURER PASS &amp; SEYMOUR AND COOPER</p> <p>2.13. MECHANICAL AND/OR ROOF TOP EQUIPMENT</p> <p>2.13.1. COORDINATE SIZE OF BREAKERS AND FEEDERS WITH MECHANICAL. FEEDERS ON DRAWINGS ARE BASED ON DESIGN LOUIS PROVIDED BY MECHANICAL DRAWINGS. CONTRACTOR SHALL CONFIRM THE FEEDER SIZES AND BREAKERS ON SHOP DRAWINGS PRIOR TO ROUGH-IN AND PURCHASE OF MATERIAL/EQUIPMENT TO POWER UP UNITS. DISCREPANCIES ARE TO BE NOTED TO THE ENGINEER.</p> <p>2.13.2. PROVIDE MAINTENANCE RECEPTACLES AS REQUIRED BY A.E. COORDINATE WITH MECHANICAL. SHOULD THE EQUIPMENT NOT INCLUDE A MAINTENANCE RECEPTACLE AS AN OPTION, THE CONTRACTOR SHALL INCLUDE TO PROVIDE A 15/208V GFCI RECEPTACLE AND A 1P-20A BREAKER FROM THE LOCAL PANEL FOR EACH GROUP OF UNITS. UNITS MORE THAN 50' APART SHALL HAVE ITS OWN RECEPTACLE. RECEPTACLE SHALL BE MOUNTED TO A PEDestal, OR ROOF CURB AND SEALED WATERTIGHT. PROVIDE AN IN-USE COVER FOR THE RECEPTACLE.</p> <p>3. LIGHTING</p> <p>3.1. MANUFACTURERS OPERATIONAL TESTS:</p> <p>3.1.1. TEST FIXTURE FOR ACCEPTANCE OF LAMP MADE TO MAXIMUM TOLERANCE AS REQUIRED IN A.N.S.I. STANDARDS.</p> <p>3.1.1.1. TEST FIXTURES WITH RATED LAMPS FOR STARTING AND OPERATION.</p> <p>3.1.1.2. CHECK WIRING FOR AGREEMENT WITH DESIGN CIRCUIT.</p> <p>3.1.1.3. TEST FOR SHORT CIRCUITS AND IMPROPER GROUNDS.</p> <p>3.2. HANGERS AND FITTINGS:</p> <p>3.2.1. SUPPORT FIXTURES AS SHOWN ON THE DRAWINGS, LEVEL, PLUMB AND TRUE WITH THE STRUCTURE AND OTHER EQUIPMENT, AND IN A HORIZONTAL OR VERTICAL POSITION AS INTENDED.</p> <p>3.2.2. WALL OR SIDE BRACKET MOUNTED FIXTURE HOUSINGS SHALL BE RIGIDLY INSTALLED AND ADJUSTED TO GIVE A NEAT FLUSH FIT TO THE SURFACE ON WHICH IT IS MOUNTED.</p> <p>3.3. SUPPORTS:</p> <p>3.3.1. SUPPORT FIXTURES BY HANGERS AND MOUNTING ARRANGEMENTS WHICH WILL NOT CAUSE THE FIXTURE FRAME, HOUSING, SIDES OR LENS FRAME TO BE DISTORTED, OR PREVENT COMPLETE ALIGNMENT OF SEVERAL FIXTURES IN A ROW.</p> <p>3.3.2. MOUNTING METHOIS FOR FIXTURES ON IN SUSPENDED CEILINGS ARE TO BE AS FOLLOWS:</p> <p>3.3.3. WHERE LIGHTING FIXTURES ARE RECESSED INTO SUSPENDED CEILINGS, THESE FIXTURES ARE TO BE SUPPORTED INDEPENDENTLY OF THE CEILING USING #12 JACK CHAIN HANGERS. EACH CHAIN IS TO BE SECURED SEPARATELY TO THE STRUCTURE ABOVE SO THAT NO WEIGHT FALLS ON THE CEILING SUSPENSION SYSTEM.</p> <p>3.3.4. IN NO CASE WILL REINFORCEMENT OF THE CEILING SUSPENSION SYSTEM BE REQUIRED FOR SUPPORT OF THE FIXTURE HOUSING. MARK HOME RUNS TO BE EMT FROM JUNCTION BOX AT CLUSTER OF FIXTURES TO PANEL.</p> <p>3.3.5. WHERE CROSS MEMBER SUPPORTS ARE REQUIRED ABOVE THE CEILING TO PROVIDE SUPPORT POINTS, THESE ARE TO BE STEEL CHANNELS OR ANGLES.</p> <p>3.4. INSTALLATION:</p> <p>3.4.1. INSTALLATION OF ALL LIGHTING EQUIPMENT SHALL COMPLY WITH THE RELEVANT SECTIONS OF THE ONTARIO ELECTRICAL SAFETY CODE.</p> <p>3.4.2. CLUSTER OF RECESSED FIXTURES SHALL BE WIRED WITH #800 OR #90 WIRE IN FLEXIBLE STEEL CONDUIT TO ADJACENT OUTLET BOXES PLACED ABOVE THE FINISHED CEILING, WITHIN REACH OF THE FIXTURE HOUSING. MARK HOME RUNS TO BE EMT FROM JUNCTION BOX AT CLUSTER OF FIXTURES TO PANEL.</p> <p>3.4.3. AT THE COMPLETION OF CONSTRUCTION AND ACCEPTANCE OF WORK, ALL LIGHTING FIXTURES SHALL BE CLEAN, COMPLETE WITH ALL NECESSARY ACCESSORIES AND PROVIDED WITH THE REQUIRED OPERATING LAMPS).</p> <p>3.4.4. FIXTURES AS SHOWN ON THE ELECTRICAL DRAWINGS ARE APPROXIMATE LOCATIONS ONLY. INSTALLATION OF FIXTURES SHALL BE IN ACCORDANCE WITH REFLECTED CEILING PLANS, DETAILS AND/OR FIELD INSTRUCTIONS ISSUED BY THE ARCHITECT.</p> <p>3.4.5. ALL 347V FIXTURES TO HAVE LOCAL DISCONNECT TO COMPLY WITH THE ONTARIO ELECTRICAL SAFETY CODE.</p> <p>3.4.6. UPON COMPLETION, CLEAN LIGHTING REFLECTORS, LENSES AND OTHER LIGHTING SURFACES THAT HAVE BEEN EXPOSED TO CONSTRUCTION DUST AND DIRT.</p> <p>3.4.7. THE MOUNTING HEIGHTS OF BUILDING MOUNTED FIXTURES SHALL BE CONFIRMED PRIOR TO ROUGH-IN. REVIEW ARCHITECTURAL PLANS/ELEVATIONS. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES BETWEEN PLANS AND INDICATED MOUNTING HEIGHTS IN SCHEDULED PLANS BETWEEN METRIC AND IMPERIAL DESIGNATED HEIGHTS.</p> <p>4. GROUND FAULT CIRCUIT INTERRUPTERS - CLASS 'A'</p> <p>4. GENERAL</p> <p>4.1.1. COMPONENTS COMPRISING GROUND FAULT PROTECTIVE SYSTEM TO BE OF SAME MANUFACTURER.</p> <p>4.2. BREAKER TYPE GROUND FAULT INTERRUPTER</p> <p>4.2.1. SINGLE POLE GROUND FAULT CIRCUIT INTERRUPTER FOR 15A, 120V, 1 PHASE CIRCUIT C/W TEST AND RESET FACILITIES.</p> <p>4.2.2. SINGLE POLE GROUND FAULT CIRCUIT INTERRUPTER FOR 30A, 120V, 1 PHASE CIRCUIT C/W TEST AND RESET FACILITIES.</p> <p>4.3. INSTALLATION</p> <p>4.3.1. DO NOT GROUND NEUTRAL ON LOAD SIDE OF GROUND FAULT RELAY.</p> <p>4.3.2. PASS PHASE CONDUCTORS INCLUDING NEUTRAL THROUGH ZERO SEQUENCE TRANSFORMERS.</p> <p>4.3.3. CONNECT SUPPLY AND LOAD WIRING TO EQUIPMENT IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.</p> <p>5.10. WIRING</p> <p>5.10.1. FROM EACH TELEPHONE JACK SHOW, PROVIDE HOME RUN CABLE, 4 PAIR CATEGORY 6 (6A), FT6 (PLENUM RATED) CABLE FROM JACK TO MAIN EXISTING TELEPHONE BOARD VIA CONDUIT/PIPE UNDER FLOOR OR ABOVE CEILING TRAYS.</p> <p>5.10.2. FROM EACH COMPUTER JACK SHOW, PROVIDE A HOME RUN CABLE, 4 PAIR CATEGORY 6 (6A), FT6 (PLENUM) RATED CABLE IN ACCORDANCE WITH EIA/TIA 568B CRITERIA RUN TO EXISTING HUB VIA CONDUIT, J HOOKS OR CABLE TRAYS.</p>	<p>4.4.3. SUBMIT REPORT OF TESTS TO CONSULTANT AND A CERTIFICATE THAT SYSTEM AS INSTALLED MEETS CRITERIA SPECIFIED HEREIN.</p> <p>4.4.4. DEMONSTRATE SIMULATED GROUND FAULT TESTS.</p> <p>5. COMPUTER/TELECOM CABLING SYSTEM</p> <p>5.1. SCOPE OF WORK</p> <p>5.1.1. SUPPLY AND INSTALL A STRUCTURED WIRING SYSTEM USING CATEGORY 6 (6A) TWISTED PAIR TECHNOLOGY IN ACCORDANCE WITH EIA/TIA 568B WIRING SPECIFICATION.</p> <p>5.1.2. EACH COMPUTER OUTLET SHOWN NEW ON THE DRAWINGS SHALL MEET OR EXCEED CATEGORY 6 (6A) EIA/TIA SPECIFICATION</p> <p>5.1.2.1. CATEGORY 6 (6A), 4 PAIR TWISTED CABLE FT6 (PLENUM RATED) HOME RUN CABLE FROM EACH INDIVIDUAL OUTLET TO HUB CLOSURE VIA CONDUIT/PIPE UNDER FLOOR OR ABOVE CEILING TRAYS. THE COMPUTER OUTLET TO THE WIRING CLOSET SHALL EXCEED THE RECOMMENDED</p>
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Notes:

No.	Revision	Date	By
2	RE-ISSUED FOR TENDER	2024.12.10	J.R.
1	ISSUED FOR PRICING	2024.12.03	J.R.

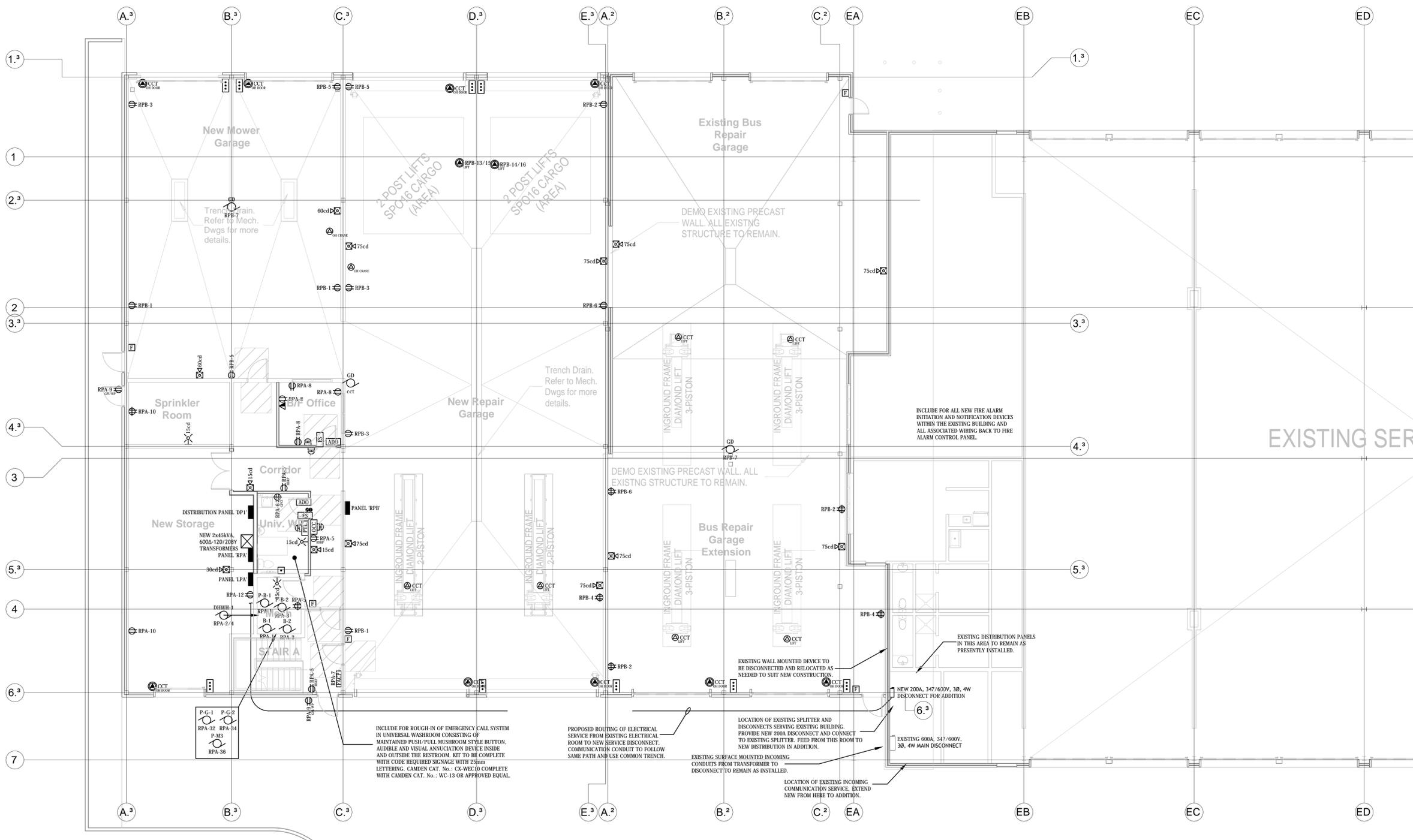


**SEI**  
 Electrical Engineering  
 12 Argyle Street N., Caledonia, ON, N3W 1B6  
 www.sei-ee.com

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Project  
**WEGO GARAGE ADDITION**  
 7805 NIAGARA RIVER PKWY, NIAGARA FALLS, ON

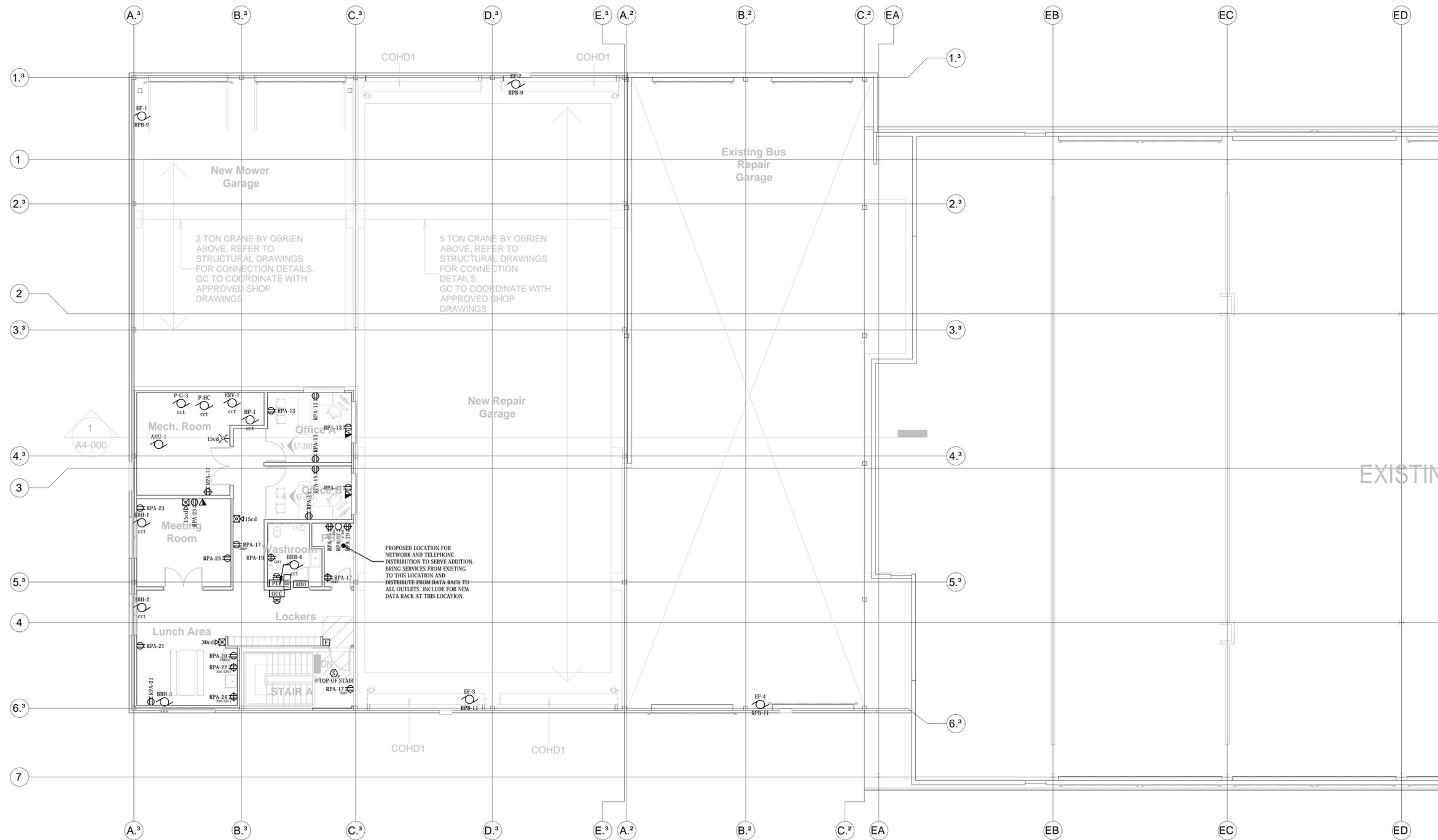
Title <b>1ST FLOOR POWER AND SYSTEMS PLAN</b>			
Drawn By: KM	Designed By: JR	Approved By: KS	Date: NOV 2024
Project No. 24-186	Scale AS NOTED		
Drawing No. <b>E300</b>	Sheet	Revision <b>1</b>	



**GROUND FLOOR PLAN - POWER AND SYSTEM LAYOUT**  
 SCALE: 1:100

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Notes:



SECOND FLOOR PLAN - POWER AND SYSTEMS LAYOUT  
 SCALE: 1:100

No.	Revision	Date	By
2	RE-ISSUED FOR TENDER	2024.12.10	J.R.
1	ISSUED FOR PRICING	2024.12.03	J.R.

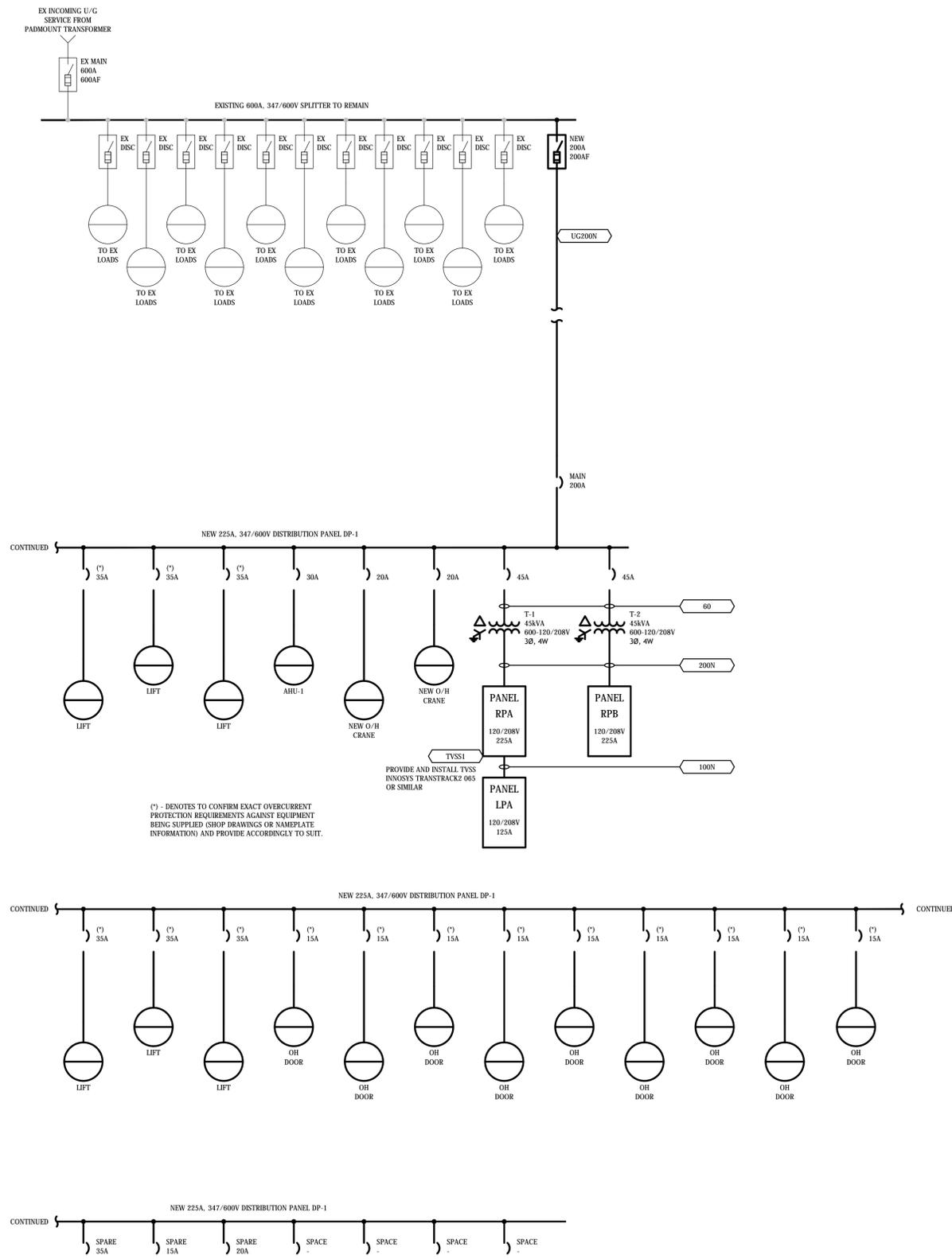
**SEI**  
 Electrical Engineering  
 12 Argyle Street N., Caledonia, ON, N3W 1B6  
 www.sei-ee.com

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Project  
**WEGO**  
**GARAGE ADDITION**  
 7805 NIAGARA RIVER PKWY, NIAGARA FALLS, ON

Title <b>2ND FLOOR POWER AND SYSTEMS PLAN</b>			
Drawn By: KM	Designed By: JR	Approved By: KS	Date: NOV 2024
Project No. 24-186		Scale AS NOTED	
Drawing No. <b>E301</b>	Sheet	Revision <b>1</b>	

File: P:\2024\24-186 WEGO ARCH D - 186 E300 E300 PLANS.dwg  
 December 10, 2024 - 02:10pm Plotted by: Judy



SINGLE LINE DIAGRAM  
SCALE: N.T.S.

WIRE AND CONDUIT SCHEDULE (COPPER)		
TYPE/SYMBOL	FEEDER DESCRIPTION	CONDUIT DESCRIPTION
15	3 CONDUCTOR #12 CU + GND	IN 3/4" EMT CONDUIT
15N	4 CONDUCTOR #12 CU + GND	IN 3/4" EMT CONDUIT
20	3 CONDUCTOR #12 CU + GND	IN 3/4" EMT CONDUIT
20N	4 CONDUCTOR #12 CU + GND	IN 3/4" EMT CONDUIT
1-20	2 CONDUCTOR #12 CU + GND	IN 3/4" EMT CONDUIT
30	3 CONDUCTOR #10 CU + GND	IN 3/4" EMT CONDUIT
30N	4 CONDUCTOR #10 CU + GND	IN 3/4" EMT CONDUIT
1-30	2 CONDUCTOR #10 CU + GND	IN 3/4" EMT CONDUIT
40	3 CONDUCTOR #8 CU + GND	IN 1" EMT CONDUIT
40N	4 CONDUCTOR #8 CU + GND	IN 1" EMT CONDUIT
50	3 CONDUCTOR #8 CU + GND	IN 1" EMT CONDUIT
50N	4 CONDUCTOR #8 CU + GND	IN 1" EMT CONDUIT
60	3 CONDUCTOR #6 CU + GND	IN 1-1/2" EMT CONDUIT
60N	4 CONDUCTOR #6 CU + GND	IN 1-1/2" EMT CONDUIT
80	3 CONDUCTOR #4 CU + GND	IN 1-1/2" EMT CONDUIT
80N	4 CONDUCTOR #4 CU + GND	IN 1-1/2" EMT CONDUIT
100	3 CONDUCTOR #3 CU + GND	IN 1-1/2" EMT CONDUIT
100N	4 CONDUCTOR #3 CU + GND	IN 1-1/2" EMT CONDUIT
1-100N	3 CONDUCTOR #3 CU + GND	IN 1-1/4" EMT CONDUIT
125	3 CONDUCTOR #1 CU + GND	IN 1-1/2" EMT CONDUIT
125N	4 CONDUCTOR #1 CU + GND	IN 2" EMT CONDUIT
1-125N	3 CONDUCTOR #1 CU + GND	IN 2" EMT CONDUIT
150	3 CONDUCTOR #1/0 CU + GND	IN 2-1/2" EMT CONDUIT
150N	4 CONDUCTOR #1/0 CU + GND	IN 2-1/2" EMT CONDUIT
200	3 CONDUCTOR #3/0 CU + GND	IN 2-1/2" EMT CONDUIT
200N	4 CONDUCTOR #3/0 CU + GND	IN 2-1/2" EMT CONDUIT
250	3 CONDUCTOR #250MCM CU + GND	IN 2-1/2" EMT CONDUIT
250N	4 CONDUCTOR #250MCM CU + GND	IN 3" EMT CONDUIT
400	PARALLEL RUN OF 3 CONDUCTOR #3/0 CU + GND, OR 3 CONDUCTOR #600MCM CU + GND, OR 3 CONDUCTOR #600MCM CU + GND	IN PARALLEL RUN OF 2-1/2" EMT CONDUIT, OR 4" EMT CONDUIT
400N	PARALLEL RUN OF 4 CONDUCTOR #3/0 CU + GND, OR 3 CONDUCTOR #600MCM CU + GND, OR 3 CONDUCTOR #600MCM CU + GND	IN PARALLEL RUN OF 2-1/2" EMT CONDUIT, OR 4" EMT CONDUIT
600	2 PARALLEL RUNS OF 3 CONDUCTOR #350MCM CU + GND, OR 3 PARALLEL RUNS OF 3 CONDUCTOR #350MCM CU + GND	IN 4" EMT CONDUIT
600N	2 PARALLEL RUNS OF 4 CONDUCTOR #350MCM CU + GND, OR 3 PARALLEL RUNS OF 3 CONDUCTOR #350MCM CU + GND	IN 4" EMT CONDUIT
800	2 PARALLEL RUNS OF 3 CONDUCTOR #600MCM CU + GND, OR 3 PARALLEL RUNS OF 3 CONDUCTOR #600MCM CU + GND	IN TWO (2) - 4" EMT CONDUITS, OR IN THREE (3) - 3" EMT CONDUITS
800N	2 PARALLEL RUNS OF 4 CONDUCTOR #600MCM CU + GND, OR 3 PARALLEL RUNS OF 3 CONDUCTOR #600MCM CU + GND	IN TWO (2) - 4" EMT CONDUITS, OR IN THREE (3) - 3" EMT CONDUITS
1200	3 PARALLEL RUNS OF 3 CONDUCTOR #600MCM CU + GND, OR 4 PARALLEL RUNS OF 3 CONDUCTOR #350MCM CU + GND	IN THREE (3) - 4" EMT CONDUITS, OR IN FOUR (4) - 3" EMT CONDUITS
1200N	3 PARALLEL RUNS OF 4 CONDUCTOR #600MCM CU + GND, OR 4 PARALLEL RUNS OF 4 CONDUCTOR #350MCM CU + GND	IN THREE (3) - 4" EMT CONDUITS, OR IN FOUR (4) - 3" EMT CONDUITS
1800	4 PARALLEL RUNS OF 3 CONDUCTOR #600MCM CU + GND, OR 6 PARALLEL RUNS OF 3 CONDUCTOR #250MCM CU + GND	IN FOUR (4) - 4" EMT CONDUITS, OR IN SIX (6) - 2-1/2" EMT CONDUITS
1800N	4 PARALLEL RUNS OF 4 CONDUCTOR #600MCM CU + GND, OR 6 PARALLEL RUNS OF 4 CONDUCTOR #250MCM CU + GND	IN FOUR (4) - 4" EMT CONDUITS, OR IN SIX (6) - 2-1/2" EMT CONDUITS

WIRE AND CONDUIT SCHEDULE (ALUMINUM)		
TYPE/SYMBOL	FEEDER DESCRIPTION	CONDUIT DESCRIPTION
AL-100	3 CONDUCTOR #1 AL + GND	IN 1-1/2" EMT CONDUIT
AL-100N	4 CONDUCTOR #1 AL + GND	IN 1-1/2" EMT CONDUIT
AL-100N	3 CONDUCTOR #2 AL + GND TECK FEEDER	SELF CONTAINED 3 CONDUCTOR FEEDER - ARMOURRED CABLE
AL-125	3 CONDUCTOR #2/0 AL + GND	IN 2" EMT CONDUIT
AL-125N	4 CONDUCTOR #2/0 AL + GND	IN 2" EMT CONDUIT
AL-1-125N	3 CONDUCTOR #2/0 AL + GND	IN 2" EMT CONDUIT
AL-150	3 CONDUCTOR #3/0 AL + GND	IN 2-1/2" EMT CONDUIT
AL-150N	4 CONDUCTOR #3/0 AL + GND	IN 2-1/2" EMT CONDUIT
AL-200	3 CONDUCTOR #250 MCM AL + GND	IN 3" EMT CONDUIT
AL-200N	4 CONDUCTOR #250 MCM AL + GND	IN 3" EMT CONDUIT
AL-250	3 CONDUCTOR #350 MCM AL + GND	IN 3" EMT CONDUIT
AL-250N	4 CONDUCTOR #350 MCM AL + GND	IN 3" EMT CONDUIT
AL-400	PARALLEL RUN OF 3 CONDUCTOR #250 MCM AL + GND, OR 3 CONDUCTOR #900 MCM AL + GND	IN PARALLEL RUN OF 3" EMT CONDUIT, OR 4-1/2" EMT CONDUIT
AL-400N	PARALLEL RUN OF 4 CONDUCTOR #250 MCM AL + GND, OR 3 CONDUCTOR #900 MCM AL + GND	IN PARALLEL RUN OF 3" EMT CONDUIT, OR 4-1/2" EMT CONDUIT

UNDERGROUND AND SERVICE FEEDERS WIRE AND CONDUIT SCHEDULE		
TYPE/SYMBOL	FEEDER DESCRIPTION	CONDUIT DESCRIPTION
UG60	3 CONDUCTOR #6 AWG CU + GND	IN 2" RIGID PVC CONDUIT AS PER D11-1, OR IN 2" DB2 CONDUITS AS NOTED
UG60N	4 CONDUCTOR #6 AWG CU + GND	IN 2" RIGID PVC CONDUIT AS PER D11-1, OR IN 2" DB2 CONDUITS AS NOTED
UG60N-AL	4 CONDUCTOR #4 AWG AL + GND	IN 2" RIGID PVC CONDUIT AS PER D11-1, OR IN 2" DB2 CONDUITS AS NOTED
UG100	3 CONDUCTOR #3 CU + GND	IN 2" RIGID PVC CONDUIT AS PER D11-1, OR IN 2" DB2 CONDUITS AS NOTED
UG100N	4 CONDUCTOR #3 CU + GND	IN 2" RIGID PVC CONDUIT AS PER D11-1, OR IN 2" DB2 CONDUITS AS NOTED
UG100N-AL	4 CONDUCTOR #1 AL + GND	IN 2" RIGID PVC CONDUIT AS PER D11-1, OR IN 2" DB2 CONDUITS AS NOTED
UG200	3 CONDUCTOR #2/0 CU + GND	IN 2-1/2" RIGID PVC CONDUIT AS PER D11-1, OR IN 2-1/2" DB2 CONDUITS AS NOTED
UG200N	4 CONDUCTOR #2/0 CU + GND	IN 2-1/2" RIGID PVC CONDUIT AS PER D11-1, OR IN 2-1/2" DB2 CONDUITS AS NOTED
UG200N-AL	4 CONDUCTOR #4/0 CU + GND	IN 3" RIGID PVC CONDUIT AS PER D11-1, OR IN 3" DB2 CONDUITS AS NOTED
UG400	3 CONDUCTOR #500 MCM CU + GND	IN 4" RIGID PVC CONDUIT AS PER D11-1, OR IN 4" DB2 CONDUITS AS NOTED
UG400N	4 CONDUCTOR #500 MCM CU + GND	IN 4" RIGID PVC CONDUIT AS PER D11-1, OR IN 4" DB2 CONDUITS AS NOTED
UG400N-AL	4 CONDUCTOR #750 MCM AL + GND, OR 2 PARALLEL RUNS OF 4 CONDUCTOR #250 MCM AL + GND	IN 4-1/2" RIGID PVC CONDUIT AS PER D11-1, OR IN 4-1/2" DB2 CONDUITS AS NOTED FOR PARALLEL RUNS OF 2 RUNS OF 3" DB2 CONDUITS AS PER D11-2, OR RIGID PVC IF NOTED ON PLANS
UG600	2 PARALLEL RUNS OF 3 CONDUCTOR #350MCM CU + GND	IN PARALLEL RUN OF 3-1/2" RIGID PVC CONDUIT, OR IN PARALLEL RUN OF 3-1/2" DB2 CONDUIT AS PER D11-2
UG600N	2 PARALLEL RUNS OF 4 CONDUCTOR #350MCM CU + GND	IN PARALLEL RUN OF 3-1/2" RIGID PVC CONDUIT, OR IN PARALLEL RUN OF 3-1/2" DB2 CONDUIT AS PER D11-2
UG600N-AL	2 PARALLEL RUNS OF 4 CONDUCTOR #500MCM AL + GND	IN PARALLEL RUN OF 4" RIGID PVC CONDUIT, OR IN PARALLEL RUN OF 4" DB2 CONDUIT AS PER D11-2
UG800	2 PARALLEL RUNS OF 3 CONDUCTOR #600MCM CU + GND, OR 3 PARALLEL RUNS OF 3 CONDUCTOR #350MCM CU + GND	IN PARALLEL RUNS OF 4" DB2 CONDUITS AS PER D11-2 OR D11-3, OR IN PARALLEL RUNS OF 4" RIGID PVC IF NOTED ON PLANS
UG800N	2 PARALLEL RUNS OF 4 CONDUCTOR #600MCM CU + GND, OR 3 PARALLEL RUNS OF 4 CONDUCTOR #350MCM CU + GND	IN PARALLEL RUNS OF 4" DB2 CONDUITS AS PER D11-2 OR D11-3, OR IN PARALLEL RUNS OF 4" RIGID PVC IF NOTED ON PLANS
UG800N-AL	3 PARALLEL RUNS OF 4 CONDUCTOR #500MCM AL + GND, OR 4 PARALLEL RUNS OF 4 CONDUCTOR #300MCM AL + GND	IN PARALLEL RUNS OF 4" DB2 CONDUITS AS PER D11-3 OR D11-4, OR IN PARALLEL RUNS OF 4" RIGID PVC IF NOTED ON PLANS
UG1200	3 PARALLEL RUNS OF 3 CONDUCTOR #750MCM CU + GND, OR 4 PARALLEL RUNS OF 3 CONDUCTOR #500MCM CU + GND	IN THREE (3) PARALLEL RUNS OF 4-1/2" DB2 CONDUITS AS PER D11-3, OR IN FOUR (4) PARALLEL RUNS OF 4" DB2 AS PER D11-4
UG1200N	3 PARALLEL RUNS OF 4 CONDUCTOR #750MCM CU + GND, OR 4 PARALLEL RUNS OF 3 CONDUCTOR #500MCM CU + GND	IN THREE (3) PARALLEL RUNS OF 4-1/2" DB2 CONDUITS AS PER D11-3, OR IN FOUR (4) PARALLEL RUNS OF 4" DB2 AS PER D11-4
UG1200N-AL	4 PARALLEL RUNS OF 4 CONDUCTOR #750MCM AL + GND, OR 6 PARALLEL RUNS OF 4 CONDUCTOR #500MCM AL + GND	IN FOUR (4) PARALLEL RUNS OF 4-1/2" DB2 CONDUITS AS PER D11-4, OR IN SIX (6) PARALLEL RUNS OF 4" DB2 AS PER D11-6
UG1600	6 PARALLEL RUNS OF 3 CONDUCTOR #500MCM CU + GND	IN PARALLEL RUN OF 4" DB2 CONDUITS AS PER D11-6
UG1600N	6 PARALLEL RUNS OF 4 CONDUCTOR #500MCM CU + GND	IN PARALLEL RUN OF 4" DB2 CONDUITS AS PER D11-6
UG1600N-AL	6 PARALLEL RUNS OF 4 CONDUCTOR #750MCM AL + GND, OR 8 PARALLEL RUNS OF 4 CONDUCTOR #500MCM AL + GND	IN SIX (6) PARALLEL RUNS OF 4-1/2" DB2 CONDUITS AS PER D11-6, OR IN EIGHT (8) PARALLEL RUNS OF 4" DB2 AS PER D11-8
UG2000	6 PARALLEL RUNS OF 3 CONDUCTOR #750MCM CU + GND, OR 8 PARALLEL RUNS OF 3 CONDUCTOR #500MCM CU + GND	IN SIX (6) PARALLEL RUNS OF 4-1/2" DB2 CONDUITS AS PER D11-6, OR IN EIGHT (8) PARALLEL RUNS OF 4" DB2 AS PER D11-8
UG2000N	6 PARALLEL RUNS OF 4 CONDUCTOR #750MCM CU + GND, OR 8 PARALLEL RUNS OF 3 CONDUCTOR #500MCM CU + GND	IN SIX (6) PARALLEL RUNS OF 4-1/2" DB2 CONDUITS AS PER D11-6, OR IN EIGHT (8) PARALLEL RUNS OF 4" DB2 AS PER D11-8
UG2000N-AL	8 PARALLEL RUNS OF 4 CONDUCTOR #900MCM AL + GND	IN EIGHT (8) PARALLEL RUNS OF 4-1/2" DB2 CONDUITS AS PER D11-8

WIRE AND CONDUIT SCHEDULE (ALUMINUM)		
TYPE/SYMBOL	FEEDER DESCRIPTION	CONDUIT DESCRIPTION
AL-600	2 PARALLEL RUNS OF 3 CONDUCTOR #500MCM AL + GND	IN PARALLEL RUNS OF 3-1/2" EMT CONDUITS
AL-600N	2 PARALLEL RUNS OF 4 CONDUCTOR #500MCM AL + GND	IN PARALLEL RUNS OF 3-1/2" EMT CONDUITS
AL-800	2 PARALLEL RUNS OF 3 CONDUCTOR #900MCM AL + GND, OR 4 PARALLEL RUNS OF 3 CONDUCTOR #250MCM AL + GND	IN TWO (2) - 4-1/2" EMT CONDUITS, OR IN FOUR (4) - 3" EMT CONDUITS
AL-800N	2 PARALLEL RUNS OF 4 CONDUCTOR #900MCM AL + GND, OR 4 PARALLEL RUNS OF 4 CONDUCTOR #250MCM AL + GND	IN TWO (2) - 4-1/2" EMT CONDUITS, OR IN FOUR (4) - 3" EMT CONDUITS
AL-1200	4 PARALLEL RUNS OF 3 CONDUCTOR #500MCM AL + GND, OR 5 PARALLEL RUNS OF 3 CONDUCTOR #350MCM AL + GND	IN FOUR (4) - 4" EMT CONDUITS, OR IN FIVE (5) - 3" EMT CONDUITS
AL-1200N	4 PARALLEL RUNS OF 4 CONDUCTOR #500MCM AL + GND, OR 5 PARALLEL RUNS OF 4 CONDUCTOR #350MCM AL + GND	IN FOUR (4) - 4" EMT CONDUITS, OR IN FIVE (5) - 3" EMT CONDUITS
AL-1600	5 PARALLEL RUNS OF 3 CONDUCTOR #600MCM AL + GND, OR 6 PARALLEL RUNS OF 3 CONDUCTOR #400MCM AL + GND	IN FIVE (5) - 4" EMT CONDUITS, OR IN SIX (6) - 3-1/2" EMT CONDUITS
AL-1600N	5 PARALLEL RUNS OF 4 CONDUCTOR #600MCM AL + GND, OR 6 PARALLEL RUNS OF 4 CONDUCTOR #400MCM AL + GND	IN FIVE (5) - 4" EMT CONDUITS, OR IN SIX (6) - 3-1/2" EMT CONDUITS

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Notes:

No.	Revision	Date	By
2	RE-ISSUED FOR TENDER	2024.12.10	J.R.
1	ISSUED FOR PRICING	2024.12.03	J.R.



Seal

Project  
**WEGO GARAGE ADDITION**  
7805 NIAGARA RIVER PKWY, NIAGARA FALLS, ON

Title  
**ELECTRICAL SINGLE LINE DIAGRAM AND PANEL SCHEDULE**

Drawn By: KM	Designed By: JR	Approved By: KS	Date: NOV 2024
Project No. 24-186	Scale NTS		
Drawing No. <b>E500</b>	Sheet	Revision <b>1</b>	

Panel RPA								
LOAD	DESCRIPTION	LCCT	BREAKER	PHASE	BREAKER	LCCT	DESCRIPTION	LOAD
	BOILER B-1	1	15A	A	20A 2P	2	WATER HEATER	
	BOILER B-2	3	15A	B		4		
	HOUSEKEEPING RECEPTACLES	5	15A	C	15A	6	WASHROOM RECEPTACLE	
	(L) FIRE ALARM PANEL	7	15A	A	15A	8	OFFICE RECEPTACLES	
	EXTERIOR RECEPTACLES	9	15A	B	15A	10	GENERAL RECEPTACLES	
	SPARE	11	15A	C	15A	12	GENERAL RECEPTACLES	
	OFFICE RECEPTACLES	13	15A	A	15A	14	SPARE	
	OFFICE RECEPTACLES	15	15A	B	15A	16	SPARE	
	HOUSEKEEPING RECEPTACLES	17	15A	C	15A	18	SPARE	
	WASHROOM RECEPTACLE	19	15A	A	15A	20	FRIDGE RECEPTACLE	
	GENERAL RECEPTACLES	21	15A	B	20A	22	COUNTER RECEPTACLE	
	MEETING ROOM RECEPTACLES	23	15A	C	20A	24	COUNTER RECEPTACLE	
	SERVER ROOM RECEPTACLE	25	20A	A	15A	26	SPARE	
	SERVER ROOM RECEPTACLE	27	30A	B	15A	28	SPARE	
	SERVER ROOM RECEPTACLE	29	15A	C	15A	30	SPARE	
	SPARE	31	15A	A	15A	32	HYDRONIC PUMP	
	SPARE	33	15A	B	15A	34	HYDRONIC PUMP	
	SPARE	35	15A	C	15A	36	HYDRONIC PUMP	
		37		A		38		
		39		B		40		
		41		C		42		
		43		A		44		
		45		B		46		
		47		C		48		
		49		A		50		
		51		B		52		
		53		C		54		
		55		A		56		
		57	30A	B	60A	58	PANEL LPA	
		59	1 3P	C	3P	60		
0							WATTS	0
208	VOLTAGE		PHASE A				0	0.00
3	PHASE		PHASE B				0	0.00
100A	MAIN BREAKER		PHASE C				0	0.00
100A	MAIN BUS		TOTAL				0	0.00

Panel RPB								
LOAD	DESCRIPTION	LCCT	BREAKER	PHASE	BREAKER	LCCT	DESCRIPTION	LOAD
	GENERAL SHOP RECEPTACLES	1	15A	A	15A	2	GENERAL SHOP RECEPTACLES	
	GENERAL SHOP RECEPTACLES	3	15A	B	15A	4	GENERAL SHOP RECEPTACLES	
	GENERAL SHOP RECEPTACLES	5	15A	C	15A	6	GENERAL SHOP RECEPTACLES	
	GAS DETECTION SYSTEM	7	15A	A		8		
	GARAGE EXHAUST FANS	9	15A	B		10	OUTDOOR AIR HANDLING HEAT PUMP UNIT	
	GARAGE EXHAUST FANS	11	15A	C		12		
		13	15A	A	15A 2P	14	2 POST LIFT (**)	
		15	2P	B		16		
	SPARE	17	15A	C	15A	18	SPARE	
	SPARE	19	15A	A	15A	20	SPARE	
	SPARE	21	15A	B	15A	22	SPARE	
	SPARE	23	15A	C	15A	24	SPARE	
	SPARE	25	20A	A	20A	26	SPARE	
	SPARE	27	20A	B	20A	28	SPARE	
		29		C		30		
		31		A		32		
		33		B		34		
		35		C		36		
		37		A		38		
		39		B		40		
		41		C		42		
0							WATTS	0
208	VOLTAGE		PHASE A				0	0.00
3	PHASE		PHASE B				0	0.00
100A	MAIN BREAKER		PHASE C				0	0.00
100A	MAIN BUS		TOTAL				0	0.00

Panel LPA								
LOAD	DESCRIPTION	LCCT	BREAKER	PHASE	BREAKER	LCCT	DESCRIPTION	LOAD
	(L) EXIT AND EMERGENCY LIGHTING	1	15A	A	20A	2	GARAGE BAY LIGHTING	
	SECOND FLOOR GENERAL LIGHTING	3	20A	B	20A	4	GARAGE BAY LIGHTING	
	STAIR LIGHTING	5	15A	C	20A	6	GARAGE BAY LIGHTING	
	GROUND FLOOR GENERAL LIGHTING	7	20A	A	20A	8	SPARE	
	GROUND FLOOR GENERAL LIGHTING	9	20A	B	20A	10	SPARE	
	SPARE	11	15A	C	15A	12	SPARE	
		13		A		14		
		15		B		16		
		17		C		18		
		19		A		20		
		21		B		22		
		23		C		24		
0							WATTS	0
208	VOLTAGE		PHASE A				0	0.00
3	PHASE		PHASE B				0	0.00
100A	MAIN BREAKER		PHASE C				0	0.00
125A	MAIN BUS		TOTAL				0	0.00

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2	RE ISSUED FOR TENDER	2024.12.10	J.R.
1	ISSUED FOR PRICING	2024.12.03	J.R.



Seal

Project  
**WEGO**  
**GARAGE ADDITION**  
 7805 NIAGARA RIVER PKWY, NIAGARA FALLS, ON

Title  
**ELECTRICAL**  
**PANEL SCHEDULES**

Drawn By: KM	Designed By: JR	Approved By: KS	Date: NOV 2024
Project No. 24-186	Scale NTS		
Drawing No. <b>E550</b>	Sheet	Revision <b>1</b>	



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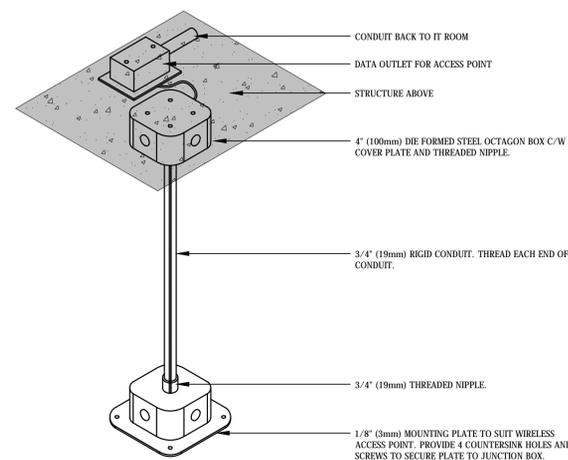


**SEI**  
 Electrical Engineering  
 12 Argyle Street N., Caledonia, ON, N3W 1B6  
 www.sei-ee.com

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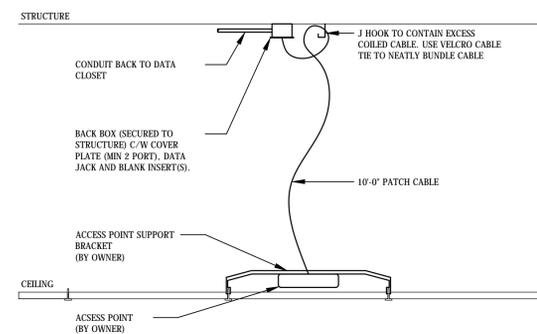
Project  
**WEGO**  
**GARAGE ADDITION**  
 7805 NIAGARA RIVER PKWY, NIAGARA FALLS, ON

Title <b>ELECTRICAL DETAILS</b>			
Drawn By: <b>KM</b>	Designed By: <b>JR</b>	Approved By: <b>KS</b>	Date: <b>NOV 2024</b>
Project No. <b>24-186</b>		Scale <b>NTS</b>	
Drawing No. <b>E700</b>		Sheet	Revision <b>1</b>



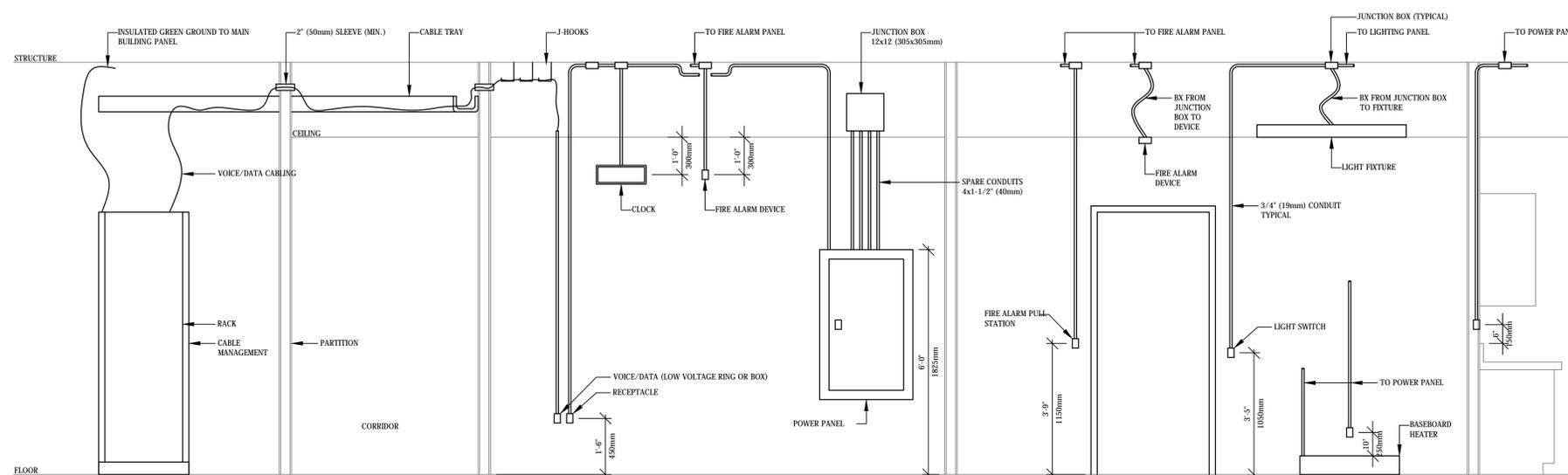
- DETAIL NOTES:
- PROVIDE BUSHINGS ON ALL HOLES FOR CABLING.
  - CONDUIT SHALL BE DEBURRED PRIOR TO INSTALLATION.
  - THE ENTIRE MOUNT SHALL BE PAINTED TO BLEND WITH CEILING. COORDINATE COLOUR WITH ARCHITECT.
  - MOUNT SHALL BE SECURELY FASTENED TO THE STRUCTURE ABOVE. PROVIDE 1/4" LAG SCREWS OR STRUT CHANNEL BETWEEN STRUCTURAL ELEMENTS.
  - CONTRACTOR SHALL COORDINATE MOUNTING PLATE WITH OWNER AND DRILL TO MATCH AND MOUNT OWNERS EQUIPMENT.
  - PROVIDE A PATCH CABLE FROM THE WIRELESS OUTLET JACK ADJACENT TO THE MOUNT AND FISH CABLE THROUGH CONDUIT TO ACCESS POINT. PROVIDE A J HOOK AND NEATLY COIL EXCESS CABLE WITH VELCRO.

**WIRELESS ACCESS POINT SUSPENSION**  
 SCALE: NTS



- DETAIL NOTES:
- THE CONTRACTOR SHALL PROVIDE ALL SUPPORTS AS REQUIRED TO SECURELY FASTEN BACK BOXES, CONDUIT, ACCESS POINTS, ETC. ACCESS POINTS MOUNTED TO T-BAR SHALL USE MANUFACTURE SUPPLIED BARS AND CLIPS TO SUPPORT ACCESS POINT. ACCESS POINTS MOUNTED ON DRYWALL SHALL BE SUPPORTED FROM THE CEILING ABOVE WITH UNISTRUT OR SIMILAR SYSTEM. ACCESS POINT SHALL NOT BE SECURED TO DRYWALL UNLESS WRITTEN APPROVAL FROM OWNER IS GIVEN.
  - A PULL STRING SHALL BE LEFT IN THE CONDUIT TO ALLOW AN ADDITIONAL CABLE TO BE PULLED TO THIS POINT AT A LATER DATE.
  - CONTRACTOR IS TO COORDINATE THE LOCATION OF THE DATA JACK/BACK BOX WITH THE OWNER PRIOR TO ROUGH-IN. EXACT LOCATION TO BE DETERMINED ONCE THE WALLS ARE STUDDED.
  - DATA JACK IS TO BE LABELED WITH DATA PORT NUMBER. REFER TO SPECIFICATIONS FOR LABEL INFORMATION.

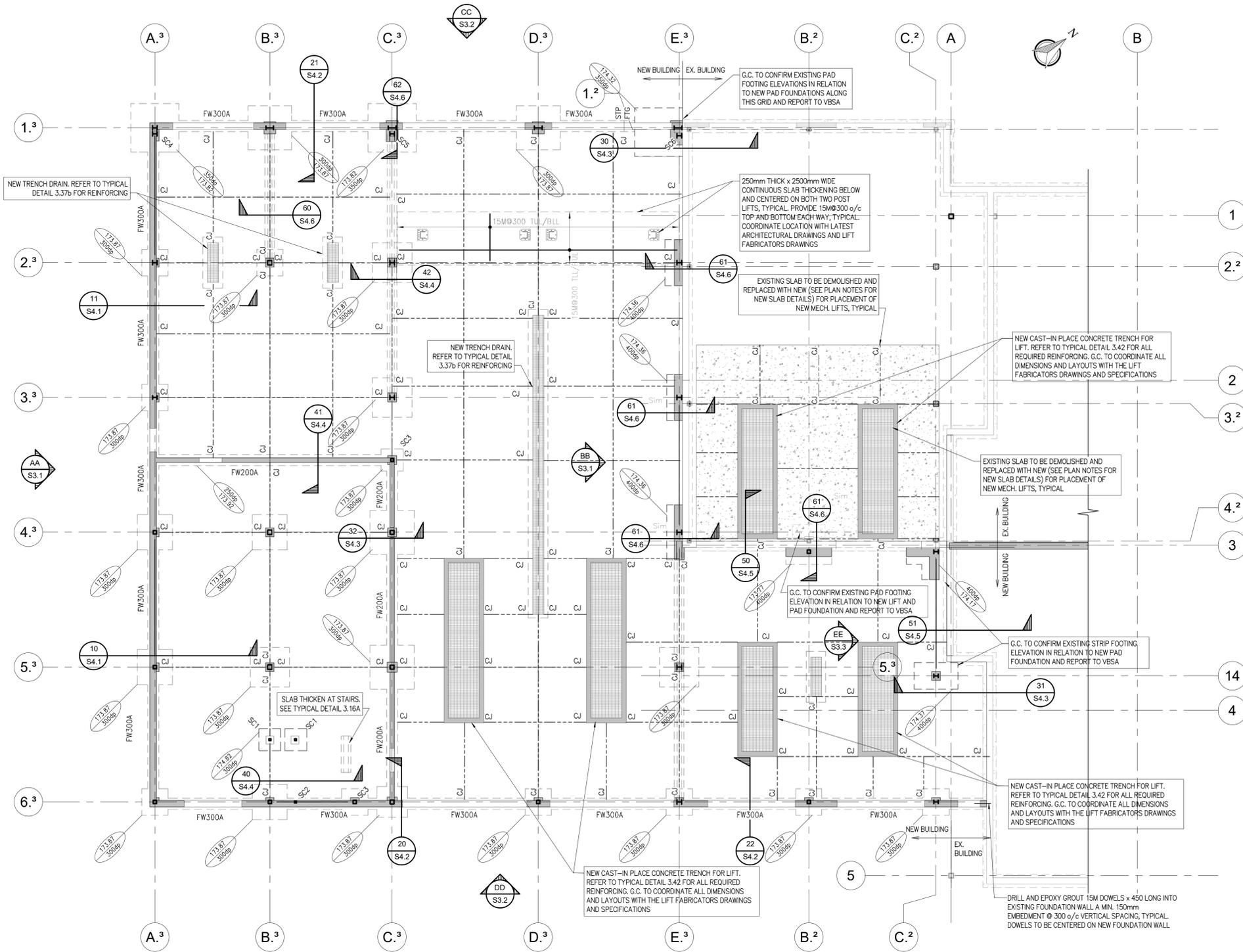
**TYPICAL WIRELESS ACCESS POINT DETAIL**  
 SCALE: NTS



- DETAIL NOTES:
- DETAIL IS APPLICABLE FOR DEVICES SHOWN ON PLANS. ALL THE DEVICES INDICATED IN THE DETAIL MAY NOT OCCUR ON THE PLANS.
  - CONDUIT SHALL BE PROVIDED IN ALL CASES UNLESS DENOTED AS BX OR AS ALLOWED IN THE SPECIFICATIONS.
  - ALL CONDUITS FOR LOW VOLTAGE CABLING AND WIRING SHALL HAVE BUSHINGS INSTALLED TO PREVENT CHAFFING OF WIRES).
  - ALL CONDUITS ARE TO GO DIRECTLY FROM THE OUTLET BOX UP THE WALL INTO THE CEILING SPACE. NO HORIZONTAL RUNS OF CONDUIT, OR GROUPING OF CONDUITS WITH OTHER SERVICES IN CLOSE PROXIMITY.
  - CONDUITS ARE TO HAVE PULL ROPES INSTALLED AND LEFT BEHIND TO ALLOW THE PULLING OF ADDITIONAL SERVICES IN THE FUTURE.
  - ALL BREACHES IN WALLS ARE TO BE FIRESTOPPED TO MAINTAIN THE FIRE SEPARATIONS.
  - PROVIDE SUPPORTS FOR ALL CEILING MOUNTED ELEMENTS (IE CHAIN HANGERS FOR FIXTURES ETC.) DEVICES SHALL NOT BE SUPPORTED BY A CEILING TILE.

**TYPICAL MOUNTING HEIGHTS/INSTALLATION DETAIL**  
 SCALE: NTS





**FOUNDATION PLAN NOTES**

- TOP OF SLAB ELEVATION AT FINISHED FLOOR LEVEL IS AT +0.00 (175.340), CONFIRM ALL ELEVATIONS WITH ARCHITECTURAL DRAWINGS.
- THE BUILDING FOUNDATIONS HAVE BEEN DESIGNED FOR A BEARING RESISTANCE (SLS) OF 144 kPa (3000 psf) AND A FACTORED BEARING RESISTANCE (ULS) OF 190 kPa (4000 psf) ON UNDISTURBED NATIVE SOIL U.N.O. ON PLAN. ALL BEARING RESISTANCES TO BE VERIFIED BY GEOTECHNICAL INVESTIGATION AFTER EXCAVATION AND REPORTED TO VBSA.
- UNDERSIDE OF FOOTINGS ARE TO BE A MINIMUM OF 1200mm BELOW FINISHED GRADE UNLESS NOTED OTHERWISE AS THUS:  $\frac{1200}{\text{---}}$  ON PLAN. AT LOCATIONS WHERE STRIP FOOTINGS ABUT PAD FOOTINGS THICKEN STRIP FOOTING LOCALLY TO MATCH UNDERSIDE OF ADJACENT PAD FOOTING AS SHOWN ON TYPICAL DETAIL 3.03.
- TYPICAL SLAB ON GRADE CONSTRUCTION U.N.O.:** 125mm CONCRETE SLAB WITH 152x152 MM 18.7x18.7 WELDED WIRE FABRIC ON VAPOUR BARRIER ON 200mm LAYER OF COMPACTED 19mm CLEAR CRUSHED STONE ON APPROVED NATIVE SUBGRADE OR APPROVED ENGINEERED FILL. **GARAGE AREA:** 150mm CONCRETE SLAB WITH 152x152 MM 18.7x18.7 WELDED WIRE FABRIC ON VAPOUR BARRIER ON 200mm LAYER OF COMPACTED 19mm CLEAR CRUSHED STONE ON APPROVED NATIVE SUBGRADE OR APPROVED ENGINEERED FILL.
- SEE ARCHITECTURAL DRAWINGS FOR SLOPES TO DRAINS IN FLOOR AREAS. MAINTAIN ALL STRUCTURAL THICKNESS SHOWN.
- SEE ARCHITECTURAL DRAWINGS FOR TOP OF FOUNDATION WALL ELEVATIONS. DEPRESS TOP OF FOUNDATION WALL 300mm AT ALL DOOR OPENINGS.
- CENTRE ALL CONCRETE PIERS UNDER STEEL COLUMN BASE PLATES UNLESS NOTED OTHERWISE. SEE ARCHITECTURAL DRAWINGS FOR COLUMN OFFSETS FROM GRID LINES.
- AT ALL LOCATIONS ON PLAN NOTED AS THUS:  $\frac{\text{---}}{\text{---}}$ , PROVIDE A SAWCUT OR A CONSTRUCTION JOINT (SEE TYPICAL DETAIL 3.15). PROVIDE A CONTROL JOINT AT ALL INTERIOR DOOR LOCATIONS OVER FOUNDATION WALLS. FINAL LOCATIONS OF CONTROL JOINTS MUST BE COORDINATED BETWEEN THE CONCRETE CONTRACTOR AND THE FLOOR FINISHING CONTRACTOR THROUGH THE GENERAL CONTRACTOR. **MANY SLAB ON GRADE SAWCUTS HAVE BEEN OMITTED FOR CLARITY - CONTRACTOR TO FOLLOW 3.15 AND SUBMIT SAWCUT PATTERNS FOR REVIEW BY THE ARCHITECT AND STRUCTURAL CONSULTANT.**
- CONCRETE CONTRACTOR TO COORDINATE WITH ALL TRADES THE LOCATION OF ALL PIPE SLEEVES THROUGH CONCRETE FOUNDATION WALLS. PIPE SLEEVES MAY NOT BE PLACED WITHIN FOOTINGS. FOUNDATIONS MUST BE STEPPED DOWN TO ACCOMMODATE ELEVATION OF PIPE SLEEVES. SEE TYPICAL DETAILS FOR STEPS IN FOUNDATION WALLS. REPORT ANY DISCREPANCIES TO THE STRUCTURAL CONSULTANT.
- UNDERSIDE OF ALL COLUMN BASE PLATES TO BE 200mm BELOW TOP OF FINISH FLOOR ELEVATION UNLESS NOTED OTHERWISE IN THE COLUMN SCHEDULE.
- FOR 125mm SLAB ON GRADE, THICKEN SLAB UNDER ALL CONCRETE BLOCK PARTITION WALLS AND BEARING LOCATIONS FOR STAIRS (SEE TYPICAL DETAIL 3.16A). FOR 200mm SLAB ON GRADE, PROVIDE 15M @ 300 TRANSVERSE BARS x 1500mm LONG AND 4-15M CONT. COORDINATE DIMENSIONS TO CONCRETE BLOCK PARTITION WALLS AND STAIRS WITH ARCHITECTURAL PLANS. NON-LOADBEARING BLOCK PARTITION WALLS ARE SHOWN ON FOUNDATION PLAN AS THUS:  $\frac{\text{---}}{\text{---}}$  FOR INFORMATION ONLY. LOCATION OF ALL BLOCK PARTITIONS AND CORRESPONDING SLAB THICKENINGS MUST BE COORDINATED WITH ARCHITECTURAL PLANS AND DETAILS.
- PROVIDE A STEPPED STRIP FOOTING WHERE INDICATED ON PLAN AS 'STP FTG'. SEE TYPICAL DETAIL 3.02 FOR STEP FOOTING DETAILS AND LIMITATIONS.
- SEE TYPICAL DETAIL 3.33 FOR CONSTRUCTION OF HOUSEKEEPING PADS FOR MECHANICAL & ELECTRICAL EQUIPMENT. SEE MECHANICAL & ELECTRICAL DRAWINGS FOR REQUIRED CONCRETE HOUSEKEEPING PAD LOCATION AND DIMENSIONS. HOUSEKEEPING PADS NOT SHOWN ON STRUCTURAL DRAWINGS.
- PROVIDE DOWELS FOR WALLS OR COLUMNS IN STRIP FOOTINGS TYPICAL. DOWELS TO MATCH WALL OR COLUMN VERTICAL REINFORCEMENT TYPICAL.
- PROVIDE 25mm THICK RIGID INSULATION BETWEEN ADJACENT FOOTING POURS, TYP. AT ALL LOCATIONS WHERE TWO SEPARATE FOOTINGS ARE IN CLOSE CONTACT WITH EACH OTHER.

ISSUED FOR TENDER Oct 17/24



4682 Portage Rd., Unit 1  
Niagara Falls, ON, L2E 6A3  
T | 905-357-2030  
W | www.vbands.com  
E | info@vbands.com

Niagara Parks Commission  
**WEGO Garage Addition**

7805 Niagara River Pkwy, Niagara Falls, ON

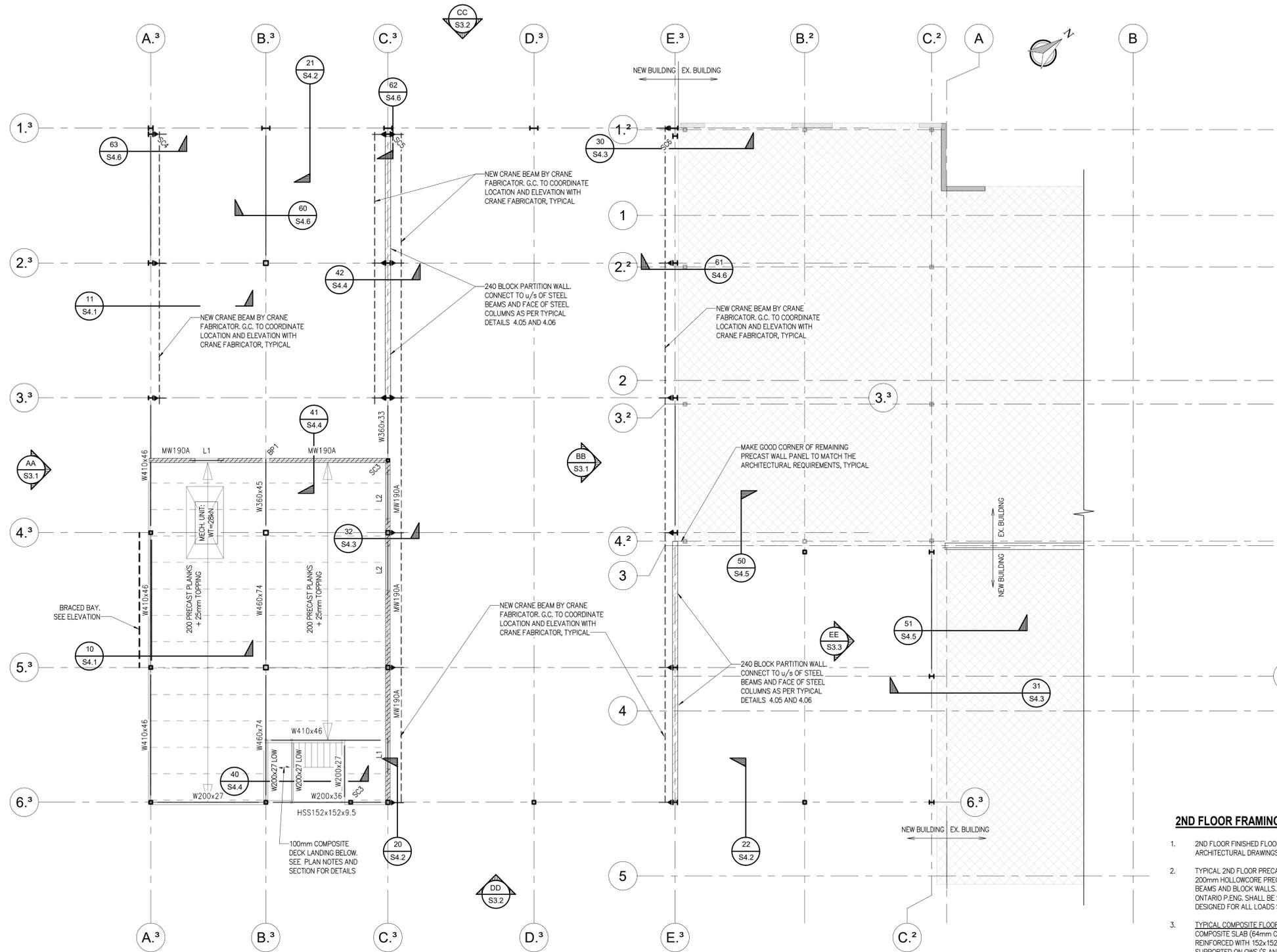
**FOUNDATION PLAN**

DRAWN BY:	MG
DATE:	10/17/2024 2:20:54 PM
SCALE:	As indicated
PROJECT NO.:	24175
CHECKED:	BCS

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**S1.0**

REV. #



**2ND FLOOR FRAMING PLAN NOTES**

- 2ND FLOOR FINISHED FLOOR ELEVATION IS AT +3200 (178.540m GEODETIC). CONFIRM WITH ARCHITECTURAL DRAWINGS.
- TYPICAL 2ND FLOOR PRECAST FLOOR CONSTRUCTION U.N.O. ON PLAN: 25mm TOPPING ON 200mm HOLLOWCORE PRECAST PLANKS (SEE PLAN FOR LOCATIONS) SUPPORTED ON STEEL BEAMS AND BLOCK WALLS. HOLLOW CORE PLANK SHOP DRAWINGS BEARING THE SEAL OF AN ONTARIO P.ENG. SHALL BE SUBMITTED TO THE STRUCTURAL CONSULTANT. PLANKS TO BE DESIGNED FOR ALL LOADS SHOWN ON PLAND AND IN SCHEDULES.
- TYPICAL COMPOSITE FLOOR STAIR LANDING CONSTRUCTION U.N.O. ON PLAN: 102mm COMPOSITE SLAB (64mm CONCRETE ON 38mm METAL COMPOSITE DECK, 0.76mm MIN.) REINFORCED WITH 152x152 MW18.7xMW18.7 WELDED WIRE FABRIC. COMPOSITE DECK IS SUPPORTED ON OWS/S'S AND STEEL BEAMS.
- SEE ARCHITECTURAL DRAWINGS FOR COLUMN OFFSETS FROM GRID LINES.
- STEEL DECK SPAN DIRECTION IS INDICATED WITH ARROWS AS THUS ON PLAN.
- TOP OF STEEL BEAMS ARE AT UNDERSIDE OF FLOOR DECK UNLESS NOTED ON PLANS THUS BELOW UNDERSIDE OF DECK. TOP OF STEEL ELEVATIONS FROM UNDERSIDE OF DECK ARE BASED ON AN ASSUMED JOIST SHOE DEPTH OF 102mm UNLESS NOTED OTHERWISE ON PLAN.
- BEAMS DENOTED WITH ARE TO BE CONNECTED FOR FULL MOMENT AND SHEAR CAPACITY OF BEAM UNLESS NOTED OTHERWISE.
- DESIGN THE PRECAST FLOOR PLANKS, INCLUDING THEIR CONNECTION TO SUPPORTING ELEMENTS FOR AN FACTORED DIAPHRAGM SHEAR FORCE OF 100 kN/m.
- TIE JOISTS ARE INDICATED ON PLANS AS "TJ" ON PLAN. EXTEND BOTH TOP AND BOTTOM CHORD MEMBERS AND CONNECT THEM TO COLUMN, BEAM, OR WALL.
- NOT ALL FLOOR OPENINGS HAVE BEEN SHOWN ON PLAN. STEEL FABRICATOR TO COORDINATE FINAL SIZE AND LOCATION OF FLOOR OPENINGS WITH MECHANICAL DRAWINGS AND GENERAL CONTRACTOR PRIOR TO FABRICATION. SEE TYPICAL DETAILS FOR REQUIRED FRAMING AROUND FLOOR OPENINGS. GENERAL CONTRACTOR TO COORDINATE PROVIDING LIGHT GAUGE STEEL CLOSURE SCREEDS WHERE STEEL ANGLES NOT PROVIDED - SEE TYPICAL DETAIL 5.08

ISSUED FOR TENDER  
1 Oct 17/24



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4082 Portage Rd., Unit 1  
Niagara Falls, ON, L2E 6A3  
T | 905-357-2030  
W | www.vbands.com  
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**WEGO Garage Addition**

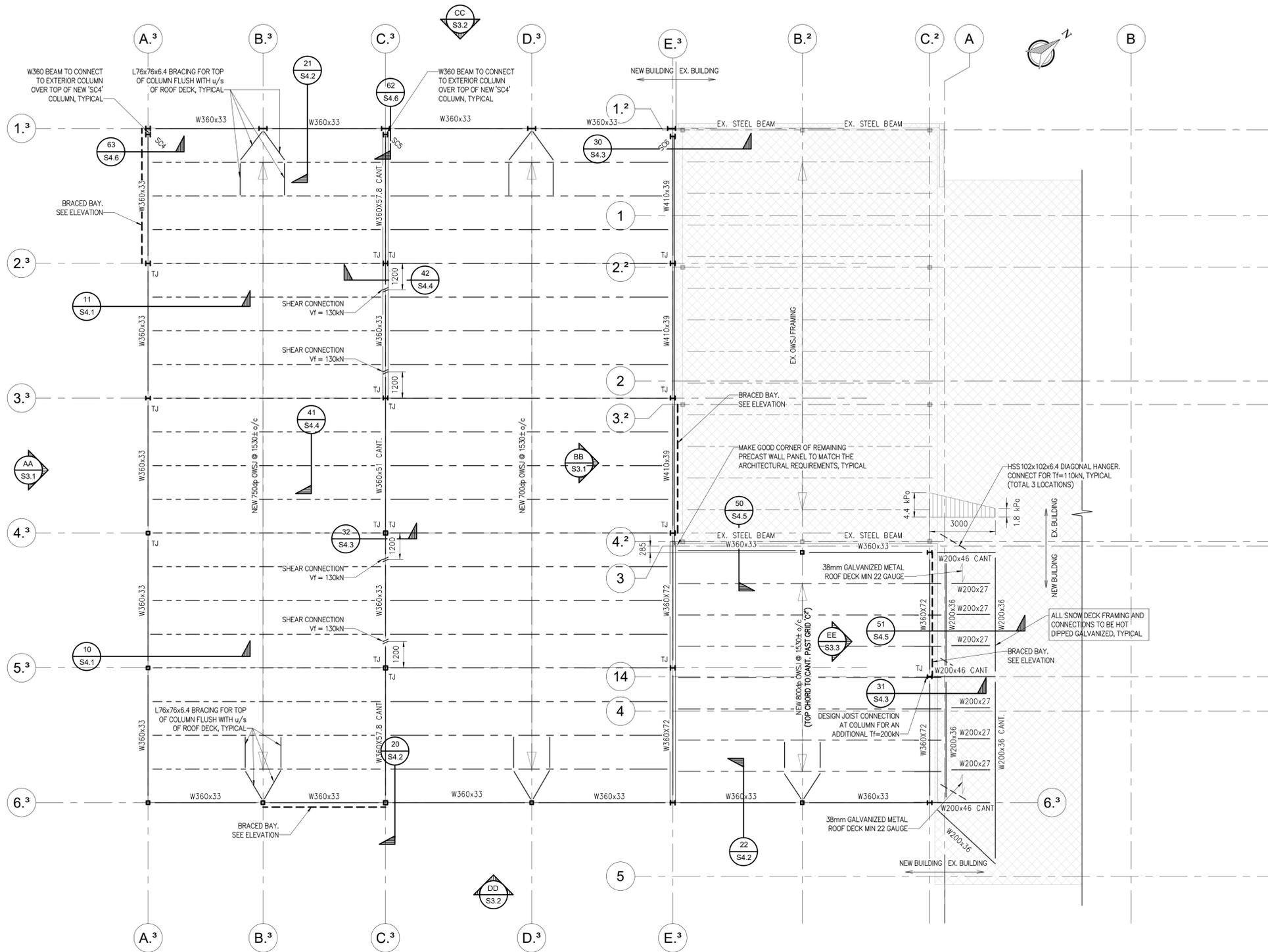
7805 Niagara River Pkwy, Niagara Falls, ON  
**2ND FLOOR FRAMING PLAN**

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DATE: **10/17/2024 2:20:57 PM**  
SCALE: **As indicated**  
PROJECT NO.: **24175**  
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**S1.1**

REV. #



**ROOF FRAMING PLAN NOTES**

- ROOF U/S DECK ELEVATION IS AT +6550 (181.890m GEODETIC). CONFIRM ALL ELEVATIONS WITH ARCHITECTURAL DRAWINGS.
- TOP OF STEEL BEAM IS AT UNDERSIDE OF SLOPING ROOF DECK UNLESS NOTED ON PLANS THUS "u/s" BELOW UNDERSIDE OF SLOPING ROOF DECK. TOP OF STEEL ELEVATIONS FROM UNDERSIDE OF ROOF DECK ARE BASED ON ASSUMED JOIST SHOE DEPTHS OF 100mm UNLESS NOTED OTHERWISE ON PLAN.
- ROOF SLOPES ACHIEVED WITH TAPERED INSULATION (SEE ARCHITECTURAL DRAWINGS). ROOF SLOPES ARE SHOWN ON PLAN AS UNDERSIDE OF DECK ELEVATIONS [ ±xx ] AT LOW AND HIGH POINTS, BASED ON THE LATEST INFORMATION AVAILABLE TO THE CONSULTANTS. COORDINATE ROOF SLOPES WITH ARCHITECTURAL DRAWINGS.
- TYPICAL STEEL ROOF CONSTRUCTION U.N.O.: 38mm STEEL ROOF DECK SUPPORTED BY STEEL JOISTS OR STEEL BEAMS SPACED AS SHOWN ON PLAN. STEEL DECK FABRICATOR TO DESIGN DECK AND DETERMINE DECK THICKNESS (GAUGE) BASED ON LOADS SHOWN ON PLAN AND SCHEDULE (CANAM P-3615 OR EQUAL WITH MINIMUM 0.76mm THICKNESS). NOTE AREAS WITH DRIFT LOADING MAY REQUIRE HEAVIER GAUGE DECK - DESIGNER TO VERIFY ALL AREAS.
- STEEL DECK SPAN DIRECTION IS INDICATED WITH ARROWS AS THUS  $\rightarrow$  ON PLAN.
- ADDITIONAL SNOW LOAD ACCUMULATION IS INDICATED AS "DRIFT" AND IS SHOWN ON PLAN. THIS LOAD IS IN ADDITION TO THE BASIC SNOW LOAD LISTED ON THIS DRAWING. NOTE DRIFTS ARE CUMULATIVE - SEE DASHED PROFILE BOUNDARIES ON PLAN.
- SEE ARCHITECTURAL DRAWINGS FOR COLUMN OFFSETS FROM GRID LINES.
- OWS SPACING WILL VARY DEPENDING ON GRID SPACING AND TIE JOIST LOCATIONS. OWS AND DECK TO BE SIZED ACCORDINGLY.
- OWS DESIGNER TO REFER TO MECHANICAL SPRINKLER DRAWINGS AND ALLOW FOR ASSOCIATED ADDITIONAL PIPE LOADS.
- OWS DESIGNER TO REFER TO LATEST MECHANICAL TO COORDINATE DUCTS THROUGH THE OWS/S AND JOIST GRIDDERS
- DESIGN THE STEEL ROOF DECK AND STEEL JOISTS, INCLUDING THEIR CONNECTION TO SUPPORTING ELEMENTS FOR A FACTORED DIAPHRAGM SHEAR FORCE OF 5.0 kN/m.
- DESIGN THE STEEL ROOF DECK, STEEL JOISTS AND THEIR CONNECTIONS TO SUPPORTING MEMBERS FOR AN UNFACTORED UNIFORM UPLIFT PRESSURE OF 1.0kPa.
- MECHANICAL ROOFTOP UNITS ARE SHOWN ON PLAN BASED ON THE LATEST INFORMATION AVAILABLE TO THE CONSULTANTS. STEEL FABRICATOR MUST COORDINATE FINAL WEIGHT, SIZE AND LOCATION OF ALL ROOFTOP UNITS WITH GENERAL CONTRACTOR PRIOR TO FABRICATION. SEE THIS SHEET FOR TYPICAL SNOW DRIFT DIAGRAM AROUND ROOFTOP UNITS.
- NOT ALL ROOF OPENINGS HAVE BEEN SHOWN ON PLAN. STEEL FABRICATOR TO COORDINATE FINAL SIZE AND LOCATION OF ROOF OPENINGS WITH GENERAL CONTRACTOR PRIOR TO FABRICATION. SEE TYPICAL DETAIL 5.02 ON DRAWING S5.3 FOR REQUIRED FRAMING AROUND ROOF OPENINGS.
- TIE JOISTS OR TIE JOIST GRIDDERS ARE INDICATED ON PLANS AS "TJ" ON PLAN. EXTEND BOTH TOP AND BOTTOM CHORD MEMBERS AND CONNECT THEM TO COLUMN, BEAM, OR WALL.
- BEAMS DENOTED WITH  $\rightarrow$ MC ARE TO BE CONNECTED FOR FULL MOMENT AND SHEAR CAPACITY OF BEAM UNLESS NOTED OTHERWISE.
- ALL BEAMS ON PLAN ARE TO BEAR ON 'BP'1 BEARING PLATES AT CONCRETE WALLS U.N.O ON PLAN.

ISSUED FOR TENDER  
1 Oct 17/24



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STRUCTURAL ENGINEERS

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Niagara Falls, ON, L2E 6A3  
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WEGO Garage Addition

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**PARTIAL ROOF FRAMING PLAN**

DRAWN BY:	MG
DATE:	10/17/2024 2:20:59 PM
SCALE:	As indicated
PROJECT NO.:	24175
CHECKED:	BCS

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**S1.2**

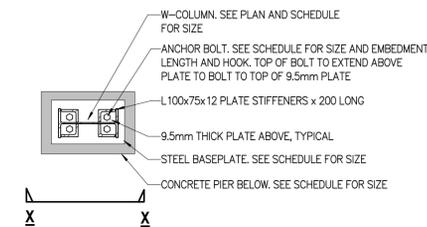
REV. #



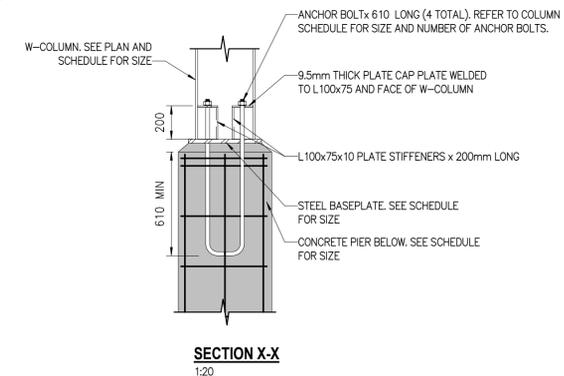
COLUMN MARK	A <sup>3</sup> -1,3	A <sup>3</sup> -2,3	A <sup>3</sup> -3,3	A <sup>3</sup> -4,3	A <sup>3</sup> -5,3	A <sup>3</sup> -6,3	B <sup>3</sup> -1,3	B <sup>3</sup> -2,3	B <sup>3</sup> -4,3	B <sup>3</sup> -5,3	B <sup>3</sup> -6,3	C <sup>3</sup> -1,3	C <sup>3</sup> -2,3	C <sup>3</sup> -3,3	C <sup>3</sup> -4,3	C <sup>3</sup> -5,3	C <sup>3</sup> -6,3	D <sup>3</sup> -1,3	D <sup>3</sup> -6,3	
COLUMN/FOOTING DATA																				
ROOF LEVEL ELEVATION +6550																				
LEVEL 2 FLOOR ELEVATION +3200	W200x62	W200x62 Mf = 30kNm	W200x42 Mf = 30kNm	HSS 152x152x6.4	HSS 152x152x6.4	HSS 152x152x6.4	W360x57	HSS 203x203x13	HSS 203x203x13	HSS 203x203x13	HSS 152x152x6.4	W360x57	W200x62 Mf = 30kNm	W200x62 Mf = 30kNm	HSS 178x178x6.5 Mf = 40kNm	HSS 178x178x6.5 Mf = 40kNm	HSS 178x178x6.5 Mf = 40kNm	W360x57	HSS 152x152x6.4	
GROUND FLOOR ELEVATION 0.00	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER	TOP OF PIER
u/s OF STEEL BASE PLATE ELEVATION (FROM ELEVATION +0000)	-350	-200	-200	-200	-200	-200	-350	-200	-200	-200	-200	-350	-200	-200	-200	-200	-200	-350	-200	
TOP OF PIER ELEVATION (FROM ELEVATION +0000)	-400	-250	-250	-250	-250	-250	-400	-250	-250	-250	-250	-400	-250	-250	-250	-250	-250	-400	-250	
BASE PLATE (mm) (SQUARE U.O.)	300x25x300	300x20x300	300x20x300	300x20x300	300x20x300	300x20x300	450x20x250	300x20x300	300x20x300	300x20x300	300x20x300	450x20x250	300x20x300	300x20x300	350x20x350	350x20x350	350x20x350	450x20x250	300x20x300	
ANCHOR BOLT	No. / SIZE	4-25Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-32Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-32Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-32Ø	4-20Ø	
	EMBEDMENT (mm)	600	400	400	400	400	600	400	400	400	400	600	400	400	400	400	400	600	400	
	HOOK (mm)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
PIER	SIZE (mm)	400x800	400x400	400x400	400x400	400x400	550x550	400x400	400x400	400x400	400x400	550x950	400x400	400x400	450x450	450x450	450x450	550x550	400x400	
	VERTICAL REINFORCING	8-25M	8-20M	8-20M	8-20M	8-20M	8-25M	8-20M	8-20M	8-20M	8-20M	8-25M	8-20M	8-20M	8-20M	8-20M	8-20M	8-25M	8-20M	
	TIES (SEE TYP. DETAIL 3.06)	10M @ 400	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 400	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 400	10M @ 300	10M @ 400	10M @ 300					
FOOTING	SIZE (L x l x W mm)	2200x350x2200	1200x300x1200	1200x300x1200	1600x300x1600	1600x300x1600	2000x350x2000	1200x300x1200	1600x300x1600	1800x300x1800	1600x300x1600	2200x350x2200	1800x300x1800	1800x300x1800	2000x300x2000	2000x300x2000	1400x300x1400	2000x350x2000	1200x300x1200	
	HORIZONTAL REINFORCING	8-15M B.E.W. & T.E.W. HOOKED	4-15M B.E.W. & T.E.W. HOOKED	4-15M B.E.W. HOOKED	6-15M B.E.W. & T.E.W. HOOKED	6-15M B.E.W. & T.E.W. HOOKED	4-15M B.E.W. HOOKED	8-15M B.E.W. & T.E.W. HOOKED	4-15M B.E.W. HOOKED	5-15M B.E.W. HOOKED	8-15M B.E.W. HOOKED	5-15M B.E.W. & T.E.W. HOOKED	8-15M B.E.W. HOOKED	8-15M B.E.W. HOOKED	12-15M B.E.W. HOOKED	12-15M B.E.W. HOOKED	5-15M B.E.W. & T.E.W. HOOKED	8-15M B.E.W. & T.E.W. HOOKED	4-15M B.E.W. HOOKED	
COMMENTS	REFER TO TYPICAL BASEPLATE CONNECTION DETAIL THIS DRAWING REFER TO SECTION 637 FOR CRANE BEAM CONNECTION	REFER TO SECTION 637 FOR CRANE BEAM CONNECTION SEE SECTION FOR CANT. BEAM DETAILS *CRANE LOAD INCLUDED	REFER TO SECTION 637 FOR CRANE BEAM CONNECTION SEE SECTION FOR CANT. BEAM DETAILS *CRANE LOAD INCLUDED				REFER TO TYPICAL BASEPLATE CONNECTION DETAIL THIS DRAWING					REFER TO TYPICAL BASEPLATE CONNECTION DETAIL THIS DRAWING	SEE SECTION FOR CANT. BEAM DETAILS *CRANE LOAD INCLUDED	SEE SECTION FOR CANT. BEAM DETAILS *CRANE LOAD INCLUDED	SEE SECTION FOR CANT. BEAM DETAILS *CRANE LOAD INCLUDED	SEE SECTION FOR CANT. BEAM DETAILS *CRANE LOAD INCLUDED	SEE SECTION FOR CANT. BEAM DETAILS *CRANE LOAD INCLUDED	REFER TO TYPICAL BASEPLATE CONNECTION DETAIL THIS DRAWING		
UNFACTORED LOADS (kN)	DL = 12 LL = 15	DL = 50 LL = 80*	DL = 50 LL = 80*	DL = 155 LL = 140	DL = 155 LL = 140	DL = 65 LL = 55	DL = 25 LL = 30	DL = 12 LL = 15	DL = 165 LL = 120	DL = 220 LL = 160	DL = 135 LL = 110	DL = 30 LL = 35	DL = 115 LL = 205*	DL = 115 LL = 205*	DL = 200 LL = 245*	DL = 225 LL = 265*	DL = 85 LL = 120*	DL = 15 LL = 20	DL = 15 LL = 20	
COLUMN/FOOTING DATA																				
COLUMN MARK	A <sup>3</sup> -1,3	A <sup>3</sup> -2,3	A <sup>3</sup> -3,3	A <sup>3</sup> -4,3	A <sup>3</sup> -5,3	A <sup>3</sup> -6,3	B <sup>3</sup> -1,3	B <sup>3</sup> -2,3	B <sup>3</sup> -4,3	B <sup>3</sup> -5,3	B <sup>3</sup> -6,3	C <sup>3</sup> -1,3	C <sup>3</sup> -2,3	C <sup>3</sup> -3,3	C <sup>3</sup> -4,3	C <sup>3</sup> -5,3	C <sup>3</sup> -6,3	D <sup>3</sup> -1,3	D <sup>3</sup> -6,3	

**COLUMN AND PAD FOOTING SCHEDULE NOTES**

- FOR COLUMN OFFSETS FROM GRIDLINES. REFER TO ARCHITECTURAL DRAWINGS.
- COLUMN SCHEDULE IS SCHEMATIC ONLY. COORDINATE ALL TOP OF COLUMNS, COLUMN SPLICE LOCATIONS, CONNECTIONS, ETC. WITH PLANS, SECTIONS AND ARCHITECTURAL DRAWINGS.
- FOR PLACEMENT OF CONCRETE PAD FOOTINGS AND ASSOCIATED PIERS. SEE TYPICAL DETAIL 3.05 AND 3.38.
- FOR TIES IN ALL CONCRETE COLUMNS AND PIERS. SEE TYPICAL DETAIL 3.06.
- FOR STRUCTURAL STEEL BASE PLATES AND PAD FOOTINGS, FIRST PLAN DIMENSION IS TO BE ORIENTED IN THE N-S DIRECTION U.O.
- SEE STRUCTURAL SPECIFICATION FOR REQUIRED MINIMUM CONCRETE STRENGTHS, SLUMPS, AND AIR CONTENTS.
- SEE TYPICAL DETAIL 3.01 FOR CLEAR COVER TO REINFORCING BARS IN CONCRETE PIERS AND FOOTINGS.
- ALL BOTTOM REINFORCING FOR PAD FOOTINGS TO BE HOOKED, UNLESS NOTED OTHERWISE.



**PLAN DETAIL COLUMN BASEPLATE AT GRID A<sup>3</sup>-1, B<sup>3</sup>-1, C<sup>3</sup>-1, D<sup>3</sup>-1 AND E<sup>3</sup>-1**  
1:20



**SECTION X-X**  
1:20

ISSUED FOR TENDER  
1 Oct 17/24



**MBSA**  
**VanBoxmeer Stranges Antonio**  
**STRUCTURAL ENGINEERS**

4082 Portage Rd., Unit 1  
Niagara Falls, ON, L2E 6A3  
T | 905-357-2030  
W | www.vbands.com  
E | e@vbands.com

Niagara Parks Commission

**WEGO Garage Addition**

7805 Niagara River Pkwy, Niagara Falls, ON

**SCHEDULES**

DRAWN BY: **VR**  
DATE: **10/17/2024 2:21:02 PM**  
SCALE: **As indicated**  
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CHECKED: **BCS**

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**S2.2**

REV. #

COLUMN MARK	E.3.1.3	E.3.2.3	E.3.3.3	E.3.4.3	E.3.5.3	E.3.6.3	B.3.3	B.3.6.3	C.3.3	C.3.4A	C.3.6.3	SC1	SC2	SC3	SC4	SC5	SC5	
COLUMN/FOOTING DATA																		
ROOF LEVEL ELEVATION +6550																		
LEVEL 2 FLOOR ELEVATION +3200	W200x67	MC MF = 40kNm W200x62	HSS 152x152x6.4	HSS 152x152x6.4	W200x36	W200x36	W200x36	U/S STAIR LANDING HSS127x127x1.3	U/S STAIR LANDING HSS96x96x1.5	HSS 152x152x6.4	MC MF = 30kNm W200x62	MC MF = 40kNm W200x62	MC MF = 40kNm W200x62					
GROUND FLOOR ELEVATION 0.00	FIXED BASE																	
TOP OF PIER																		
u/s OF STEEL BASE PLATE ELEVATION (FROM ELEVATION +0000)	-350	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-200	-350	-350	-350	
TOP OF PIER ELEVATION (FROM ELEVATION +0000)	-400	-250	-250	-250	-250	-250	-250	-250	-250	-250	-250	-250	-250	-250	-400	-400	-400	
BASE PLATE (mm) (SQUARE U.N.O.)	450x20x250	300x20x300	300x20x300	300x20x300	300x20x300	300x20x300	300x20x300	300x20x300	300x20x300	300x20x300	300x20x300	300x20x300	250x20x250	300x20x300	300x20x300	300x20x300	300x20x300	
ANCHOR BOLT	No. / SIZE	4-32Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	4-20Ø	
	EMBEDMENT (mm)	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	400	
	HOOK (mm)	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	
PIER	SIZE (mm)	550x950	2100x400	2100x400	2500x400	400x400	400x400	2100x400	400x400	SEE COMMENTS	400x400	400x400	350x350	350x350	'A3-1"	'C3-1"	'E3-1"	
	VERTICAL REINFORCING	8-25M	SEE SECTION 61	SEE SECTION 61	SEE SECTION 61	8-20M	8-20M	SEE SECTION 61	8-20M	SEE SECTION 61	8-20M	8-20M	8-20M	8-20M	8-20M	'A3-1"	'C3-1"	'E3-1"
	TIES (SEE TYP. DETAIL 3.06)	10M @ 400	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	10M @ 300	'A3-1"	'C3-1"	'E3-1"
FOOTING	SIZE (L x t x W mm)	2200x350x2200	2100x400x800	2100x400x800	2500x400x800	1800x300x1800	1200x300x1200	2100x400x800	1200x300x1200	SEE COMMENTS	1200x300x1200	1200x300x1200	1000x300x1000	1000x300x1000	1200x300x1200	'A3-1"	'C3-1"	'E3-1"
	HORIZONTAL REINFORCING	SEE COMMENTS	SEE COMMENTS	SEE COMMENTS	SEE COMMENTS	8-15M B.E.W. HOOKED	4-15M B.E.W. HOOKED	SEE COMMENTS	4-15M B.E.W. HOOKED	SEE COMMENTS	4-15M B.E.W. & T.E.W. HOOKED	4-15M B.E.W. HOOKED	4-15M B.E.W. HOOKED	4-15M B.E.W. HOOKED	4-15M B.E.W. HOOKED	'A3-1"	'C3-1"	'E3-1"
COMMENTS																		
UNFACTORED LOADS (kN)	DL = 15 LL = 20	DL = 60 LL = 120*	DL = 60 LL = 120*	DL = 75 LL = 135*	DL = 120 LL = 190*	DL = 30 LL = 85*	DL = 15 LL = 20	DL = 15 LL = 20	DL = 15 LL = 15	DL = 15 LL = 60	DL = 15 LL = 15	DL = 15 LL = 15	DL = 15 LL = 15	DL = 20 LL = 20	DL = 50 LL = 60	DL = 50 LL = 60	DL = 50 LL = 60	
COLUMN/FOOTING DATA																		
COLUMN MARK	E.3.1.3	E.3.2.3	E.3.3.3	E.3.4.3	E.3.5.3	E.3.6.3	B.3.3	B.3.6.3	C.3.3	C.3.4A	C.3.6.3	SC1	SC2	SC3	SC4	SC5	SC5	

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- SEE TYPICAL DETAIL 3.01 FOR CLEAR COVER TO REINFORCING BARS IN CONCRETE PIERS AND FOOTINGS.
- ALL BOTTOM REINFORCING FOR PAD FOOTINGS TO BE HOOKED, UNLESS NOTED OTHERWISE.

ISSUED FOR TENDER  
1 Oct 17/24



4082 Portage Rd., Unit 1  
Niagara Falls, ON, L2E 6A3  
T | 905-357-2030  
W | www.vbands.com  
E | e@vbands.com

Niagara Parks Commission

WEGO Garage Addition

7805 Niagara River Pkwy, Niagara Falls, ON

SCHEDULES

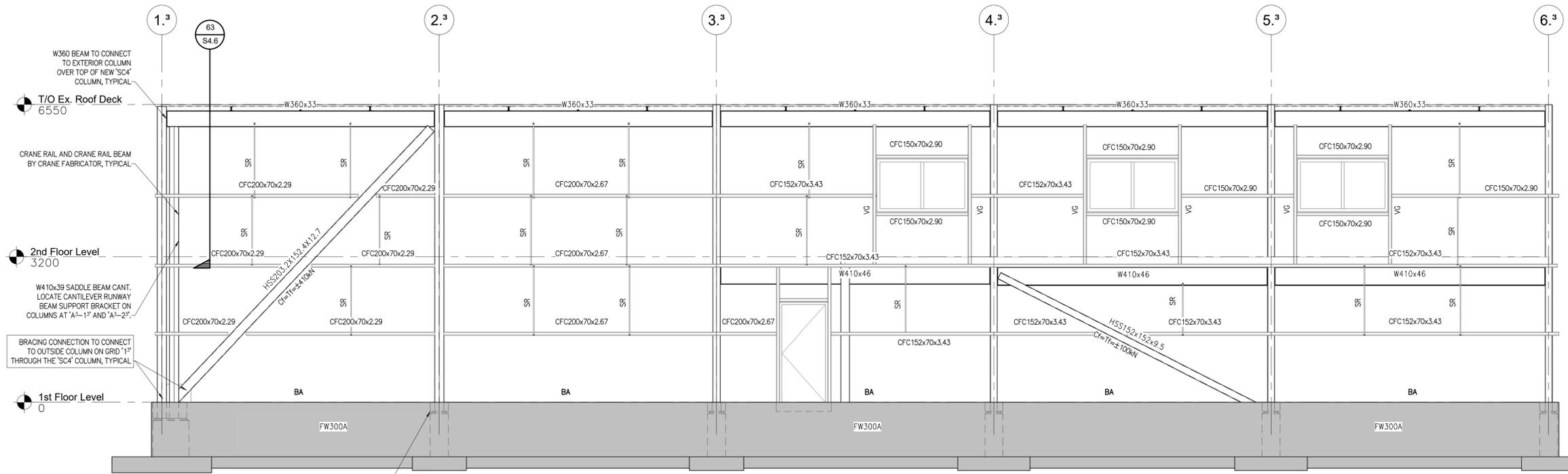
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DATE: **10/17/2024 2:21:03 PM**  
SCALE: **1 : 100**  
PROJECT NO.: **24175**  
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**S2.3**

REV. #

Autodesk Docs://24-006 - NPC - WEGO Garage Niagara Falls/24175 Structural Central.rvt

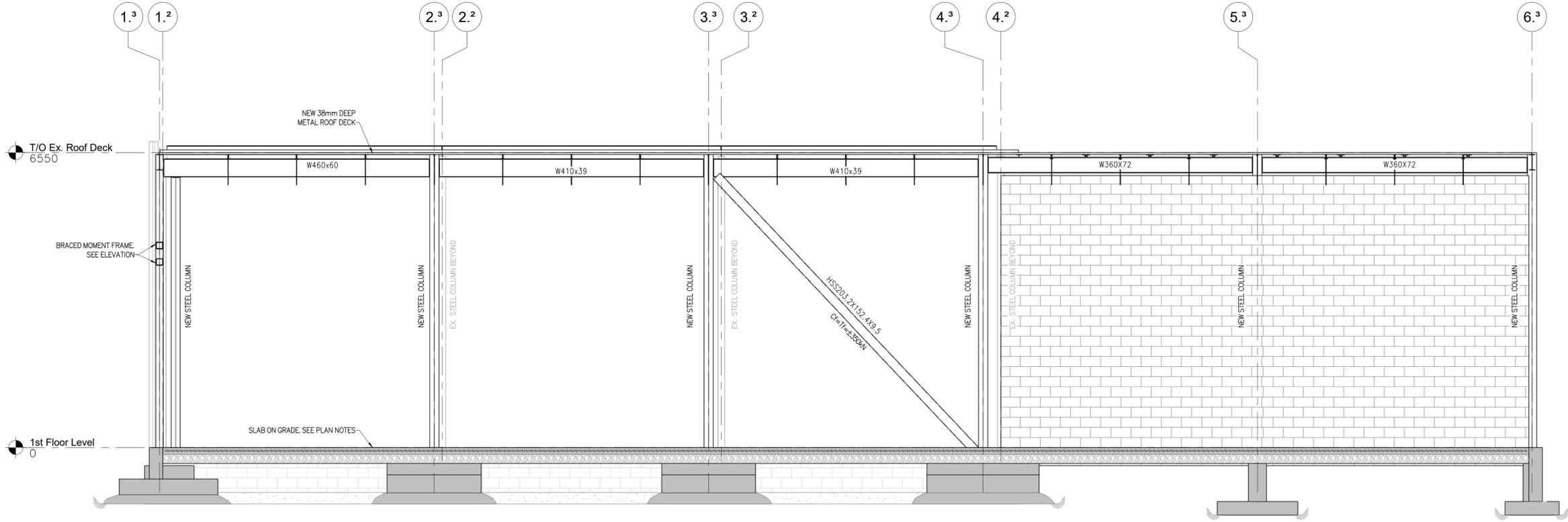


**BA** - L102x102x6.4 CONTINUOUS SUPPORT OF INSULATED SIDING. FIELD WELDED TO CAST-IN PLATES AT TOP OF FOUNDATION WALL. PLATES TO BE 102x102x8 STEEL PLATES ANCHORED TO CONCRETE WALL WITH 2-10# NELSON HEADED CONCRETE ANCHORS x 150 LONG SPACED ALONG WALL @ 900 o/c MAX. INSTALL ONE EACH SIDE OF COLUMN AND/OR DOOR OPENING, TYPICAL.

**SG** - 16mmØ SAG RODS. PROVIDE NUTS ON TOP AND BOTTOM OF GIRT. LOCATE SAG ROD IN CENTRE OF GIRT TYPICAL AT 3RD POINT IN GIRT SPAN UNLESS NOTED OTHERWISE.

ELEVATION AA  
1 : 50  
S1.0

**VG** - CFC150x70x3.43 VERTICAL GIRTS. CONNECT TO TOP OF PRECAST/FOUNDATION WALL w/ A STEEL BASEPLATE AND 2-19mmØx150 EMBEDMENT POWERS WEDGE BOLTS, TYPICAL.



ELEVATION BB  
1 : 50  
S1.0

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Niagara Parks Commission  
WEGO Garage Addition

7805 Niagara River Pkwy, Niagara Falls, ON  
ELEVATIONS

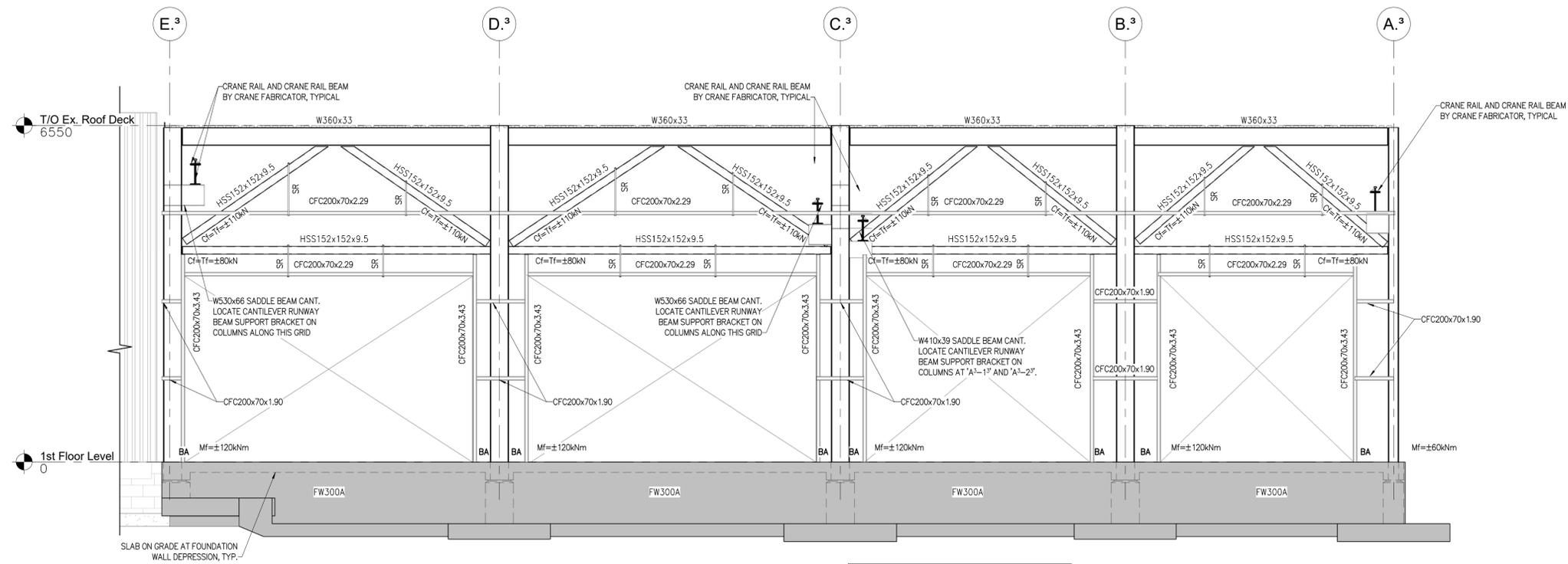
DRAWN BY: VR  
DATE: 10/17/2024 2:21:06 PM  
SCALE: 1 : 50  
PROJECT NO.: 24175  
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S3.1

REV. #

Autodesk Docs://24-006 - NPC - WEGO Garage Niagara Falls/24175 Structural Central.rvt

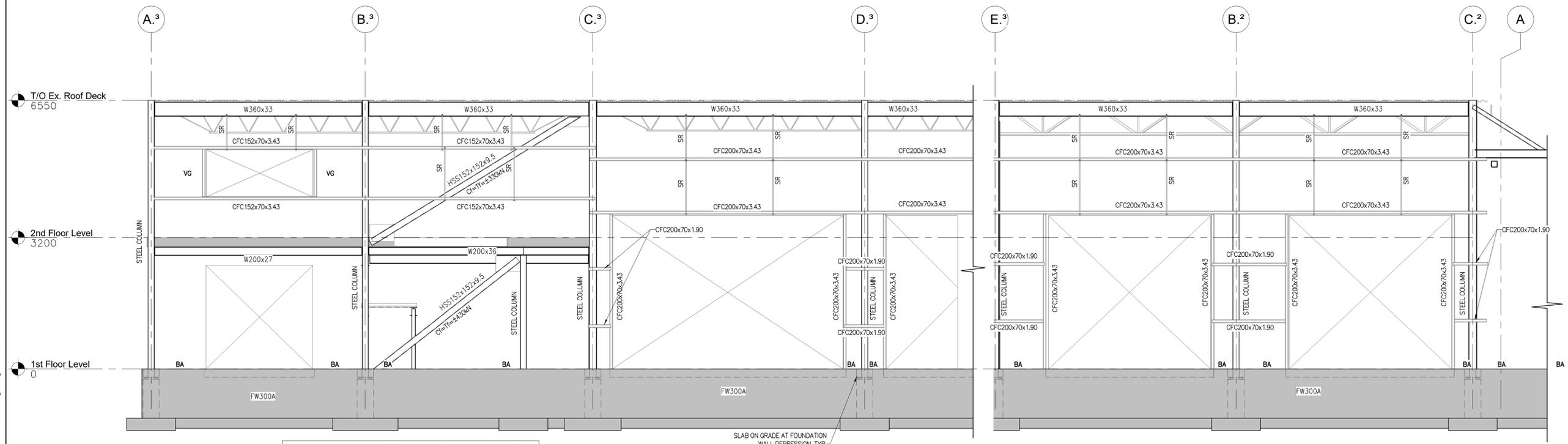


**BA** - L102x102x6.4 CONTINUOUS SUPPORT OF INSULATED SIDING. FIELD WELDED TO CAST-IN PLATES AT TOP OF FOUNDATION WALL. PLATES TO BE 102x102x8 STEEL PLATES ANCHORED TO CONCRETE WALL WITH 2-100 NELSON HEADED CONCRETE ANCHORS x 150 LONG SPACED ALONG WALL @ 900 o/c MAX. INSTALL ONE EACH SIDE OF COLUMN AND/OR DOOR OPENING, TYPICAL.

**SG** - 16mmØ SAG RODS. PROVIDE NUTS ON TOP AND BOTTOM OF GIRT. LOCATE SAG ROD IN CENTRE OF GIRT TYPICAL AT 3RD POINT IN GIRT SPAN UNLESS NOTED OTHERWISE.

ELEVATION **CC**  
1 : 50 **S1.0**

AT ALL OVERHEAD DOORS EXTEND THE CFC VERTICAL JAMBS EACH SIDE OF THE DOOR OPENING DOWN TO THE SILL OF THE OVERHEAD DOOR. COPE BACK THE EXTERIOR FLANGE OF THE GIRT AT CONCRETE WALL.



**VG** - CFC200x70x3.43 VERTICAL GIRTS. CONNECT TO TOP OF PRECAST/FOUNDATION WALL w/ A STEEL BASEPLATE AND 2-19mmØx150 EMBEDMENT POWERS WEDGE BOLTS, TYPICAL.

**BA** - L102x102x6.4 CONTINUOUS SUPPORT OF INSULATED SIDING. FIELD WELDED TO CAST-IN PLATES AT TOP OF FOUNDATION WALL. PLATES TO BE 102x102x8 STEEL PLATES ANCHORED TO CONCRETE WALL WITH 2-100 NELSON HEADED CONCRETE ANCHORS x 150 LONG SPACED ALONG WALL @ 900 o/c MAX. INSTALL ONE EACH SIDE OF COLUMN AND/OR DOOR OPENING, TYPICAL.

**SG** - 16mmØ SAG RODS. PROVIDE NUTS ON TOP AND BOTTOM OF GIRT. LOCATE SAG ROD IN CENTRE OF GIRT TYPICAL AT 3RD POINT IN GIRT SPAN UNLESS NOTED OTHERWISE.

ELEVATION **DD**  
1 : 50 **S1.0**

AT ALL OVERHEAD DOORS EXTEND THE CFC VERTICAL JAMBS EACH SIDE OF THE DOOR OPENING DOWN TO THE SILL OF THE OVERHEAD DOOR. COPE BACK THE EXTERIOR FLANGE OF THE GIRT AT CONCRETE WALL.

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Niagara Parks Commission

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ELEVATIONS

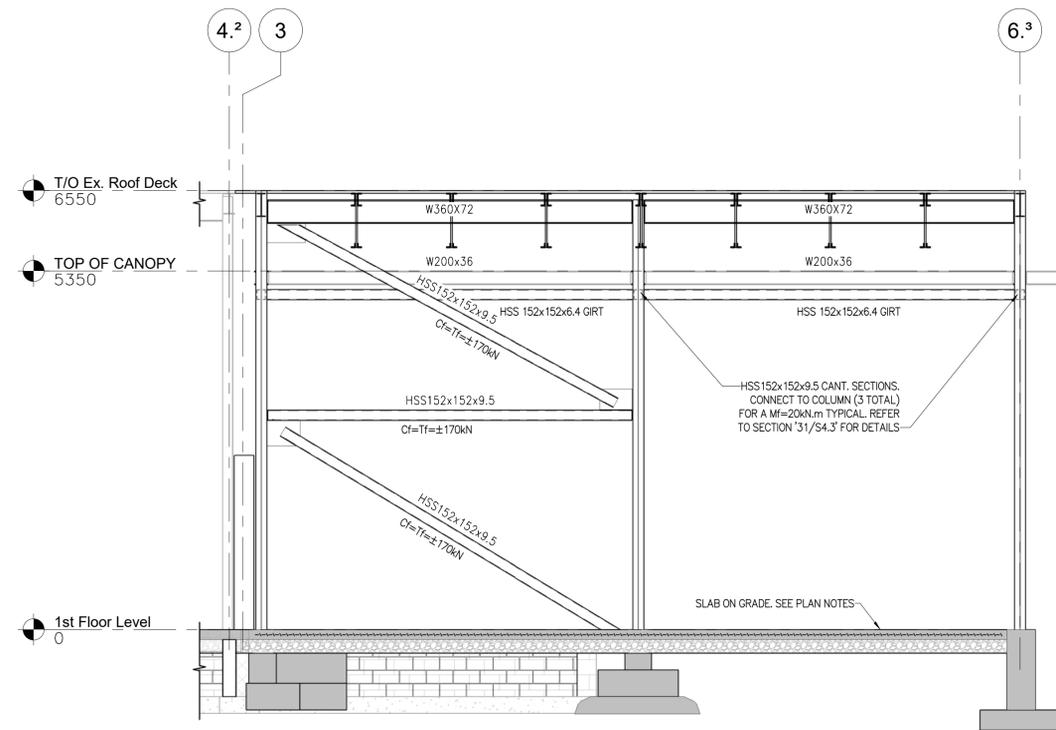
DRAWN BY: **VR**  
DATE: **10/17/2024 2:21:08 PM**  
SCALE: **1 : 50**  
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**S3.2**

REV. #



ELEVATION **EE**  
1 : 50 **S1.0**

Autodesk Docs://24-006 - NPC - WEGO Garage Niagara Falls/24175 Structural Central.rvt

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VanBoxmeer Stranges Antonio  
STRUCTURAL ENGINEERS

4082 Portage Rd., Unit 1  
Niagara Falls, ON, L2E 6A3  
T | 905-357-2030  
W | www.vbands.com  
E | sl@vbands.com

Niagara Parks Commission

WEGO Garage Addition

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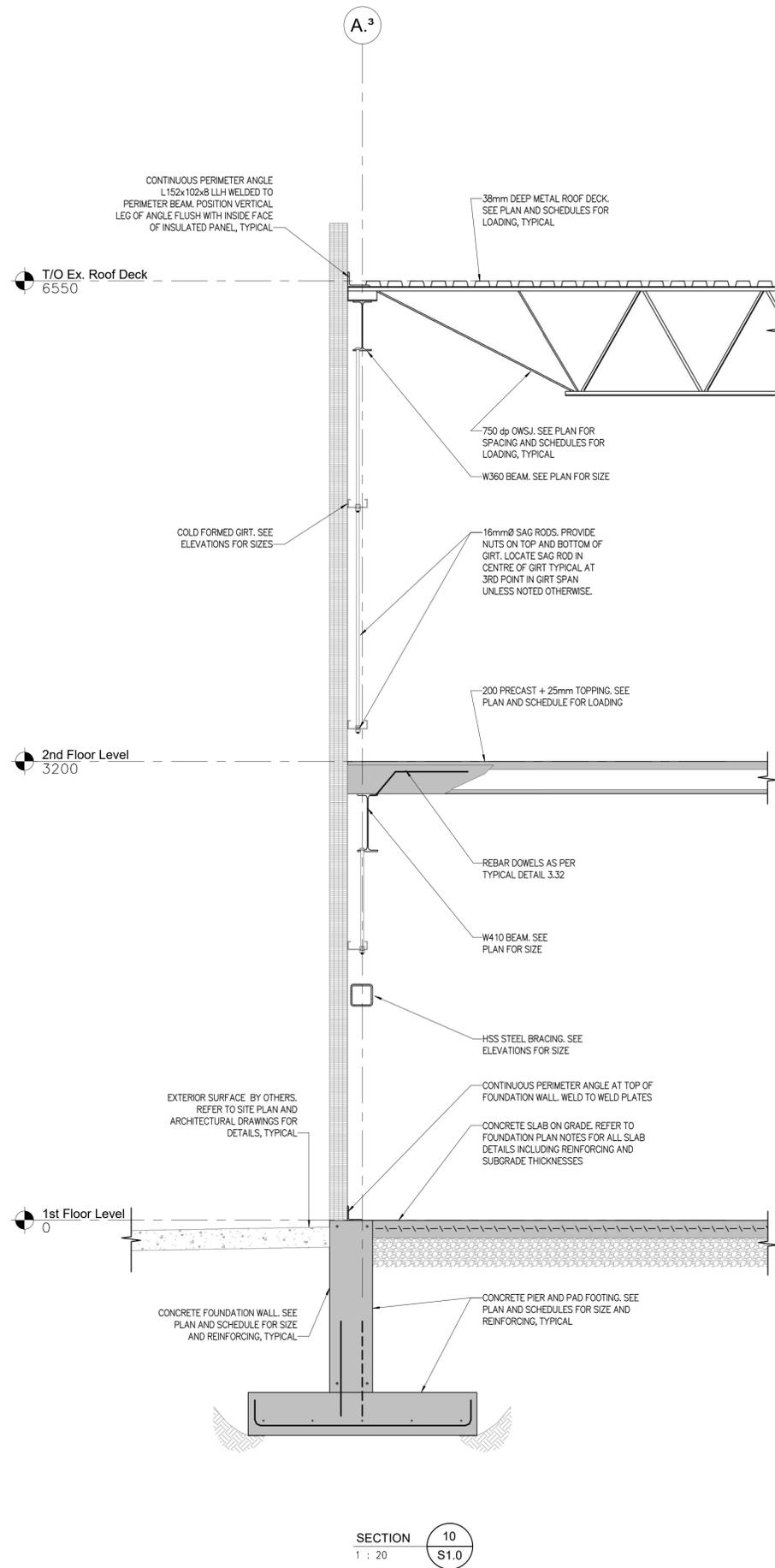
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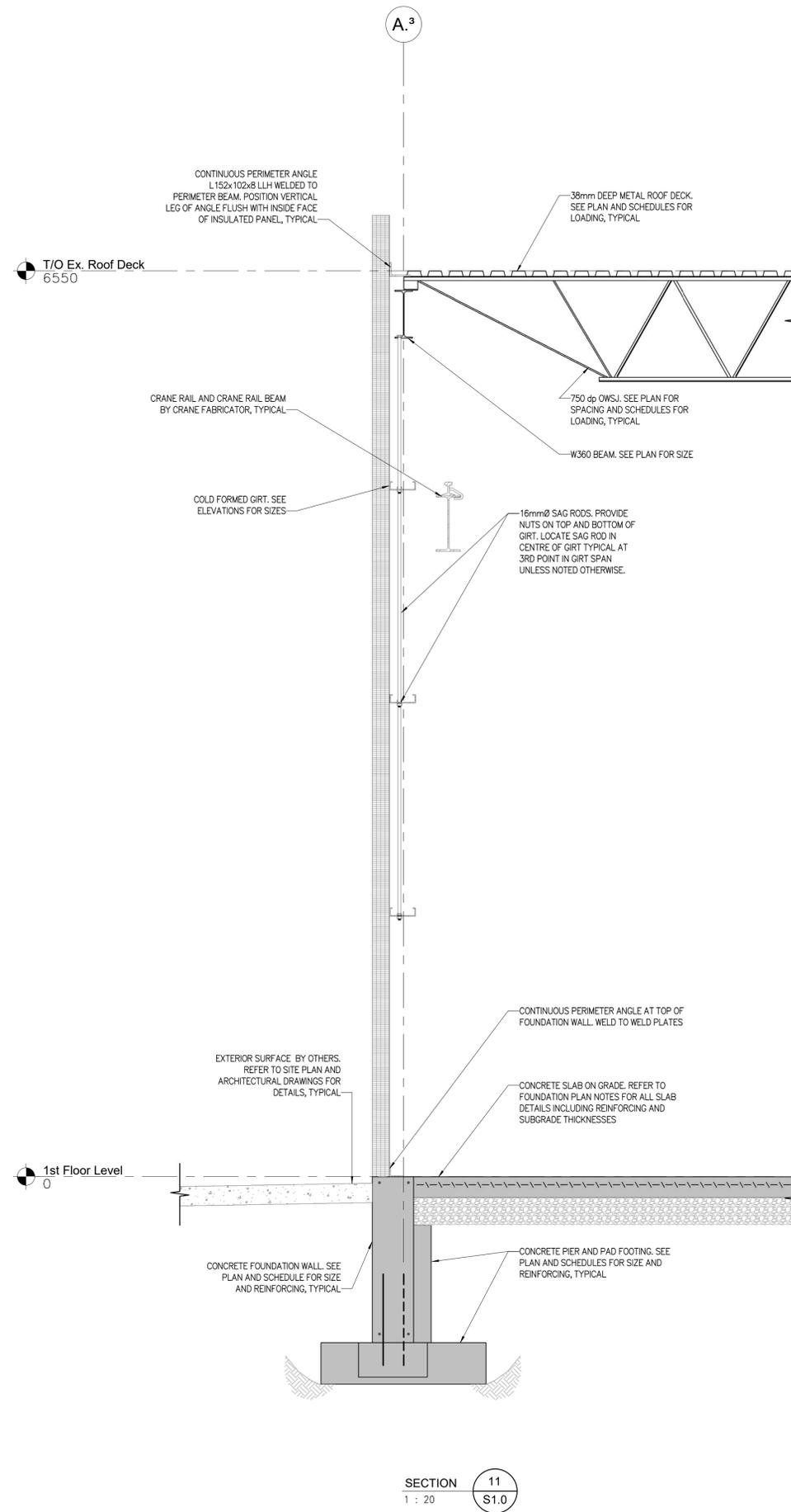
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**S3.3**

REV. #



SECTION 10  
1 : 20



SECTION 11  
1 : 20

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T | 905-357-2030  
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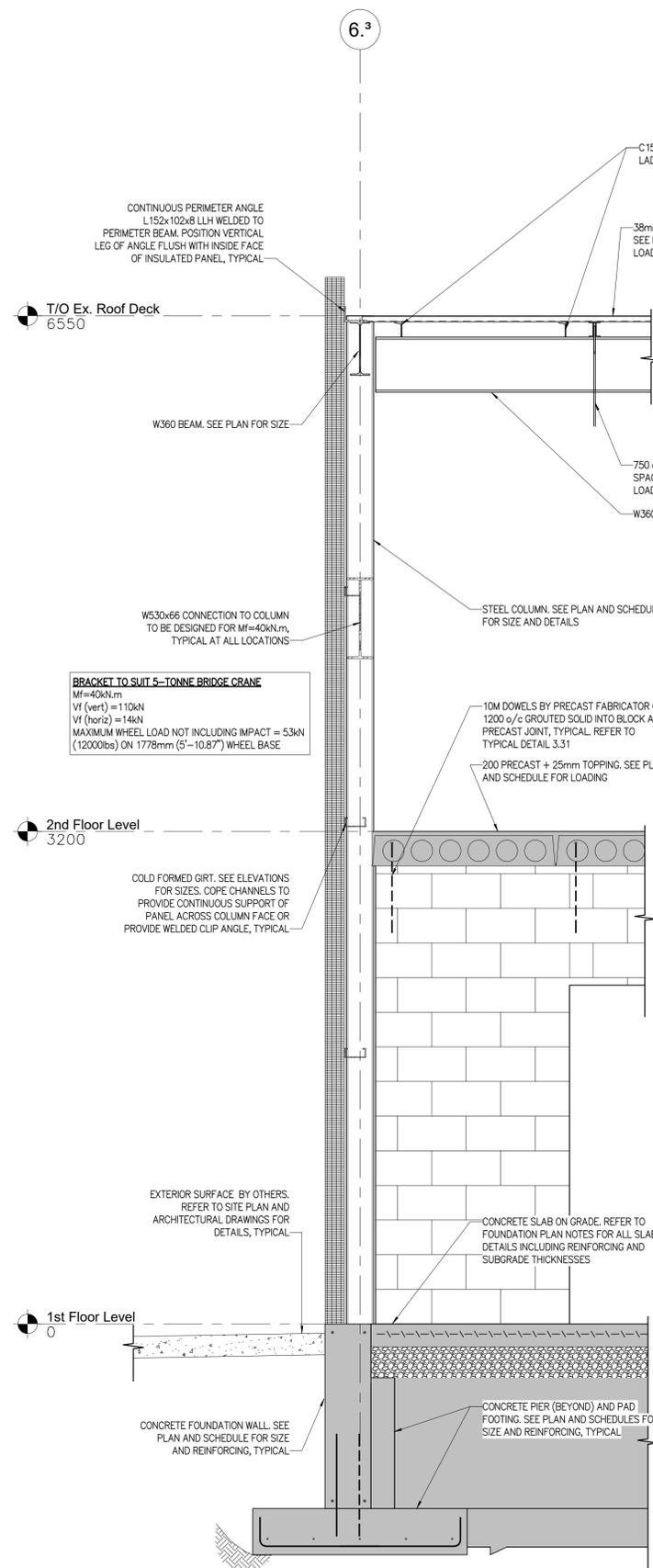
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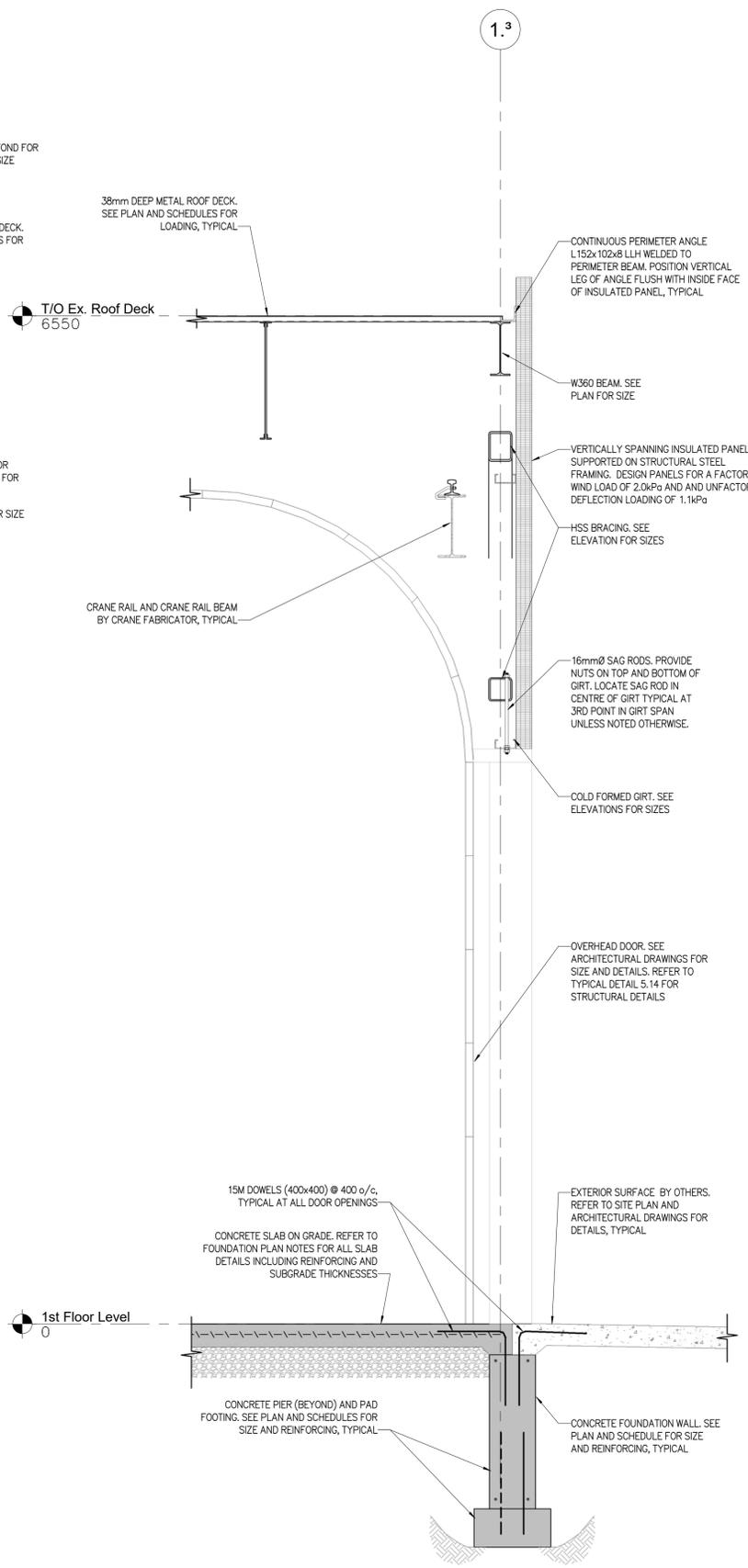
**S4.1**

REV. #

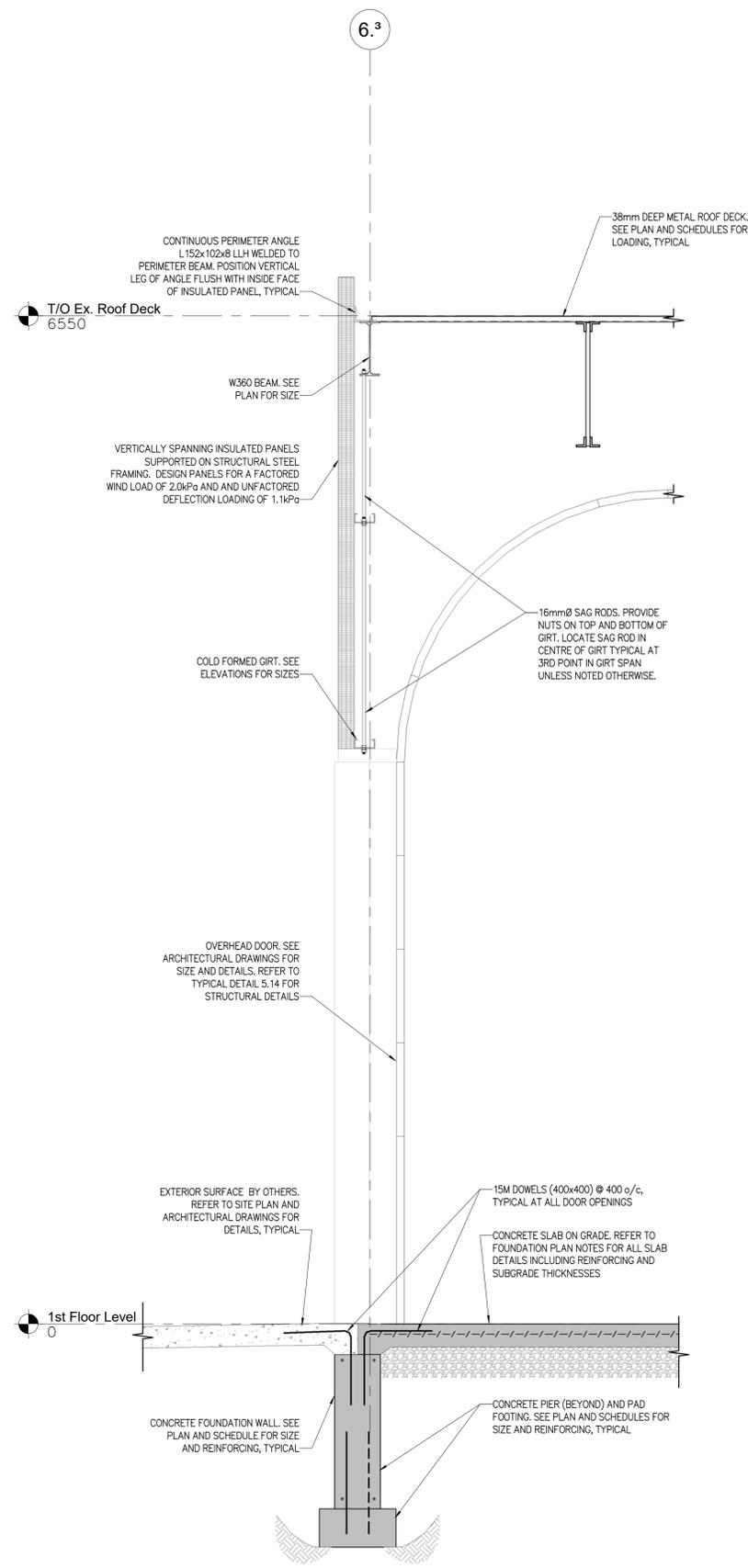
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SECTION 20  
1 : 20 S1.0



SECTION 21  
1 : 20 S1.0



SECTION 22  
1 : 20 S1.0

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T | 905-357-2030  
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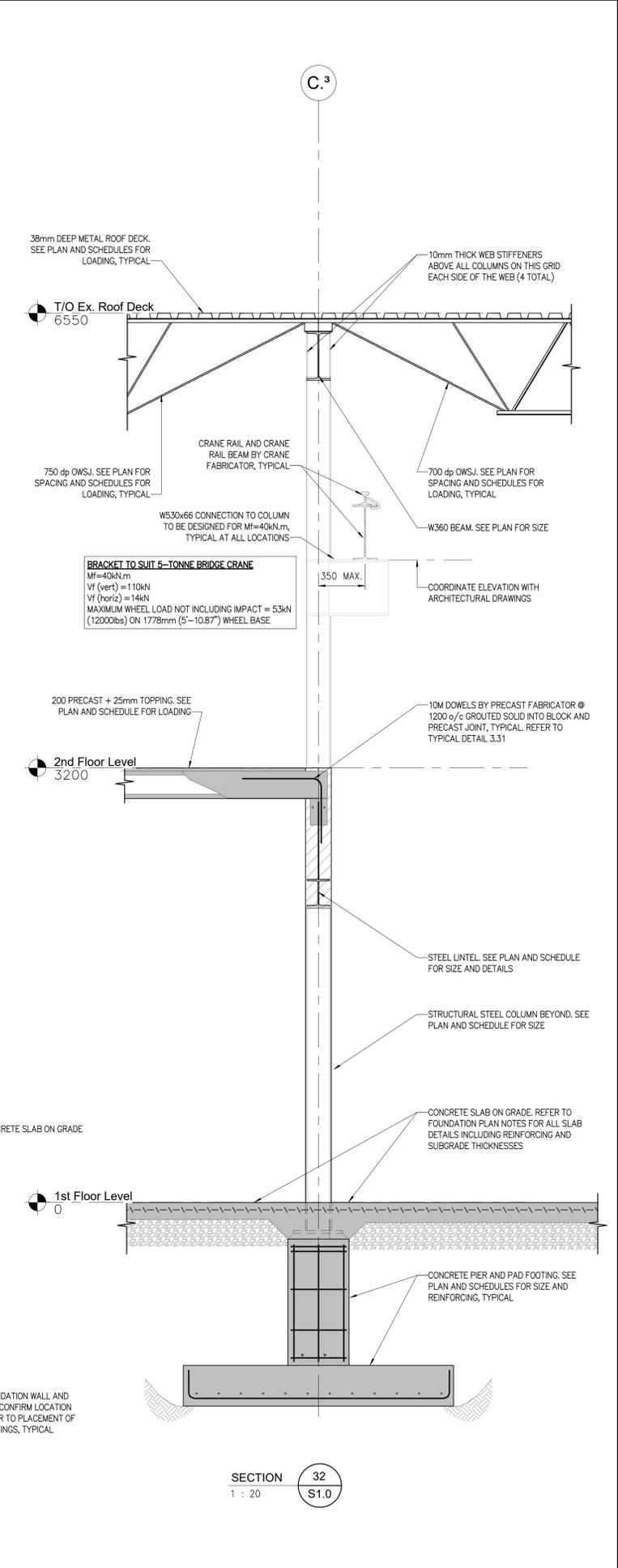
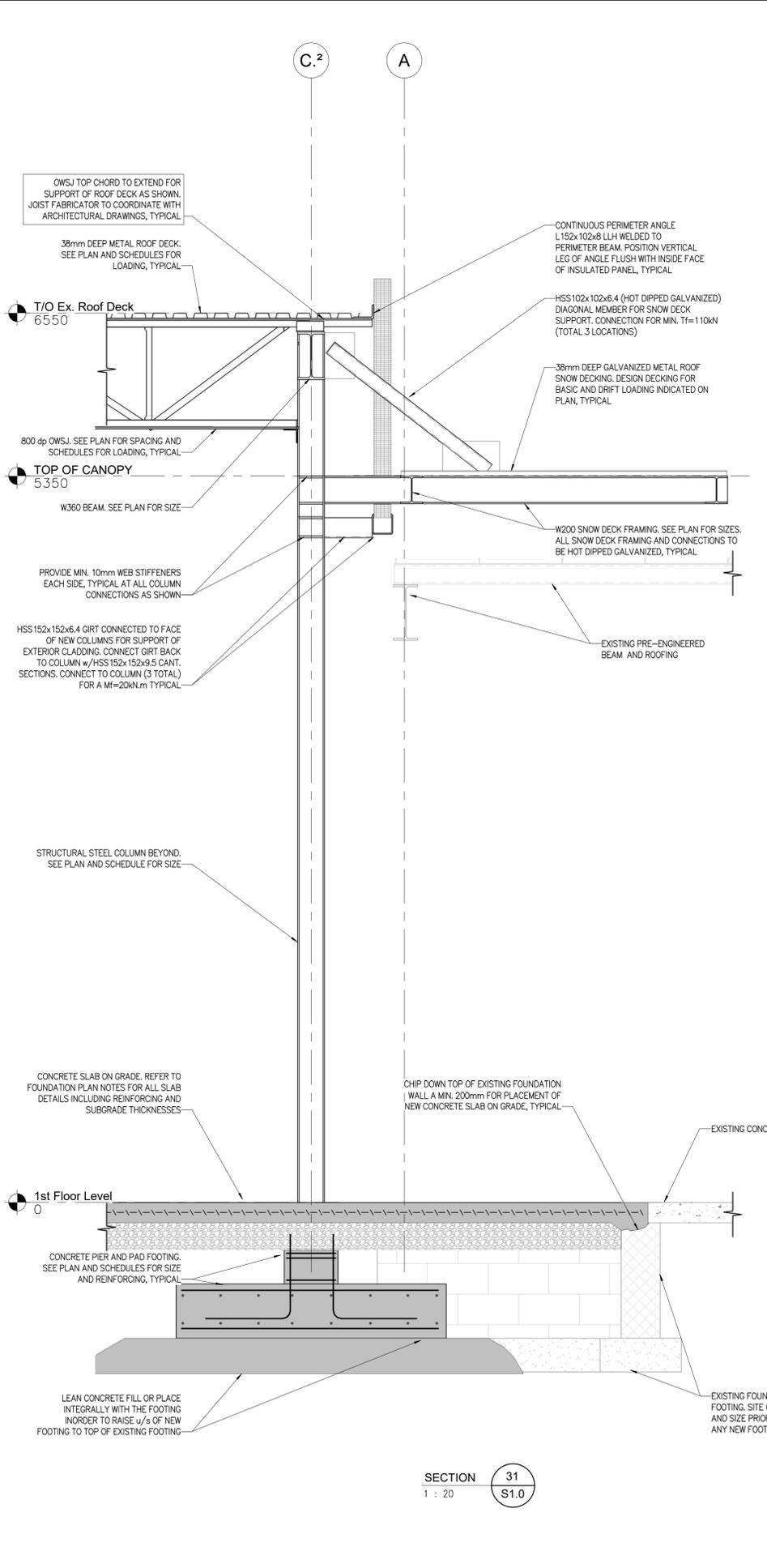
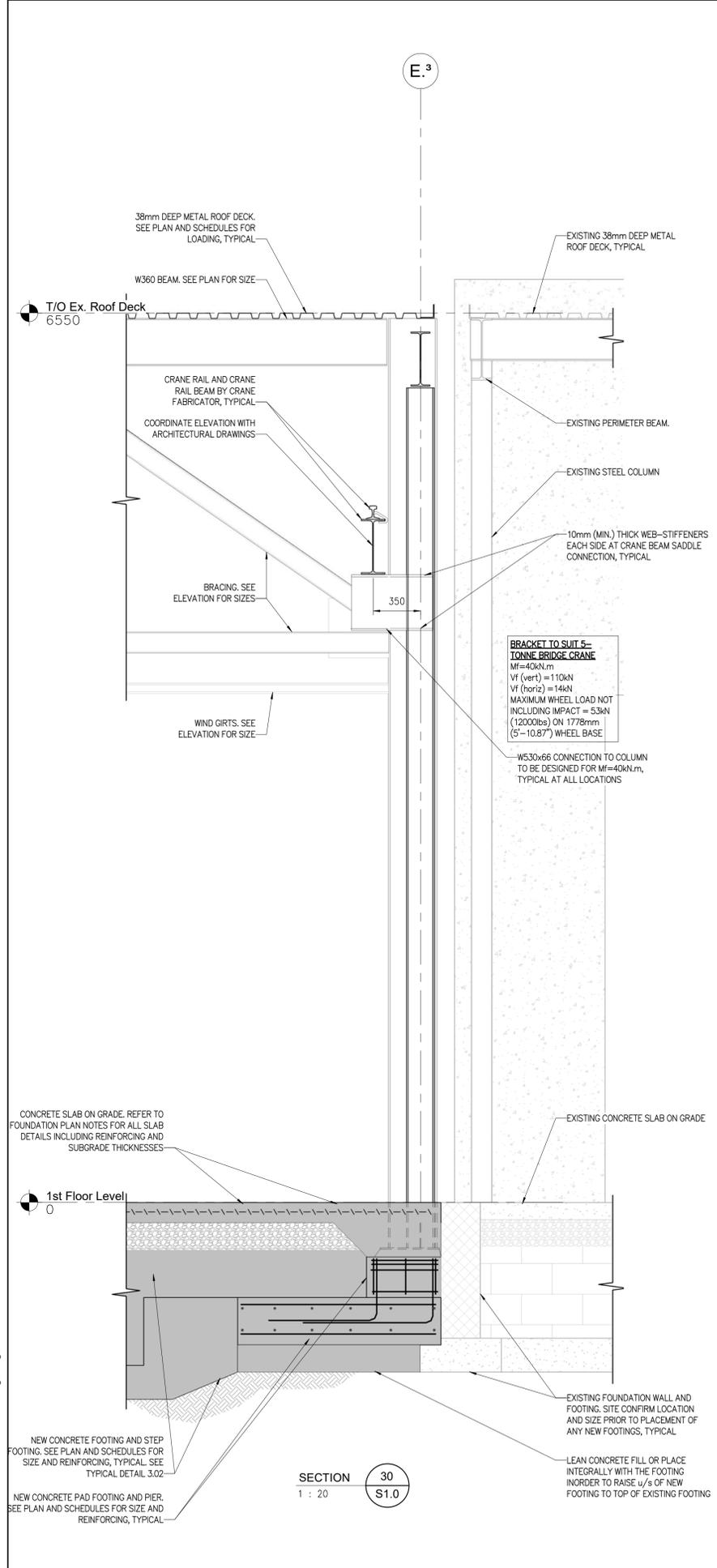
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**S4.2**

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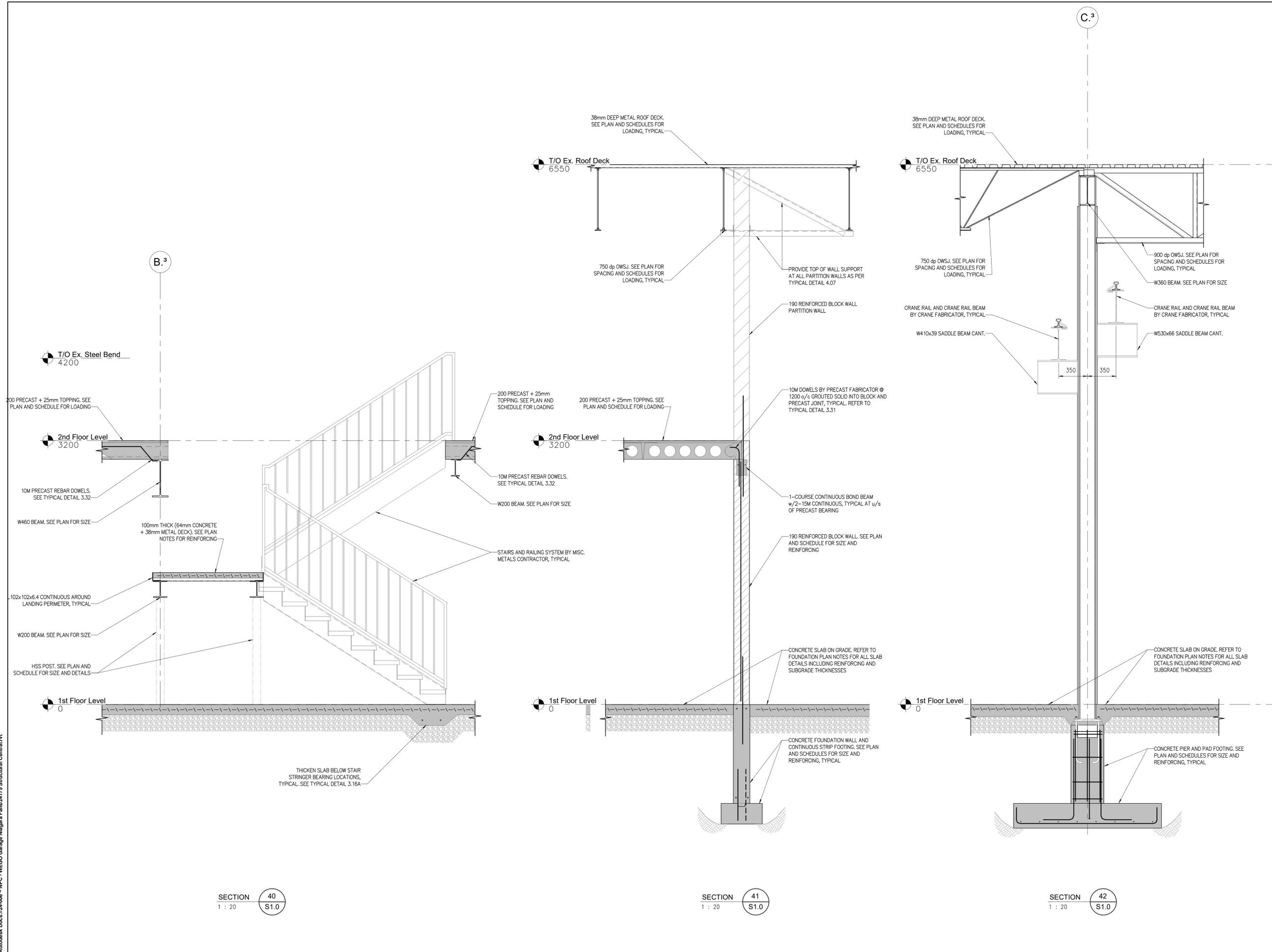
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**S4.3**

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SECTION 40  
1 : 20 S1.0

SECTION 41  
1 : 20 S1.0

SECTION 42  
1 : 20 S1.0

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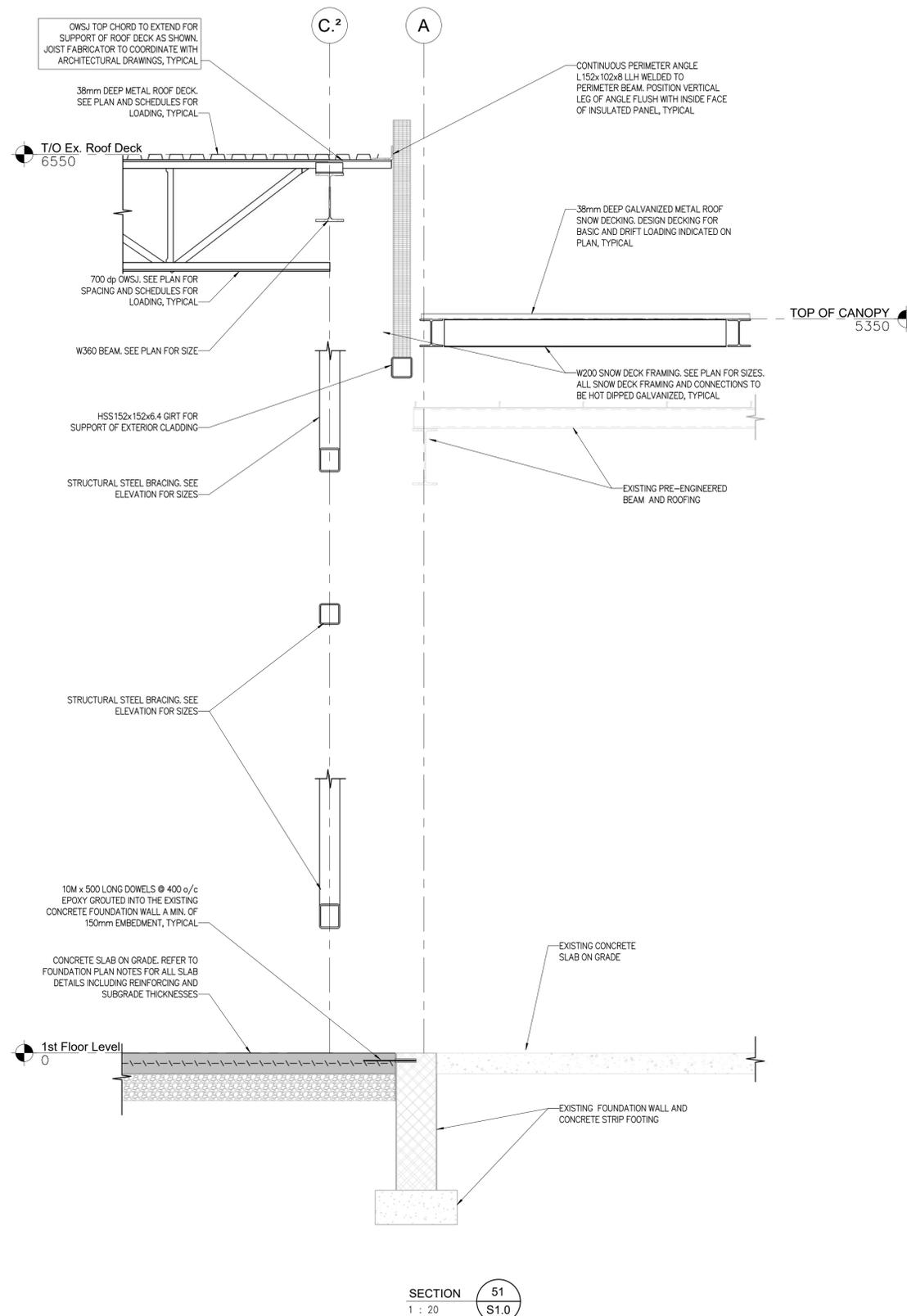
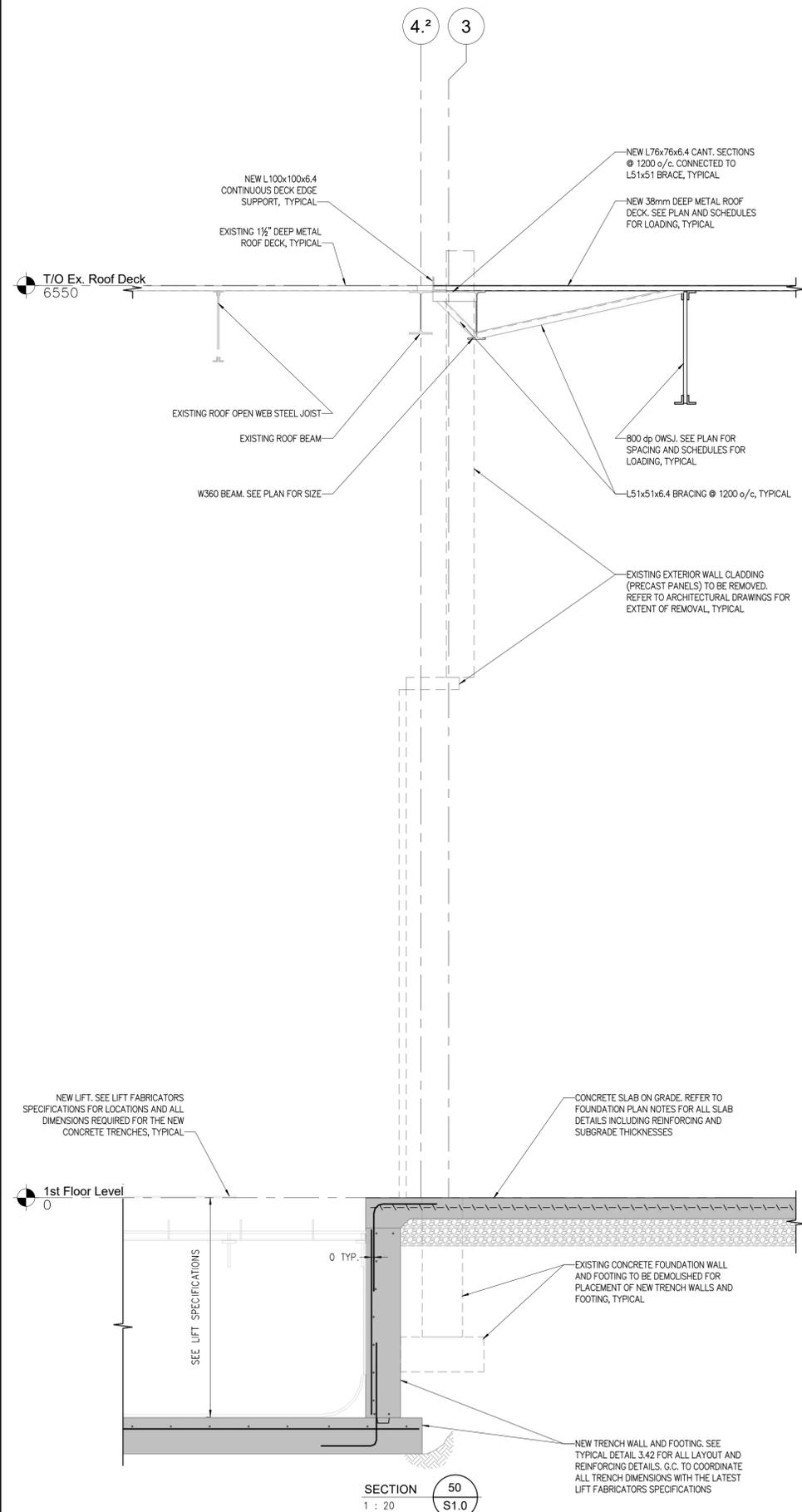
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**S4.4**

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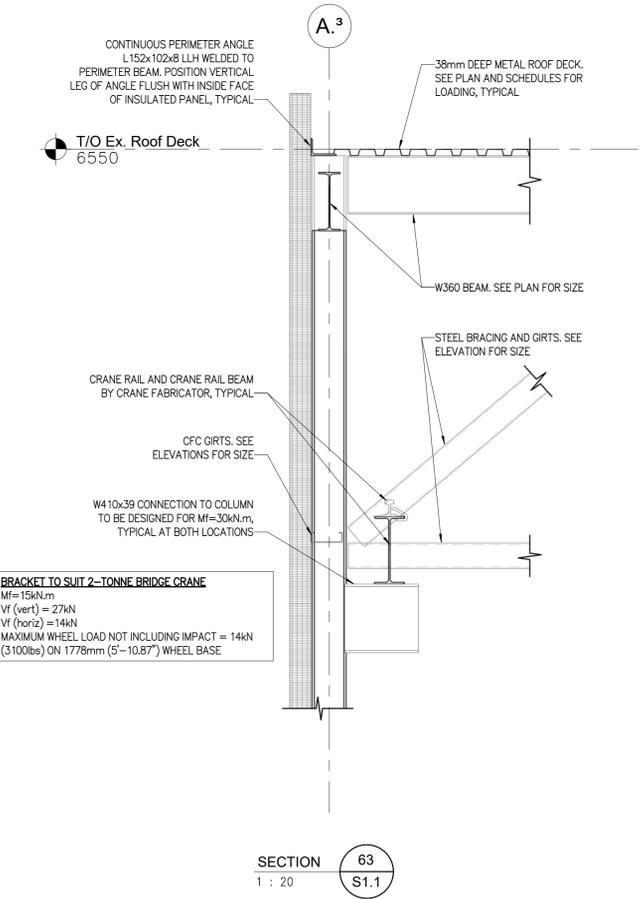
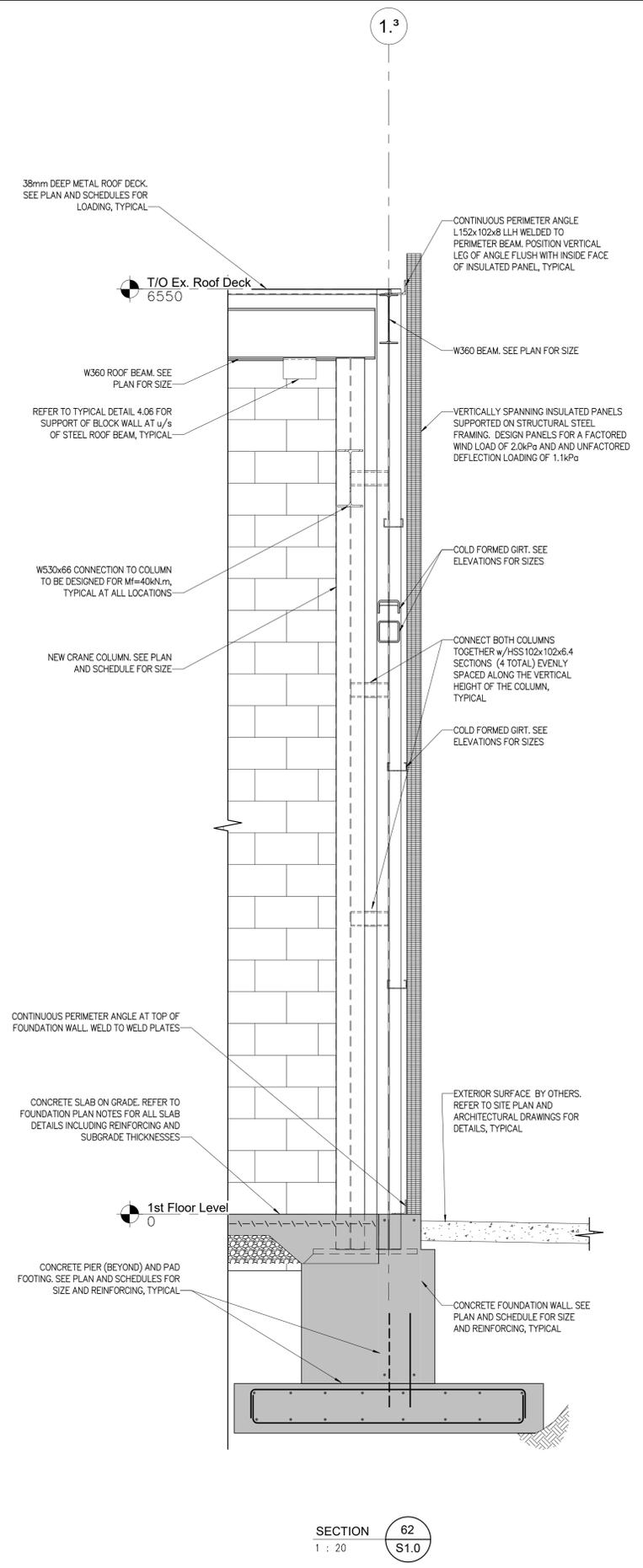
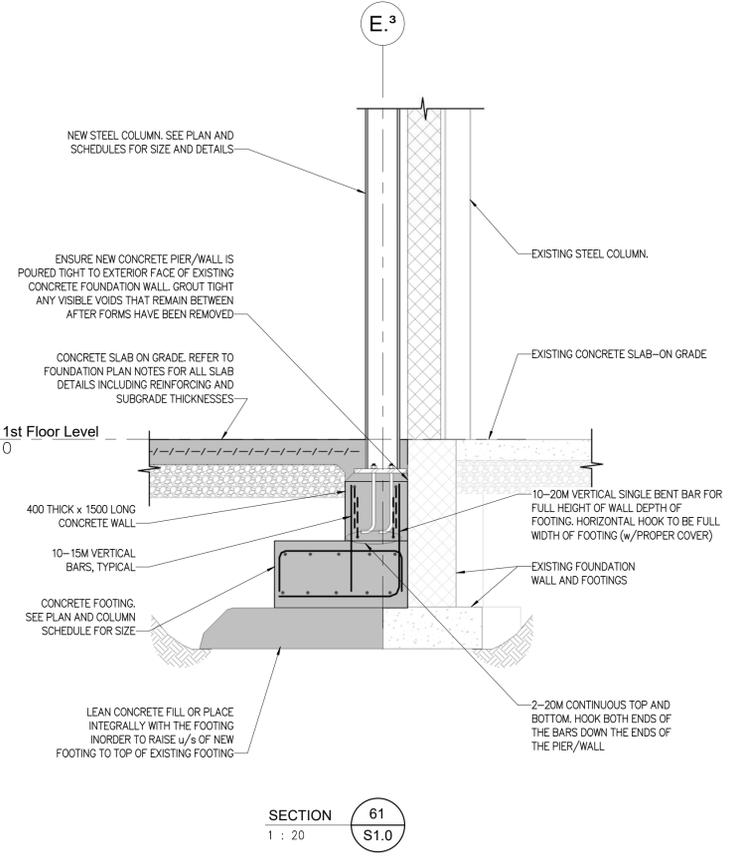
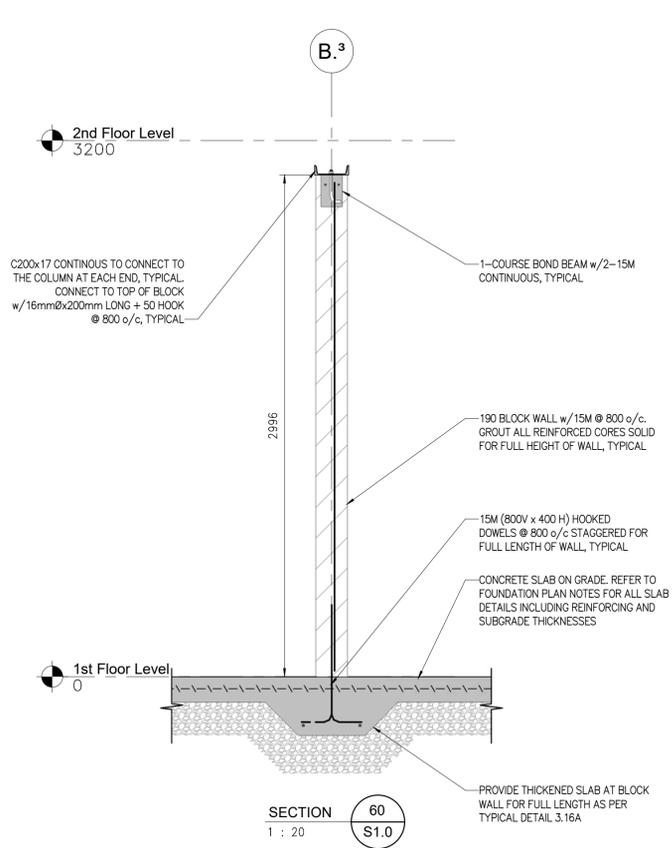
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**S4.5**

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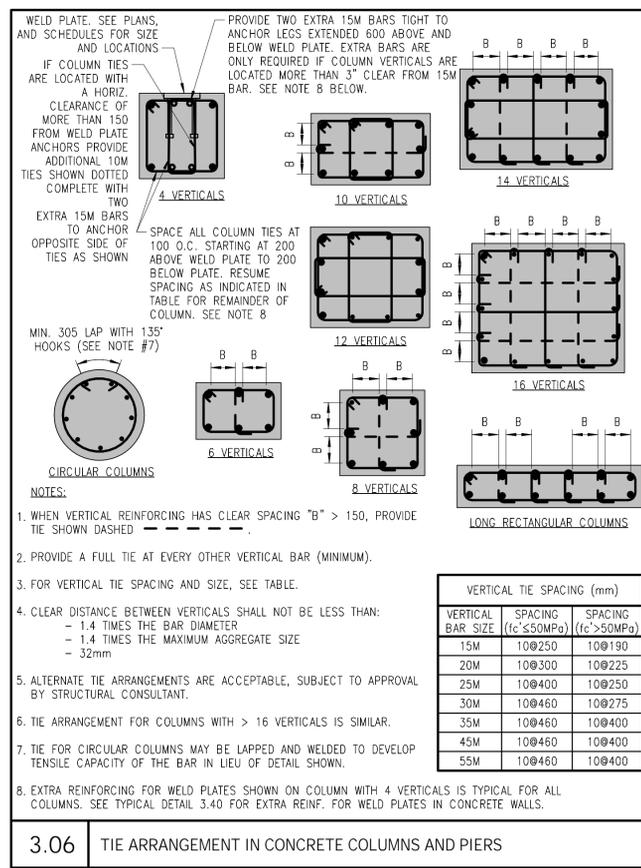
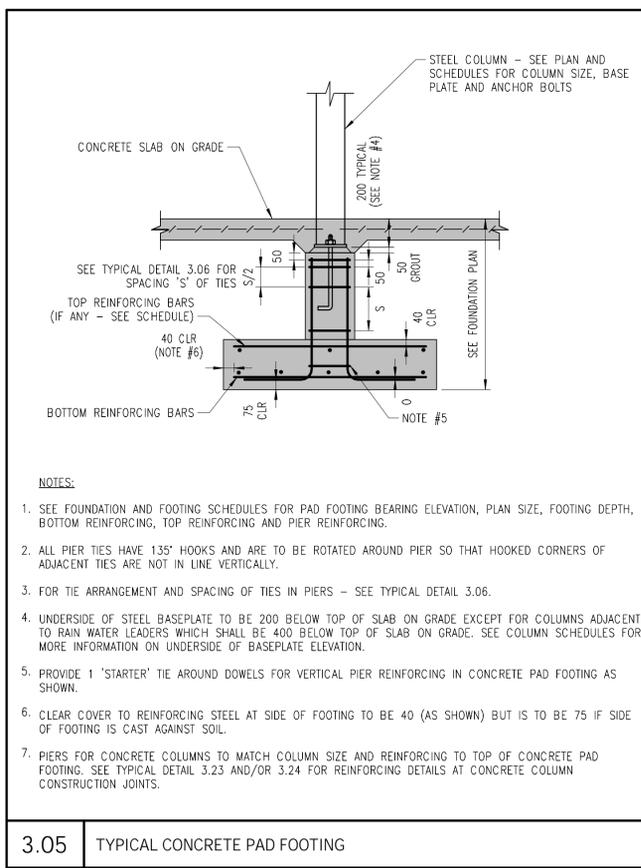
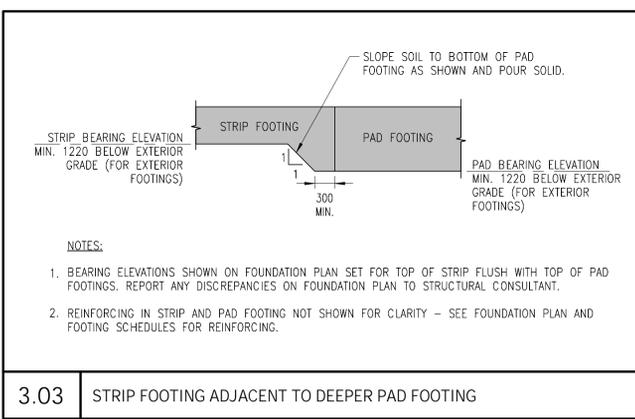
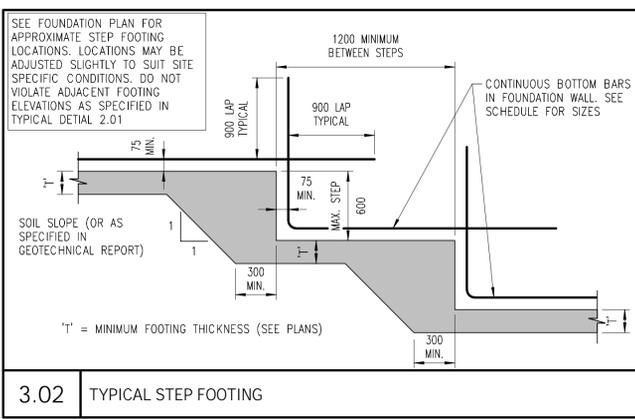
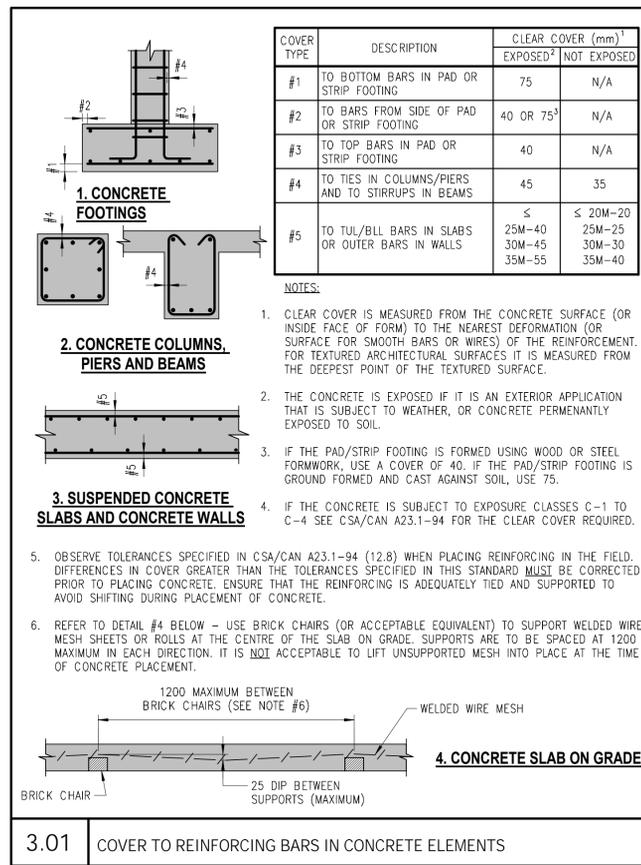
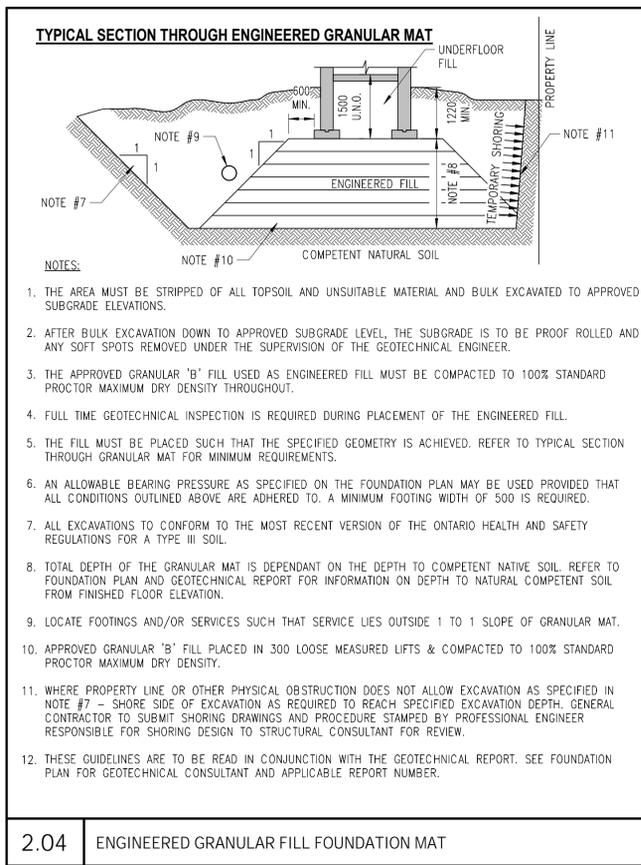
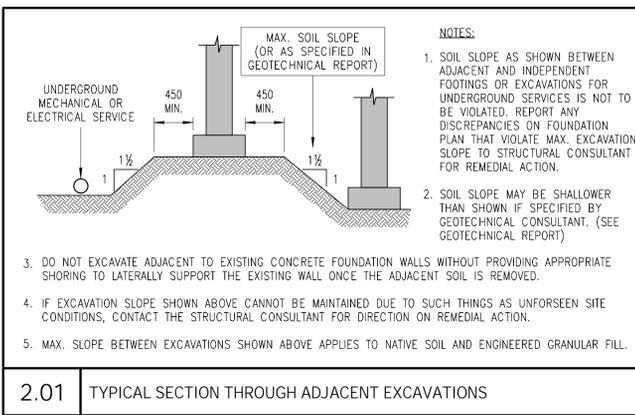
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**S4.6**

REV. #



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Niagara Falls, ON, L2E 6A3  
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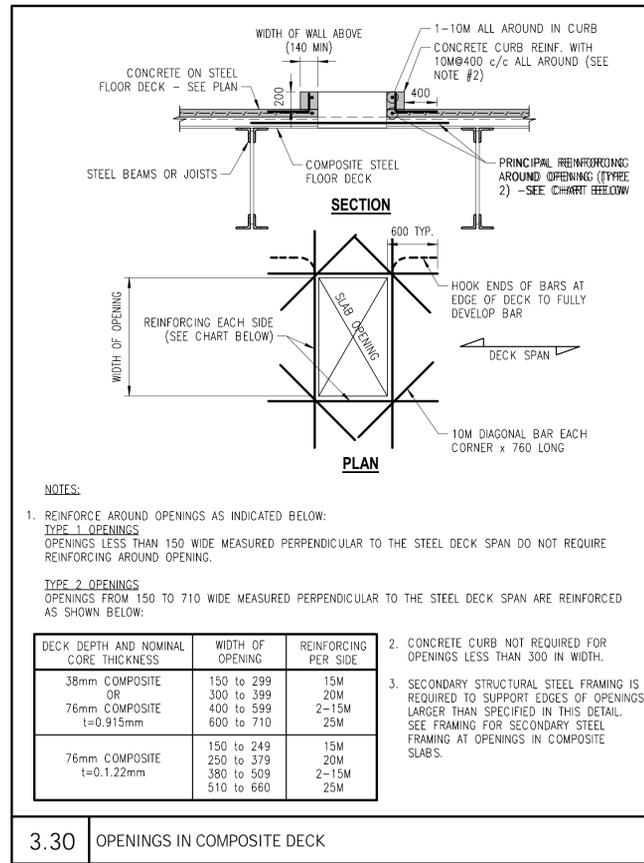
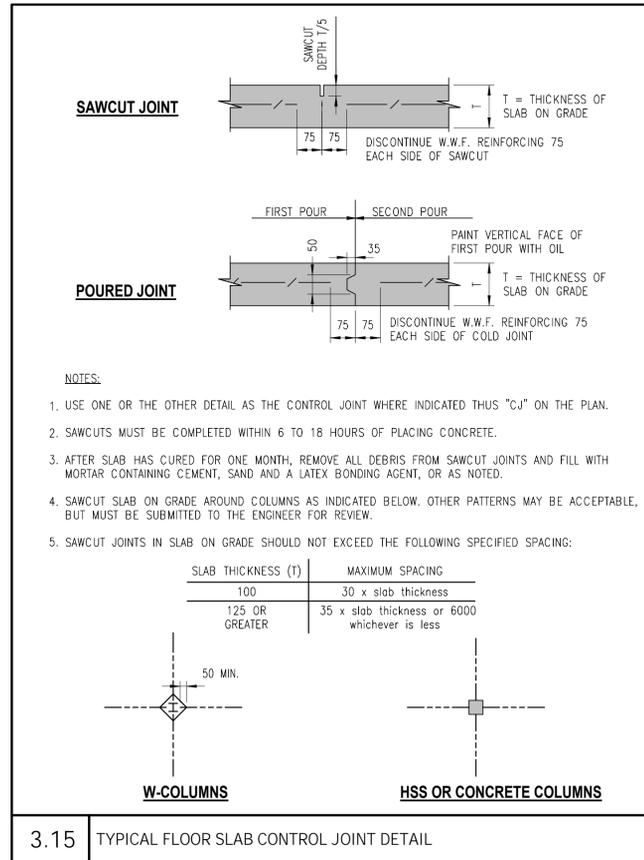
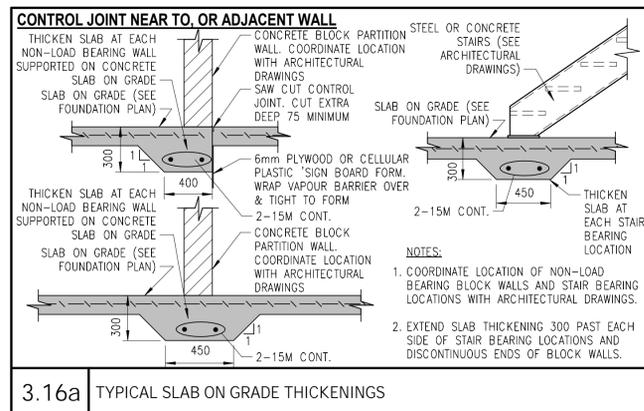
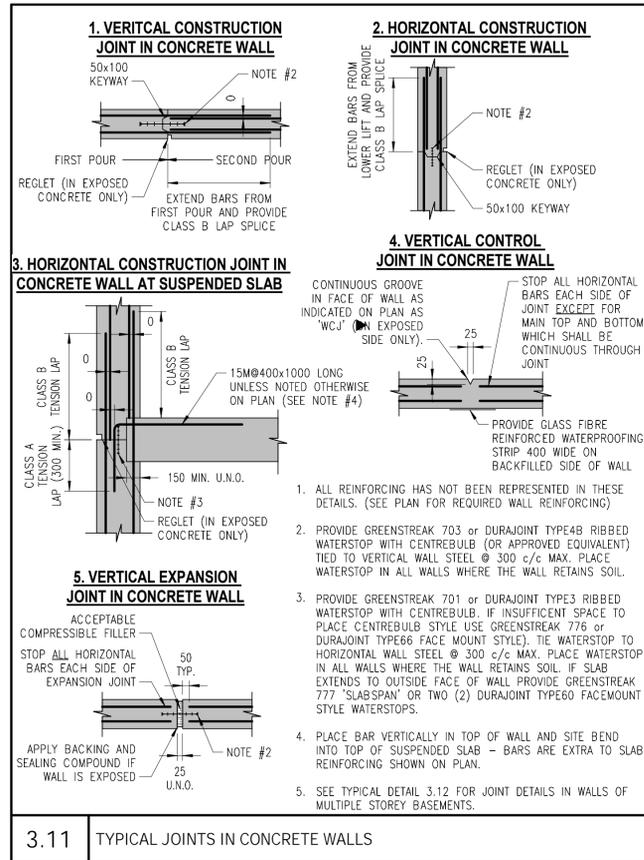
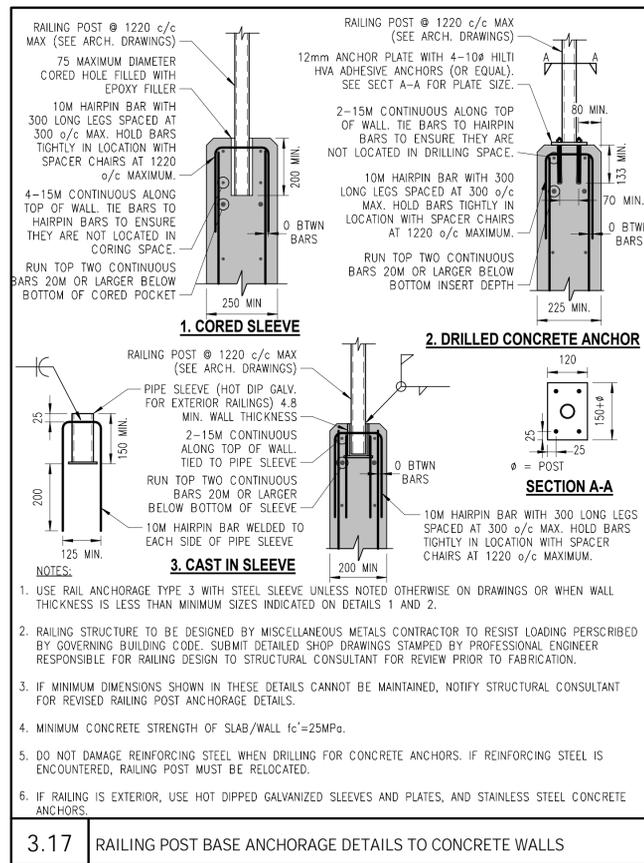
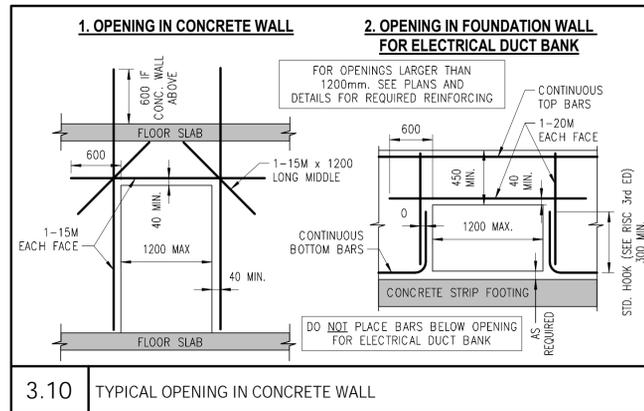
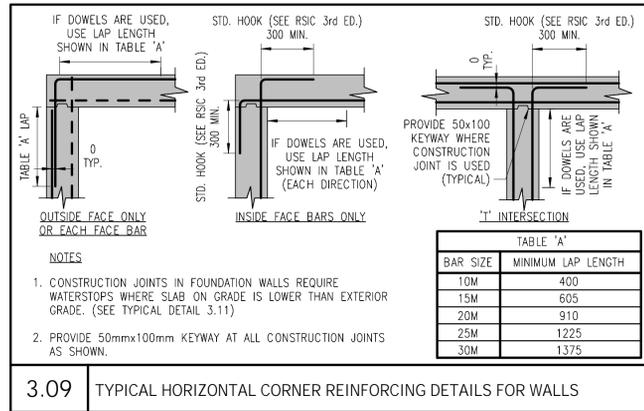
TYPICAL DETAILS

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**S5.1**

REV.#



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TYPICAL DETAILS

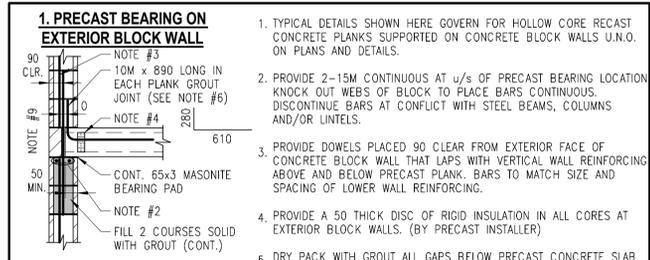
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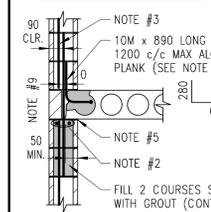
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**S5.2**

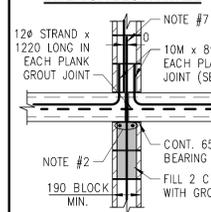
REV. #



**2. PRECAST PARALLEL TO EXTERIOR BLOCK WALL**

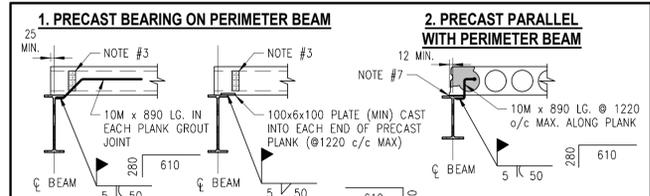


**3. PRECAST BEARING ON INTERIOR BLOCK WALL**

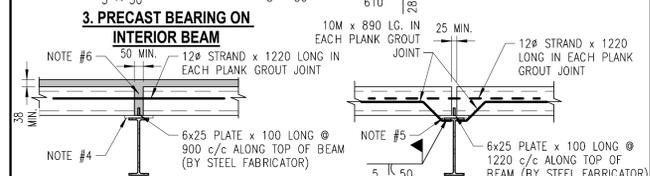
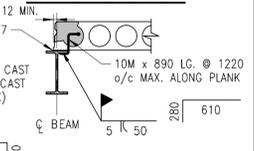


- TYPICAL DETAILS SHOWN HERE GOVERN FOR HOLLOW CORE RECAST CONCRETE PLANKS SUPPORTED ON CONCRETE BLOCK WALLS U.N.O. ON PLANS AND DETAILS.
- PROVIDE 2-15M CONTINUOUS AT u/s OF PRECAST BEARING LOCATION KNOCK OUT WEBS OF BLOCK TO PLACE BARS CONTINUOUS. DISCONTINUE BARS AT CONFLICT WITH STEEL BEAMS, COLUMNS AND/OR LINTELS.
- PROVIDE DOWELS PLACED 90 CLEAR FROM EXTERIOR FACE OF CONCRETE BLOCK WALL THAT LAPS WITH VERTICAL WALL REINFORCING ABOVE AND BELOW PRECAST PLANK. BARS TO MATCH SIZE AND SPACING OF LOWER WALL REINFORCING.
- PROVIDE A 50 THICK DISC OF RIGID INSULATION IN ALL CORES AT EXTERIOR BLOCK WALLS. (BY PRECAST INSTALLER)
- DRY PACK WITH GROUT ALL GAPS BELOW PRECAST CONCRETE SLAB PRIOR TO PLACING CONCRETE BLOCK WALL ABOVE. (BY MASONRY CONTRACTOR)
- IF THERE IS NOT A LOAD BEARING CONCRETE BLOCK WALL ABOVE, THE 10M DOWEL IS TO BE DRILLED AND EPOXY ANCHORED INTO GROUT FILLED CONCRETE BLOCK BELOW. THIS WORK IS TO BE COMPLETED BY THE PRECAST CONCRETE INSTALLATION CONTRACTOR. 10M DOWELS ARE TO BE DRILLED AND EPOXY ANCHORED TO BLOCK BELOW AT ALL PRECAST ROOF LOCATIONS. DO NOT PLACE VERTICAL LEG OF DOWEL INTO CONCRETE BLOCK PARAPET ABOVE.
- VERTICAL WALL REINFORCING IS TO BE LOCATED AT THE CENTRE OF THE CONCRETE BLOCK WALL. EXTEND BARS FROM LOWER LIFT TO LAF WITH BARS IN UPPER LIFT.
- REFER TO DETAIL #4 BELOW. CAMBER OF PRECAST SLAB RUNNING PARALLEL TO CONCRETE BLOCK WALL IS TO HAVE CAMBER AT TIME OF INSTALLATION LIMITED TO 12mm MAXIMUM.
- USE DETAIL #1 AND #2 AT INTERIOR WHERE BLOCK WALL IS EXPOSED ON SIDE NOT SUPPORTING PRECAST FLOOR PLANK.

**3.31** HOLLOW CORE PRECAST FLOOR PLANKS SUPPORTED ON CONCRETE BLOCK WALLS OR CAST-IN-PLACE CONCRETE (CONCRETE BLOCK WALLS SHOWN, CAST-IN-PLACE CONCRETE SIMILAR)

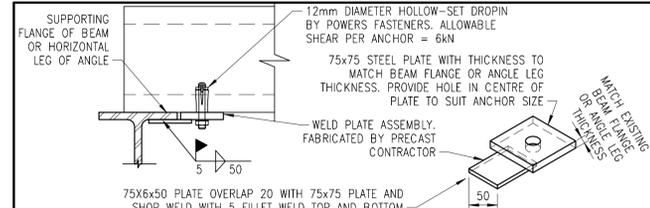


**2. PRECAST PARALLEL WITH PERIMETER BEAM**



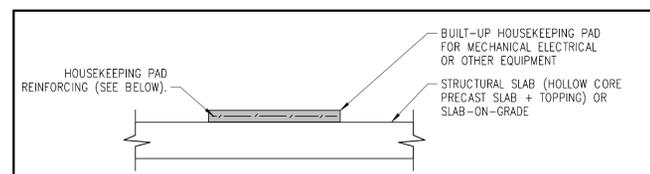
**3.32** HOLLOW CORE PRECAST FLOOR PLANKS SUPPORTED ON STEEL BEAMS

- TYPICAL DETAILS SHOWN HERE GOVERN FOR HOLLOW CORE PRECAST CONCRETE PLANKS SUPPORTED ON STRUCTURAL STEEL BEAMS U.N.O. ON PLANS AND DETAILS.
- REFER TO DETAIL #1 ABOVE AND TYP DETAIL 3.32b. ANY CONNECTION DETAIL SHOWN (WELDED REBAR IN GROUT JOINT, WELD PLATE CAST INTO u/s OF PLANK OR POST INSTALLED PLATE WITH 10M WELDED BARS) IS ACCEPTABLE. PRECAST DESIGN ENGINEER TO ENSURE THAT CONNECTION DETAIL USED IS ABLE TO SAFELY TRANSMIT DIAPHRAGM LOADS GIVEN ON EACH FRAMING PLAN.
- PROVIDE A 50 THICK DISC OF RIGID INSULATION IN CORES AT EXTERIOR WALLS. (BY PRECAST INSTALLER)
- IF BEAM FLANGE WIDTH IS 190 OR LESS, PROVIDE 205 WIDE x 6 THICK CONTINUOUS PLATE WELDED TO TOP FLANGE OF STEEL BEAM TO PROVIDE ADEQUATE BEARING SUPPORT FOR PRECAST PLANKS.
- IF BEAM FLANGE WIDTH IS 165 OR LESS, PROVIDE 180 WIDE x 6 THICK CONTINUOUS PLATE WELDED TO TOP FLANGE OF STEEL BEAM TO PROVIDE ADEQUATE BEARING SUPPORT FOR PRECAST PLANKS.
- CONCRETE FINISHER TO ENSURE THAT CONCRETE COMPLETELY FILLS GAP BETWEEN ENDS OF PRECAST FLOOR PLANKS WHEN PLACING CONCRETE TOPPING.
- DRY PACK WITH GROUT ALL GAPS BELOW PRECAST CONCRETE SLAB. (BY GENERAL CONTRACTOR)
- ALL FIELD WELDS SHOWN ABOVE TO BE COMPLETED BY PRECAST PLANK ERECTION CONTRACTOR.



- ALSO REFER TO TYPICAL DETAIL 3.32. THIS DETAIL IS PROVIDED AS AN ALTERNATE TO PROVIDING CAST IN STEEL PLATES. THIS ALTERNATE IS MEANT TO BE USED IN CONJUNCTION WITH 10M REBARS WELDED TO UNDERSIDE OF BEAM FLANGE OR ANGLE LEG. (IE 10M BARS ARE TO BE PLACED AT JOINTS BETWEEN PRECAST PLANKS AT 1200 O.C. IN ADDITION TO ABOVE DETAILED PLATE ASSEMBLIES TO TRANSFER HORIZONTAL DECK SHEARS.) SUPPLY AND INSTALLATION OF THESE SHEAR PLATES COMPLETE WITH WELDING IS BY THE PRECAST PLANK SUPPLIER AND ERECTOR.
- REFER TO PLANS FOR SHEAR LOADS TO BE TRANSFERRED FROM PRECAST PLANK TO STRUCTURAL STEEL SHAPE. TO DETERMINE NUMBER OF PLATES REQUIRED DIVIDE THE TOTAL SHEAR LOAD TO BE TRANSFERRED TO LATERAL RESISTING ELEMENT BY 6 kN AND ROUND UP BY ONE PLATE. DISTRIBUTE PLATES EQUALLY ALONG LENGTH OF STRUCTURAL STEEL MEMBER.

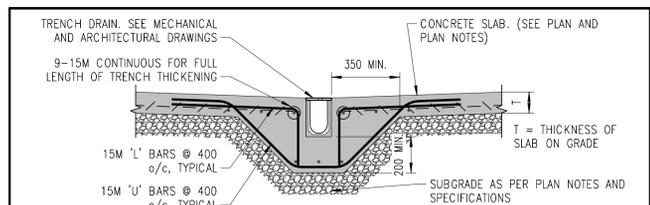
**3.32b** ALTERNATE SHEAR PLATE CONNECTION BETWEEN HOLLOW CORE PRECAST PLANKS AND STRUCTURAL STEEL SUPPORTS



- NOTES:
- CONSULT WITH MECHANICAL DRAWINGS FOR SIZE AND LOCATIONS OF ALL REQUIRED HOUSEKEEPING PADS.
  - PROVIDE REINFORCEMENT IN HOUSEKEEPING PADS AS FOLLOWS:

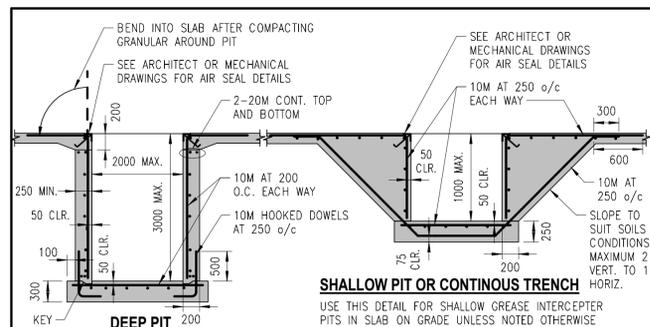
PAD THICKNESS "t" (mm)	REINFORCEMENT
100	152x152 MW18.7xMW18.7 WWF ONE LAYER
150	10M @ 300 MIDDLE EACH WAY

**3.33** EQUIPMENT HOUSEKEEPING PADS

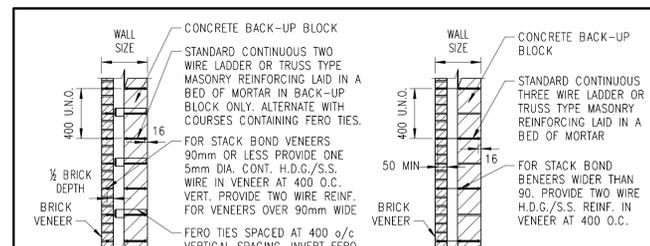


- NOTES:
- SAW-CUT PERIMETER OF THE SLAB TO BE DEMOLISHED AND REMOVED (IF APPLICABLE).
  - REMOVE CONCRETE AND FILL FOR THE INSTALLATION OF THE MECHANICAL SERVICES.
  - INSTALL MECHANICAL SERVICES AND BACKFILL WITH GRANULAR 'A' COMPACTED TO A MINIMUM OF 98% SPMD OR HIGHER AS DIRECTED BY THE SOILS REPORT.
  - PLACE CONCRETE, WITH PROPERTIES SPECIFIED IN THE CONCRETE SPECIFICATIONS.
  - ALLOW CONCRETE TO CURE PRIOR TO LOADING THE CONCRETE SLAB. (REFER TO CONCRETE SPECIFICATIONS)

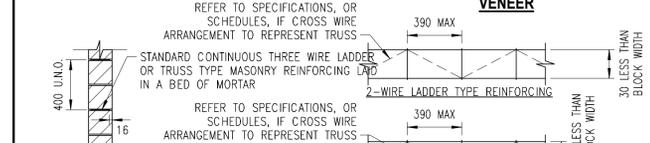
**3.37b** TYPICAL SLAB ON GRADE PREFABRICATED TRENCH DRAIN REINFORCING



**3.42** TYPICAL PIT AND TRENCH DETAILS



**2. EXTERIOR VENEER WALL WITH LADDER TYPE REINF. TYING BRICK VENEER**



**3. SINGLE WYTHE EXTERIOR OR INTERIOR WALLS**

- AT MULTI WYTHE WALLS WITH MASONRY VENEER USE DETAIL 1 ABOVE UNLESS SPECIFICALLY NOTED OTHERWISE.
- DETAIL #2 TO BE USED ONLY IF VENEER WYTHE COURSES WITH BACK-UP BLOCK. SUBMIT DETAILED BRICK/BLOCK COURSING SHOP DRAWINGS FOR REVIEW BEFORE STARTING BLOCK WALL CONSTRUCTION.
- ALL HORIZONTAL REINFORCING TO HAVE MINIMUM CORROSION PROTECTION CONSISTING OF HOT DIPPED GALVANIZING AFTER FABRICATION TO A.S.T.M. A-153-B2 STANDARD. REFER TO SPECIFICATIONS IF STAINLESS STEEL REQUIRED.
- UNLESS NOTED OTHERWISE MASONRY REINFORCING SHALL BE 9 GAUGE 2-WIRE CONTINUOUS LADDER TYPE. (REFER TO LOAD BRG WALL SCHEDULE AND TYPICAL DETAILS FOR MINIMUM WIRE SIZES AND IF TRUSS TYPE WIRE REINFORCING IS REQUIRED IN SEISMIC ZONES.)
- THE OVERALL WIDTH OF THE MASONRY REINFORCING SHALL BE APPROX. 65 LESS THAN THE THICKNESS OF THE WALL. THE CROSS WIRES SHOULD NOT HAVE A DIP.
- LAP THE REINFORCING 200 AT SPLICES (300 FOR PLAIN WIRE).
- USE PREFABRICATED CORNERS AND TEES IN ALL MASONRY WALL CORNERS AND INTERSECTIONS.
- PROVIDE EXTRA LAYERS OF MASONRY REINF. IN FIRST COURSE ABOVE AND BELOW ALL BLOCK OPENINGS.

**4.02** TYPICAL CONTINUOUS HORIZONTAL REINFORCING IN ALL MASONRY WALLS

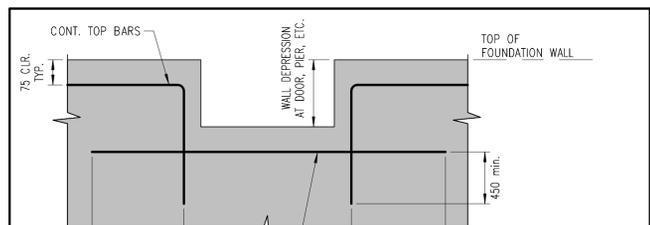


TABLE 'A'

BAR SIZE	MINIMUM LAP LENGTH
10M	400
15M	605
20M	910
25M	1225
30M	1375

**3.39** TYPICAL LAP DETAIL FOR CONTINUOUS TOP REBAR AT PIER AND DOOR DEPRESSIONS IN WALLS

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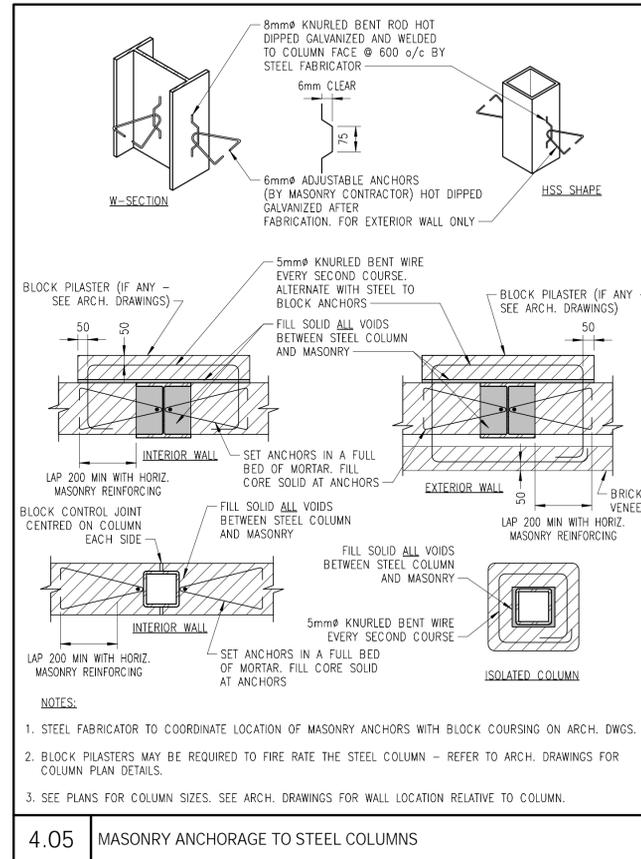
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PROJECT NO.: 24175  
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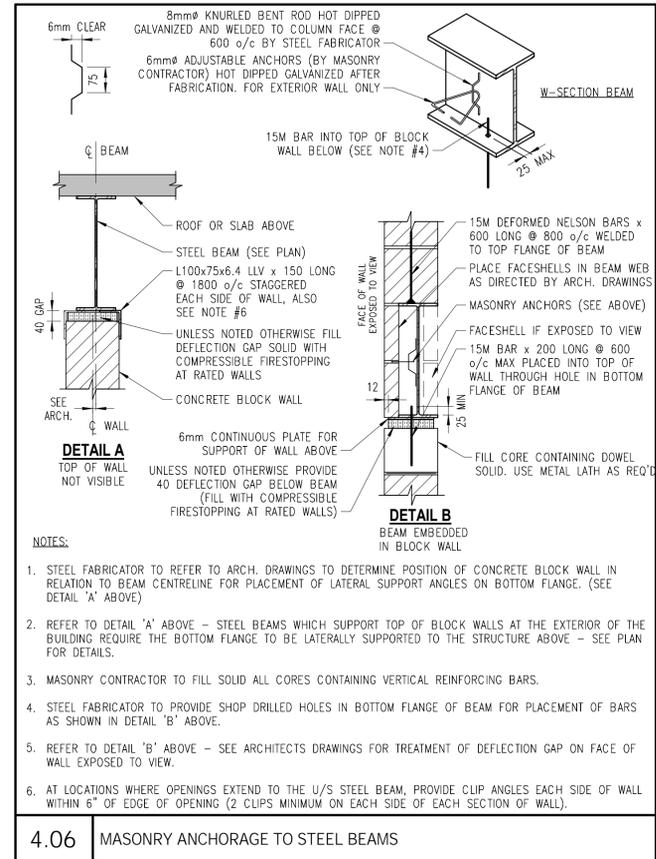
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**S5.3**

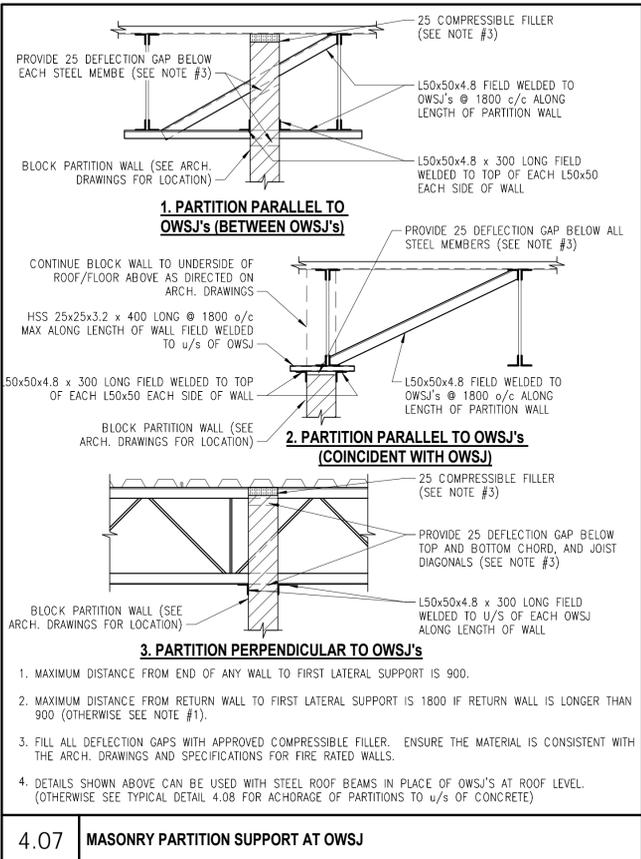
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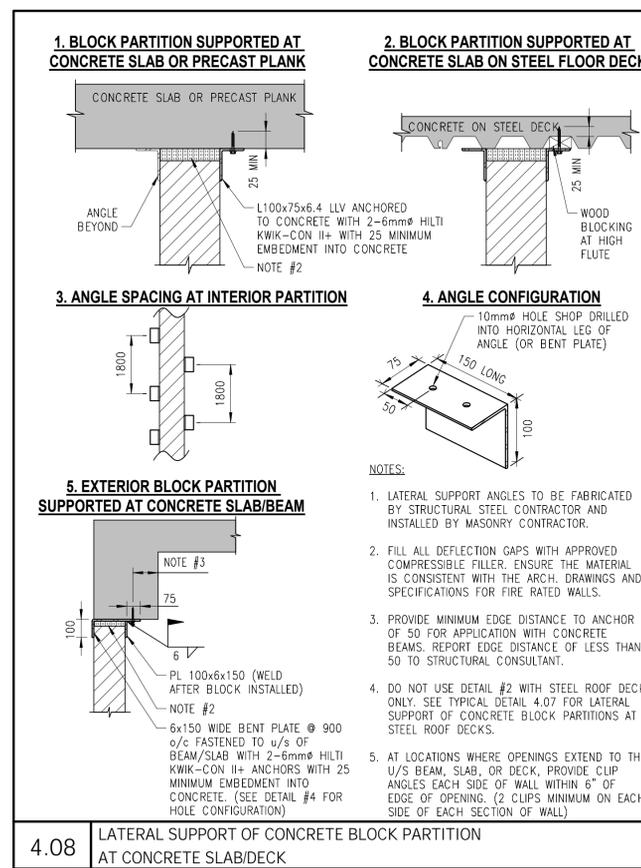
4.05 MASONRY ANCHORAGE TO STEEL COLUMNS



4.06 MASONRY ANCHORAGE TO STEEL BEAMS



4.07 MASONRY PARTITION SUPPORT AT OWSJ

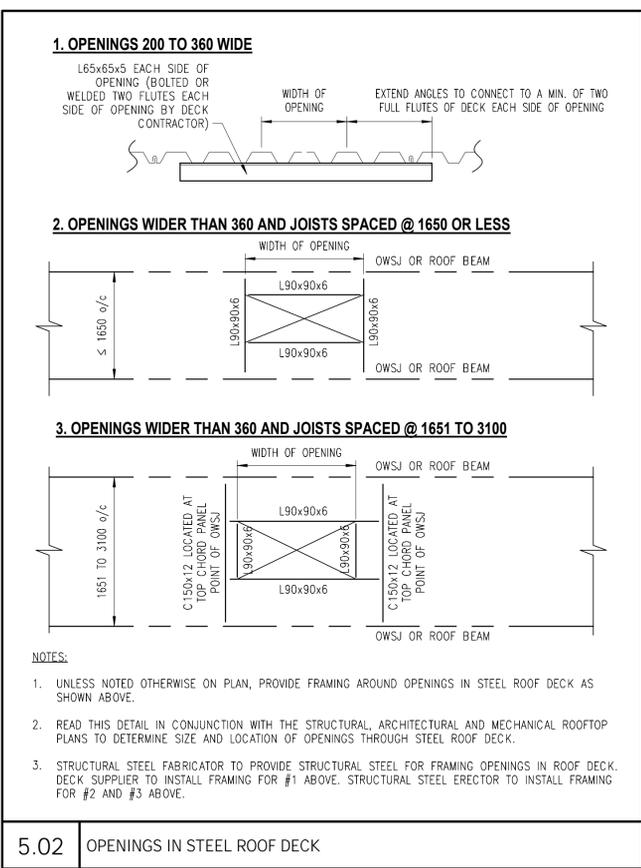


4.08 LATERAL SUPPORT OF CONCRETE BLOCK PARTITION AT CONCRETE SLAB/DECK

WALL THICKNESS	CLEAR SPAN OF ROUGH MASONRY OPENING				DETAIL
	UP TO 1220	1221 to 1800	1801 to 2360	2361 to 3050	
90 BLOCK 90 VENEER	L90x90x6	L100x90x8	L125x90x8	L125x90x10	LLV
140 BLOCK	2-L65x65x6	2-L90x65x6	2-L90x65x8	2-L90x65x10	65 LEGS HORIZ.
190 BLOCK	2-L90x75x6	2-L90x90x6	2-L100x90x8	2-L125x90x10	90 LEGS HORIZ.
240 BLOCK	L100x75x6 + L125x75x6	L100x100x6 + L125x75x6	L100x100x8 + L125x90x8	L150x100x8 + L125x125x8	100 AND 125 LEGS HORIZ.
290 BLOCK	3-L90x75x6	3-L90x90x6	3-L100x90x8	3-L125x90x10	90 LEGS HORIZ.

5.01 STRUCTURAL STEEL LINTELS FOR NON-LOAD BEARING CONCRETE BLOCK WALLS AND BRICK VENEER



5.02 OPENINGS IN STEEL ROOF DECK

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VanBoxmeer Stranges Antonio  
STRUCTURAL ENGINEERS

4082 Portage Rd., Unit 1  
Niagara Falls, ON, L2E 6A3  
T | 905-357-2030  
W | www.vbands.com  
E | al@vbands.com

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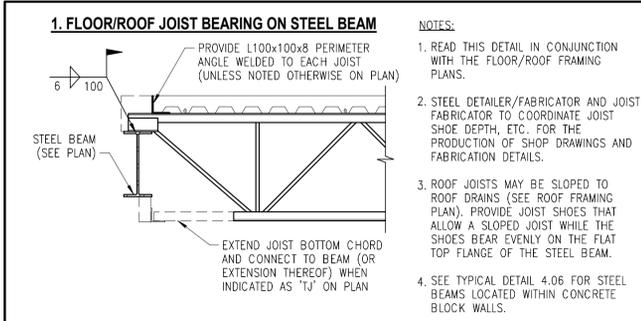
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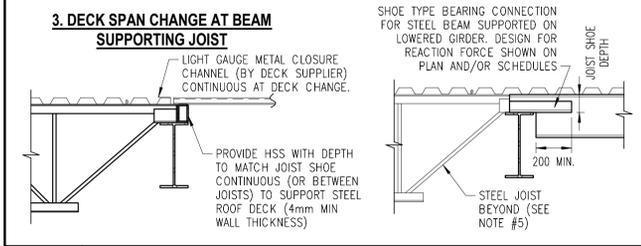
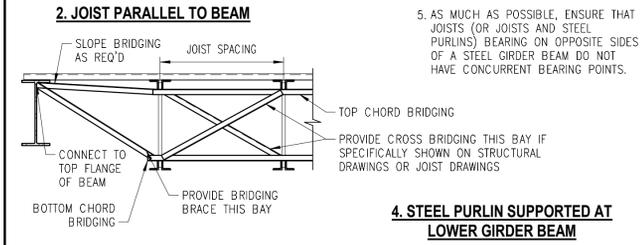
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**S5.4**

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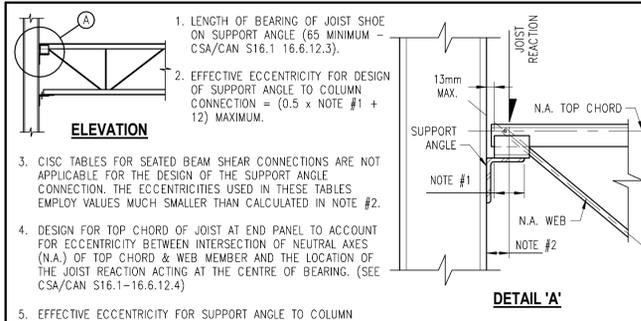


- NOTES:**
1. READ THIS DETAIL IN CONJUNCTION WITH THE FLOOR/ROOF FRAMING PLANS.
  2. STEEL DETAILER/FABRICATOR AND JOIST FABRICATOR TO COORDINATE JOIST SHOE DEPTH, ETC. FOR THE PRODUCTION OF SHOP DRAWINGS AND FABRICATION DETAILS.
  3. ROOF JOISTS MAY BE SLOPED TO ROOF DRAINS (SEE ROOF FRAMING PLAN). PROVIDE JOIST SHOES THAT ALLOW A SLOPED JOIST WHILE THE SHOES BEAR EVENLY ON THE FLAT TOP FLANGE OF THE STEEL BEAM.
  4. SEE TYPICAL DETAIL 4.06 FOR STEEL BEAMS LOCATED WITHIN CONCRETE BLOCK WALLS.
  5. AS MUCH AS POSSIBLE, ENSURE THAT JOISTS (OR JOISTS AND STEEL PURLINS) BEARING ON OPPOSITE SIDES OF A STEEL GIRDER BEAM DO NOT HAVE CONCURRENT BEARING POINTS.



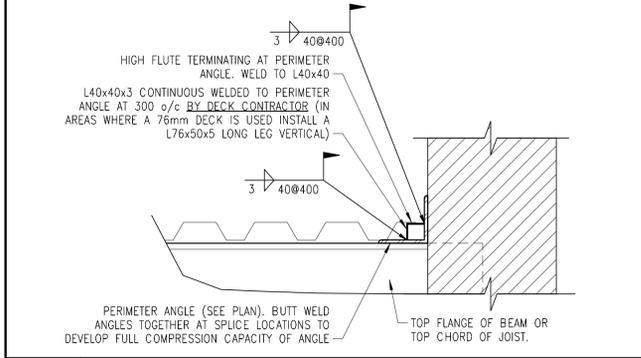
- 4. STEEL PURLIN SUPPORTED AT LOWER GIRDER BEAM**
- SHOE TYPE BEARING CONNECTION FOR STEEL BEAM SUPPORTED ON LOWERED GIRDER. DESIGN FOR REACTION FORCE SHOWN ON PLAN AND/OR SCHEDULES.

5.05 STEEL JOISTS SUPPORTED ON STEEL BEAMS

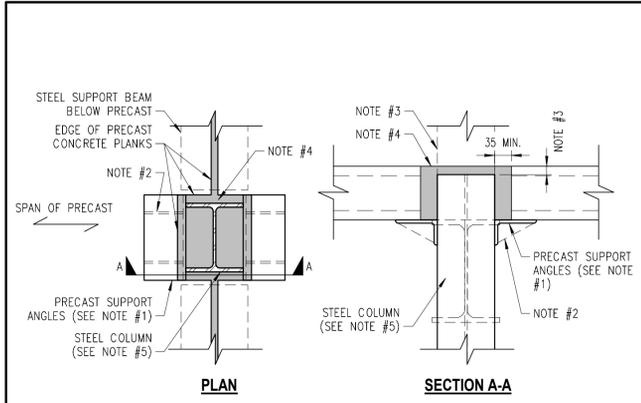


- NOTES:**
1. LENGTH OF BEARING OF JOIST SHOE ON SUPPORT ANGLE (65 MINIMUM - CSA/CAN S16.1 16.6.12.3).
  2. EFFECTIVE ECCENTRICITY FOR DESIGN OF SUPPORT ANGLE TO COLUMN CONNECTION =  $(0.5 \times \text{NOTE #1} + 12)$  MAXIMUM.
  3. CISC TABLES FOR SEATED BEAM SHEAR CONNECTIONS ARE NOT APPLICABLE FOR THE DESIGN OF THE SUPPORT ANGLE CONNECTION. THE ECCENTRICITIES USED IN THESE TABLES EMPLOY VALUES MUCH SMALLER THAN CALCULATED IN NOTE #2.
  4. DESIGN FOR TOP CHORD OF JOIST AT END PANEL TO ACCOUNT FOR ECCENTRICITY BETWEEN INTERSECTION OF NEUTRAL AXES (N.A.) OF TOP CHORD & WEB MEMBER AND THE LOCATION OF THE JOIST REACTION ACTING AT THE CENTRE OF BEARING. (SEE CSA/CAN S16.1-16.6.12.4)
  5. EFFECTIVE ECCENTRICITY FOR SUPPORT ANGLE TO COLUMN CONNECTION IS NOT TO BE EXCEEDED AS SPECIFIED IN NOTE #2. STRUCTURAL CONSULTANT MUST BE NOTIFIED IF THIS DIMENSION CANNOT BE MAINTAINED.

5.06 OPEN WEB STEEL JOIST SUPPORTED AT STEEL COLUMN

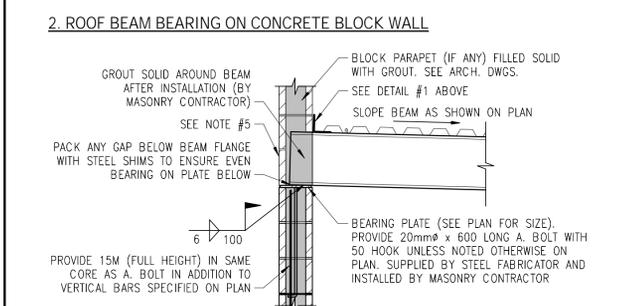
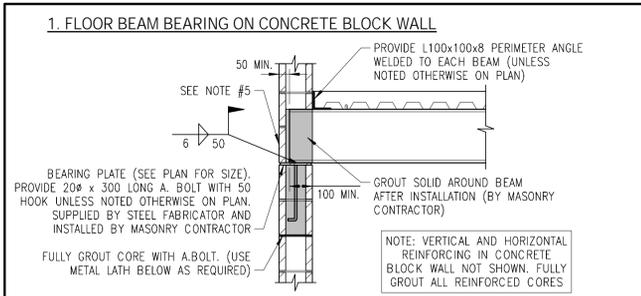


5.07 TYPICAL DECK CLOSURE DETAIL WHERE HIGH FLUTE DOES NOT CLOSE WITH PERIMETER ANGLE



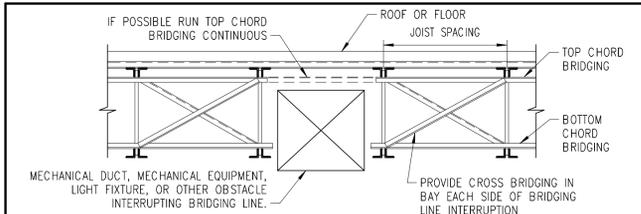
5.10 SUPPORT OF PRECAST CONCRETE PLANKS AT STEEL COLUMNS

- NOTES:**
1. WHERE PRECAST CONCRETE FLOOR/ROOF PLANK SPAN(S) TERMINATE AT A STEEL COLUMN, PROVIDE L152x89x8.0 LH STEEL SUPPORT ANGLES WELDED TO FACE OF COLUMN AS SHOWN. NOTE THAT ANGLE MAY BE REQUIRED ONLY ON ONE SIDE OF COLUMN. SEE FRAMING PLANS TO DETERMINE NUMBER OF ANGLES REQUIRED AT EACH STEEL COLUMN.
  2. IF LENGTH OF PRECAST PLANK BEING SUPPORTED IS 9000mm OR GREATER, ADD 6.4mm STIFFENERS AT 1/3 SPAN OF STEEL ANGLE. SEE FRAMING PLAN TO DETERMINE LENGTH OF PRECAST CONCRETE PLANK BEING SUPPORTED BY ANGLE.
  3. IF CONCRETE COLUMN TERMINATES AT LEVEL OF PRECAST CONCRETE FLOOR/ROOF SLABS TO BE SUPPORTED, EXTEND COLUMN ABOVE UNDERSIDE OF PRECAST PLANKS TO WITHIN 30mm OF TOP OF PRECAST ELEVATION. NOTE THAT PRECAST CONCRETE SLAB FABRICATOR MUST NOTCH AROUND COLUMN REGARDLESS OF WHETHER COLUMN CONTINUES ABOVE PRECAST.
  4. IF NOT CONCRETE TOPPING PRESENT, PRECAST CONCRETE PLANK ERECTOR TO FULLY GROUT AROUND STEEL COLUMN AS SHOWN. PROVIDE FORMWORK AT UNDERSIDE OF PRECAST AS REQUIRED TO SUPPORT WET GROUT AROUND COLUMN. IF CONCRETE TOPPING IS PRESENT, CONCRETE FORMING CONTRACTOR TO ENSURE THAT COLUMN IS FULLY SURROUNDED BY CONCRETE AS SHOWN.
  5. W-SECTION COLUMN SHOWN - TYPICAL DETAIL IS SIMILAR FOR HSS COLUMN SECTIONS.



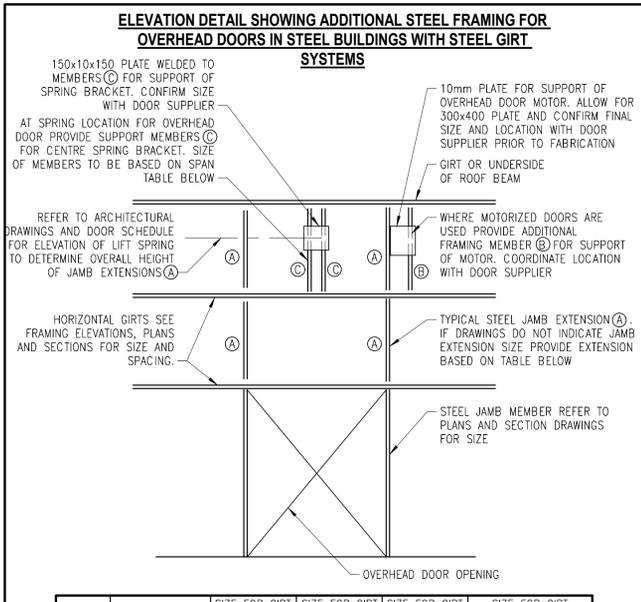
1. READ THIS DETAIL IN CONJUNCTION WITH FLOOR AND ROOF FRAMING PLANS AND ANY BEARING PLATE SCHEDULES.
2. ROOF BEAM IS CLASSIFIED AS ANY BEAM SUBJECTED TO WIND UPLIFT LOADS.
3. 15M REINFORCING BAR SHOWN IN WALL OF DETAIL #2 IS IN ADDITION TO THE VERTICAL WALL REINFORCING INDICATED ON PLAN. GENERAL CONTRACTOR TO LAYOUT LOCATION OF ALL BEARING PLATES FOR MASONRY CONTRACTOR FOR CORRECT PLACEMENT OF THIS EXTRA 15M BAR.
4. MASONRY CONTRACTOR TO SET ALL BEAM BASEPLATES LEVEL IN A BED OF MORTAR. FILL CORES BELOW BEARING PLATE SOLID AS SHOWN IN DETAILS.
5. SEE ARCHITECTURAL DETAILS TO DETERMINE IF FACE OF WALL IS EXPOSED. IF EXPOSED, USE FACESHELLS AS REQUIRED AT BEAM POCKET TO MAINTAIN COURSING AND FULL BLOCK PLACEMENT.

5.11 STEEL BEAMS SUPPORTED ON CONCRETE BLOCK WALLS



- NOTES:**
1. READ THIS DETAIL IN CONJUNCTION WITH THE FLOOR/ROOF FRAMING PLANS.
  2. STEEL JOIST CONTRACTOR TO REVIEW MECHANICAL AND ELECTRICAL DRAWINGS TO DETERMINE LOCATIONS WHERE BOTTOM CHORD HORIZONTAL BRIDGING WILL BE INTERRUPTED BY LIGHTS, DUCTS, OR OTHER EQUIPMENT.
  3. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR DISTRIBUTION OF JOIST SHOP DRAWINGS TO MECHANICAL AND ELECTRICAL TRADES FOR CONFIRMATION ON LOCATIONS WHERE LIGHTS, DUCTS, OR OTHER EQUIPMENT INTERRUPT BRIDGING LINES.

5.13 DUCT OR OTHER MECH. OR ELECT. CONFLICT WITH JOIST BRIDGING



MEMBER MARK	MEMBER NAME	SIZE FOR GIRT SPACING UP TO 1500	SIZE FOR GIRT SPACING UP TO 2400	SIZE FOR GIRT SPACING UP TO 4000	SIZE FOR GIRT SPACING UP TO 7000
(A)	JAMB EXTENSION	L100x100x6	C150x12	C200x17	HSS 203x102x4.78
(B)	MOTOR SUPPORT	L100x100x6	C150x12	C200x17	HSS 203x102x4.78
(C)	SPRING SUPPORT	L100x100x6	C150x12	C200x17	HSS 203x102x4.78

- NOTES:**
1. AT LOCATIONS WHERE MEMBERS (A), (B), AND (C), ARE CONNECTED TO UNDERSIDE OF ROOF BEAM PROVIDE VERTICALLY SLOTTED CONNECTION.
  2. REFER TO ARCHITECTURAL DRAWINGS AND ELECTRICAL DRAWINGS TO DETERMINE IF OVERHEAD DOORS ARE POWER OPERATED AND REQUIRE MOTOR SUPPORT FRAMING MEMBER (C).

5.14 STEEL FRAMING FOR OVERHEAD DOOR HARDWARE

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